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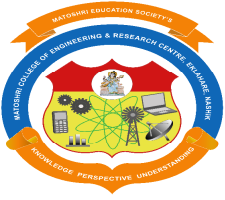
Vision

"To Establish Omnipotent Learning Centre Meeting the Standards to Evolve as a Lighthouse for the Society."

Mission

- Setting up state-of-the-art infrastructure
- Instilling strong ethical practices and values
- Empowering through quality technical education
- Tuning the faculty to modern technology and establishing strong liaison with industry
- Developing the institute as a prominent center for Research and Development
- Establishing the institute to serve a Lighthouse for the society

Quality Statement

"We, Matoshri College of Engineering & Research Center are committed to practice a system of Quality Assurance that inculcates quality culture, aiming at quality initiation, sustenance and enhancement of quality comprehensively ultimately leading the institute as Center of Excellence."

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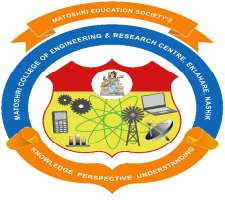## Indian Plumbing Premier league (IPPL)   Sakshi Khare, B.E. Civil

Indian plumbing association had organized a IPPL (Indian plumbing professional league 2020) on vertual platform. This program is started from 26 September 2020. In the IPPL session are connected on zoom meeting appEvery Saturday had done session and Sunday it's repeated that session. There are 6 sessions are arranged IPPL various topics are covered in it. They teaching about the plumbing have put how important it is.

  Water supply and distribution, pumping and hydro – pneumatic system, fixtures/fittings/valves and appurtenances, hot water system,WTP and STP ,water efficient plumbing products India code , storm water drainage, rainwater harvesting terminologies, codes and standards, sanitary drainage system, indirect Wast and challenges in execution such a topics are covered in the sessions also such a great staff are allotted to conduct sessions like . managing director , executive director, director , chief executive, plumbing consultant, owner, engineering creation public health consultant , plumbing engineers , chairman and managing director are guided us .

     Indian plumbing association giving to opportunity students , engineers, Architecture, consultant, contractors, to participate in IPPL (Indian plumbing professional league). after the every session arranged the quiz competition it's 5 winner are announced in next session. they winners are connected during the training session that prize is cash reward of Rs 5000/- an excellent opportunity to learn Do's and Don't of plumbing technology this league are helding in every year. Now in covide 19 situation also the gives an opportunity to learn online platform. They provided the various codesand A guide to good plumbing practice-AGGPP. A unique creation of the IPA technical committee. Available in various languages English, Hindi, Marathi, Bangla, Gujarati, Malayalam and Kannada.

"Planning and Operations of Multi-Objective River and Reservoir Systems"   Mrs. S. V. Pawar

Climate variability and change affect the occurrence of extreme hydrological events. Extreme weather and climate events pose serious threats to water and environmental resources management in many regions of the world. River basins are influenced by multiple factors that affect ecological and socio-hydrological systems. These systems operate on different spatial and temporal scales, often with high dynamics. Successful planning and operations of river and reservoir systems require an integrative understanding of coupled human and natural systems for generating scientifically sound, economically-efficient and socially-acceptable and sustainable solutions. To overcome the significant challenges in the planning and operations of multi-objective river and reservoir systems, cutting-edge knowledge, innovative approaches and an in-depth understanding of the inherent scientific, economic,

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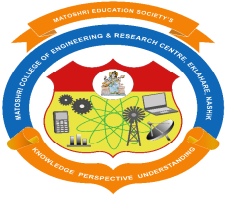# Matoshri College of Engineering and Research Centre, Nashik
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social and environmental issues is imperative. This Special Issue of Water provides the platform for researchers and practitioners to contribute the wide knowledge and best practices for strengthening the management of our precious water resources and to present the advances in water resources systems analysis, planning and management for water resource allocation, conflict resolution, water governance, and sustainable development in a changing world. Papers in the Special Issue will highlight research that addresses processes and innovative concepts and methodologies, strategies, tools, big data application and empirical studies and/or case studies that are relevant to planning and operations of multi-objective river and reservoir systems.

Water distinguishes our planet compared to all the others we know about. While the global supply of available freshwater is more than adequate to meet all current and foreseeable water demands, its spatial and temporal distributions are not. There are many regions where our freshwater resources are inadequate to meet domestic, economic development and environmental needs. In such regions, the lack of adequate clean water to meet human drinking water and sanitation needs is indeed a constraint on human health and productivity and hence on economic development as well as on the maintenance of a clean environment and healthy ecosystems. All of us involved in research must find ways to remove these constraints. We face multiple challenges in doing that, especially given a changing and uncertain future climate, and a rapidly growing population that is driving increased social and economic development, globalization, and urbanization. How best to meet these challenges requires research in all aspects of water management. Since 1965, the journal Water Resources Research has played an important role in reporting and disseminating current research related to managing the quantity and quality and cost of this resource. This paper identifies the issues facing water managers today and future research needed to better inform those who strive to create a more sustainable and desirable future.

Water management is the activity of planning, developing, distributing and optimum use of water resources under defined water polices and regulations. It includes: (1) management of water treatment of drinking water, industrial water, sewage or waste water; (2) management of water resources; (3) management of flood protection; (4) management of irrigation; (5) management of the water table. In an ideal world, water management planning has regard, to all the competing demands for water and seeks to allocate water on an equitable basis to satisfy all uses and demands. This is rarely possible in practice. Successful management of any resources requires accurate knowledge of the resource available, the uses to which it may be put, the competing demands for the resource, measures to and processes to evaluate the significance and worth of competing demands and mechanisms to translate policy decisions into actions on the ground. For water as a resource, this is particularly difficult since sources of water can cross many national boundaries and the uses of water include many that are difficult to assign financial value to and may also be difficult to manage in conventional terms.

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Examples include rare species or ecosystems or the very long-term value of ancient ground water reserves.
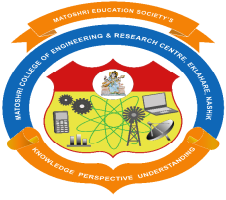
Air Pollution biggest threat to life on Earth	Mr. N. B. Aher

Air pollution is the contamination of the air, irrespective of indoors or outside. It occurs when any harmful gases, dust, smoke enter the atmosphere and makes it difficult for plants, animals and humans to survive. Air pollution can further be classified into visible and invisible air pollution.

Primarily air pollutants can be caused by primary source or secondary resources. The pollutants that are a direct result of the process can be called primary pollutants. A classic example of a primary pollutant is sulfur dioxide emitted from factories. The secondary pollutants are caused by the intermingling and reaction of primary pollutants. The smog created by interactions of several primary pollutants is known to be as, a secondary pollutants. Sulfur dioxide emitted from the combustion of fossil fuels like coal, petroleum and other factory combustibles are one of the major causes of air pollution. The pollution emitting from vehicles including trucks, jeeps, cars, trains, airplanes cause an immense amount of pollution. We rely on them to fulfill our daily needs of transportation. But their overuse is killing our environment as dangerous gases are polluting the environment. carbon monoxide caused by improper or incomplete combustion and generally emitted from vehicles is another major pollutant along with nitrogen oxides, that is produced from both natural and manmade process. Ammonia is a very common bi-product from agricultural related activities and one of the most hazardous gases in the atmosphere. Use of insecticides, pesticides and fertilizers in agricultural activities has grown quite a lot. They emit harmful chemicals into the air and can also cause water pollution.

Manufacturing companies release a large amount of carbon monoxide, hydrocarbons, organic compounds and chemicals into the air, thereby depleting the quality of air. Manufacturing industries can be found at every corner of the earth and there is no area that has not been affected by it. Petroleum refineries also release hydrocarbons and various other chemicals that pollute the air and also cause land pollution. During mining, dust and chemicals are released in the air causing massive air pollution. This is one of the reasons which is responsible for the deteriorating health conditions of workers and nearby residents. The effects of air pollution are alarming. They are known to create several respiratory and heart conditions, along with various cancers. Among other dangers, several millions are known to have died due to direct or indirect effects of air pollution. Children in areas exposed to air pollutants are said to commonly suffer from pneumonia and asthma. Another direct effect is the global warming. With increasing temperatures worldwide, increase in sea levels and melting of ice and icebergs, displacements and loss of habitat have already signaled an impending disaster if actions for preservation and normalization are not undertaken soon.Harmful gases like nitrogen oxides and sulfur oxides are released into the atmosphere during the burning of fossil fuels.

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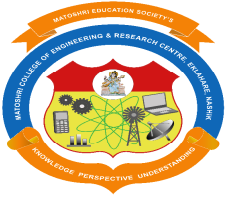
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When it rains, the water droplets combines with these air pollutants become acidic and fall in the form of acid rain. Acid rain can cause great damage to humans, animals and crops.

Eutrophication is a condition where a large amount of nitrogen present in some pollutants triggers abundant growth of algae on the surface of the sea, lakes and ponds adversely affecting fish, plants and animal species. The algae are present due to the presence of chemicals. Like humans, animals also face some devastating effect of air pollution. Toxic chemicals present in the air can force birds and animal species to migrate to a new place and change their habitat. The toxic pollutants deposited over the surface of the water and can also affect sea animals.Ozone exists in the earth's stratosphere and is responsible for protecting humans from harmful Ultraviolet (UV) rays. Earth's ozone layer is depleting due to the presence of chlorofluorocarbons, hydro chlorofluorocarbons. As the ozone layer depletes, it will emit harmful rays back to the earth and can cause skin and eye related problems. The UV rays are also affecting crops badly.

Air pollution can be reduced by encouraging people to use more and more public modes of public transportation to reduce pollution. Also, try to make use of car pooling to save energy and money. Switch off fans and lights while going out. Understand the concept of reduce, reuse and recycle. Do not throw away items that are of no use. In-fact reuse them for some other purpose, e.g old jars can be used to store cereals or pulses. Clean energy technologies like solar, wind and geothermal are on a globally high demand these days. Governments across the world are providing grants to consumers interested in installing solar panels for their homes. This will go a long way to curb air pollution. Compact florescent lights consume less electricity as against their counterparts. They live longer, consume less electricity, lower electricity bills and also help in to reduce pollution by consuming less energy. Planting more trees can be helpful in providing a clean and pure air to breathe in.

Several attempts are being made worldwide on personal, industrial and governmental levels to reduce the air pollution. Pakistan Navy, in line with the Government of Pakistan's vision of 'Clean and Green Pakistan' launched a Tree Plantation campaign which includes planting of mangroves along the coastal belt of Sindh and Balochistan and pine on Margalla Hills. It will serve as an impetus to not only reduce global warming as well as air pollution. Moreover, a series of innovations and experiments aimed at alternate and non-conventional options to reduce pollutants must be put to use at a larger scale to make the impact felt. Air pollution is one of the larger mirrors of man's follies, and a challenge, we need to overcome to see a bright tomorrow.

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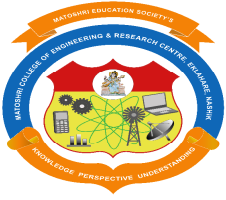## Ground water in India   Mrs. M. S. Aher

Ground water is the water that seeps through rocks and soil and is stored below the ground. The rocks in which ground water is stored are called aquifers. Aquifers are typically made up of gravel, sand, sandstone or limestone. Water moves through these rocks because they have large connected spaces that make them permeable. The area where water fills the aquifer is called the saturated zone. The depth from the surface at which ground water is found is called the water table.

As of April 2015, the water resource potential or annual water availability of the country in terms of natural runoff (flow) in rivers is about 1,869 Billion Cubic Meter (BCM)/year.2 However, the usable water resources of the country have been estimated as 1,123 BCM/year. This is due to constraints of topography and uneven distribution of the resource in various river basins, which makes it difficult to extract the entire available 1,869 BCM/year. Out of the 1,123 BCM/year, the share of surface water and ground water is 690 BCM/year and 433 BCM/year respectively. Setting aside 35 BCM for natural discharge , the net annual ground water availability for the entire country is 398 BCM.3 The overall contribution of rainfall to the country's annual ground water resource is 68% and the share of other resources, such as canal seepage, return flow from irrigation, recharge from tanks, ponds and water conservation structures taken together is 32%.4 Due to the increasing population in the country, the national per capita annual availability of water has reduced from 1,816 cubic metre in 2001 to 1,544 cubic metre in 2011.2 This is a reduction of 15%.The level of ground water development is very high in the states of Delhi, Haryana, Punjab and Rajasthan, where ground water development is more than 100%. This implies that in these states, the annual ground water consumption is more than annual ground water recharge. In the states of Himachal Pradesh, Tamil Nadu and Uttar Pradesh and the Union Territory of Puducherry, the level of ground water development is 70% and above. In rest of the states, the level of ground water development is below 70%. Over the years, usage of ground water has increased in areas where the resource was readily available

Ground water extraction and use

Experts believe that India is fast moving towards a crisis of ground water overuse and contamination. Ground water overuse or overexploitation is defined as a situation in which, over a period of time, average extraction rate from aquifers is greater than the average recharge rate. In India, the availability of surface water is greater than ground water. However, owing to the decentralized availability of groundwater, it is easily accessible and forms the largest share of India's agriculture and drinking water supply. 89% of ground water extracted is used in the irrigation sector, making it the highest category user in the country. This is followed by ground water for domestic use which is 9% of the extracted groundwater. Industrial use of ground water is 2%. 50% of urban water requirements and 85% of rural domestic water requirements are also fulfilled by ground water.

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Irrigation through ground water

The largest component of ground water use is the water extracted for irrigation. The main means of irrigation in the country are canals, tanks and wells, including tube-wells. Of all these sources, ground water constitutes the largest share. Wells, including dug wells, shallow tube-wells and deep tube wells provide about 61.6% of water for irrigation, followed by canals with 24.5%. Over the years, there has been a decrease in surface water use and a continuous increase in ground water utilization for irrigation. The share of tube wells has increased exponentially, indicating the increased usage of ground water for irrigation by farmers. The dependence of irrigation on ground water increased with the onset of the Green Revolution, which depended on intensive use of inputs such as water and fertilizers to boost farm production. Incentives such as credit for irrigation equipment and subsidies for electricity supply have further worsened the situation. Low power tariffs have led to excessive water usage, leading to a sharp fall in water tables.
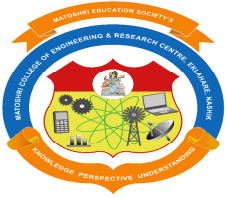
Ground water contamination

Ground water contamination is the presence of certain pollutants in ground water that are in excess of the limits prescribed for drinking water. The commonly observed contaminants include arsenic, fluoride, nitrate and iron, which are geogenic in nature. Other contaminants include bacteria, phosphates and heavy metals which are a result of human activities including domestic sewage, agricultural practices and industrial effluents. The sources of contamination include pollution by landfills, septic tanks, leaky underground gas tanks, and from overuse of fertilizers and pesticides. It has been pointed out that nearly 60% of all districts in the country have issues related to either availability of ground water, or quality of ground water, or both.

