TECNO SAVIOR
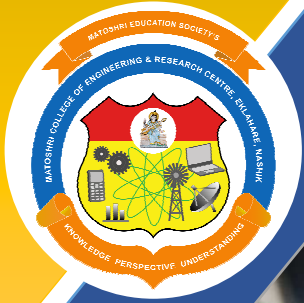
Matoshri College of Engineering & Research Centre, Nashik

Eklahareshivar, Near Odhagaon, Opposite to Nashik-Aurangabad Highway, Nashik, Maharashtra 422105Contact: 0253-2406600/1/2/3

Website: engg.matoshri.edu.in/Email: matoshricoe.hr@gmail.com

Toll free No.:1800 233 6602

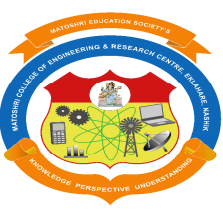Matoshri College of Engineering & Research Centre, Nashik

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."

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Solar-Powered Cars	Mr. Vikas Suresh Daund

With the increased interest in renewable and sustainable energy systems, solar-powered cars have come to the fore. Many automobile companies are working towards making solar cars, and the technology could well change the future of the automotive industry. Solar cars are electric cars that use photovoltaic cells to convert energy from sunlight into electricity. These cars can store some solar energy in batteries to allow them to run smoothly at night or in the absence of direct sunlight. If used on a large scale, solar-powered cars not only help with environmental pollution but also noise pollution.

How do solar-powered cars work?

A solar panel allows photons, or particles of light, to excite electrons, generating a flow of electricity. Solar panels are made up of many, smaller units called photovoltaic cells that are linked together. Each photovoltaic cell is essentially a sandwich of two slices of semi-conducting material, such as silicon.
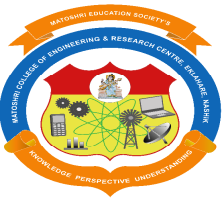
- There are some of the advantages of using solar cars:
- Saves money on fuel
- Is sustainable and environment-friendly
- No additional costs except battery replacement
- Does not cause noise pollution or air pollution

Many prototypes of solar-powered cars are currently in development. Both large and small automakers are involved in developing hybrid solar cars.Automobile companies are already working on ways to capitalize on the idea with interim technology, such as solar roof panels for charging batteries and internal systems.However, solar cars have a number of serious design and technological limitations. Some of these are partly tied to aesthetics. Such a car needs to be able to accommodate several solar panels, and there is limited space for that. That's why, most solar vehicles developed so far are meant to run in solar car races, and not meant for regular use. Additionally, solar-powered cars aren't "100%" eco-friendly. If you look at the way batteries and solar cells are made, especially how the minerals used are mined from the Earth, it becomes clear that each vehicle comes with its share of carbon footprint.

The Different Materials Used To Make Solar Panels.	
	Ritesh Sonawane, BE Mechanical

If you have ever wondered what materials are used on solar panels then this article is for you. We'll take a look at the different materials used to manufacture solar cells. This includes both the raw materials and any synthetic additives a solar panel is made from.Whilst the materials will vary between different solar panel manufacturers, this article will give you a good overall understanding of the materials you can expect to find in the solar industry as a whole.

1

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Frame Materials

Frames are a key feature in the design of a solar panel. They help to hold different components together, offer protection against the elements, and help to improve durability. Most solar panel frames are made from either anodized or powder coated aluminum.

Anodized Aluminum Solar Panel Frames

Most high-quality solar panels will feature an anodized aluminum frame and using this material has numerous benefits. Most importantly, it has the ability to reflect more heat, helping to improve the overall conversion efficiency of a solar cell.

Anodized aluminum is also easy to maintain. You can periodically clean it to restore its appearance. The material isn't affected by sunlight and will often withstand scratches better than powder coated alternatives.

Powder Coated Solar Panel Frames

Solar panels comprising of a powder coated aluminum frame are ideal for those who prefer style over function. Most frames of this type come in black and blend in better with dark roof tiles. They can, however, come in a wide variety of colors to match different elements of a new or existing building. You can even achieve either a gloss, matt, or satin finish with the powder coating technique.

The main drawback with powder coated solar frames is that they scratch more easily than their anodized alternatives. The benefit here though is that you can repair powder coated materials, unlike scratches on anodized aluminum frames.

Backing Material

Backing materials are a key component in the design of a solar panel. Their main function is to increase efficiency by offering reliable electrical conductivity. From a safety standpoint, by helping to insulate the panel, they also offer protection against electric shock.
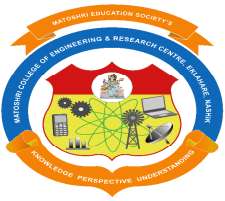
We refer to solar panel backings as photovoltaic backsheets. These often comprise a number of different materials laminated together to deliver high-performance properties. These materials can differ significantly between manufacturers.

Solar Cell Materials

Solar cells are arguably the most important feature of a solar panel. It is the solar cell that is responsible for converting sunlight into electricity through the photovoltaic effect. Let's now take a look at the different materials that are used to make solar cells.

Crystalline Silicon Cells

Solar cells made from silicon are the most popular choice for today's solar panels. We can separate Crystalline silicon (c-Si) into different categories based on the crystal size of the resulting silicon wafer used in a solar cell. The two most popular categories of c-Si are as follows:

2

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

Polycrystalline Silicon – Also known as 'multicrystalline silicon', this type of solar photovoltaic cell is the most common. Due to its popularity and a more efficient manufacturing process (involving molten silicon), solar panels using cells of this type are often the cheapest to buy.

Monocrystalline Silicon – This is a highly efficient type of solar cell used in premium solar panels. They generally offer more power output than rival products but are far more expensive. Solar panels using monocrystalline silicon cells feature a distinctive pattern of small white diamonds. This is due to how the wafers are cut

Thin Film Cells

Solar panels using thin film solar cells are less common than crystalline silicon alternatives. Although they tend to be cheaper, their performance isn't as good as c-Si technology. A benefit of thin film cells is that they are flexible and therefore slightly more durable.

Recent enhancements in thin film technology have helped to close the gap, with some thin film cells now outperforming polycrystalline silicon cells. However, the technology is still a long way off that of a monocrystalline silicon cell.

The most popular materials in thin film solar cells are as follows:

Amorphous Silicon – This is a popular material used widely on thin film solar cells. It uses around 1% of the silicon that a traditional crystalline silicon cell contains, making it considerably cheaper.

Cadmium Telluride – Cadmium solar cells are the only thin film product to have rivaled the performance of monocrystalline silicon cells. The drawback to this material is that it is highly toxic, causing concern regarding the disposal of old cadmium cells.

Copper Indium Gallium Selenide (CIGS) – This is the third mainstream thin film solar cell technology. When we compare this to crystalline silicon, CIGS cells can be anywhere between 80 and 160 times thinner.
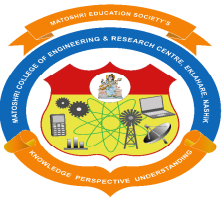
Anti-Reflective Coatings

To help improve the efficiency of a solar cell, a special coating is often applied that helps to reduce reflection. Anti-reflective coatings allow solar photovoltaic cells to absorb more light and therefore increase efficiencies.

Silicon nitride is often the material of choice for anti-reflective solar cell coatings. It is applied as a film above the cell and is available in different thicknesses. You can learn more about anti-reflective coatings for silicon solar cells at pveducation.org.

Other Noteworthy Materials

The overall construction of a solar panel also features a variety of other noteworthy materials. These include the following:

Glass – Widely used in the design of solar panels, glass can be found above conventional silicon solar cells. With thin-film technologies, the cells are usually sandwiched between two panes of glass. This is

3

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

one of the main drawbacks of thin-film technologies in that the extra layer of glass can significantly increase the overall weight of the panel.

Copper – You can find copper in various components of a solar panel. It can be used in everything from wires (including earthing cables) through to inverters that convert DC current to AC.

Plastic – Plastic is a common feature of a solar panel. It can be used to house junction boxes that are often found on the underside of a solar panel. Junction boxes provide an easy way of connecting multiple panels together to form a single system.

Hazardous Materials Used On Solar Panels

Some of the materials used to make solar panels can be hazardous to both our health and the environment. Although not ideal, toxic substances are sometimes used to help improve the efficiency and durability of solar energy systems. The following table details some of the hazardous materials that can be found on a solar panel.

As you will see, most of the above only concern thin-film solar technologies. Traditional silicon solar cells are considered safe, but the manufacturing of those cells does produce silicon tetrachloride – a highly toxic byproduct harmful to plants and animals. Manufacturers should take steps to reduce the amount of silicon tetrachloride that is released into the surrounding environment.

Whilst there is no denying that solar panels come with their own environmental concerns, using the sun as an energy source is still one of the best things we can do for the environment.

Summary of The Above Materials

Solar cell manufacturing involves lots of different materials. Many of these are exotic and have only achieved fame due to the emergence of the solar power industry.

The actual list of materials in a solar panel is primarily dictated by the type of solar cells it contains. As we explained in this article, these might be silicon-based solar cells or thin film cells using different materials. These might include cadmium telluride or copper indium gallium selenide (CIGS for short).

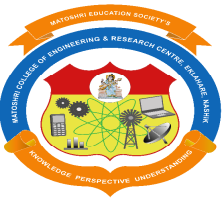Source: https://www.clean-energy-ideas.com/solar/solar-panels/the-different-materials-used-to-make-solar-panels/

The Three R's of Waste Management

Mr. Sanjay Sonawane, Student-BE Mechanical

The three R's of waste management is a simple yet effective method of helping to cut down on waste. For those who don't know, the 3 R's stand for; Reduce, Reuse, and Recycle.

The phrase has become synonymous with waste reduction and is used in countries across the world to educate people about its importance. When we reduce, reuse, and recycle, we help to curb the amount of waste that is sent to landfills. In addition, we help to conserve resources by reusing what we have. All of this has numerous positive effects on our planet.

By following the three R's, you too can reduce the impact you have on the environment. Take a look at the following information to learn more about how you can reduce, reuse, and recycle.

4

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

It's simple to remember the three R's – see below for a breakdown of what they are and what's involved at each step of the waste hierarchy.

1. Reduce

It's no surprise that Reduce comes first in the 3 R's. By reducing what we use, we automatically become more resourceful. This step is vital in helping to avoid unnecessary waste ending up in landfills.

Here are some simple yet effective steps you can take to help reduce the amount of waste you produce:

Buy products with less packaging such as loose fruit and vegetables instead of pre-packaged alternatives. You might even choose to grow your own to help reduce packaging even further.

Buy concentrated products to help reduce packaging. Cleaning solutions, washing detergents, and fabric conditioners are good examples of this.

Choose compressed deodorants and other aerosols to help increase the amount of product you receive in the same volume of packaging.

Where appropriate, buy other items in bulk. Such products tend to have less packaging overall and can sometimes save you money.

Say no to plastic bags. Instead, take your own reusable bags when going to the store.

Cut down on tin foil, cling film, and freezer bags. Instead, use food-grade containers that you can wash and reuse.

Go paperless on your bills to reduce the amount of paper you receive through the mail.

Reduce the amount of printing you do and only print the documents that are necessary. Where possible, use PDF or other electronic document formats.

Where appropriate, opt-out of receiving promotional material through the post. If you still wish to receive it, consider an email subscription instead.

When next buying batteries, consider rechargeable ones instead of disposable batteries. Even better, buy mains powered devices instead of battery operated alternatives.

Buy durable goods. These are more likely to last longer, reducing the need to replace them as often.
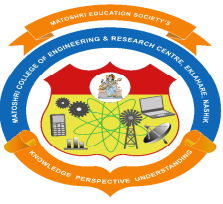
2. Reuse

Next up in the 3 R's of waste management is Reuse. By reusing old or second-hand items we reduce the amount of waste sent to landfills. This process also helps to conserve the earth's natural resources.

There are many ways you can reuse items to avoid having to buy new ones every time. These include the following:

Buy second-hand items such as clothing and furniture, or if buying new, consider donating your old items to a family member, friend, or second-hand store so that someone else can reuse it.

Where possible, swap your single-use items for multiple-use alternatives. Key examples include shopping bags, food bags, tin foil and cling film. Consider a fabric shopping bag you can use again and again and swap your food bags, foil and cling film for reusable containers.

5

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Buy a reusable water bottle and refill it from a tap or water fountain. This will reduce plastic waste and save you lots of money in the long run.

If something's broken, why not attempt to fix it? This reduces the need to buy replacement items which could cost you a lot more anyway.

Be inventive and use disposable product packaging for other purposes. Disposable plastic pots and containers can be used for everything from pen holders to plant pots.

3. Recycle

Last in the list of the 3 R's is recycle. By recycling items we no longer need we reduce the amount of waste that ends up in landfills. Just like reusing items, recycling also helps to conserve natural resources. These are two examples of why recycling is important.

Nowadays, you can recycle a wide variety of items, so make sure you recycle as much as you can. Some of the ways you can recycle include the following:

Use local recycling programs to their full potential. Household recycling bins, tips, and junkyards can all be used to help you recycle a wide range of materials.

Compost your garden and food waste so you can use it as a natural fertilizer. This avoids having to buy compost and other soil treatments further down the line.

When buying new products, opt for those made from a high percentage of recycled materials.

Make sure any new items you buy have recyclable packaging. This way, you know your recycling efforts will be a success.

Overview

The three R's of waste management (Reduce, Reuse, Recycle) are key in helping to reduce the amount of waste we send to landfill. By following these simple but effective guidelines, we also help to conserve the earth's natural resources for future generations to enjoy.

Source:https://www.clean-energy-ideas.com/recycling/overview/the-three-rs-of-waste-management/
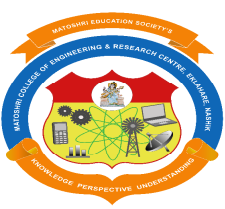
Renewable vs Nonrenewable Resources

Mr. Mahesh Shirsath, Student-BE Mechanical

Why are renewable sources of energy better than nonrenewable sources? In this article, we compare the benefits and drawbacks of renewable vs nonrenewable resources to find out.

Why Renewables Are Better

Renewable energy sources include solar, wind, geothermal, hydro, and biomass. Together, they offer many benefits over nonrenewable alternatives such as coal, oil, and gas. We will now take a look at each of the main benefits.

1. Renewables Are Better For The Environment

6

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Renewables are much better for the environment than nonrenewable alternatives. Solar, wind, geothermal, and hydro energy doesn't produce any carbon dioxide. This is a greenhouse gas that contributes to climate change.

Non-renewable alternatives such as coal, oil, and natural gas are less kind to the environment. To make use of the energy they contain, we need to burn them. The burning of fossil fuels releases significant quantities of carbon dioxide into the atmosphere. They are also responsible for methane and nitrous oxide emissions (other harmful greenhouse gases).

Some renewable resources do have environmental concerns, however. Of the five main types of renewables, biomass and hydro energy have the most concern:

Biomass – Although a renewable resource, we still need to burn biomass to generate power. This releases emissions just like the burning of fossil fuels does. There is an upside to this though. As the organic matter that makes up biomass grows, it absorbs carbon dioxide. This helps to offset the pollution it generates as we burn it. When managed in a sustainable way, biomass can be carbon neutral.

Hydro – Hydroelectric dams are known for flooding large areas of land to form a reservoir. This can lead to the decay of vegetation, which releases methane. Again, there is an upside, however. The amount of clean electricity a hydroelectric dam can generate will result in much lower carbon emissions from the use of fossil fuel alternatives.

2. Renewable Energy Resources Will Never Run Out

This is one of the main benefits in the renewable vs nonrenewable debate. A renewable resource means it will never run out. It will be replenished quickly. For solar energy, the sun shines during the day and will come back the next. With wind energy, the wind blows regularly. Geothermal activity will always exist for as long as the earth supports life. The same goes for water – it will always be available.

3. Using Renewables Conserves Nonrenewable Resources

Similar to our second benefit is the fact that using renewables can conserve non-renewable resources. Unlike renewable energy sources, non-renewables will one day run out.
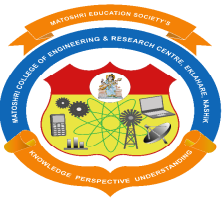
Fossil fuels are formed out of prehistoric plants and animals. Coal, oil, and natural gas can take millions of years to form naturally. When they have run out, they are gone. You cannot simply wait until the day after to be able to use them again. For this reason, it is important to conserve them for future generations to use.

Why Nonrenewables Are Better

Renewable energy sources don't win the debate in every instance, however. Nonrenewable alternatives are better in other ways. Lets now take a look at why you might choose nonrenewables over renewables.

1. Nonrenewables Are Cheap And Reliable

There is no question that nonrenewable energies are cheap and reliable. They are used all over the world and support a thriving global energy industry. This helps to reduce the cost of fossil fuels by a considerable amount.

7

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Renewables such as solar and wind energy are susceptible to atmospheric conditions. This makes them less reliable than fossil fuels. With coal, oil, and gas, we can store it for use when we need it. With solar and wind, you can only harness it when the sun is shining or the wind is blowing.

2. Nonrenewable Energy Sources Are Well Established

Nonrenewable energy sources are hugely popular all over the world. We use them in everything from power plants through to transport and cooking. A global network of energy infrastructure exists to support the use of nonrenewables. Because this type of energy is so well established, it would be difficult and expensive to switch to renewables overnight.

Because renewables are less established, they tend to be more expensive. This can put people off investing in clean energy technologies. A primary example of this is electric cars. These, can, in theory, be charged from renewable electricity. The problem is that cars running on traditional fuels such as gasoline and diesel are still much cheaper.

Conclusion

There's no question that nonrenewable energy resources are an easy way of meeting our energy demands. They are well established, affordable, and just 'easy'. The problem with nonrenewable, however, is that they will have significant consequences for future generations.

Renewable energy sources can help to reduce emissions of greenhouse gases. This, in turn, will help to curb the future effects of climate change. It will also help to improve air quality and our health.What more, renewables are completely free to use! We are not charged for the energy we consume, only the technology we need to buy. As prices of solar panels come down, more and more homeowners are likely to make the switch to solar energy.

We can conclude that renewable energy sources are a far better choice than nonrenewable.