The Committee on Estimates 2014-15 that reviewed the occurrence of high arsenic content in ground water observed that 68 districts in 10 states are affected by high arsenic contamination in groundwater. These states are Haryana, Punjab, Uttar Pradesh, Bihar, Jharkhand, Chhattisgarh, West Bengal, Assam, Manipur and Karnataka.

Local management of ground water

The phenomena of local water users successfully managing their water resources has been observed in only a few areas. The Planning Commission recommended that local planners take the following steps while planning for ground water management:

- Determining the relationship between surface hydrological units such as watershed or river basins, and hydrological units below the ground such as aquifers, Identification of ground water recharge areas,
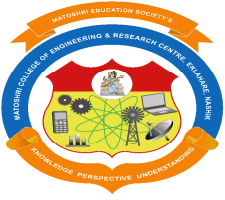- Maintaining ground water balance at the level of the village or the watershed, and

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Fog Water as an alternative and Sustainable Water Resource for countries like Peru and Chile   **Puja Pansare. T.E. Civil**

Forests in arid areas of the world "milk" the fog cloud. "Tiny water particles condense on the needles and leaves." And so he is imitating this process using plastic nets four meters high and ten meters wide. Wind drives the moist fog into the nets where it condenses on the mesh and is "fished" out of the gloom, collected at the lower edge of the net, and then guided through a drainage system."At the right spot we can collect 5 liters of water per square meter. That means 200 liters per day per fog collector,". That is not enough to supply an entire desert region such as the coast of the Atacama Desert in northern Chile and Peru, but it could be a simple, cheap alternative to tankers transporting water from the valleys. In this arid region, the cold Humboldt current in the Pacific Ocean is responsible for a coastal fog which creeps up the sides of the Andes mountains to a height of 600 to 800 meters.The warm, humid continental air which drifts out to sea is cooled by the cold sea water and condenses. The fog lies like a blanket over the coastal areas and hampers any exchange with warmer air above.This actually prevents clouds from forming and so there is no rain. The result is the formation of deserts further inland. Aside from the Atacama, the Namib Desert in West Africa is another example of this phenomenon.

Where fog is present on an average of 200 days a year, a small amount of vegetation can establish it self hanks to the fog. For the villagers in the foothills of the Andes and other similar areas the phenomenon means potential access to running water.In 1987, the Chilean village Chungungo was the first settlement in the mountains to profit from the "Camanchaca", as the locals call their coastal fog. Dozens of fog collectors provided up to 40 liters of drinking water for the 330 residents, supplementing the existing water supply, much of which was trucked in.Since then three other projects have been implemented in Chile and Peru. In the meantime, the concept has also reached remote regions in Africa, Asia and the Caribbean. The system depends on the clouds, but only if the local people know how to organize themselves to maintain the fog-catching nets will it be sustainable. In that sense the nets could revolutionize traditional social structures, benefitting girls and women in particular.

In Africa, for example, fetching water is women's work, and often requires girls and women to walk many kilometers to get to the water source, often through harsh terrain and even war zones. Traditionally referred to as the "guardians of water" these girls and women have neither the time for education nor the chance for greater equality. The fog nets could change all that. Robert Schemenauer knows just how much the nets can change people's lives. For more than 20 years the Canadian cloud physicist has loved nothing more than to breathe foggy air.With the help of a non-governmental organization FogQuest he has installed fog nets in arid regions of 13 countries. His current projects are in Chile, Ethiopia, Eritrea, Nepal and Morocco."We are always going to need some way to solve water problems for rural villages, isolated villages, and clusters of remote homes," he said an

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interview for the International Development Research Centre in Canada. "That's how the fog collector projects got started, by trying to solve water problems that couldn't be solved any other way."In most industrialized countries the farming of water from fog is a non-issue. However, some regions like the southern tip of Spain are already fighting droughts and water scarcity.Scientists have got their eyes on European outposts in the Atlantic. It may be worth milking the fog on the islands of Tenerife or Lanzarote.

The Technology behind Face Unlocking in Smartphones   *Dr. Swati Bhavsar*

Visualizations That Really Works

Not long ago, the ability to create smart data visualizations, or dataviz, was a nice-to-have skill. For the most part, it benefited design- and data-minded managers who made a deliberate decision to invest in acquiring it. That's changed. Now visual communication is a must-have skill for all managers, because more and more often, it's the only way to make sense of the work they do.

Data is the primary force behind this shift. Decision making increasingly relies on data, which comes at us with such overwhelming velocity, and in such volume, that we can't comprehend it without some layer of abstraction, such as a visual one. A typical example: At Boeing the managers of the Osprey program need to improve the efficiency of the aircraft's takeoffs and landings. But each time the Osprey gets off the ground or touches back down, its sensors create a terabyte of data. Ten takeoffs and landings produce as much data as is held in the Library of Congress. Without visualization, detecting the inefficiencies hidden in the patterns and anomalies of that data would be an impossible slog.But even information that's not statistical demands visual expression. Complex systems—business process workflows, for example, or the way customers move through a store—are hard to understand, much less fix, if you can't first see them.Thanks to the internet and a growing number of affordable tools, translating information into visuals is now easy (and cheap) for everyone, regardless of data skills or design skills. This is largely a positive development. One drawback, though, is that it reinforces the impulse to "click and viz" without first thinking about your purpose and goals. Convenient is a tempting replacement for good, but it will lead to charts that are merely adequate or, worse, ineffective. Automatically converting spreadsheet cells into a chart only visualizes pieces of a spreadsheet; it doesn't capture an idea. As the presentation expert Nancy Duarte puts it, "Don't project the idea that you're showing a chart. Project the idea that you're showing a reflection of human activity, of things people did to make a line go up and down. It's not 'Here are our Q3 financial results,' it's 'Here's where we missed our targets.Managers who want to get better at making charts often start by learning rules. When should I use a bar chart? How many colors are too

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many? Where should the key go? Do I have to start my y-axis at zero? Visual grammar is important and useful—but knowing it doesn't guarantee that you'll make good charts. To start with chart-making rules is to forgo strategy for execution; it's to pack for a trip without knowing where you're going. Your visual communication will prove far more successful if you begin by acknowledging that it is not a lone action but, rather, several activities, each of which requires distinct types of planning, resources, and skills. The typology I offer here was created as a reaction to my making the very mistake I just described: The book from which this article is adapted started out as something like a rule book. But after exploring the history of visualization, the exciting state of visualization research, and smart ideas from experts and pioneers, I reconsidered the project. We didn't need another rule book; we needed a way to think about the increasingly crucial discipline of visual communication as a whole. The typology described in this article is simple. By answering just two questions, you can set yourself up to succeed.

The Two Questions

To start thinking visually, consider the nature and purpose of your visualization:

Is the information conceptual or data-driven?

Am I declaring something or exploring something?

If you know the answers to these questions, you can plan what resources and tools you'll need and begin to discern what type of visualization will help you achieve your goals most effectively.

The first question is the simpler of the two, and the answer is usually obvious. Either you're visualizing qualitative information or you're plotting quantitative information: ideas or statistics. But notice that the question is about the information itself, not the forms you might ultimately use to show it. For example, the classic Gartner Hype Cycle uses a traditionally data-driven form—a line chart— but no actual data. It's a concept.

Hype Cycle for Emerging Technologies
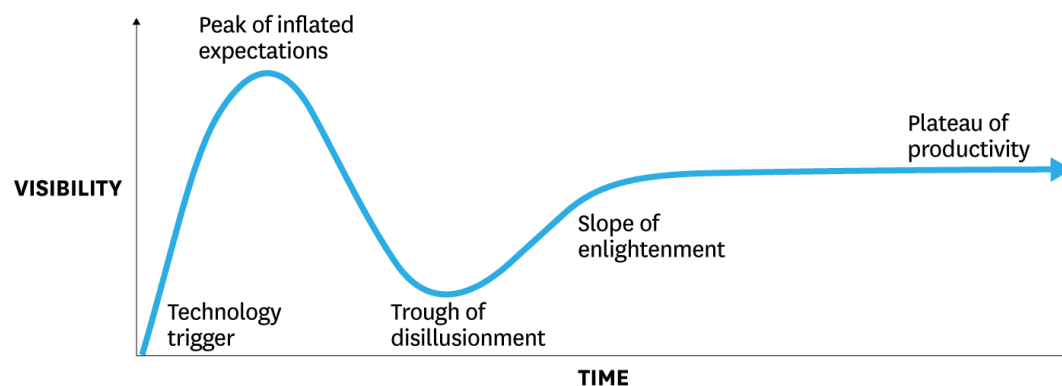
If the first question identifies what you have, the second elicits what you're doing: either communicating information (declarative) or trying to figure something out (exploratory).

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Managers most often work with declarative visualizations, which make a statement, usually to an audience in a formal setting. If you have a spreadsheet workbook full of sales data and you're using it to show quarterly sales in a presentation, your purpose is declarative.

But let's say your boss wants to understand why the sales team's performance has lagged lately. You suspect that seasonal cycles have caused the dip, but you're not sure. Now your purpose is exploratory, and you'll use the same data to create visuals that will confirm or refute your hypothesis. The audience is usually yourself or a small team. If your hypothesis is confirmed, you may well show your boss a declarative visualization, saying, "Here's what's happening to sales."

Exploratory visualizations are actually of two kinds. In the example above, you were testing a hypothesis. But suppose you don't have an idea about why performance is lagging—you don't know what you're looking for. You want to mine your workbook to see what patterns, trends, and anomalies emerge. What will you see, for example, when you measure sales performance in relation to the size of the region a salesperson manages? What happens if you compare seasonal trends in various geographies? How does weather affect sales? Such data brainstorming can deliver fresh insights. Big strategic questions—Why are revenues falling? Where can we find efficiencies? How do customers interact with us?—can benefit from a discovery-focused exploratory visualization.

Beacon Technology   Ms. Pranjali Jadhav

What Is Beacon Technology?

Beacons are small, wireless transmitters that use low-energy Bluetooth technology to send signals to other smart devices nearby. They are one of the latest developments in location technology and proximity marketing. Put simply, they connect and transmit information to smart devices making location-based searching and interaction easier and more accurate.

How Do Beacons Work?

The beacon device itself is incredibly simple. Each device contains a CPU, radio, and batteries, and it works by repeatedly broadcasting out an identifier. This identifier is picked up by your device, usually a mobile, and marks out an important place in your environment.

The identifier is a unique ID number that your smartphone recognizes as unique to the beacon. Once connected, the beacon will carry out whatever function it has been programmed to perform. We will go into more detail later on some of the many functions beacon can carry out.

What Are the Benefits of Beacon Technology?

The technology itself has lots of applications and potential. Some functions were available when the beacons were first introduced, and some have become available as the technology has advanced.

1.   **Improved offline attribution with Google Ads :**

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By connecting the signals of your beacon to your Google Ads account, gain a lot of useful insight into your searcher's offline activity and may even help you track in store visits. This means that when you serve your Google search ads, you may be able to attribute the number of online users that walk into the store.

Businesses and marketers spend billions each year on their online advertising efforts; therefore, understanding your offline attribution is more important than ever. Traditionally, it has been a marketer's nightmare to understand how their online marketing efforts are linked to offline attribution. However, by tracking key interaction points of users that have clicked on your digital ads you can understand how effective your digital ads are at driving customers and sales to your store.

A typical example could go like this:

Step 1: User types in search terms "smart black shoes."

Step 2: Your Google search ad appears.

Step 3: User clicks on the search ad, browses the product, then closes their phone.

Step 4: This user decides they want to try the shoes on before buying, so they walk into your shop.

Step 5: When they enter the shop, their phone picks up an identifier from your shop's beacon.

Step 6: The beacon recognizes that this phone is the same one that clicked on your search ad and links this data with your Google Ads account as a "store visit."

And voila, by installing a beacon in your shop, you have dramatically improved your attribution modelling. By logging actual store visits from your search ads, this technology will help you understand the impact and effectiveness of your search ads. If you see they are driving lots of visits to your shop, you may want to invest more in search.
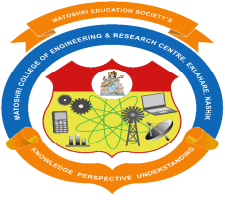
However, if you find very few users are following up their initial interest with a store visit, then you might not see a large enough ROI from your search ads. By gathering as much data as possible on your marketing activity, you can better understand what is working for you and what is not – and you can adapt your marketing strategy accordingly.

TL;DR: Beacons don't guarantee in store visit tracking, but can help improve measurement if there are already enough quality signals in place. We often struggle with clients who go out and buy a $200 beacon and then get frustrated that they still don't meet the criteria for tracking in store visits.

2.   Out-of-store marketing

This was initially the biggest selling point of beacon technology when beacons were released in 2013. Even though out-of-store marketing hasn't taken off as much as people had expected, it nevertheless has plenty of potential for the right businesses and for marketers willing to invest in it.

Any important information that you want your potential customers to know can be transmitted directly to any receptive devices that are within the range of your beacon. This could be a simple alert to notify the user that they are within range of your shop. Or, the alert could be something more complex, like sending messages related to discounts, loyalty programs, and competitions that you are

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running. The brands themselves can also push individual product discounts using your in-store beacons.

By using this location-based technology, you can personalize you're out-of-store marketing, helping you monetize any potential foot traffic. With mobiles now an integral part of everyday life, proximity marketing will only continue to grow. Therefore, implementing it effectively it will add another dimension to your digital strategy.