Source:https://www.clean-energy-ideas.com/energy/renewable-energy/renewable-vs-nonrenewable-resources/

What is Active Solar Energy?   *Mr. Vikas Suresh Daund*

Solar energy is one of the main types of renewable energy sources. It helps to support life on earth by warming our planet and feeding our crops. We can also use it to generate power and for heating water or air. But what is active solar energy?

The term 'active solar energy' often arises when discussing solar thermal heating systems. You may also hear the term 'passive solar energy' which is the opposite of active solar.

So, what does the 'active' part actually mean? Well, this refers to the type of system that is used. Any solar thermal installation that makes use of moving parts, electronics, switches, and/or controls should be considered an active system. This means that the vast majority of solar hot water systems can be classed as active solar energy because they often contain pumps, switches, and electronic controls.

How Does Active Solar Energy Work?

8

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Active solar energy systems use solar energy to heat either a liquid or a fluid. They do this using what's known as a solar collector which absorbs solar energy. During this process, heat is captured from the sun's rays and is

transferred to either fluid or air inside collector Figure: Collectors like these are used on active solar energy systems.Where a fluid is heated, this can next be fed into a heat exchanger, allowing it to transfer its heat to water. This water can then be fed into a building's hot water supply or central heating system. These systems may also store the hot water in a storage tank for later use.

Other Uses of Active Solar Energy

We've already established that active solar heating systems can provide hot water for your taps and radiators. They can, however, be used in a couple of other ways as detailed below.

Heating Air

Yes, it's even possible to heat the air inside your home from solar energy. In this scenario, air collectors are used instead of fluid collectors. There are two main types of solar air heating systems in use today:
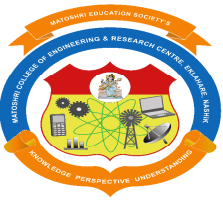
Closed-loop Systems – These systems recycle cooler air from inside your home by passing it through a solar air collector, heating the air, and then blowing it back into your home.

Open-loop Systems – These are less common and work in much the same way as closed-loop systems, only they receive air from outside, heat it and then blow it into your home. This can be less effective than a closed-loop system as it has to do more work.

The major drawback of solar air heating systems is that they use a pump or a fan to circulate the air. This process uses electricity which may not come from renewable sources. Some homes are however fitted with solar panels to provide the electricity.

Heating Swimming Pools

Some swimming pools are fitted with a solar heating system. In such systems, an intake draws water from the pool and passes it through a solar collector where it is heated. The warmer water is then fed back into the pool, increasing its temperature.

9

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

As with most solar thermal energy systems, this process does, of course, involve a pump for moving the water. This needs to be powered and can use large amounts of electricity over time. You can, however, make use of solar power to reduce the impact this may have on your carbon footprint.

Solar pool coverings can also be installed to help absorb solar energy. These aren't, however, examples of active solar energy systems. Instead, they are a type of passive solar energy. These covers also offer the added benefit of heat retention, reducing the rate at which the water loses its heat.

How Effective is Active Solar Technology?

Active solar technologies are much more effective than passive solar alternatives. Because they can move either fluids and air, they are more efficient and don't simply rely on the natural absorption and spread of solar energy.

The cost-effectiveness of active solar energy systems depends on a range of factors. These can include where you live, the size of your house and the type and capacity of your system.

Most homeowners choose to install solar PV over solar thermal systems but this doesn't mean solar thermal isn't right for you. If you're confused about the two, we also have an article covering the differences between solar PV and solar thermal.
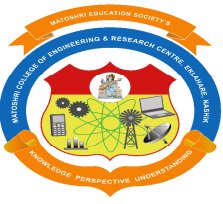
Recap

So, we have learned that active solar energy refers to any system that makes use of moving parts, electronics, switches, or other controls. This is different from passive solar energy in that active systems have to do something to make use of the energy. Passive systems simply absorb solar radiation and don't feature any 'active' or moving heat transfer systems.

Source: https://www.clean-energy-ideas.com/solar/solar-thermal-energy/what-is-active-solar-energy/

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

10

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).
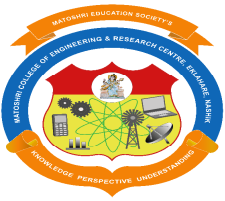
NAAC ACCREDITED

Technosavior

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 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.

Global To Glocal   - Saurabh Karde (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 well as business houses now a days have a contemporary perception of 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

11

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

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.
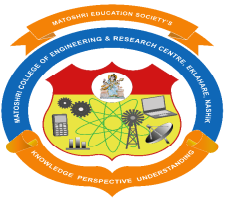
With such kind of online portals we can expect the local brands to flourish in larger extent. If we are preceding a technological solution to make the market available for the local markets then surely we are tapping to the growth of local businesses and in turn we are contributing to the growth of nation 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.

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

12

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

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.

Machine Learning and Intelligent Vision for the Industrial Edge   D.D.AHIRE
Reference- www.google.com

The increase in automation of manufacturing and industrial processes creates more demand for intelligent vision-based systems. These systems capture visual input and then use a variety of processing techniques to make decisions based on that input. These vision systems are often integrated in larger control systems, and so they must be capable of real-time communication with other devices.

NXP's i.MX 8M Plus applications processor enables machine learning and intelligent vision for the industrial edge and a wide range of other applications. In this article, learn more about the features of the i.MX 8M Plus applications processor and how it can be used in embedded vision systems.
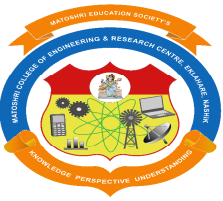
When utilizing cloud computing, the user relies on computational resources outside the bounds of their local network. With edge computing, much of the processing is brought back within the local network's bounds, and as a result, sensitive data can also be kept within the local network.

Edge devices can perform a wide variety of tasks. In the cloud computing paradigm, they were often utilized for filtering, pre-processing, and storing or buffering the data. New advancements, such as integrated neural processing units (NPUs), open possibilities of what can be accomplished in edge devices. Edge devices that can make decisions based on a variety of data sources, such as camera input, and enable users to keep essential data within the local network. This reduces the amount of data that must be uploaded to the cloud and increases the system's overall reliability and security. It can also enable faster real-time decision making, as transmitting data to the cloud and waiting for control responses adds latency, preventing a cloud computing architecture from being able to address some applications.

With an embedded NPU, an edge processing system can discard unwanted or noisy results from an input device, such as a camera, and only upload relevant data sets to the cloud. This saves bandwidth from the local site and reduces the amount of storage and processing required in the cloud, which, in turn, reduces the long-term operating cost.

NXP helps to enable vision-based applications at the edge with the new i.MX 8M plus applications processor by integrating two MIPI CSI camera interfaces and dual camera image signal processors (ISPs) with a supported resolution of up to 12 megapixels, along with a 2.3 TOPS neural processing unit (NPU) to accelerate machine learning.

The integrated ISPs reduce the system's overall complexity, cost, and power requirements while offering an optimal imaging solution, particularly at two megapixels and higher resolutions. The

13

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

multimedia capabilities of the i.MX 8M Plus SoC also includes video encode and decode, 2D and 3D graphic acceleration, and audio and voice functionalities.

The i.MX 8M Plus processor brings in communication interfaces such as two gigabit Ethernet controllers. One of them is time-sensitive networking (TSN) capable, while the second supports audio-video bridging (AVB). The device also includes dual CAN-FD interfaces, two USB 3.0/2.0 ports, one PCIe gen 3.0 interface, and three SDIO 3.0 controllers.

The i.MX 8M Plus SoC makes use of heterogeneous computing, by providing developers with several different programmable processing cores. The Arm® Cortex®-A53 cores are enabled with Yocto Linux®, providing enablement for application developers. The integrated M7 core provides real-time performance, or it can be used to enable low power operating modes.

Many manufacturing and controlling applications require high reliability. To ensure high reliability, NXP included DRAM inline ECC support and ECC on on-chip RAM to detect and correct memory errors.

Putting all of the features mentioned above together, the i.MX 8M Plus applications processor is well suited to enable any vision-based embedded system at the edge. These systems can range from quality control mechanisms in a factory that detect faulty items on a production line, to intelligent smart home controllers, for example, an automated climate and security controller.

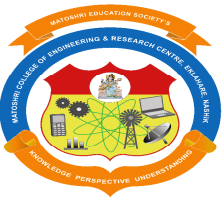|	
Protecting IoT Embedded Designs with Security ICs	*V.S .Wadekar*
	Reference- www.google.com

In this article, we discuss some key security threats to be aware of when designing for the IoT, important security functions, and how protecting these designs is becoming easier with advances in security ICs.

You're working hard to develop the next generation of your smart, connected device. It improves on the capabilities of its predecessor while adding a few new features. Then you catch the latest headline about an IoT device that has been hacked. Is it too late to protect your design? It's never too late to design in security—and it's also more important than ever. The IoT brings great convenience to the way that we live, work, and play. But left unprotected, smart devices can provide an entry point into larger networks and sensitive data. Some IoT design breaches are more attention-grabbing than others. Counterfeiting and cloning are common threats, resulting in lost revenue for the OEM and, often, a quality hit that impacts customers. Having authentic, or genuine, parts provides assurance that the parts will work as intended and also helps to ensure that viruses won't get introduced into the environment. In an automated factory or a utility plant, for instance, equipment that has been tampered with can trigger a malfunction that leads to costly downtime, damage, or even customer harm.

Then there are the attacks that could potentially be life-harming. For example, consider a WiFi-enabled pacemaker. Last year, the U.S. Department of Homeland Security issued an advisory warning that hackers could easily gain access to a brand of implanted cardiac defibrillators. According to the

14

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

department, an attacker with short-range access to the product in question could, when the product's radio is turned on, inject, replay, modify, and/or intercept data within the telemetry communication.

Another concern for medical devices is product refurbishing. While allowed by the U.S. Food and Drug Administration, refurbishing a medical device can create problems. The biggest threat is to limited-use peripherals. While the refurbishing process could restore the peripheral so that it is like new, it may also negate its limited-use properties.

Security ICs with advanced cryptographic features can protect IoT sensor nodes in power plants and similar applications from security threats.

Cryptography without Being an Expert

Keeping IoT designs safe from threats requires:

- Secure communication and authenticity of endpoints
- Strong key management to protect and encrypt sensitive data
- Secure boot to validate firmware and defend against malware attacks
- Feature control so you can securely enable and disable various factory-based options

Security ICs continue to provide advanced levels of protection for existing as well as new embedded designs. And one of the advantages of designing with these devices is, you can take advantage of robust cryptography functions without having to be a cryptography expert. A software-based approach would require much more development effort while introducing vulnerabilities that hackers can exploit. Let's take a closer look at key features in a security IC that you'll want to have in order to keep your IoT designs safe.
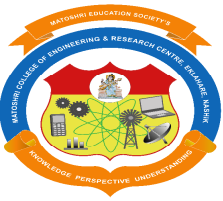
Physically Unclonable Function (PUF) Technology

If you want strong protection against invasive and reverse-engineering attacks, PUF technology is here to help. A PUF circuit relies on the naturally occurring random analog characteristics of fundamental MOSFET devices to produce cryptographic keys. Because the key is generated only when needed and isn't stored anywhere on the chip, an attacker has nothing to steal. If an attacker attempts to probe or observe the PUF operation, this activity modifies the underlying circuit characteristics, preventing the attacker from discovering the secret key.2

PUF is like a unique fingerprint, making it invaluable for the implementation of secret and private keys as utilized by the security IC. For example, a PUF-derived secret key is used to encrypt all information stored in the security IC's EEPROM memory. A security attack that retrieves the contents of the EEPROM is definitively thwarted as the contents are encrypted and the PUF key required for decryption cannot be extracted

Asymmetric and Symmetric Algorithms

Cryptographic algorithms lock or unlock cryptographic functions such as authentication, authorization, and encryption. There are two types of algorithms: symmetric and asymmetric. Symmetric algorithms

15

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

involve keys that are private between the sender and the receiver. Their shared keys are securely stored and never shared with anyone else.

The sender and receiver authenticate data using this shared key, which provides both with the assurance that the information source can be trusted. An asymmetric algorithm uses one key that's stored privately and a second that is public. Data signed with a private key can only be verified by its associated public key.

Advanced Encryption Standard (AES)

The AES algorithm is a fixed-width symmetric algorithm ideal for bulk encryption. It scrambles and substitutes input data based on the value of an input key in a reversible way, resulting in ciphertext (encrypted or encoded information). The input message is padded first to ensure that it will fit in "n" number of 128-bit blocks. Each 128-bit block is fed into the encryption algorithm along with an encryption key.

The algorithm then performs a certain number of rounds of obscuring the input block bits based on the number of bits in the encryption key. The obscuring consists of shuffling data bits, where portions of the data are substituted with values from a look-up table and XOR operations are performed to flip bits from 0 to 1 based on bit values in a set of round keys generated from the input encryption key. To unscramble the original input block data, the AES decryption function performs the reverse of the operations in the encryption function using the same encryption key.

As embedded designs, including battery-powered IoT sensor nodes, become more pervasive in our everyday lives, it's essential to ensure that they're protected against security threats. Today's security ICs are integrated with an array of cryptographic functions that make it easier to protect these designs without having to be a cryptography expert.
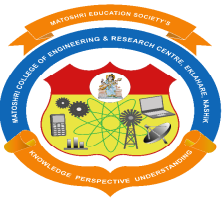
Introduction to the I2S Interface   D.D.Dighe

This article discusses the characteristics and applications of a serial communication protocol intended specifically for audio systems.

I2S and the Age of Digital Audio

The growing collection of commonly used electrical-engineering abbreviations can be a bit overwhelming at times, and I won't hold it against you if you've seen the term "I2S" a few times and just assumed that it was simply a typographically erroneous version of "I2C."

There is indeed some relationship between these two protocols. Both were initially developed by Philips Semiconductors (now NXP), and both begin with "I2" because they are intended for inter-IC communication. However, I2S was released after I2C, and whereas I2C is a generic interface, I2S is designed for transporting audio data—the "S" in the name stands for "sound."

I2S was created in the 1980s, when digital was beginning its conquest of the consumer-audio market. The stated purpose of I2S is to facilitate the development of audio electronics by means of a

16

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

standardized interface for transmission of digital data among ADCs, DACs, digital filters, digital signal processors, and other types of ICs used in audio systems. It is inherently a two-channel protocol, because it was designed for stereophonic sound (that's the fancy name for what we call "stereo").

Data is driven on the SD line, the state of the WS line corresponds to the audio channel (right or left) that is currently being transmitted, and the clock line carries the serial clock. As you can see in the diagram, the WS and SCK signals can be generated by the transmitter, the receiver, or a third-party controller component.

The following lists identify salient characteristics of the three I2S signals.

Serial Data (SD)

- Digital values are transmitted MSb first.
- Transmitter and receiver do not need to have an agreed-upon word length; the transmitter sends what it has, and the receiver takes what it can use.
- New data bits can be clocked out on the rising or falling edge of the clock. However, they must be clocked in on the rising edge, so the more straightforward approach here is the arrangement shown in the diagram below—i.e., we clock data out on the falling edge and we clock it in on the rising edge.
- The protocol does not include unused clock periods between words; the LSb of one word is followed immediately by the MSb of the next word.

Word Select (WS)

- A logic low on WS indicates that the word currently being transferred is part of the data stream for the left audio channel; logic high on WS indicates right-channel audio.
- To facilitate data handling on both the transmitter and the receiver side, the WS signal transitions **one clock period before** the completion of a data word:
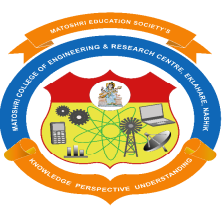
Clock

- The protocol does not specify a maximum data rate.
- The clock runs continuously.

I2C vs. I2S

If you're familiar with the I2C protocol, you may have realized by now that I2C and I2S are much less similar than their names would suggest.

I2C doesn't emphasize high data rates, and it involves handshaking features that allow it to function effectively and reliably in (potentially large) networks consisting of various different types of ICs. As conveyed by the following diagram, a lot of things can go wrong in this type of communication environment, and the complexity of the I2C protocol reflects the complexity of the task for which it is intended.

17

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

I2S, on the other hand, is designed to efficiently move a specific type of digital data. Transfer speed is more important, since real-time serialized transmission of high-resolution, two-channel audio requires much more bandwidth than communication tasks that are often accomplished via I2C (or UART).

The point-to-point nature of I2S transmission eliminates the need for I2C's pullup resistors, and using a third signal for word-level synchronization allows us to dispense with the protocol details that help I2C maintain data organization in a two-wire bus.

I2S is more like SPI than I2C. In fact, an SPI implementation intended for unidirectional data transmission uses essentially the same configuration: one signal for the clock, one for data, and a third for word-level synchronization.

I2S is an efficient, straightforward serial-communication protocol that is great for digitized audio. However, there's no law saying that it is **limited** to audio data. I used it years ago to implement a prototype software-defined radio; I2S offered transfer speed sufficient for baseband signals and was conveniently incorporated into the DSP development platform that I was working with.

Proximity Sensors: Reviewing the Different Technologies   Pranali Kaiche

Reference- www.google.com

Most commonly utilized as a no-touch method to provide either simple object detection or precise distance measurement to an object, there are now many technologies that fall under the proximity sensor hierarchy, each offering different operating principles, strengths, and drawbacks.
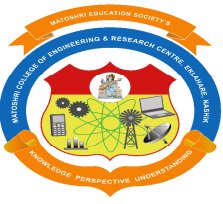
However, with such a variety of options available, how does an engineer choose the technology best suited for their design?

To aid designers in this process, this article will discuss four of the most popular proximity sensor technologies that would realistically fit in portable or small fixed embedded systems and are suitable for moderate ranges of detection from a few inches up to tens of feet:

- Ultrasonic
- Photoelectric
- Laser rangefinder
- Inductive sensors

Capacitive and Hall effect sensors are two other popular proximity sensor technologies that will not be considered here due to their typically limited use in very close-range detection scenarios.

Before delving into each of the four technologies highlighted above, it is important to note that no proximity sensor technology will offer a one-size-fits-all solution for every application and intended use. There are many factors to consider when selecting a proximity sensor technology such as cost, detection range, package size, refresh rate, and effect of materials.