3. Advanced data gathering

The positional accuracy beacons can give you is up for debate, but it is clear that this Bluetooth technology is an improvement on other proximity technologies like GPS and WiFi. With this greater accuracy, you can gather more reliable information on how and where your customers are moving throughout your shop.You can use this data in tandem with your ecommerce stats to adapt and improve your product listings and in-store layout. If you are finding that the majority of your customers are spending their time browsing your homeware section at the back of your store, perhaps this area could be expanded or brought to the front. Ultimately this data could help you refine your customer journey, tailor future marketing campaigns and boost your in-store conversions.

4. Google My Business listing improvement

Installing a beacon in your business will also help your Google My Business listing. The beacon itself can track popular visiting times for your company improving the accuracy shown in the GMB listing. Through Google's Local Guides service you can garner more reviews for your business. The beacon will also help you gather more information on check-in and request users to upload photos of the venue.
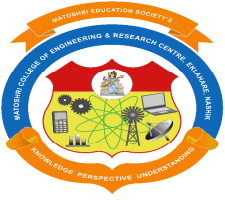
An up-to-date and detailed GMB listing is essential for local SEO. Therefore, using a beacon can help supercharge your data collection and ensure your **Google My Business** listing stands out from the rest.

5. Customer Benefits

We can see the benefits of beacon technology for the marketer are clear, but we can't forget about the consumers themselves. Beacons help improve the user experience by adding an additional layer of personalized interaction during the shopping experience. Targeted ads and offers from their favorite brands build trust, security, and familiarity. With consumers now having so much choice in the retail market both online and offline, building trust in your brand has never been more important. In a study by PWC this year, they found 35% of consumers ranked 'trust in brand' as among their top three reasons for purchasing in retail.

The Future of Beacons in Marketing

The possibilities of beacon technology in proximity marketing and location-based technology are numerous. As data gathering tools, beacons offer Google a chance to better understand businesses that use their services, as well as the users themselves, in order to improve their algorithm.

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The logistics and transportation industry is one of the main benefactors of improved location-based technology. Bluetooth low-energy beacons can be used for more accurate asset tracking, particularly indoors.

In addition to tracking objects themselves, beacons could be used to track people such as patients or doctors in hospitals during emergencies. The focus may have initially been on the retail industry, but as the technology matures, we can expect other sectors to follow in understanding how beacon technology can aid their day-to-day activities.

Data Science in Digital Marketing

Ms. Akanksha Shirode,TE Computer Engineering

Digital marketing data analytics and Digital Marketing are undoubtedly the buzzwords of job seekers across the world . One might imagine that the 2 are mutually exclusive – one for the mathematically inclined, and therefore the other for the creative minds. this is often the contemporary version of the unending "Arts vs Science" debate. If you're within the doldrums of trying to work out which path to settle on , or maybe if you would like to vary your style altogether – there's excellent news for you!

This is the longer term of selling as time pass and more and more people get on the web ,so you bought to upskill yourself with Digital Marketing Programs Digital marketing is all about creating the proper content and promote; Data Science is all about leveraging content. What happens once you combine the 2 forces? the simplest and most pragmatic method to answer this question is to require a glance at examples from the important world.

The best part about Digital Marketing and Data Analytics working in conjunction with one another is that they create a gorgeous , virtuous cycle content results etc. A marketing campaign collects data, the info is interpreted, better products are delivered, and more targeted marketing campaigns are created again, more data is collected, and therefore the show goes on!

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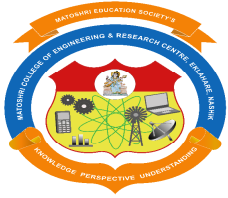| PAPER BATTERY	Ms. Pallavi Hon, SE Computer Engineering

ABSTRACT: Today the biggest problem faced by the electronics industry is the size of the battery as gadgets gets thinner and smaller day by day. But at certain point the battery size and its weight creates an obstacle. To overcome this '**Paper Battery'** present the ultimate solution. The paper battery is literally a conducting paper with a lot of power packed inside it. The various problems faced by the commonly used batteries and how the paper battery offers the solution to all these problems. A detailed construction of paper battery is explained in this paper. A comparison of SWCNT and MWCNT is also shown in this paper. This paper also contains the possible applications which could change our lives. The safety issues of Li-ion batteries, the limitations of NiCad & NiMH and the drawbacks of lead acid battery are discussed in this paper. The advantage of paper battery over these batteries is also described.

INTRODUCTION: There has been a growing demand for thinner and smaller electronic devices. To achieve those demands "Paper Battery" offers the best solution. Paper battery is actually a cellulose based „paper" with CNT deposited on either side of paper. A stack of such papers makes a paper battery. Some batteries use Silver Nano Wires instead of CNT. It is extremely thin, flexible, light weight and stores much power in less space. Recently developed paper battery combines the Li-ion based chemicals to make a combination of Li-ion and paper battery.

Figure-1 Paper Battery

Construction: Paper battery combines cellulose based paper with CNT the paper can act both high energy paper battery and super capacitor depending on the design. Cellulose is complex organic substance found in paper and pulp. CNT"s are main ingredients of paper battery. CNT's where discovered by Japanese scientist name Iijima in 1991. They are now considered as top-class subject in academic researches and industrial areas CNT"s are allotropes is carbon made of graphite and have be constructed in cylindrical tubes with Nano meter scale in diameter and several millimetres in length. Carbon nanotubes (CNTs) consist exclusively of carbon atoms arranged in a series of condensed benzene rings rolled up into a tubular structure. This novel artificial nanomaterial belongs to the

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family of fullerenes, the third allotropic form of carbon along with graphite and diamond which are both natural sp2 (planar) and sp3 (cubic) forms, respectively.

WORKING: A conventional battery or Rechargeable battery contains a number of separate components that produce electrons through a chemical reaction between the metal and the electrolyte of the battery. The Paper battery works when the paper is dipped in the ion-based liquid solution; next a chemical reaction occurs between the electrodes and liquid. The electrons move from the cathode to anode to generate electricity. The paper electrode stores energy while recharging within 10 seconds because the ions flow through the thin electrode quickly. Figure 4 shows the working of a paper battery. The best method to increase the output of the battery is to stack different paper batteries one over the other.

Advantages:
• Non-toxic, biodegradable
• Eco friendly, biocompatible
• Easy to recycle
• Durable: shelf life of three years
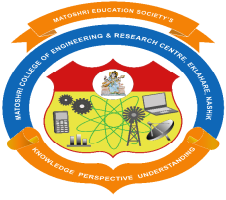• Works during extreme conditions -75°C to 150 °C

Disadvantages:
• Low shear strength can be torn easily
• CNT production technique is expensive
• Nano-toxic for CNT manufacturing workers
• Can cause fibrosis in lungs

Application:
• RFID tags and other tracking
• Smart Newspapers
• Credit/Debit cards
• Greeting card with audio, light
• Hybrid cards
• Laptops, smartphones.
• Aircraft and spacecraft.

CONCLUSION: After analysis of paper battery, we can conclude that the major component of paper battery is CNT. The CNT manufacturing techniques are inefficient which obviously increases the cost, making the paper battery expensive. If the cost is kept economical the batteries will revolutionize the electronics industry. Further research is needed in Nano toxicology to make CNT"s non-hazardous for our health. The use of lithium as an electrode in paper battery can solve most of the

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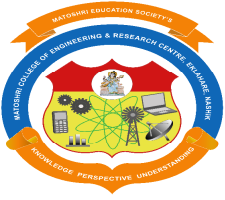
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safety issues of Li-ion batteries. With paper batteries we can predict a whole a new world of possibilities and endless applications which will one day change our daily lives.

Data Science in Indian Agriculture

Avinash Korde SE Computer Engineering

"India has enough food, does it have too many people's to work in agriculture?" Whenever I read this question, it forced me to think about future of our Indian Agriculture. Agriculture is the backbone of the Indian economy, but currently it required more support than any other. Agriculture in India lacks institutional attention, support from banks in terms of loans and other welfare schemes, and suffer from different environmental challenges. Now we are living in 21'st century where each and every one is surrounded by different new technologies. Today's trending technologies are Cloud Computing, Data Science, Big Data, The Internet of Things and many more. We can use these technologies in approx each and every field which can change the way individuals communicate, learn, and think. Technology plays an important role in society today. We can easily use these technologies in field of Agriculture as well, we can call it as Smart Farming. It makes use of technologies like the Internet of Things, Cloud Computing, Machine Learning and Big Data to enable farmers to have more insights on the consequences of their actions and take a much better and informed decision on farming practices. We can use multiple sensors and resources to retrieve and analyze the data instantly ex. Weed patches, Fungal or insect infestation, Nutrient, Soil Moisture, Humidity, Temperature, Rainfall and many other information. The Internet of Things, where devices are capable of communicating with each other and deliver real-time updates and notifications to farmers on crop statuses, water levels, moisture content, crop yield, and more. Large scale farmers and those in the industrial countries are using modern technology for automation in their farms. They have turned their farms into a factory; and have automated every process possible with a heavy amount of computing. With the movement of the world towards digital agriculture, a lot of investment has been poured into it. Numerous research and development are going on to maximize the efficiency of farms. Incorporating new technology will escalate the yields of both small- and large-scale farms. Source: https://www.analyticsvidhya.com & https://medium.com

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MULTI-PLATFORM DEVELOPMENT

Ms. Bharti Nikale,TE Computer Engineering

Intro to Cross-Platform App Development

Whether your company is creating a mobile application for the app stores or for use internally, you are often faced with the challenge of needing to develop it for multiple platforms. Typically, this means targeting both iOS and Android devices.
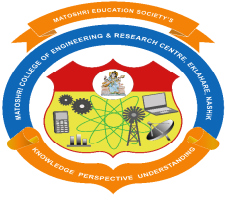
Unlike the early days of the "smartphone" era where many developers only targeted a single platform, market research today shows that the U.S. consumer market is about 47 percent Apple and 52 percent Android. As a key decision-maker or developer, how do you solve the problem of creating your mobile application for both of these platforms?

For some, their company has the budget and resources to have two development teams, each programming in the native environments for the platform. While developing in each platform's native tooling does give you the advantage of being closer to the platform, it comes with a cost.

Yes, there's the actual cost of hiring native developers from a smaller pool of talent, but, more importantly: Neither code base you're building with is sharable. Whatever code the iOS team develops, cannot be reused by the Android team and vice-versa. You now have two separate code bases in existence, which must be individually maintained. So, if there is a change to the business logic or design that runs within your app, your company now must update and test both code bases for this change.

Analyzing the Structure of Your App

Now, step back for a moment and look at the core structure of your app. What is it made of at a component level?A header, that contains a title, some action buttons. Probably a list of a few actionable items like form elements and buttons, and maybe a tab bar or a side menu for navigation controls. At the core, fairly stock and common user interface components.Take another moment and inventory of some the most used apps on your phone, and I would expect that you can boil them down to a standard collection of components as well, like… buttons, toggles, inputs, list, etc. So, if we can deconstruct our application into these core components, why should we have to code them more than once?This is where cross-platform development frameworks, like Ionic, can provide a solution for many developers.Finally, with the release of Ionic 4 and this version being built with web components, it's UI library has now expanded from using Angular as its default framework to compatibility with any front-end framework like React, Vue, or even vanilla JavaScript. This means that Ionic is not just cross-platform, but also cross-framework as well—allowing you to use one development approach across teams, who can continue using their front-end framework of choice.Curious about other cross-platform approaches and how they compare to Ionic? We've also written a guide that dives deeper into the different cross-platform approaches: Hybrid-Native vs.

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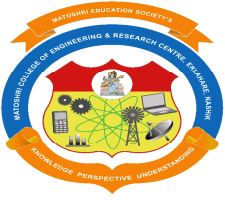
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Hybrid Web vs. Native. You can read more about the native layer of this type of approach here and don't miss the "cheat-sheet" comparison grid at the bottom of the linked article to review the highlights of each type of app development.

Smart Microgid   Mr. Hadpe S.S

Microgrids provide a bottom-up approach to cope with the arising complexity and volatility added from the increasing use of renewable energy sources. A microgrid can provide better coordination and resource utilization, better integration of renewable energy sources, improved economical revenue and privacy protection. A microgrid is a system comprising one or more units for energy generation, energy consumption and, possibly, one or more units for energy storage. For example, a smart microgrid could contain a PV array, a household with electrical devices and batteries for storage. Microgrids can be grid-connected or off-grid, and it is also possible that a microgrid can operate in both modes. A smart microgrid contains local control intelligence to operate and coordinate its components. With this in mind, we can assess components of a microgrid based on the possibility to control their power. Renewable energy sources such as PV systems or wind turbines provide only a limited possibility of control, since they are normally operated to provide their maximum output (e.g., operating at the maximum power point of a PV array). While it is possible to reduce their output (e.g., operating a PV array off the maximum power point or using feathering in a wind turbine), this is no good strategy in economic terms since the energy not retrieved cannot be recovered later. Energy consumers allow limited controllability given that they can be controlled (see the concept of a smart appliance for particular approaches and issues) and that the comfort loss for the user is acceptable . Energy storage can operate as a consumer (given that the storage is not full) and as a provider of energy (given that the storage is not empty). While, in general, a storage allows a larger time frame for the balancing between energy generation and consumption, it also comes with additional complexity for finding the right control strategy and for defining the optimal size for a storage.

While smart microgrids come with the advantage of being a small system in comparison with the overall energy grid, the small size also comes with new challenges. For example, a microgrid requires a tighter coordination of its components since the law of large numbers does not apply for them. This also means much less inertia and therefore smaller timescales in its control systems. While a large synchronous grid comes with timescales of minutes that can be handled by a human operator, a small microgrid could have a timescale of milliseconds, thus requiring a fully automatic system for its control. Current trends in smart microgrid research therefore include automatic and self-organizing control systems, prediction of renewable energy sources, stabilizing microgrids by adding storage or designing DC microgrids to better address the nature of PV produced energy and batteries. An energy management system for a smart microgrid aims at controlling a microgrid in order to fulfill a given

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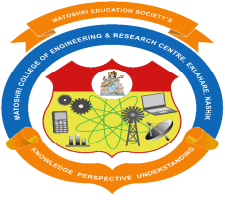
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objective. Objectives could be maximizing renewable energy usage, maximizing revenue, maximizing user satisfaction, giving user feedback or protecting privacy by obfuscating the power consumption at the grid connection point .

1. Investigating energy usage

Energy usage entails complex dynamics which need to be understood in order to offer effective energy conservation and management strategies. Specifically, to enable research on energy management and sustainability, it is important to build upon publicly available datasets. This allows for assessing solutions before their actual deployment, while still guaranteeing that they work for the real world. In this section, we explore existing energy datasets with the aim of offering an exhaustive comparison of previous measurement campaign and findings. We report of a completed research project addressing energy conservation in Austria and Italy. In particular, we discuss an initial survey carried out to identify common scenarios (e.g., in terms of used devices, diffusion of renewable energy generation) . We then focus on the GREEND dataset, which we collected during a year-long measurement campaign in the regions of study [6]. The dataset was used in our research to model the operation of household appliances, particularly in terms of usage mining and load disaggregation , and the problem of determining running devices from an overall power measurement .

2. The MONERGY project

The MONERGY project aimed at proposing solutions to reduce residential energy consumption in the Austrian region of Carinthia and the Italian region of Friuli-Venezia Giulia. This required firstly the identification of commonalities and differences in terms of scenarios and lifestyle. Therefore, we carried out an analysis of the devices responsible for most consumption so as to derive typical consumption scenarios in the regions. Specifically, we conducted a web survey targeted to residents of the area under study being older than 18. The survey was offered in Italian and German, required approximately 15 min to be completed, and consisted of 43 questions concerning five main sections: (i) household information, (ii) use of electrical devices, (iii) sensitivity toward energy consumption and renewable energy generation, (iv) sensitivity and expectation toward energy management systems, and (v) demographic information. The collected 397 responses were cleaned and resulted in 325 usable ones, namely 186 from Carinthia (96 F and 90 M) and 139 from Friuli-Venezia Giulia (63 F and 76 M). The analysis of collected survey data reported. provided further insights on the consumption scenarios across the regions. In particular, we identified a greater share of electrical devices, namely hobs, heaters and boilers in Carinthia and contrarily a greater adoption of gas-powered devices and air conditioners in FVG. The study also showed a still limited diffusion of renewables (7.91% in FVG and 2.69% in Carinthia), as well as in billing mechanisms. Because of the already completed rollout of digital meters, residents of FVG are billed under a time-of-use tariff plan (mainly distinguishing nights from day, as well as weekends), while in Carinthia yearly metering and billing is still the norm. As a consequence, we observed that residents in FVG are already benefitting

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of time-of-use tariffs to exploit more favorable pricing conditions when operating their devices, namely their washing machine (62.59%), lights (24.46%), iron (22.3%), electric oven (21.58%), dryer (10.79%), conditioner (10.07%) and dishwasher (9.35%). The main countermeasure to increase efficiency in Carinthia is device replacement, done by 67.20% of respondents in the previous 4 years, although Carinthians expressed their willing to exploit more favorable pricing schemes, mainly to operate their washing machine (48%), electrical boiler (23%), and dryer (20%). The analysis was continued in Ref. [9] with an estimation of energy usage and an assessment of residents' attitude toward energy management systems, as well as in Ref. [10], where building information was used to extract models of the dwellings (e.g., in terms of number of floors, area) to be used to optimally size the communication infrastructure of an energy monitoring system.
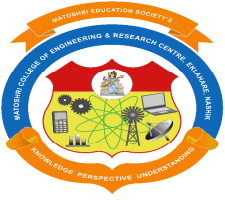
3. Collecting energy data

Energy management is only possible after the collection of energy consumption and production data. In particular, we deal with the following physical quantities: (i) the voltage expressed in volts, (ii) the current (i.e., the quantity of charge per second) expressed in amperes, and (iii) the phase shift between these two measures. To collect digital measurements, the amplitude of a signal can be lowered with a voltage divider and fed into an analog-to-digital converter (ADC) to extract its voltage value. The current can be measured using a Hall-effect sensor or a current transformer, that are transducers converting the magnetic field generated from the flowing current into a proportional output voltage, which can be similarly fed into an ADC and stored as digital value. Contrarily, the phase shift (phi) is the time shift between the measured voltage and the flowing current, and is generally estimated using numerical methods. It is important to remark that datasets for energy management commonly deal with power measurements, which can be distinguished in three different quantities: (i) an active or real power measured in watts (W), a reactive power specified in reactive-volt-amperes (VAR) and (ii) an apparent power expressed in volt-amperes (VA), related as follows:

$P\ [W] = V_{RMS} \cdot I_{RMS} \cdot \cos(\Phi_{vi})$

$Q\ [VAR] = V_{RMS} \cdot I_{RMS} \cdot \sin(\Phi_{vi})$

$S\ [VA] = V_{RMS} \cdot I_{RMS}$

The root-mean-square value (RMS) of a signal can be computed by dividing the peak value by the crest factor, a signal-specific property. For a sinusoidal signal, this is for instance 2 while it is 3 for a triangular one. Another important matter when measuring electrical signals is the sampling frequency, which according to the Nyquist-Shannon theorem should be greater than twice the highest frequency in the measured signal, in order to avoid the aliasing effect, in presence of which it is impossible to reconstruct the original signal.

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New Discoveries in the Electrical Field

Mr. Bhise D. R.

Technology is making a huge impact on the construction industry as well as its trade industries like electrical contracting. In this field, numerous innovative tech tools have been introduced but there are also new discoveries that are worth mentioning. All these modifications are changing the way electrical construction works, as well as how electricity is created. Overall, they promote higher efficiency both during the construction process and the turnover of buildings.
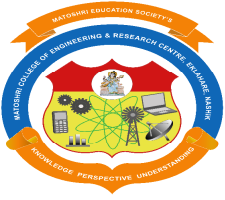
Na-TECC

The Georgia Tech's George W. Woodruff School of Mechanical Engineering is experimenting on a conversion energy engine using sodium's isothermal and solar heat for generating electricity. This new engine was called "Na-TECC" (Na-sodium and "Thermo-Electro-Chemical Converter"). Basically, this machine improves energy efficiency so that lesser heat will leak. That means more savings on electricity. The experiments involved using solar power to run the machine and power a whole house. Soon, when it's fully developed, it can already be recommended by electrical subcontractors for new building construction.

The Revolution of Betavoltaics

In another, the same school in Georgia is recycling nuclear waste to produce electricity. Only   this time, the engine isn't using reactors and sans moving parts. Experiments are being made on this new breed of betavoltaics, which is funded by the   Defense Advanced Research Projects Agency (DARPA). The agency is collaborating with Stanford University's team of researchers. Overall, this betavoltaics can achieve conversion efficiencies of between 4 and 18 percent. That means high savings in electricity generation. They even revealed that this technology can generate about one watt of power continuously for as long as 30 years. Although this low power can't be used in buildings, researchers believe that they ca soon perfect the new betavoltaics so they can produce more power that's needed in bigger structures.

Robotics and Drones

Robots are being used these days to replace human labor to make work faster and more accurate. But in the electrical trades, robots are being deployed in places with high electrical hazards so as to prevent accidents and deaths. Drones are also starting to be a huge part of the monitoring process of electrical subcontractors. These UAVs (Unmanned Aerial Vehicle) are used to take photos and videos of the site to give the project manager a clearer overview of the project even without visiting the site. This goes the same with electrical subcontractors who may need to handle one or two projects at the

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same time. Instead of using traditional mobile cameras or DSLRs to capture progress, crew members can use drones instead to capture images from hard-to-reach spots in the construction site.

IoT and Cloud Computing

Data is also important for electrical subcontractors. The plan, schedule, drawing, budget, and other files they send to the site are vital to making the work of crew members efficient. Meanwhile, the reports that crew members write are a way for the electrical subcontractor to stay updated on what's happening at the site. So should there be any issues, electrical workers can simply send the report via the cloud and the subcontractor receives it right away, enabling him to act on the issue immediately. This is why we always recommend for subcontractors to shift to cloud-based software so that reporting and collaboration can be done in real-time.
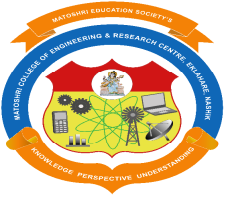
Smart watch

While it seems like smart watches are just luxuries for construction workers, but in the electrical trades, these gadgets are actually used for saving lives. The Proxy Smart watch, for instance, is a wearable that helps ensure the safety of electrical workers at the site by reducing risks of injuries and electrocution. The watch is equipped with sensors that notify the user of any high-voltage electricity sensed nearby. It also has GPS sensors that send out location stamps so that electrical subcontractors are sure that their workers are at the site where they are assigned.

Smart Helmet and AR

Augmented Reality is quickly finding its rightful spot in the construction and electrical trades industries. DAQRI is one of the makers of smart helmets equipped with augmented reality glasses to assist electrical professionals in an optimized way. Like other industrial-grade AR glasses, DAQRI is equipped with cameras, sensors, and smart features that allow electrical workers to determine the exact location of ductwork and electrical cabling required in the building without having to look at the drawing repeatedly. Ultimately, it provides a hands-free means of reviewing documents while working at the site.

BIM

BIM is a new way of creating models in the construction industry. It acts more than just a CAD where only the specs and dimensions are defined around the 2D sketch of the project. BIM, on the other hand, generates an intelligent 3D model that contains all the specs, standards, and physical functions of the parts of the project. This makes it easier for project teams to determine possible flaws in the original plan. This is also where other systems of the building are laid out like HVAC, ductworks,

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pipings, and electrical cables. This makes it easier for subcontractors to collaborate with each other as some systems are dependent on others like electrical cables and ductworks.

Electrical Subcontractor Scheduling Software

To keep your electrical workers stay on top of their goals, you need to equip them with a digital tool that will serve as their reference for their tasks and deadlines. Paper documents are already obsolete and they were proven inefficient when it comes to relaying information. First, entries can be old and inaccurate on paper documents compared to the data used at the office. Changes can happen any time so it would be convenient to have software where new files can be updated instantly. Second, a cloud-based electrical subcontractor scheduling software helps the subcontractor find out about issues in real-time and track progress regularly even without visiting the site. As you know, it can take over an hour or two to walk through buildings, making it time-consuming to check accomplishments every day. Accuracy, efficiency, and real-time collaboration and communication are the main offerings of electrical subcontractor scheduling software like Pro Crew Schedule.
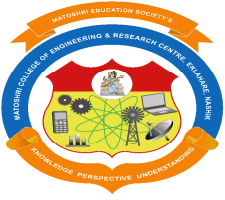
Prefabrication

The use of modular construction is becoming the new standard in the construction industry here in the U.S. as well as other parts of the world. This pre-engineered solution makes it faster to complete a project, but more than that, the established prefab manufacturers guarantee higher-quality construction components that comply with or even surpass the project's specifications. Some electrical systems can also be prefabricated in a manufacturing site where fittings are already attached to the pre-engineered components. Apart from prewired walls making work faster, prefabrication also makes the electrical workers safer.

Energy-efficient Lighting

LED is still among the greatest innovation in the electrical field. The use of LEDs in buildings has greatly reduced energy consumption and they even produce better light quality than the traditional fluorescent bulbs. Furthermore, LEDs are longer-lasting and safer to use.

In the future, electrical experts believe that LEDs will become more prominent and they will be used in smart systems that are remote, heat, or voice-controlled. In fact, there are now houses and vehicles using LEDs that e connected with Alexa for more convenient control. Wireless LEDs are also expected to be developed in the coming yeas, making installation in buildings faster by up to 70 percent.

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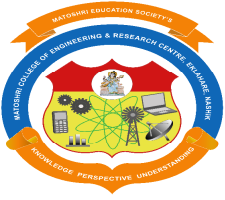## Self Confidence: First Step to Success   Dr. Rakesh G. Shriwastava

This world, in which we live, is a very competitive one. It is popularly described as a rat race, full of competent people and the fittest of them survives. Success is not a cake walk. One has to face lots of hardships and obstacles to taste success. The most important aspect in achieving success is self-confidence. However, people are ambitious but not confident enough to go for it. Infact, most of them don't know how to go about it or are terrified to take risks in their lives. Self-confidence is not something which can be achieved in a day or two. Let us understand that we are not born with it. It's the situation we face, motivation from others and self-motivation that make us truly confident. Hence those of us who feel that we lack confidence, have no reason to be upset. There are 3 kinds of people. One, who dream big but do not have any idea how to pursue it. The second, who are over confident and end up ruining their opportunities. Lastly, the ones who are confident and have talent. This segment knows what they want and how to move further. For attaining a goal, it is important to strive for it and work on the strategies relentlessly. It is necessary to make proper planning and follow up. We will come across ups and downs but should not lose focus and give up. Work hard throughout and be focused until the desired result is achieved. Now, the question arises as to what are the plans/strategies. At the outset, one has to be disciplined. It is not easy as it sounds, but, requires lot of commitment. However, it is not impossible. Take good care of physique as it is very important when it comes to self-confidence. Healthy food habits and proper sleep are very much essential. Since hard work is involved, it is imperative that we do not lose hope or be disheartened. Knowing who you are and what your strengths are, is an area that requires your utmost focus. However, it depends on how we perceive it. Everybody has flaws, but we have to shine through them. Don't lose hope, be patient, take care of oneself and work hard.

Differential Evolution based Voltage Injection Scheme for Maintaining Constant Load Voltage   Ms. Tidke Ashwini V.

Injection voltage is planned using a series voltage injection scheme to keep the desired load voltage at load end with considering load power factor as variable with source voltage as fixed and variable. This injected voltage is optimized as control variable so as to get the required voltage at load end. For this differential evolution has been used to validate the injected voltage and the obtained results are also simulated in MATLAB. For the presented work short transmission line model has been considered and In order to maintain load voltage constant, planning is done for injection voltage by considering different values of source voltage, power factor angle, active and reactive power. Planning is done for injection voltage to keep the desired voltage, thus injected voltage is estimated

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by Differential Evolution (DE) and validated by MATLAB simulation. Quadrature booster and In-Phase booster is utilized to generate desired injected voltage to maintain constant load voltage. Thus planning of injection voltage is done by using Quadrature and In-Phase booster, also validated in MATLAB simulation.

Nowadays, current industrial devices are mostly based on electronic devices like programmable logic controllers and electronic drives. The electronic devices are very delicate to disturbances and become less tolerant to power quality problems such as voltage sags, swells and harmonics. Voltage dips are considered to be one of the most severe disturbances to the industrial equipment's.