18

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Understanding where each technology falls on the spectrum of these different factors and which are the most crucial to the end application will be key to making the right selection.

Ultrasonic Technology

Ultrasonic sensors generate ultrasonic pulses of sound and measure the time it takes for that pulse to bounce off an object and return. They can be used to calculate the distance to said object or simply detect its presence.

An ultrasonic sensor implementation can use either individual transmitter and receiver modules—wherein the transmitter emits a chirp and the receiver detects it—or the transmit and receive functions can be combined into a single module known as an ultrasonic transceiver. In implementations where separate transmitter and receiver modules are used, they are typically positioned as close together as possible for the greatest accuracy.

Due to their simple design, ultrasonic sensors are a low-cost option with a number of advantages that make them well suited for a wide array of applications. Capable of sending out hundreds of pulses per second, ultrasonic sensors are accurate with a high refresh rate.

Because ultrasonic sensors are based on sound rather than electromagnetic waves, the color and transparency of objects, as well as operation in light or dark environments, have no impact on accuracy or function. In addition, as sound waves spread over time, their detection area increases, which can be a strength or weakness based on the design needs.
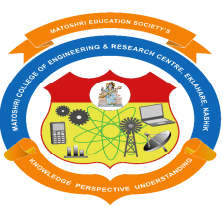
Although sound is not impacted by light or darkness, the speed of sound is impacted by changes in air temperature. Any dramatic changes in this temperature can greatly affect the accuracy of ultrasonic sensors. This can be offset by measuring the temperature in order to update any calculations, but this is still a limitation of the technology.

These sound waves can also be limited by soft or absorbent materials that do not allow sound to bounce off as efficiently. Lastly, ultrasonic sensors are not intended for underwater use and their dependence on sound waves means that they are non-functional in a vacuum where there is no medium for sound transmission. CUI Devices' blog, The Basics of Ultrasonic Sensors, covers this technology in further detail.

Photoelectric Technology

Most effective for absence or presence detection, photoelectric sensors are commonly recognized for their use in garage door sensors or occupant counting in stores, among other industrial, residential, and commercial applications. With no moving parts, photoelectric sensors generally have long product life cycles. They are able to sense most materials, but transparent objects or water could lead to issues.

They offer several different implementations: through-beam, retroreflective, and diffuse-reflective.

19

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

The through-beam implementation is what one might recognize as the garage door sensor mentioned above with a transmitter and receiver placed opposite from one another. Any break in the beam between these two points indicates to the sensor the presence of an object.

Laser Rangefinder Technology

Utilizing electromagnetic beams rather than sound waves, laser rangefinder sensors operate on similar principles as ultrasonic sensors. While this technology has become more economically viable in recent years, it is still a much more expensive option compared to ultrasonic and other technologies.

Laser rangefinder technology does have an extremely long detection range upwards of hundreds or thousands of feet, along with fast response times. Due to the speed of light being much faster than the speed of sound, time of flight measurements can be a challenge for laser rangefinder sensors. This is where implementations like interferometry can be utilized to lower cost and improve accuracy.

As mentioned earlier, laser range finding is by far the most expensive technology discussed in this article, making it less feasible for many engineers' bill of materials. The lasers used in this sensor technology also draw a lot of power, limiting its use in portable applications, while also exposing users to potential eye safety risks.

Depending on the intended application, a laser's relatively focused sensing area and lack of dispersion could be seen as an advantage or limitation. Laser rangefinders also do not perform well when dealing with water or glass.
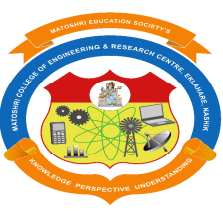
Inductive Technology

Although based on an older operating principle, inductive sensors have recently gained more widespread use. Unlike the other three technologies discussed thus far, however, inductive technology is only suitable for metallic objects.

Inductive sensors operate by detecting changes in its magnetic field as metallic objects come within its detection range. This is the basic operating principle of any metal detector.

Outside of the common metal detector, inductive sensors have a wide detection range typically in the realm of millimeters to meters. This could include close-range applications such as counting gear rotations or longer-range implementations like vehicle detection on roadways.

They perform best with ferrous materials (i.e., iron and steel), but can still detect non-magnetic objects with a reduced detection range. Inductive sensors also boast extremely fast refresh rates, simple operation, and flexibility in terms of their detection range. However, they are ultimately limited by what they can sense and are prone to interference from a variety of sources.

20

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Voice Controlled Air Purifier with Sleeping Aid   *M.N.Navale*

Reference- www.google.com

Air pollution is now a global problem and especially major cities. The air pollution levels in many cities usually reach pollution levels way beyond health air standards. Sleep deprivation is another problem that has resulted from busy schedules and stress. The solution to protect ones lungs while indoors lies in air purifiers.

Well here we develop a modern day air purifier which can be operated by just voice commands and also helps one sleep by playing relaxing sleep music when asked by user. The purifier is a perfect modern day air filtration unit that uses HEPA filtration with added UV to filter as well as kill any bacteria or viruses in the process.

The voice controlled air purifier provides the following advantages:

- HEPA filtration for dust & PM2.5 Pollution
- UV For Bacteria and virus killing
- Voice activated and shutoff
- Voice activated fan speed control
- Voice based pollution level notification via speech
- Voice activated sleep/relaxing music player
- Easy to use contactless operation

The air purifier achieves this functionality using HEPA filters, UV filter, Speaker Module, Mic, LCD Display, Fan, PM2.5 Sensor, Air quality Sensor and all this controlled by a raspberry Pi controller.
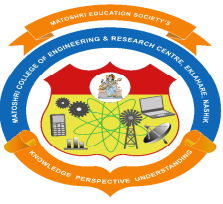
The system circuitry s powered by a dc power supply to run the purifier. The raspberry pi controller makes use of a microphone to listen to the users commands. The user may start or turn off the purifier by saying "Purifier Turn On" and "Purifier Turn Off". Also the user can control the purifier fan speed as desired using voice commands.

The user can also ask the purifier to speak out the current pollution levels in the room. The system on receiving this command speaks out the current PM2.5 and air quality levels to the user via the speaker. The user may also command to play sleep music upon which the raspberry controller plays sleeping music to help user sleep. The system makes use of speaker to speak or play music to the user and the mic to listen to users voice commands.

The purifier pulls in air through the bottom and throws out filtered air through the top mesh. The raspberry pi is used to listen to user commands and operate the fan and speaker to fulfil all functions of this multipurpose air purifier.

Components

- Raspberry Pi
- PM2.5 Sensor

21

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).
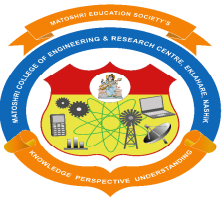
NAAC ACCREDITED

Technosavior

- Air Quality
- Fan
- Speaker
- Microphone
- HEPA Filter
- UV Filter
- LCD Display
- Power Port & DC power Adapter
- Resistors Capacitors
- Diodes & transistors
- Buttons & Switches
- Electrical & Wirings
- PCB Board
- Base frame
- Supporting Rods
- Steel Mesh
- Connectors
- Screws and Fittings

Application of DVR in Microgrid

Miss Varsharani Avhad , M.E. Second year (Power System

Electrical energy is the most efficient and popular form of energy and the modern society is heavily dependent on the electric supply. The life cannot be imagined without the supply of electricity. At the same time the quality and continuity of the electric power supplied is also very important for the efficient functioning of the end user equipment. Most of the commercial and industrial loads demand high quality uninterrupted power. Thus maintaining the qualitative power is of utmost important. The quality of the power is affected if there is any deviation in the voltage and frequency values at which the power is being supplied. This affects the performance and life time of the end user equipment. Electrical power quality is the degree of any deviation from the nominal values of the voltage magnitude and frequency. Power Quality problems concerning frequency deviation and voltage magnitude deviations because of the presence of harmonics and voltage fluctuations. Other voltage problems are the voltage sags, short interruptions and transient over voltages.

During last some yearss, the DC microgrids have taken a lot more attentions of researchers who are interested research on a DC microgrid. A DC microgrid generally contains the renewable energy sources for example PV array, wind energy, energy storage systems, such as the battery and supercapacitor. Gererally, the microgrids can work in two mode which is isolated mode or grid connected mode. A grid

22

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).
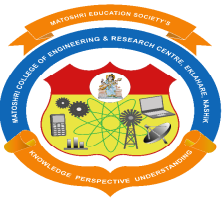
NAAC ACCREDITED

Technosavior

interfacing power quality compensator contains the shunt and series inverters are connected to the microgrid DC link to improve the power quality for the line currents and load voltages. The proposed system solve the effects resulting from the unbalanced utility grid voltages. Similarly, the dynamic voltage restorer (DVR) has been presented into mitigate the voltage sag and voltage swell. Normally, the DVR is constituted by a voltage source inverter (VSI) with an output filter and a series-connected transformer. The LC filter is extensively utilized as the output filter in DVR. Moreover, it is reported in that the LC filter with a damping resistor in series with the capacitor can improve the performance excellently of the DVR, so that the power loss incurred by the resistor can be neglected.