At load end usually the voltage support is achieved using reactive power injection by means of installing mechanically switched shunt capacitors connected to the primary side of distribution transformer. Switching is achieved by supervisory control and data acquisition system. With this scheme high speed transient's compensation and sag correction is difficult to achieve. On load operation tap changing transformer is a costlier option for voltage control. DVR is a reliable power electronic solution for voltage regulation. Additionally DVR is also helpful to handle voltage sensitive loads.
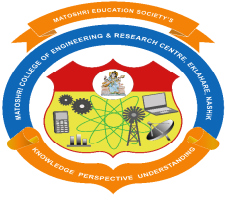
DVR is work in a series of voltage boost technology by with solid state switches for compensating voltage sags/swells. The applications of DVR are mostly for sensitive loads that may be badly affected by fluctuations in system voltage.

Power distribution systems should offer to their customers an uninterrupted flow of supply at even sinusoidal voltage at the constricted magnitude level and frequency. However I the power system there is much more nonlinear loads in practice and that nonlinear load is mostly at distribution side's load. Those nonlinear loads affect the quality of power supply. As a result of the nonlinear loads, the purity of the waveform of supplies is disturbed and that produced many of the power quality issue.The motor of a mini electric vehicle uses dozens of storage batteries as power supply, which has low voltage andlarge current. Therefore, the loss and temperature raise of the motor is high. In this paper, the loss of different

Induction Motor for Mini Electric Vehicles

Mr. Aranke V. R

Induction motors for mini electric vehicles is calculated and the effects of rotor materials and air gap length on the performance of these motors are studied. The analyses show that the efficiency of the motor with a copper mouse cage rotor is considerably higher than that of the motor with a aluminum rotor. The temperature raise of both an aircooling and a water-cooling induction motor is analyzed, which demonstrates that the temperature raise of the motor windings is higher than that of the other parts, and the temperature raise of the water-cooling motor is lower than that of the air-cooling motor.

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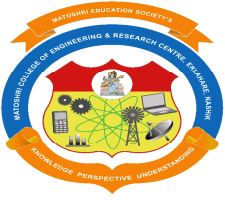
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To verify the results of the theoretical analyses, four prototype induction motors (aluminum rotor, copper mouse cage rotor, air-cooling and spiral groove machine) have been designed and processed. The experiments to measure the efficiency and temperature raise were carried out on these motors. The experimental results prove that the theoretical analyses are correct. Energy deficiency and environmental contamination are two major challenges which were met in the development of automobile industry in contemporary society. Electric vehicle which was used as a kindof energy-efficient, non-pollution, ideal "zero discharge" vehicle has been paid more attention to in recent years. With the rapid development of high-technology of power electric and control, the mini electrical vehicle has a rapid development in recent years. However owing to the high price of mini electrical vehicle, popularizing the mini electrical vehicle is still a certain difficulty. Mini electrical vehicle which has advantages of small volume, energy conversation, convenience and low prices and so on has been a hot research spot in today's electric vehicle fields The motor drive and control system is the core of electric vehicle. Induction motor which has advantages of simple structures, low prices, easy maintenances, broader constant power operation scope and so on has a broadest application in electric vehicle fields. It is demanding that the motor drive system applied in Electric Vehicle not only has a high starting torque and wide constant-power range of variable speed, but also has a high efficiency in all velocity range. The mini electrical vehicle uses the storage battery with induction motor as power supply. The low supply voltage leads to a large motor current, and a large current leads to the high Temperature raise and loss of motor. The loss increases and the efficiency decreases. The temperature raise has an effect on the performances, insulations and service life of motor, so how to reduce loss and temperature raise of motors, and to increase the efficiency of motors and reliability of operation has become the key of the motor design for of mini electrical vehicle. This discusses how to reduce loss and temperature raise and to increase the efficiency of motors, aiming at the features of low supply voltage and large current of motors for mini electrical vehicle.

Arduino based system for smart farming   Mansi Patil
www.google.com

Now a day the numbers of cases in the context of farmers committing suicideare increasing day by day. The reason for same will surely vary from the family to family of the farmers. Some causes include scarcity of water/ improper water supply, lack of knowledge of the fertility of soil and the soil content, no prior analysis of past failure and lack of direct communication between farmers and authorized personals to maintain All these factors lead to inflation where the cost of the product/pulses reduced due to high supply but lack of demand. As a result the expected price recovery of the farmer was not satisfied this leads to heavy debts and manipulates the mind of farmers to commit suicide.

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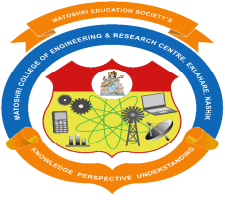Recognition of 2(F)/12(B) from University Grant Commission (UGC).

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India's water crisis is often attributed to lack of government planning, increased corporate privatization, industrial and human waste and government corruption. In addition, water scarcity in India is expected to worsen as the overall population is expected to increase to 1.6 billion by year 2050.Crop selection is affected by the system of farming employed, that is, whether purely crop farming or integrated with livestock animals. Likewise, the particular crop species to be grown will depend on the crop production practices such as monoculture, multiple cropping, hedge row-strip cropping, and planting patterns. The Agricultural Adjustment Act (AAA) was a United States federal law of the New Deal era designed to boost agricultural prices by reducing surpluses. The government bought livestock for slaughter and paid farmers subsidies not to plant on part of their land.

Public health, use of lower quantity pesticides due to fewer investments producing a decreased yield. The proposed system 'Water Management System' will not only prove to be a relief for the farmers for efficient water supply but also helping the farmers to test the soil by themselves and will provide direct communication amongst farmers and the authorized person to maintain the demand and supply ratio effectively. It helps in the understanding of plant water used, quantifying crop transpiration and soil evaporation and allows us to devise strategies to improve crop production, reduce unproductive water loses and prevent and water degradation. 'Soil Testing Tube' commonly refers to the analysis of a soil sample to determine nutrient content, composition, and other characteristics.

Iota contains a solid mainstay of several technologies that enable networks of wireless sensors such as, embedded systems, big data, cloud computing, web services, and computer networking and protocols. In agriculture's fields Internet of Things have several benefits, encompassing: The various sensors designed for this specific field of farming that gives the opportunity to work remotely on many projects related to agriculture. The different used sensors help instantly to collect and store data easily in cloud computing services. These live data can be accessed promptly and from any intelligent smart device. As approved by experts, farmers can use the IoT systems to increase their productivity as well as the quality of their products. In fact, it increases profits/incomes and reduces significantly their costs. Having access promptly to exact accurate data helps in increasing the efficiency level in the use of water, pesticides, and fertilizers amounts managements. Thus, IoTwould help in protecting the environment and ecosystems as well.

Indian Agriculture is diverse in culture. The production varies from place to place so for each crop there are certain conditions for its production. Lack of information about the crop leads to less production. This system will help to overcome this problem and gather all the information needed to increase its production. The following system provides monitoring platform for agricultural ecosystem based onIOT.

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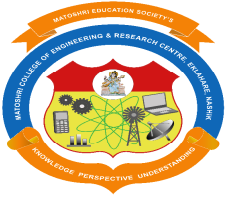
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As per systems, the crops are being monitored with the help of Arduino boards and GEM technology where in Arduino boards behave as a microcontroller. The System purpose is to supply water when farm is dry during absence of human, it will also monitor the humidity, salinity of the soil, soil moisture and temperature also. It includes Arduino Nano, Node MCU sensors like soil moisture and DHT11, Solenoid valves, relays. Through the help of internet, the control of the system is handled and the sensors used in the project stores the parameters in timely manner. This will help the user to analyze various conditions in the place anytime. Then control the conditions or parameter of the place properly.

Ultra-Low Power Sensor for Measuring Outdoor Air Quality   *D.D.Ahire*
Ref : June 24, 2021(Electronicsforu)

It has small size and performs selective ozone detection, ideal for integration in wearables, smartphones and industrial monitoring devices.Ozone gas is harmful to our health as its presence in the air is known to cause significant degradation of outdoor air quality.However, with the help of the ZMOD4510 Outdoor Air Quality (OAQ) gas sensor platform, the ozone gas level can be measured, offering the user to check the air quality in their surrounding environment. The miniature digital OAQ sensor solution comes with an IP67-qualified waterproof package and a new AI-based algorithm.Based on ultra-low-power firmware by Renesas, the ZMOD4510 can detect ozone concentration levels as low as 20 parts per billion (ppb) without reporting on other pollutants. During this selective measurement, power consumption is under 200 uW, which allows devices such as smartwatches, phones and smoke detectors to monitor for harmful ozone gasses typically found outdoors but can enter indoors through open windows and doors. It is an ideal solution for mobile and wearable devices, as well as, industrial applications such as wireless security cameras and parking meters.The new waterproof packaging allows the sensor to operate in harsh and submersible environments with superior accuracy and high performance while eliminating the need for expensive waterproofing systems. It is fully calibrated in the hydrophobic and oleophobic package, allowing customers to apply a conformal coating on their circuitry rather than adding an external membrane to the module."Measuring outdoor air quality is about location, location, location, as levels can vary dramatically from street to street and even on opposite sides of the same street," said Uwe Guenther, Senior Director, Sensing Solutions, IoT and Infrastructure Business Unit at Renesas. "The enhanced ZMOD4510 gives manufacturers the selective high-precision sensing, ultra-small size, and long battery life they need for battery-powered devices like smart watches and phones that offer customers a convenient and customized view of their immediate air quality environment."

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5G Technology   Pranali Kaiche
Ref: Dec 2018 (Electronics foru)

5G, which has been on the horizon for many years, is finally undergoing substantial testing and will begin to be commercially deployed in 2019 if not by the end of 2018. The initial phase of Massive MIMO (Multiple Input, Multiple Output) will provide significant improvements over 4G and eventually, millimeter wave 5G solutions will provide multi-gigabit per second wireless connectivity. As these initial 5G instantiations come online, the impact will be substantial.

Just as previous generations of wireless connectivity have created new markets and business models (e.g., mobile e-commerce, video streaming, etc.), the bandwidth explosion, low-latency speed and responsiveness, and highly configurable network solutions brought by 5G will dramatically remake markets and open new ones. Unlike in previous generations, however, the advances in connectivity enabled by 5G will extend beyond the internet to drive revolutionary changes in automotive, healthcare, and industrial automation markets.

Ultimately, one of the only predictions we can make with certainty is that 2019 will evolve in ways we can't predict. Some technologies that seem on the verge of achieving their promise at the start of 2019 will still be on the verge of achieving their promise at the end of 2019. Other technologies will silently reach a tipping point and become part of our everyday experience with hardly a ripple.
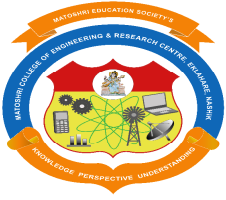
Electronic Pill, The Holy Grail Of Healthcare Technology   M.N.Navale
Source: By S.S. Verma   (Electronicforu.com) March 17, 2021

Innovative digital devices making smart use of personalised data will bring about a revolution in healthcare technology. While there are many difficulties and barriers to their adoption, these excuses can no longer stop us from embracing technologies that could have a positive impact on our lives.

With the ever-growing susceptibility of masses to diseases in this era of modernization, an affordable and easily-available health infrastructure system is the need of the hour. However, with an almost collapsed state of the government-run healthcare system (long wait times, lack of equipment and doctors) and expensive private hospitals, people are eagerly looking towards electronics-based healthcare solutions.

Electronics is already playing a huge role in different areas, such as communication, entertainment, security, sports and education. It is an exciting time for medical technology, and making smart use of modern digital innovations may bring revolution in the healthcare industry, too. Technological progress in terms of combining information and function from various electronic devices for personal medical treatments, based on individual conditions, presents an enormous opportunity for an improved, accessible and affordable healthcare system.

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The concept related to such developments is the emergence of an electronic pill. Human body is a sensitive system, and sometimes doctors are unable to detect a disease in time and it becomes too late to cure it. Use of an electronic pill helps to easily detect diseases, and this can help take prompt action against them.

Electronic pill

Although the idea of an electronic pill has been around for long, researchers are now bringing this technology to reality. The challenge has been to construct and deploy a device using advanced but available components and production techniques.

Electronic pill technology makes use of different components/parts such as drug reservoir, delivery pump, electronic microcontroller (MCU), wireless communication and sensors. These elements have to be combined in a way so as to preserve small size, reliable manufacturing and a safety profile fit for medical use. The device containing these parts is built as a small, pill-shaped capsule, which is swallowed and passed through the gastro-intestinal tract.

After many years of research and development, wireless devices enclosed in capsules that can be swallowed are now hitting the market. Use of an electronic pill will free users from invasive methods such as catheters, endoscopic instruments or radioisotopes for collecting information about the digestive tract. Drug delivery using an electronic pill will also be controlled with onboard electronics, enabling precise and adaptable delivery patterns, which are not yet possible by other means.
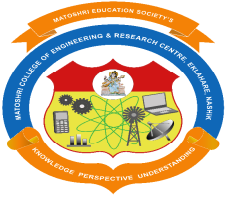
An electronic pill has multichannel sensors that will prove to be an important tool for healthcare technology towards in-depth and detailed investigation of diseases. In addition, its uses range from drug delivery to reaching specific regions of the human body to target different types of cancer, stimulate damaged tissues, track gastric problems and measure biomarkers.

To carry out these functions, the pill is powered by an edible battery and equipped with appropriate sensors. It is important to assure that the materials used to make an edible battery are not toxic to humans, as this can cause significant complications if it gets into the digestive tract.

An electronic pill contains sensors or tiny cameras that collect information as it travels through the gastrointestinal tract before being excreted from the body a day or two later. The capsule takes measurements of the local pH and temperature inside the body.

This electronic invention transmits information such as acidity, pressure and temperature levels, or images of the esophagus and intestines to the doctor's computer for analysis. Electronic pills are also being used to measure muscle contraction, ease of passage and other factors of the body to reveal information that was unavailable in the past.

In 1972, Dr John Cooper and Dr Eric Johannessen from Glasgow University (UK) developed the electronic pill. It is a medical monitoring system, measuring parameters like temperature, pH, conductivity and dissolved oxygen. It can also capture images and send it to a system.

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An electronic pill has a 16mm diameter, 55mm length and 5gm weight, and can be swallowed. It is covered by a chemically-resistant polyether-terketone (PEEK) coating. As soon as the pill moves through the gastrointestinal track, it starts to detect diseases and abnormalities. The pill can easily reach areas such as small and large intestines, and deliver real-time information to an external system. Data collected is then displayed on a monitor.

A Germany-based company, Medimetrics, involved in developing oral drug delivery, has brought the idea to reality with its IntelliCap version of the electronic pill. Its electronic drug delivery pill presents an entirely new means of intelligent delivery and monitoring.

This development opens the door to a wide range of applications that are in the early stages of exploration. Taking advantage of advanced electronic monitoring and control functions, the future version of this technology is expected to be more customised and aimed at specific disease treatments.

Types of electronic pill

An electronic pill can be classified into two types: one including a camera that collects data from disease-infected areas and sends it to the system, and the other containing only sensors to measure pH level, temperature, oxygen level and so on.

Electronic pills in the form of capsules are now also being implanted under the skin. First, the capsule containing designer cells monitors the metabolism and then intervenes to correct problems through the production of proteins and metabolites.The capsules also contain electronic components that control the designer cells and are connected to the external world. Doctors can use their smartphones to intervene and adjust the functioning of such electronic pills, if necessary.Electronic pills club diagnostics and treatment together. Treatment can be administered immediately and in the correct individual specific doses, making it possible to stop metabolic diseases in the beginning itself.

Intelligent pill.This is basically a plastic capsule usually taken with solid food or water. It is meant to be transported through the digestive system in a natural manner. Then, the drug is dispensed to different parts of the body. The size of the device is similar to that of a fat multivitamin, and the drug can carry out specialised actions.

IntelliCap drug

This electronic pill acts as a drug delivery and monitoring device. It is made of a drug reservoir, wireless communication system, electronic controllers, sensors and delivery pump. The device has a minuscule form and, upon ingestion, it travels through the gastrointestinal tract. Use of onboard electronics makes the drug delivery precise and flexible.

Advantages

There are many advantages of using electronic pills, such as:

Localised drug delivery

Smaller doses of drugs result in fewer complications from the drugs' movement through the bloodstream. This means that side effects of the drugs are minimised and their therapeutic value

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maximised. Effect of the drugs is expected to take place quicker, because it delivers the medicine at the specific location of the disease.

Instant response

An electronic pill is equipped with microprocessors, batteries, antennae and other components that make it possible for medical staff to get real-time alerts about the patient's reaction to a particular drug. At this moment, if the doctor observes any irregularity, certain commands can be sent to halt the delivery of the drug.

Disadvantages

Electronic pills have some significant drawbacks that can limit their widespread applications. Some such limitations are:

Exorbitant price

Electronic pills at the moment are products of significant investments in research and development. These are not available for commercial consumption in many countries. With advances in research and development in various components involving printing and nanotechnology, it is expected that the cost of production will reduce in the times to come.

Limited applications. Because it is still a relatively new technology, applications are still restricted to certain areas. For example, electronic pills cannot be used to detect radiation abnormalities and carry out radiation treatment. Electronic pills for kids are especially difficult to produce because of the sensitive issues involved with their digestion.

Communication Protocols: Reviewing the Options for Encoder Applications
D.D.Dighe
www.google.com

Abstract:

This article discusses the use of an encoder to ensure accurate ongoing tracking of a motor's rotor shaft and the key factors that will help in the selection of the encoder based on different parameters

Introduction:

Increasing use of motors in robotics, industrial drives, factory automation systems, renewable energy generation sites, and so on, combined with a growing need for more power-efficient operation, has caused a major ramp-up in rotary encoder usage in recent years.

To maximize operational efficiency levels of a motor, accurate ongoing tracking of its rotor shaft is needed. This will allow constant data to be acquired on the rotor's position, plus the speed and direction of its movement. Such functions can be achieved by the inclusion of some form of an

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encoder in the system design. However, before deciding on the nature of the encoder that will be specified, you need to understand the key factors that will influence this decision given a set of application or logistical requirements.

Absolute or Incremental?

There are several possible options available when choosing an encoder. An incremental encoder is a type of encoder device that converts angular motion or position of a shaft into an analog or digital code to identify position or motion. Incremental encoders are one of the most commonly used rotary encoders. An incremental type will help with determining the position relative to a reference point, while an absolute encoder assigns a unique code to each potential rotor position (Figure 1).

Although incremental encoders are cheaper and simple to implement, absolute encoders have clear operational advantages associated with them. The most notable advantage of using absolute encoders is the fact that they have an immediate response (as they simply need to identify the specific code). Through their use, the rotor position can be determined as soon as the system is activated. Incremental encoders report position changes nearly instantaneously, which allow them to monitor the movements of high speed mechanisms in near real-time. Because of this, incremental encoders are commonly used in applications that require precise measurement and control of position and velocity. This is particularly advantageous in safety-critical application scenarios.
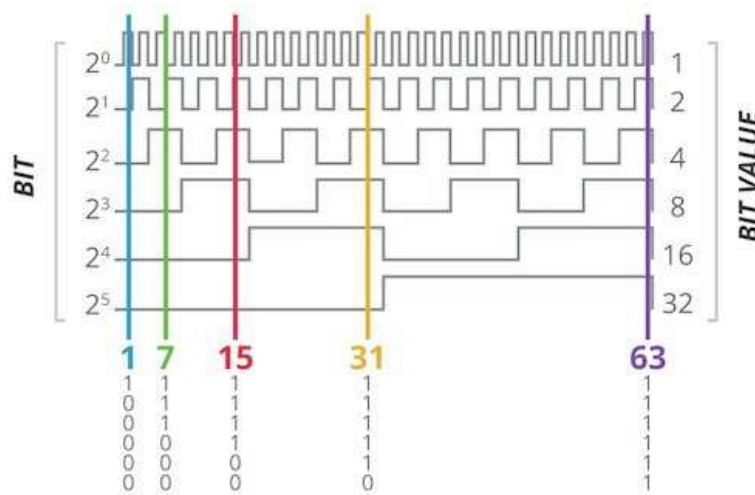
Figure1. Each potential rotor position on an absolute encoder has a unique code

Which Encoder Type Should Be Used?

There are also several different ways via which the encoding mechanism may be implemented. Often, optical sensing is employed. However, this has certain drawbacks, especially in heavy-duty industrial environments - as the presence of dirt, grease, or oil can obscure parts of the encoder disk, thereby

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making it difficult for the accompanying photo-sensor to obtain correct results. Ongoing exposure to shocks or vibrations can also lead to the disk becoming damaged and needing to be replaced. Exact alignment is also required, which can be an iterative and time-consuming process.

Although magnetic encoders get rid of the line-of-sight issue that impairs optical encoders, these have their own drawbacks. They are relatively power-hungry and are not capable of supporting high resolutions. It is for these reasons that capacitive absolute encoders, like those featured in CUI Devices' AMT Series, are now seeing a great deal of uptake. These capacitive encoders are insusceptible to the presence of dust, dirt, and grease.

Alongside this, they have strong resilience to vibrations and extreme temperatures. They offer continued reliability, with a long and trouble-free working lifespan - as, unlike optical encoders, they are less prone to mechanical wear and tear. At the same time, they can provide far higher degrees of accuracy than their magnetic equivalents (Figure 2).
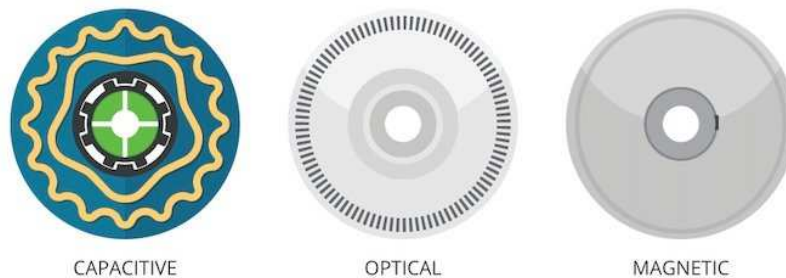

CAPACITIVE   OPTICAL   MAGNETIC

Figure2. A comparison of the encoder disks for capacitive, optical, and magnetic encoders

Integrating an Encoder

Having decided on the encoder mechanism, the next element that needs to be addressed is interfacing the encoder with the host system. There are a wide variety of interface protocols that can be employed. It is therefore important to understand the distinctions between them in order to select the most appropriate option.

Serial interfaces are commonly used for communication in industrial systems. RS-485, serial peripheral interface (SPI), and synchronous serial interface (SSI) are among the most prominent of these protocols.

SPI provides a bi-directional interface capable of supporting full-duplex operation. As there are many host microcontroller units (MCUs) that have an SPI port directly incorporated, it is a convenient means via which to implement an encoder system - taking up minimal time and effort. Elevated data rates can be supported, and it is easy to adjust this rate as well.

The use of SPI will be optimal when the interconnect distances involved are relatively short (ideally under one meter). Longer distances can be accommodated, but it will be necessary to reduce the data rate to maintain acceptable noise immunity. CUI Devices' AMT22 Series is one such SPI encoder,

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with a maximum clock speed of 2 MHz. When requested, the encoder can provide extremely quick position feedback, within 1500 ns, to the host microcontroller. Extended commands can also be used over the SPI connection to set the zero point or reset the encoder.
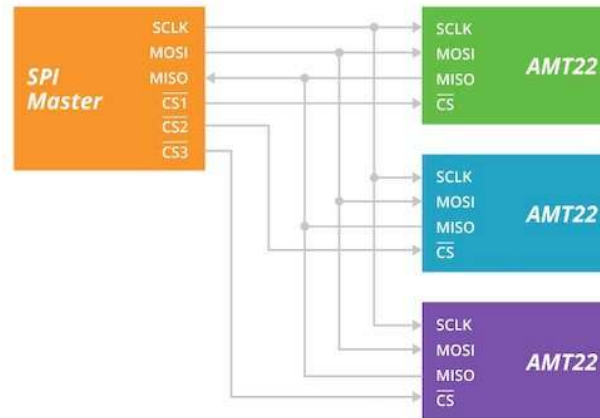

Figure 3. Example SPI configuration with shared clock signal, MOSI, and MISO and unique chip select line

Better suited to longer interconnect distances than SPI, or for use in situations where there is substantial electrical noise present, RS-485 is another option. As this is an asynchronous interface protocol, it requires no clock signal. Its differential signaling enables common-mode noise rejection and the strong noise immunity offered means that it can be deployed in extremely challenging environments where electromagnetic interference (EMI) is prevalent.

Unlike SPI, it is not necessary to curb data rate when the distance is extended. With a dedicated RS-485 transceiver the communication speed can reach 10 Mbps or higher, dependent on the distance the data needs to travel across a twisted pair cable. The cable is then terminated at each end with a resistance equal to the characteristic impedance.

Another major benefit of RS-485 is that several encoders can all be connected to one bus (Figure 4). For implementations based on RS-485 technology, the AMT21 encoder provides a solution. Its default protocol of eight data bits, no parity, and one stop bit works by having the two lower bits define the encoder command with the other 6 bits used as an encoder address. This means that up to 64 encoders can share the same bus — providing advantages in complex, large-scale implementations. AMT21 encoders can also respond to positioning requests from the host within a 3µs period.

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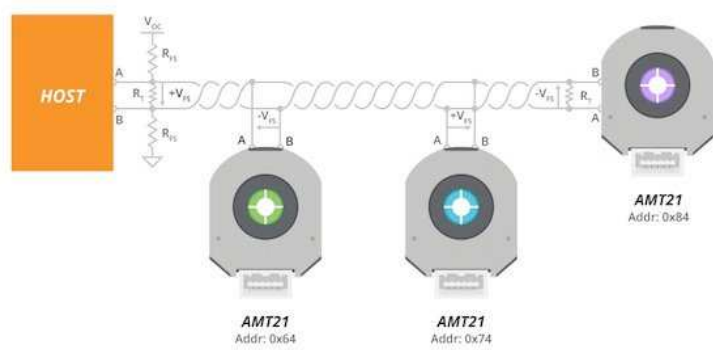
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Figure 4. An example of an RS-485 configuration featuring multiple encoders connected to the host

Data transported via SSI is synchronized by the transmitter and receiver both referencing a common clock signal. This simplex one-way communication protocol relies on differential signaling and presents a very cost-effective interface solution. It can handle similar interconnect lengths to SPI and has comparable noise performance characteristics too.

CUI Devices' AMT23 Series offers a solution in situations where SSI is the chosen interface. CUI Devices' variation of a standard SSI protocol comes with a three-wire SSI interface incorporating a chip-select connection, which streamlines installation and simplifies the interface between host and encoders. The chip-select feature enables the host to activate specific individual encoders on the bus, while the encoder responds by simply putting position data on the bus.

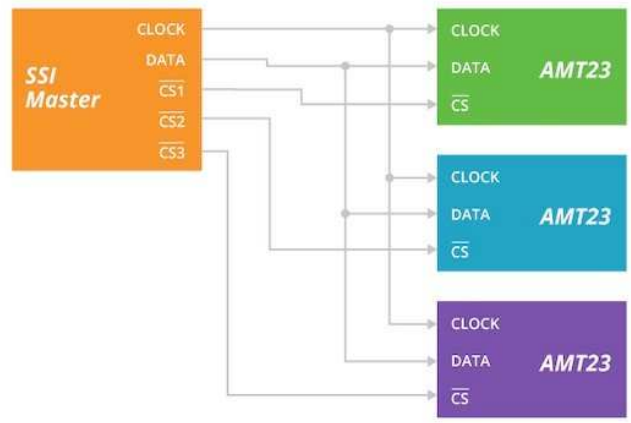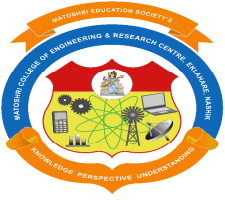Figure 5. The three-wire SSI configuration with chip select feature

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Applications:

Incremental encoders are commonly used to monitor the physical positions of mechanical devices. The incremental encoder is mechanically attached to the device to be monitored so that its output signals will change as the device moves. Example devices include the balls in mechanical computer mice and trackballs, control knobs in electronic equipment, and rotating shafts in radar antennas.
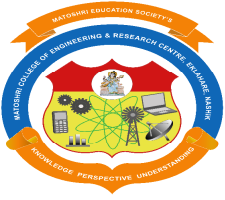
Conclusion

Through the expansive portfolio of <u>capacitive absolute encoders</u> supplied by CUI Devices, and the array of interface technologies that these units support, engineers will be able to find a solution that matches their particular application requirements. In situations where there may be lengthy connection distances involved or noise levels need to be mitigated, it will be advisable for an RS-485 interface to be utilized.