Moreover, the DVR is usually supplied by the energy storage. Recently, the renewable energy sources, for example PV, are adopted to power the DVR. In the PV-DVR system has been proposed with different operation mode, and the PV array is working maximum power point tracking (MPPT) mode. Moreover, a battery is adopted for the energy conversation when excess power is generated by the PV array. The DVR is normally controlled by the conventional methods, such as PWM method and hysteretic control method.

It is predictive voltage control method for a tranformerless DVR (TDVR) has been proposed. With the proposed method and TDVR, the load voltage can be maintained at the target value under the conditions of voltage disturbances, unbalanced and nonlinear loads. Actually, the extensive applications of the model predictive control (MPC) for power electronics have been reported, including and converters and inverters. The advantage of MPC is fast dynamic response, so that achieving the regulation of DVR for mitigation of the voltage sag and swell is promising. Additionally, the MPC method has the feature of capability of incorporating constraints, no modulator, varying switching frequency, but high computational requirement.

To design, demonstrate and evaluate the Dynamic Voltage Restorer for voltage sag and swell mitigation purpose, with several advantages when compared to with another systems. For voltage sag and swell mitigation purpose we are using Dynamic voltage restorer (DVR) with integrated DC microgrid. The co-ordination of Dynamic voltage restorer with DC microgrid includes PV array and hybrid energy storage system which contains lithium ion battery and super capacitor used to mitigate the voltage sag and swell for efficient power quality of the main grid system. The Dynamic voltage restorer dynamically regulates bus voltage of the grid for various loading conditions.

In conventional DVR system dynamic voltage restorer is supplied by the DC link capacitor or only battery storage system because of that DVR system have some limitations. So self supported DVR or battery supported DVR not work properly for the long duration of time of faulty condition. Because of that integrated DC microgrid with DVR system is proposes. This system proposes a DC microgrid integrated DVR system to mitigate the voltage sag and swell at grid side. In this system DC microgrid consists of PV panel, a lithium ion battery and also a super capacitor and this microgrid system supply the DVR which is regulated by the MPC control. In this system when voltage sag or swell occurs

23

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

because of sudden load change or switching operations on load side or grid side then DVR system injects the required magnitude voltage into the grid by using its DC storage system which is converted into AC with the help of a voltage source inverter. If any harmonics are available in the injected signal then it will removed by the LC filter which is connected after the voltage source inverter (VSI). In this proposed system DVR is controlled with the model predictive control which is more efficient than the PI controller system. Compared to the conventional pure energy storage powered DVR, the operation of the proposed system can be extended because of the combination of renewable energy source and hybrid energy storage devices.

> *Fault Ride Through Capability of Grid Connected PV System with Enhanced Energy Storage Systems"*
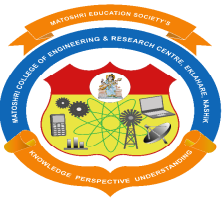>
> *Miss Madhuri Gullapalli, ME Second year (Power System)*

The electric power systems are generally experiencing different trends which may imply major changes in their architecture and operation. They are facing several issues because of integration of renewable energy sources, energy market restructuring, increasing environmental awareness and rising concerns about security of energy supply.

Nowadays, increasing the power system capacity is frequently a challenging option due to economic, environmental, and political constraints that hinder the construction of large power plants and high voltage lines. The aforementioned concerns encourage the use of distributed generation (DG) in which the energy sources are installed close to the end users. Renewable energies with their in sources (like sun and wind) and the lowest impact on the environment are the _rst choice for the primary power of DG units. The increasing penetration of renewable and clean DG in utility distribution grids gives rise to the concept of microgrids.

Microgrids which consist of renewable DG play an important role in minimizing the transmission line stress as they are located near the loads and consumers. The disadvantage of these renewable energy sources is that they are intermittent in nature and their output is unpredictable. Microgrids need to be equipped with energy storage de vices with frequent charging and discharging to reduce the intermittency in the generated power and to maintain microgrid internal instantaneous power balance, improve power quality, and ensure user load power supply reliability.

In a Microgrid with renewable energy sources, the objective is to transfer the maximum possible power. In grid connected mode, since the voltage magnitude and frequency are adapted from the main grid, the controller objectives are different from autonomous operation mode. In grid connected mode the output active and reactive power or input DC link voltage magnitude can be controlled. In autonomous mode, along with the power balance between the loads and the sources, the voltage magnitude and frequency should be controlled.

24

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).
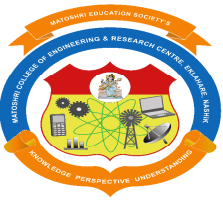
NAAC ACCREDITED

Technosavior

Recent developments and advances in energy storage and power electronics technologies are making the application of energy storage technologies a viable solution for microgrid applications . The energy storage systems in microgrid can be batteries, flywheels, super-conducting magnetic energy storage (SMES) or supercapacitor energy storage system (SCESS). An energy storage technology usually includes a power conversion unit to convert the energy from one form to another. Two factors characterize the application of an energy storage technology. One is the amount of energy that can be stored in the device which is a characteristic of the storage device itself. Another is the rate at which energy can be transferred into or out of the storage device.

Given this brief background, this project thesis proposes a control strategy that can minimize the power fluctuations in microgrids consisting of renewable energy sources such as solar. Among the energy storage systems supercapacitor energy storage system (SCESS) is proposed as it has high power density. Linear and non-linear models of grid connected PV systems is developed and optimal design of the control parameters are carried out. The power electronics blocks that are used to integrate the renewable sources to the grid are designed. The optimal SCESS to minimize the uctuation and the charging and discharging controllers are designed. The fault ride through capability of the microgrid with and without SCESS is designed and results are provided to verify the efficiency of the proposed controllers.

Organic Solar Cell New Light on Sustainability

Dr. Rakesh G. Shriwastava

In an impressive feat of engineering, scientists in Denmark have devised a rapid, scalable and industrially viable way to manufacture large sheets of flexible organic tandem solar cells. Their successful application of roll-to-roll processing is a significant achievement for this emerging renewable technology. An Organic Photovoltaic (OPV) solar cell is a polymer-based thin film solar cell. OPV solar cells have been the focus of much research as they are lightweight, flexible, inexpensive, highly tunable and potentially disposable. They are also unparalleled in the number of times that they can pay back the energy used in their manufacture. In the quest to improve the efficiency of OPVs, which, in addition to operational lifetime, is currently their key limitation, various new materials, processing methods and device architectures have been thoroughly investigated. Among these is the tandem cell, where multiple junctions are stacked upon one another. This can increase the efficiency of the cell by not only increasing the number of junctions, but, along with careful selection of complementary materials, can make it possible to harvest photons from a broader region of the spectrum. However, this more complicated architecture renders their manufacture significantly more challenging. Frederik Krebs and his research team at the Technical University of Denmark are specialists in renewable energy technologies, particularly OPVs. For the first time they have demonstrated the successful roll-to-roll manufacture of tandem OPV modules, each comprised of a stack of 14 discrete layers, which are rapidly printed, coated or deposited one on top of another by a machine reminiscent of a printing press. The

25

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

experiment was carried out in simple conditions and is extremely fast, with a single solar cell module being printed onto blank foil each second. Most importantly, the process is relatively cheap and completely scalable, with a high technical yield. 'If I have made a kilometre of solar cells, then I am not interested if one module has an efficiency of 10% and the rest are 2% – I think what is important is what you can make for the public,' says Krebs. 'I am the guy that makes a lot of it and tries to look for the average and what is practical, and then there are the other guys that look at what is obtainable. Everybody has their role to play and hopefully we will meet some day, probably somewhere in the middle.' 'The performance from these fabricated devices has a long way to go to achieve commercial viability, 'states Seth Darling, an expert in solar energy conversion at Argonne National Laboratory, US, 'but this work clearly shows that the process itself is feasible and has the potential for genuine market impact.' The future direction of this research now lies in materials development, and in the optimization of each layer for the manufacturing process.

DIGITAL CONTROL SYSTEM AND ITS APPLICATIONS

Ms. Saroj Kokne

In most modern engineering systems, it is necessary to control the evolution with time of one or more of the system variables. Controllers are required to ensure satisfactory transient and steady-state behavior for these engineering systems. To guarantee satisfactory performance in the presence of disturbances and model uncertainty, most controllers in use today employ some form of negative feedback. A sensor is needed to measure the controlled variable and compare its behavior to a reference signal. Control action is based on an error signal defined as the difference between the reference and the actual values.

The controller that manipulates the error signal to determine the desired control action has classically been an analog system, which includes electrical, fluid, pneumatic, or mechanical components. These systems all have analog inputs and outputs (i.e., their input and output signals are defined over a continuous time interval and have values that are defined over a continuous range of amplitudes). In the past few decades, analog controllers have often been replaced by digital controllers whose inputs and outputs are defined at discrete time instances. The digital controllers are in the form of digital circuits, digital computers, or microprocessors.

Intuitively, one would think that controllers that continuously monitor the output of a system would be superior to those that base their control on sampled values of the output. It would seem that control variables (controller outputs) that change continuously would achieve better control than those that change periodically. This is in fact true! Had all other factors been identical for digital and analog control, analog control would be superior to digital control. What, then, is the reason behind the change from analog to digital that has occurred over the past few decades?

Why digital control?

Digital control offers distinct advantages over analog control that explain its popularity.

26

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Accuracy: Accuracy of digital signal is high as they are represented in terms of zeros and ones which minimizes error as compared to analog signals, where noise and power supply drift are always present.

Flexibility : A digital controller is easy to modify or redesign without a complete replacement of the original controller.

Speed : This increase in processing speed has made it possible to sample and process control signals at very high speeds.
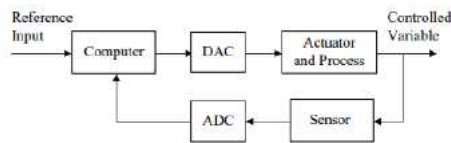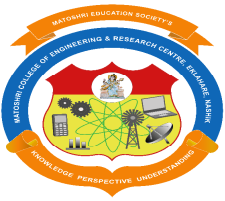
The structure of a digital control system:

Fig.1 Configuration of a digital control system.

To control a physical system or process using a digital controller, the controller must receive measurements from the system, process them, and then send control signals to the actuator that effects the control action. In almost all applications, both the plant and the actuator are analog systems. This is a situation where the controller and the controlled do not "speak the same language," and some form of translation is required. The translation from controller language (digital) to physical process language (analog) is performed by a digital-to-analog converter, or DAC. The translation from process language to digital controller language is performed by an analog-to-digital converter, or ADC. A sensor is needed to monitor the controlled variable for feedback control. The combination of the elements discussed here in a control loop is shown in Figure 1.

POWER QUALITY IMPROVEMENT BY POWER FILTER

Mr. C. R. Shinde

In recent year power system is turn towards smart grid and micro grid i.e renewable energy sources are integrated with utility grid system and hence various power electronics and non-linear lodes are used which leads to power quality problems in power system. the critical issue of power quality problem is harmonics present in power systems so for power quality improvement various power filters are used. this I m going to review recently published paper in ieee on power quality improvement by using various power filter and control strategies. As we know there are mainly three type of power filter are available to reduced THD, which are active power filter ,passive power filter and hybrid power filter and recently used inductively active power filter. all researcher trying to reduced THD below 2% and by using various type controller such as P,PI,PID controller, Hysteresis current control, fuzzy logic controller, adaptive controller, PSO for MPPT,ANN Techniques,UPQC, SMC, least squares harmonic extraction technique. Also various custom power devices such as DSTATCOM, DVR, etc

27

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

INTRODUCTION

Due to the advancement of technology, industrial structure reforming, and the development of smart grid technology recently, people have a higher demand for improved power quality . However, with the proliferation and increased use of power electronics devices and motor loading, it is becoming more difficult to achieve this goal. In mid 1940s, passive power filters (PPF) were developed to suppress current harmonics and compensate reactivepower . In 1976, active power filters (APF) were developed to compensation harmonics. HAPFs are more attractive in harmonic filtering than pure APFs from both viability and economical view. To achieve the best performance, the united power quality converter (UPQC), has been developed with an extremely high cost During 1967-2005, HAPFs are mainly applied to traditional industry, such as steel furnace, ASD, etc. Most research works focus on basic and single function, just harmonic compensating. After 2005, many researchers focus on the development of application, optimal design, and dynamic reactive power compensating. Some literatures have discussed the feasibility of HAPF in railway, wind farm, and photovoltaic generator. As the price and operatingloss of power electronic switcher limit the performance of HAPF, many researchers have proposed optimal design method in parameter selection, control method, and structures.
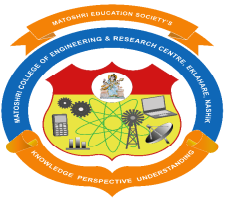
Power Quality Issues

Approximately 70 to 80% of all power quality related problem can be contributed to faulty connection and/or wiring. Power frequency disturbances, electromagnetic interferences, transient, harmonics and low poor factor are the other categories of PQ problems that are related to source of supply and load types. Survey reported of 8european country cost due to PQ issues found that 150bn Euros. Its huge cost so necessary to mitigates PQ issues.

General Control Algorithms

Its seen that the mathematical algorithm is required to analysis harmonic component is same in all references hence we called here as "GENERAL CONTROL ALGORITHMS" which is "p-q Instantaneous Real and Reactive Power Theory & another is d-q generalized theory"

POWER QUALITY IMPROVEMENT BY POWER FILTER'S

In this paper, (voltage dip) and momentary rise in voltage (voltage swell) are discussed and they are nullified using Dynamic Voltage Restorer (DVR), in order to mitigate voltage sags and swells in low voltage distribution systems. Dynamic Voltage Restorer can provide the most cost effective solution to mitigate voltage sags and swells that is required by customer also this research paper give comparison of DVR over DSTATCOM & UPQC.[3] In this article, Comprehensive analysis of the operation and control of DSTATCOM using both PI and Fuzzy logic controller as seen from result fuzzy logic controller gives more correct response but very closed with PI controller [4] In this paper, APF are act as current source which injects an anti-phase but equal magnitude to the harmonic and reactive load current to eliminate the harmonic and reactive components of the supply current in distribution system. These active filters have limitations in medium and high voltage application due to semiconductor's reverse

28

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

voltage rating constraint, and use of high rated transformers consequently system becomes inefficient, costly and bulky. Cascade seven level inverter based SAPF is a viable solution in medium and THDs are lowered down to less than 5%,after compensation THD is 1.98%, we will investigate the effect of using an APF to improve the output power quality of a simplified synchronous generator (SSG) with distorted back-EMF. A Matlab Simulink model for the SSG is built to simulate all the system, the APF and the proposed generator. Using an APF, simulation and experimental results show significant improvements in generator output current and reduced the THD in the system. High voltage applications as these provide high output voltages with less voltage rating of individual device. It also able to achieve the required voltage levels using low voltage rating devices which eliminates the need of transformer to feed the power to high voltage distribution network.

CONCLUSIONS

We firstly Concluded that Custom power devices (CPD) like DSTATCOM, DVR is effectively reduced THD but only for Load side and hence PQ problem of supply side is remains as it is [3], Then we used power filters also reduced harmonics upto standard THD 2% but only for load side. the only proposed power filtering technique namely as "inductively active power filter" technique reduced harmonics from both side power supply & load side but %THD is only upto 4.71% that is only disadvantage[13]. Then secondly we conclude that out of controller, PI controller and fuzzy controller is good but with PI-SMC controller improves THD upto 0.37%[15].Finally we concluded that for mathematical analysis AC to DC domain and vice versa is must for detection of harmonic component hence p-q & d-q algorithms generalized & important for power quality improvement using power filter.

Chatbot   *Ms. Pranjali Jadhav*
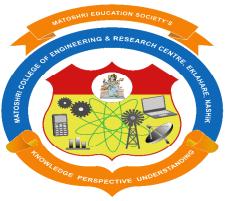
What Is a Chatbot?

A chatbot is a computer program that simulates human conversation through voice commands or text chats or both. Chatbot, short for chatterbot, is an **Artificial Intelligence (AI)** feature that can be embedded and used through any major messaging applications. There are a number of synonyms for chatbot, including "talkbot," "bot," "IM bot," "interactive agent" or "artificial conversation entity."

Understanding Chatbot

The progressive advance of technology has seen an increase in businesses moving from traditional to digital platforms to transact with consumers. Convenience through technology is being carried out by businesses by implementing Artificial Intelligence (AI) techniques on their digital platforms. One AI technique that is growing in its application and use is chatbots. Some examples of chatbot technology are virtual assistants like Amazon's Alexa and Google Assistant, and messaging apps, such as WeChat and Facebook messenger.

Chatbot in Use

29

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).
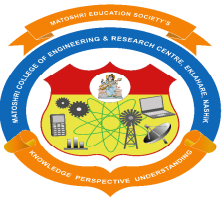
NAAC ACCREDITED

Technosavior

A chatbot is an automated program that interacts with customers like a human would and cost little to nothing to engage with. Chatbots attend to customers at all times of the day and week and are not limited by time or a physical location. This makes its implementation appealing to a lot of businesses that may not have the manpower or financial resources to keep employees working around the clock.

A chatbot works in a couple of ways: set guidelines and **machine learning**. A chatbot that functions with a set of guidelines in place is limited in its conversation. It can only respond to a set number of requests and vocabulary and is only as intelligent as its programming code. An example of a limited bot is an automated banking bot that asks the caller some questions to understand what the caller wants to be done. The bot would make a command like "Please tell me what I can do for you by saying account balances, account transfer, or bill payment." If the customer responds with "credit card balance," the bot would not understand the request and would proceed to either repeat the command or transfer the caller to a human assistant.

How Chatbots Function

A chatbot that functions through machine learning has an **artificial neural network** inspired by the neural nodes of the human brain. The bot is programmed to self-learn as it is introduced to new dialogues and words. In effect, as a chatbot receives new voice or textual dialogues, the number of inquiries that it can reply and the accuracy of each response it gives increases. Facebook has a machine learning chatbot that creates a platform for companies to interact with their consumers through the Facebook Messenger application. Using the Messenger bot, users can buy shoes from Spring, order a ride from Uber, and have election conversations with the New York Times which used the Messenger bot to cover the 2016 presidential election between Hilary Clinton and Donald Trump. If a user asked the New York Times through the app a question like "What's new today?" or "What do the polls say?" the bot would reply to the request.