If a straightforward implementation is a priority, then an encoder with SPI interfacing functionality is a good option. This is bolstered by the fact that it is supported by MCUs from a multitude of different semiconductor vendors. When the system deployment must be as streamlined as possible, with costs kept to a minimum and very little space taken up, then is SSI might be the way to go.

Process Printing Management System Using Cloud   -Prachi Gupta (B.E I.T)

Competition among printing companies is increasing in great exteent. On one hand, the costs of printing have been increasing, especially for costs of paper and manual works. Too many printing companies is the another reason for the increasing competition. For the past decade, the price for the same printing order keeps almost the same but the manual cost has doubled, which means the profit for printing companies has been deduced largely. On the other hand, the rapid development of digital devices and network, especially the Internet and mobile devices, more and more information is available in digital format instead of paper-printed format. This reduces the requirement of traditional printing.

 Any Material management is one of the most key factors affecting printing companies' profits. Competition has increased in traditional printing market. Many printing companies need innovational methods to improve printing management in order to keep their market going. Analyzing material management problems in printing companies and presented a cloud based material management to manage printing material effectively and efficiently was introduced by researchers. They focused on managing raw material within printing company to simplify the prototype system. Business process management method was used to identify material management related processes. Business process model and notation was adapted to model and express identified processes. They designed a printing material management prototype system with Software as a Service model. Results showed this model could reduce cost for printing management and help printing companies manage the raw material

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effectively and efficiently. If further more work is done on the same existing work then the material handling problem can be collectively solved.
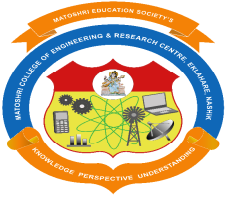
The proposed system targets to lower the physical requirements and focus on carrying online work more.

An automated websites scanning for phishing detection using machine Learning   - Sharddha Matsagar (B.E I.T)

Phishing is a kind of Cybercrime trying to obtain important or confidential information from users which is usually carried out by creating a counterfeit website that mimics a legitimate website. Phishing attacks employ a variety of techniques such as link manipulation, filter evasion, website forgery, covert redirect, and social engineering. The most common approach is to set up a spoofing web page that imitates a legitimate website. As the popularity of the web increases and web applications become tools of everyday use, the role of web security has been gaining importance as well. The last years have shown a significant increase in the number of web-based attacks. Traditionally, the ad-hoc methods have been used to detect phishing attacks based on content, URL of the webpage, etc. ... URL Based Approach: Uses page rank and combines it with other metrics derived from URL based on a priori knowledge. This method can detect upto 97% phishing websites. Too many nouns web application security vulnerabilities result from generic input validation problems. Examples of such vulnerabilities are SQL injection and Cross Site Scripting(XSS). Although the majority of web vulnerabilities are easy to understand and to avoid many web developers are, unfortunately, not security-aware. As a result, there exist many web sites on the internet that are vulnerable. This project implements an automated vulnerability scanner that for the injection attacks. The system will automatically scanned the injection attack vulnerabilities and automatically analyses websites with the aim of finding exploitable SQL injection and XSS vulnerabilities.

Go Local Buy Local   - Saurabh Kharde (B.E I.T)

Developments in technology and reliance on internet have pitched a new pathway for marketing through mobile applications. According to worldwidewebsize.com the internet hold 15- 50 billion active websites. These websites and applications have outdated many traditional ways of marketing and selling products. A combination of marketing intelligence and technology has reached to the development of mobile applications which use internet as a medium to advertise products as well as services. Customers as well as business houses now a days have a contemporary perception of

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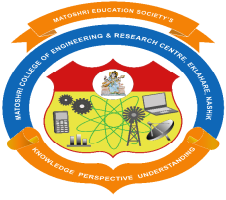
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products and services available in the market. Marketing strategies are based on online marketing which suits demands of today's customers. Keeping in view the online services this project aims to develop the solution for foodie one's and small vendors for ordering food and delivering food through online food delivery app. The project is focused on the people who already use food delivery apps. With such kind of online portals we can expect the local brands to flourish in larger extent. If we are proceeding a technological solution to make the market available for the local markets then surely we are tapping to the growth of local businesses and in turn we are contributing to the growth of nation and human society.

Lane Line Detection Algorithm for Self Driving Cars   -Pratik Jadhav (B.E I.T)

Lane detection is a challenging problem. It has attracted the attention of the computer vision community for several decades. Essentially, lane detection is a multifeature detection problem that has become a real challenge for computer vision and machine learning techniques. Although many machine learning methods are used for lane detection, they are mainly used for classification rather than feature design. But modern machine learning methods can be used to identify the features that are rich in recognition and have achieved success in feature detection tests. Being able to detect lane lines could be a crucial task for any self-driving autonomous vehicle. In this project, to identify lane lines on the road OpenCV is used. OpenCV method uses the input images to find any lane lines command among and also for rendering out an illustration of the lane. The OpenCV tools like colour selection, the region of interest selection, grey scaling, Gaussian smoothing, Canny Edge Detection, and Hough Transform line detection are being employed. A colour detection algorithm identifies pixels in a picture that matches a given colour or colour range. Region of interest selection allows you to select a rectangle in an image, crop the rectangular region and finally display the cropped image. Grey scaling is the method of changing an image from different colour spaces e.g. RGB, CMYK, HSV, etc. to shades of gray.In gaussian Blur operation, the image is converted with a mathematician filter rather than the box filter. The Gaussian filter could be a low-pass filter that removes the high-frequency elements. Canny Edge Detection is used to detect the edges in a picture. It accepts a grayscale image as input and it uses a multi-stage algorithm. The Hough Transform line is a method that is used in image processing to detect any shape if that shape can be represented in mathematical form. The goal is to piece along a pipeline to detect the line segments within the image, then average/extrapolate them and draw them onto the image for the show.

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JARVIS - Chanda Tarle (TE IT)

J.A.R.V.I.S. (Just A Rather Very Intelligent System) is a fictional character voiced by Paul Bettany in the Marvel Cinematic Universe (MCU) film franchise, based on the Marvel Comics characters Edwin Jarvis . The proposed jarvis can be further used for home applications and it can be developed as an extension over all the IoT smart home based devices. It was first used in Pepper Pott's rescue and later used to helpmate. The proposed concept is used to same AI based system for all the automated home system versions. It can help the human beings to work faster and quicker. For example it can be set to remind us that we have to go to library at 5pm exactly.also **Jarvis can** tell you the schedule for the day, teach languages, inform you what others in the home are doing, prepare toasts, set up video conferences, and play movies. **Jarvis can** also **make** remind you to, for example, go to the gym. An alarm system can be set to remind the same. Many such applications can be further developed to help people.

Design of Fixture to Reduce Loading Time on VMC Machine
Author: Mr. Yuvraj S. Khadke

Abstract: Fixtures play an important role in machining process. They are widely used in mass production as they help in reducing the loading and unloading time. Small scale industries in India are looking forward for the affordable and effective fixtures for the process of manufacturing. Many operations like turning, shaping, drilling requires skills for the workers and any mistake done by the workers may results in inaccuracy. Fixture helps in these operations by providing the support to the working piece. The work piece needs to be properly fixed and supported when mechanical operations are performed over it. This will be advantageous as it will reduce labour efforts and improve production of the work piece. In this project, we are going to design a fixture for a VMC machine as per the requirement of the Industry which will help in reducing the loading and unloading time, operator efforts and improve productivity.
Keywords: Fixtures, Casting, Jig, VMC.

I. INTRODUCTION

Fixture is a holding device for fixing, supporting and positioning the work piece for specific operations. It only provides a reference surface or device. The word "Fixture" is derived from latin word which means 'fixed' or 'attached'. Jig is a work holding device that holds, supports and locates the workpiece and guides the cutting tool for a specific operation.

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1.1 Types of Fixture

Fixtures are mostly used in milling operation but it is also used in other operations such as: turning, boring, welding and grinding. Fixtures are also made for inspection and assembly works. Moreover fixtures are used for castings and forgings which are rough and irregular in shape. With the use of locators and proper clamps, handling of those jobs will be made easy in fixtures than any other standard work holding devices.

II. DESIGN OFFIXTURE

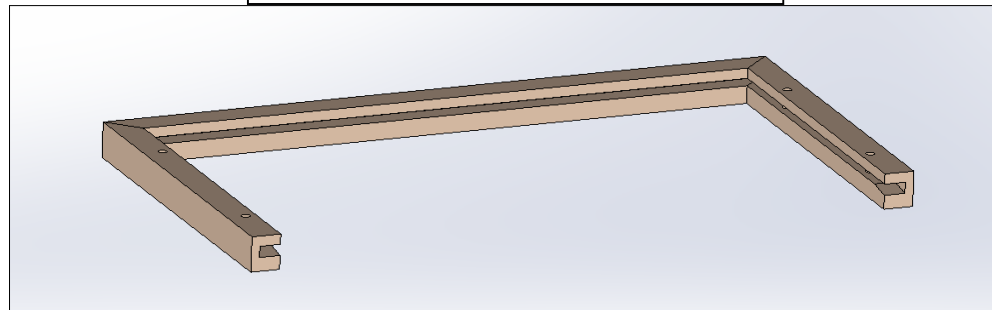### 3.1 Finalized Design

Figure 1: Finalized design of fixture
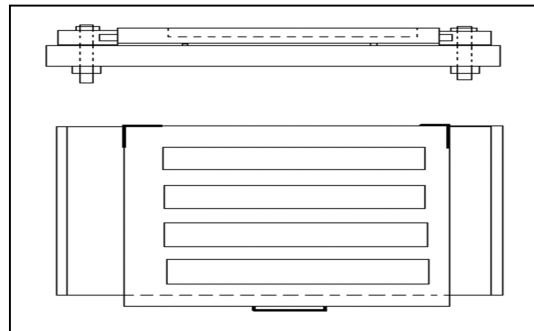
Figure 2: Tray Slider Guide(Part of Fixture)

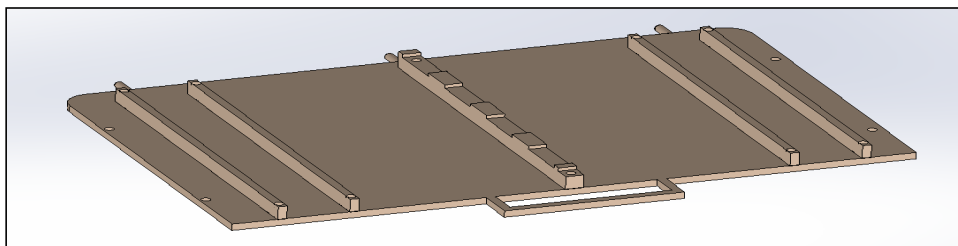**Figure 3:** Tray Slider (Part of Fixture)

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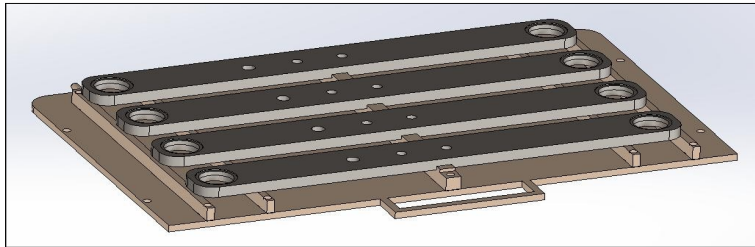
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Figure 4: Tray Slider (Part of Fixture)

The design consists of a sliding trolley and tray in which we will be able to fix more than one workpiece on the machine. The basic design is shown above. After some modification and changes, the final design will be fixed and then analysis will be done after that.

3.2 Consideration inDesign

For designing fixture, following points are to be considered:

- Type ofOperations
- Inspectionrequirements
- Provision of reliable, rigid, and robust reinforcement to theblank
- Production of jigs and fixtures with minimum number ofparts
- Fast and accurate location of the jig or fixtureblank
- Rapid mounting and un-mounting of the work-piece from the jigorfixture
- Set up timereduction
- Standard and quality parts must beused
- Reduction of lead time

III. ANALYSIS AND RESULT

4.1 Arm with only CentreSupport
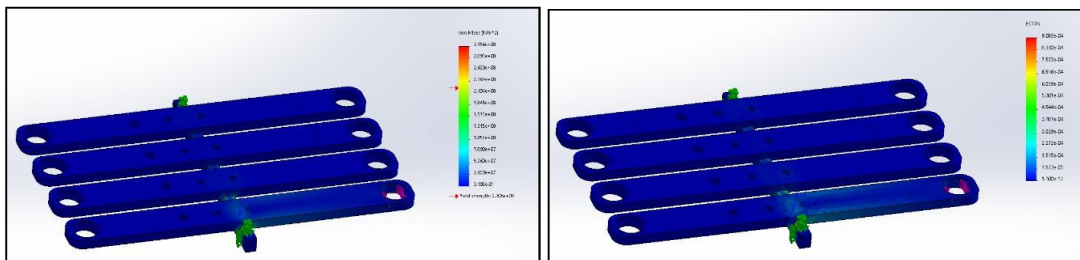
Figure: Stress analysis result(Scenario1)Figure: Strain analysis result (Scenario1)
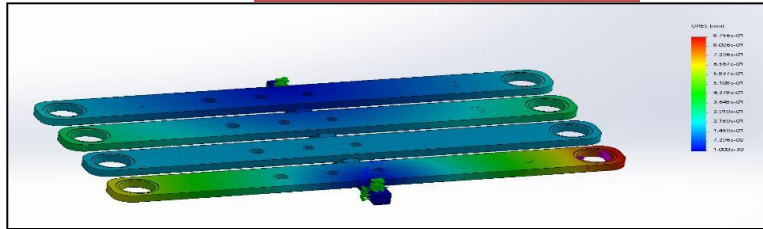
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Figure: Displacement analysis result (Scenario 1)

Arm with only Centre Support	
Maximum Stress	3.156x10^8 N/m^2
Maximum Strain	9.088x10^-4
Maximum Displacement	0.8756 mm

Table: Arm with only Centre Support FEA Results

4.2 Arm with Centre Support and ToggleClamp

Arm with Centre Support and Toggle Clamp	
Maximum Stress	3.4x10^8 N/m^2
Maximum Strain	9.545x10^-4
Maximum Displacement	1.352 mm

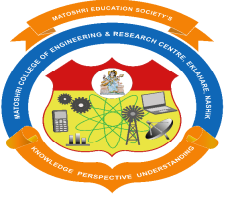**Table:** Arm with Centre Support and Toggle Clamp FEA Results

IV.   RESULT AND DISCUSSION

From the analysis results we can see that the design of fixture is safe to be manufactured. No hazardous risk is involved while machining. The Stress generated are within limits. The displacement observed is nominal and acceptable.

Then while machining there are total five tools to be used. In ATC (Automatic tool change) also it takes 17 Seconds to change tool every time. That is in single part cycle there are 5 tool changes thus 85 seconds are required for ATC. Now as we have used the fixture with four parts in it the total ATC time for four parts is equal to 75 seconds. Thus we have saved 255 seconds in every four parts.

Referring to loading time table on next page we can see we reduced almost 255 seconds in every four parts. Also the human effort has been reduced, as in earlier method the operator has to do work every 22 minutes. And now by using fixture operator has to work on machine after every one hour and 15 minutes approximately.

Sr. .no.	Specifics	Time without Fixture	Time With Fixture
1	Loading time taken by operator	43 sec	11 sec

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2	Total Program Time	19 min 50 sec	18 min 46 sec
3	Unloading	12 sec	4 sec
4	Miscellaneous (Cleaning & Inspection time)	30 sec	7.5 sec
	Total time required	21 min 15 sec	19 min 8.5 sec

Table: Total machining time comparison

We can see from the above table that we almost save two minutes per part by using fixture. Also we can increase the speed and feed of machine to reduce the cycle time on machining as the fixture is rigid and sturdy to take vibrations.

Main aspect from company's point of view is that the dedicated operator is not required on machine now. The one operator can handle two machines at a time. Thus that is direct labor cost reduction. The dependability on operator has been reduced.

Due to fixture the skilled operator is not required. As we have provided the location pins and precise slots for part loading. The toggle clamp has reduced the clamping effort. In overall aspect we can see that the fixture has played its role and the company's representative is positive towards manufacturing this fixture.

VI CONCLUSION

The fixture we designed for the Industry has reduced the loading and unloading time as required by the industry. It will lead to reduced labor efforts and make the operator's job easy. It will fulfill the requirement of production. More than one job can be machined at a time. This project has prove to be very beneficial for the team as we will get to experience practical problems faced by industry and also provide the industry with a solution by applying our knowledge thus, proving a great experience for everyone.

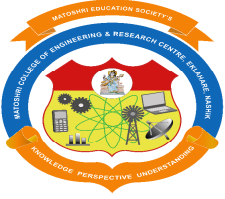Source: International Journal of Advanced Research in Science, Communication and Technology.

Social Distancing in Manufacturing Facilities

Mr. Pratik K. Sonawane

As employees continue to work at manufacturing facilities during these times, sustaining the effort in participating and enforcing social distancing measures is still incredibly important to mitigate the risk of employees contracting COVID-19.

Social Distancing in Manufacturing

Unfortunately, when working in an industrial environment such as manufacturing, workers are not able to take their work home with them. Nobody can't build cars, complete tasks for a meat packing facility, or build computer parts at home. As many faced this challenge earlier in the

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pandemic, it has resulted in two outcomes, all or most employees contracting the virus at work due to employer negligence regarding social distancing enforcement, or employers preventing the spread by reducing employee hours, providing PPE, and encouraging a hygienic workplace.

Employees that come down with COVID-19 cannot come into work due to the safety hazard they pose to their fellow co-workers which ultimately slows down or entirely stops the supply chain. However, by providing safe working conditions for employees during the pandemic, delays in the supply chain exist but are minimal. In this case, at least they are operating at some capacity rather than having to shut down the facility completely due to unsafe work practices.

Preventing absenteeism is rooted in providing a healthy and safe workplace for employees. There are several ways manufacturing facilities can achieve this goal while COVID-19 is around, those include:

• Instructing employees to stay at least six feet away from each other
• Have those working closely together wear masks as personal protection
• Stagger work shifts to keep building occupancy low
• Assign workers to more isolated tasks
• Reschedule services that are not crucial to production
• Using temperature check stations to monitor the appearance of COVID-19 symptoms
• Limiting business travel
• Sanitize, sanitize, sanitize! Make disinfectant wipes and other cleaning supplies freely available for employees to clean workspaces

Speaking of sanitization, there are several hot spots for germs in any facility that must be taken into account when trying to keep everyone safe and healthy. Those include:
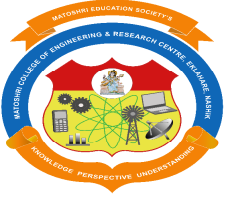
• Time clock areas
• Break rooms
• Restrooms
• Door handles

These are only a few examples, but areas such as these need to be cleaned and disinfected regularly to ensure that contamination is very low or preferably, non-existent.

Implementing Social Distancing Protocol

Beginning by going through the hierarchy of controls is incredibly useful for implementing social distancing protocol in manufacturing environments. There are five components to this method that start with the most effective and descend to the least effective protective measures.

• Elimination – Physically remove the identified hazards
• Substitution – Replace the hazard with something safer to use
• Engineering controls – Isolate people from the existing hazard
• Administrative controls – Alter the way people work
• PPE – If nothing else can be done but there is still a risk, then protect the worker with personal protective equipment

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Since the virus can't physically be removed to protect workers, most of the tactics used in mitigating risk involve the latter three in this pyramid of controls. Engineering controls can be used to enforce social distancing, administrative controls can be used to allow people to telecommute or change schedules to reflect a less populated working space, and involving PPE means acquiring masks and other necessary protective gear for workers.

Implementing social distancing is not an easy task. Much of the reason why is because employees need constant reminders of this protocol to consistently follow the new rules that ultimately prevent them from getting sick. To help with this issue, try putting down signage that is clear and easily visible to all employees. It can be anything from floor signs to remind people to keep six feet apart, floor tape to denote walking paths, wall signs to remind people about wearing masks and proper hygiene, etc.
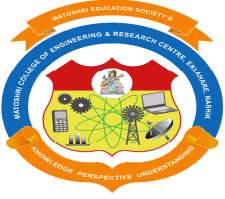
(Source: https://www.creativesafetysupply.com/articles)

3D printing technology
Mr. R.S.Patil

3D printing, or **additive manufacturing**, is the construction of a three-dimensional object from a CAD model or a digital 3D model. The term "3D printing" can refer to a variety of processes in which material is deposited, joined or solidified under computer control to create a three-dimensional object, with material being added together (such as liquid molecules or powder grains being fused together), typically layer by layer.n the 1980s, 3D printing techniques were considered suitable only for the production of functional or aesthetic prototypes, and a more appropriate term for it at the time was rapid prototyping.As of 2019, the precision, repeatability, and material range of 3D printing have increased to the point that some 3D printing processes are considered viable as an industrial-production technology, whereby the term additive manufacturing can be used synonymously with 3D printing. One of the key advantages of 3D printing is the ability to produce very complex shapes or geometries that would be otherwise impossible to construct by hand, including hollow parts or parts with internal truss structures to reduce weight. Fused deposition modeling, or FDM, is the most common 3D printing process in use as of 2020.

Other terms that have been used as synonyms or hypernyms have included desktop manufacturing, rapid manufacturing (as the logical production-level successor to rapid prototyping), and on-demand manufacturing (which echoes on-demand printing in the 2D sense of printing). Such application of the adjectives rapid and on-demand to the noun manufacturing was novel in the 2000s reveals the prevailing mental model of the long industrial era in which almost all production manufacturing involved long lead times for laborious tooling development. Today, the term subtractive has not replaced the term machining, instead complementing it when a term that covers any removal method is needed. Agile tooling is the use of modular means to design tooling that is produced by additive manufacturing or 3D printing methods to enable quick prototyping and responses to tooling and fixture

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needs. Agile tooling uses a cost-effective and high-quality method to quickly respond to customer and market needs, and it can be used in <u>hydro-forming</u>, <u>stamping</u>, <u>injection molding</u> and other manufacturing processes.

Modeling

3D printable models may be created with a <u>computer-aided design</u> (CAD) package, via a <u>3D scanner</u>, or by a plain <u>digital camera</u> and <u>photogrammetry software</u>. 3D printed models created with CAD result in relatively fewer errors than other methods. Errors in 3D printable models can be identified and corrected before printing. The manual modeling process of preparing geometric data for 3D computer graphics is similar to plastic arts such as sculpting. 3D scanning is a process of collecting digital data on the shape and appearance of a real object, creating a digital model based on it.

CAD models can be saved in the <u>stereolithography file format (STL)</u>, a de facto CAD file format for additive manufacturing that stores data based on triangulations of the surface of CAD models. STL is not tailored for additive manufacturing because it generates large file sizes of topology optimized parts and lattice structures due to the large number of surfaces involved. A newer CAD file format, the <u>Additive Manufacturing File format (AMF)</u> was introduced in 2011 to solve this problem. It stores information using curved triangulations.

Printing

Before printing a 3D model from an <u>STL</u> file, it must first be examined for errors. Most <u>CAD</u> applications produce errors in output STL files, of the following types:
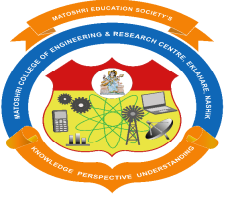
1. holes;
2. faces normals;
3. self-intersections;
4. noise shells;
5. manifold errors.

A step in the STL generation known as "repair" fixes such problems in the original model. Generally STLs that have been produced from a model obtained through <u>3D scanning</u> often have more of these errors as 3D scanning is often achieved by point to point acquisition/mapping. <u>3D reconstruction</u> often includes errors.

Once completed, the STL file needs to be processed by a piece of software called a "slicer," which converts the model into a series of thin layers and produces a <u>G-code</u> file containing instructions tailored to a specific type of 3D printer (<u>FDM printers</u>).This G-code file can then be printed with 3D printing client software (which loads the G-code, and uses it to instruct the 3D printer during the 3D printing process)

Application

In the current scenario, 3D printing or additive manufacturing has been used in manufacturing, medical, industry and sociocultural sectors which facilitate 3D printing or Additive Manufacturing to become successful commercial technology.More recently, 3D printing has also been used in the humanitarian and development sector to produce a range of medical items, prosthetics, spares and

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repairs. The earliest application of additive manufacturing was on the toolroom end of the manufacturing spectrum. For example, rapid prototyping was one of the earliest additive variants, and its mission was to reduce the lead time and cost of developing prototypes of new parts and devices, which was earlier only done with subtractive toolroom methods such as CNC milling, turning, and precision grinding. In the 2010s, additive manufacturing entered production to a much greater extent.

- In 2014, Local Motors debuted Strati, a functioning vehicle that was entirely 3D Printed using ABS plastic and carbon fiber, except the powertrain. In May 2015 Airbus announced that its new Airbus A350 XWB included over 1000 components manufactured by 3D printing.
- In 2015, a Royal Air Force Eurofighter Typhoon fighter jet flew with printed parts. The United States Air Force has begun to work with 3D printers, and the Israeli Air Force has also purchased a 3D printer to print spare parts.
- In 2017, GE Aviation revealed that it had used design for additive manufacturing to create a helicopter engine with 16 parts instead of 900, with great potential impact on reducing the complexity of supply chains.

Examples and Applications of Nanotechnolgy
Mr. Pratap R. Sonawane

Nanotechnology and nanomaterials can be applied in all kinds of industrial sectors. They are usually found in these areas:
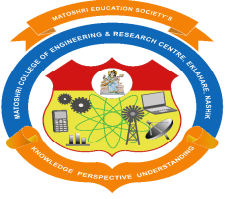
Electronics
Carbon nanotubes are close to replacing silicon as a material for making smaller, faster and more efficient microchips and devices, as well as lighter, more conductive and stronger quantum nanowires. Graphene's properties make it an ideal candidate for the development of flexible touchscreens.

Energy
A new semiconductor developed by Kyoto University makes it possible to manufacture solar panels that double the amount of sunlight converted into electricity. Nanotechnology also lowers costs, produces stronger and lighter wind turbines, improves fuel efficiency and, thanks to the thermal insulation of some nanocomponents, can save energy.

Biomedicine
The properties of some nanomaterials make them ideal for improving early diagnosis and treatment of neurodegenerative diseases or cancer. They are able to attack cancer cells selectively without harming other healthy cells. Some nanoparticles have also been used to enhance pharmaceutical products such as sunscreen.

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Environment

Air purification with ions, wastewater purification with nanobubbles or nanofiltration systems for heavy metals are some of its environmentally-friendly applications. Nanocatalysts are also available to make chemical reactions more efficient and less polluting.

Food

In this field, nanobiosensors could be used to detect the presence of pathogens in food or nanocomposites to improve food production by increasing mechanical and thermal resistance and decreasing oxygen transfer in packaged products.

Textile

Nanotechnology makes it possible to develop smart fabrics that don't stain nor wrinkle, as well as stronger, lighter and more durable materials to make motorcycle helmets or sports equipment.

Nanotechnolgy In The Future

There are bright and dark spots in the future of nanotechnology. On the one hand, the sector is expected **to grow globally, driven by technological advances, increased government support, increased private investment and growing demand for smaller devices,** to name a few. However, the environmental, health and safety risks of nanotechnology and concerns related to its commercialization could hamper market expansion.

The United States, Brazil and Germany will lead the nanotechnology industry in 2024, with an important presence in the Top 15 Asian countries such as Japan, China, South Korea, India, Taiwan and Malaysia. The cosmetics sector will climb positions stealing third place from the biomedical sector in a ranking that will be led by electronics and energy, as it is now.

*Source:https://www.iberdrola.com/innovation/nanotechnology-applications

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