Chatbots are used in a variety of sectors and built for different purposes. There are retail bots designed to pick and order groceries, weather bots that give you weather forecasts of the day or week, and simply friendly bots that just talk to people in need of a friend. The fintech sector also uses chatbots to make consumers' inquiries and application for financial services easier. A small business lender in Montreal, Thinking Capital, uses a virtual assistant to provide customers with 24/7 assistance through the Facebook Messenger. A small business hoping to get a loan from the company need only answer key qualification questions asked by the bot in order to be deemed eligible to receive up to $300,000 in financing.

30

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Computer Communication Network Device

Pranit Bharate ,SE Computer Engineering

Communications networks are used to transport information (data) exchanged between end systems with the ultimate goal of supporting a variety of services and distributed applications • Networks were initially designed and optimized for a specific service – The telephone network for the voice service – Broadcast networks for distribution of radio and TV programs – Computer networks for exchange of data among computers to support applications like remote access, file transfer, e-mail, etc. • The current trend is towards carrying traffic (flows) of different applications or services in the same network infrastructure – The concept of service integration in public networks started with ISDN (Integrated Services Digital Network), which was an evolution of the digital telephone network IDN (Integrated Digital Network), and was extended to support BISDN (Broadband ISDN), which was the driving force behind the development of ATM (Asynchronous Transfer Mode) – The Internet was designed for carrying data traffic (on a best effort basis) but is becoming the universal infrastructure for carrying any type of traffic, such as VoIP (Voice over IP), video streaming, etc. The project was aimed at providing an efficient and reliable computer communications system (using message switching techniques) in which computer resources such as programs, data, storage, special purpose hardware etc., could be shared among computers and among many users. The variety of design methods, ranging from theoretical modeling to hardware development, were primarily employed independently, although cooperative efforts among designers occurred on occasion. As of November, 1971, the network has been an operational facility for many months, with about 20 participating sites, a network information center accessible via the net, and well over a hundred researchers, system programmers, computer center directors and other technical and administrative personnel involved in its operation
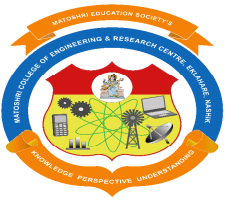
References:-

1. P Baran S Boehm P Smith On distributed communications Series of 11 reports by Rand Corporation Santa Monica California 1964

2. "Specifications for the interconnection of a Host and an IMP BBN Report No 1822 1971 revision

SPEECH RECOGNITION   Poonam Dholi

Language is man's most important means of communication and speech its primary medium. Spoken interaction both between human interlocutors and between humans and machines is inescapably embedded in the laws and conditions of Communication, which comprise the encoding and decoding of meaning as well as the mere transmission of messages over an acoustical channel. Here we deal with this interaction between the man and machine through synthesis and recognition applications. Speech recognition, involves capturing and digitizing the sound waves, converting them to basic language units

31

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

or phonemes, constructing words from phonemes, and contextually analyzing the words to ensure correct spelling for words that sound alike.

Speech Recognition is the ability of a computer to recognize general, naturally flowing utterances from a wide variety of users. It recognizes the caller's answers to move along the flow of the call. Speech recognition allows you to povide input to a system with your voice. Just like clicking with your mouse, typing on your keyboard, or pressing a key on the phone keypad provides input to an application, speech recognition allows you to provide input by talking. In the desktop world, you need a microphone to be able to do this.

SPEECH RECOGNITION

Speech recognition (or sometimes referred to as Automatic Speech Recognition) is the process by which a computer (or other type of machine) identifies spoken words. Basically, it means talking to a computer & having it correctly understand what you are saying. By "understand" we mean, the application to react appropriately or to convert the input speech to another medium of conversation which is further perceivable by another application that can process it properly & provide the user the required result. The days when you had to keep staring at the computer screen and frantically hit the key or click the mouse for the computer to respond to your commands may soon be a things of past.

Today we can stretch out and relax and tell your computer to do your bidding. This has been made possible by the ASR (Automatic Speech Recognition) technology. Speech recognition is an alternative to traditional methods of interacting with a computer, such as textual input through a keyboard. An effective system can replace, or reduce the reliability on, standard keyboard and mouse input. This can especially assist the following: People who have little keyboard skills or experience, who are slow typists, or do not have the time or resources to develop keyboard skills.
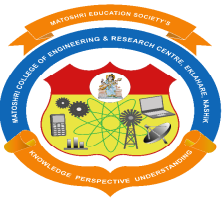
SPEECH RECOGNITION

- Dyslexic people or others who have problems with character or word use and manipulation in a textual form.
- People with physical disabilities that affect either their data entry, or ability to read (and therefore check) what they have entered.

IT web and software development services   *Yogita Labade*

In today's world, mobile and Web Development provides an effective and robust medium, which are used for communicating and delivering content to our customers and clients. Web applications are

32

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).
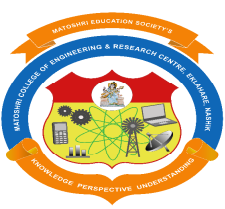
NAAC ACCREDITED

Technosavior

also extremely important for successful PR, marketing, and customer relationship management strategies. The **software development life cycle (SDLC)**, is considered as a framework that defines a set of tasks to be performed at each step in the software development process. The life cycle also defines a methodology for improving the quality of software and also the overall development process.They also provides a structure to be followed by the organizations development team. This structure consists of a detailed plan describing how to develop, maintain and replace specific software and so on.

The **software development** life cycle includes many different processes requirement gathering and analysis, Design, Implementation or coding, Testing, Deployment and Maintenance etc. The first step is to gather the business requirements of the project. The software engineering should team meets with the clients and stack holders of the project to find exactly what are their requirements for the project. To get this information they start by asking them general questions about it such as, who is the targeted market of the project, What the system will be used for, what are the expected outputs from the system etc. Before moving to the next one, all these questions must be answered. After collecting all those requirements for the project, the requirements get analyzed and checked for their validity and if it's possible to achieve these requirements and include them in the system. There include many tests such as unit test, integration test, system test etc. A unit test is an automated piece of code that invokes a unit of work in the system . They checks a single assumption about the behavior of that unit of work and there exist two type of unit testing static and dynamic unit testing .

Static Unit test is a software development process to Examination the code over all possible but the dynamic unit testing is a program unit is actually executed and its outcomes are observed. Static and dynamic unit testing complement in nature and in practice dynamic and static unit testing are performed concurrently ,and JUNIT testing is an example to the unit testing. Static unit testing is not an alternative to dynamic unit testing. Integration testing detects problems that occur when unit are combined and the every error occur when the unit are combined are likely related to the interface between units. System testing is top level of the software testing process. The software development process make use of many models that are used by widely by various organizations, some of these models include the Waterfall Model, V-Shaped Model,Spiral Method (SDM), Iterative and Incremental Method etc. Understanding the systems behavior and the parameters affecting the performance is essential to the company's management is the main thing needed for software development

- This Article References By :-
  https://medium.com/@niyajohn9495/it-web-and-software-development-services-e6e6b6f2d39

33

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

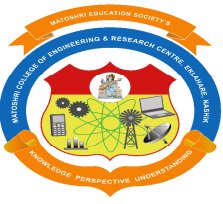| Biological Computers	Ms. Alpana Borse

Biological computers have emerged as an interdisciplinary field that draws together molecular biology, chemistry, computer science and mathematics. The highly predictable hybridization chemistry of DNA, the ability to completely control the length and content of oligonucleotides, and the wealth of enzymes available for modification of the DNA, make the use of nucleic acids an attractive candidate for all of these nanoscale applications.A 'DNA computer' has been used for the first time to find the only correct answer from over a million possible solutions to a computational problem. Leonard Adleman of the University of Southern California in the US and colleagues used different strands of DNA to represent the 20 variables in their problem, which could be the most complex task ever solved without a conventional computer. The researchers believe that the complexity of the structure of biological molecules could allow DNA computers to outperform their electronic counterparts in future.

Scientists have previously used DNA computers to crack computational problems with up to nine variables, which involves selecting the correct answer from 512 possible solutions. But now Adleman's team has shown that a similar technique can solve a problem with 20 variables, which has 220 - or 1 048 576 - possible solutions.Adleman and colleagues chose an 'exponential time' problem, in which each extra variable doubles the amount of computation needed. This is known as an NP-complete problem, and is notoriously difficult to solve for a large number of variables. Other NP-complete problems include the 'travelling salesman' problem - in which a salesman has to find the shortest route between a number of cities - and the calculation of interactions between many atoms or molecules.

Adleman and co-workers expressed their problem as a string of 24 'clauses', each of which specified a certain combination of 'true' and 'false' for three of the 20 variables. The team then assigned two short strands of specially encoded DNA to all 20 variables, representing 'true' and 'false' for each one.

In the experiment, each of the 24 clauses is represented by a gel-filled glass cell. The strands of DNA corresponding to the variables - and their 'true' or 'false' state - in each clause were then placed in the cells.Each of the possible 1,048,576 solutions were then represented by much longer strands of specially encoded DNA, which Adleman's team added to the first cell. If a long strand had a 'subsequence' that complemented all three short strands, it bound to them. But otherwise it passed through the cell.

To move on to the second clause of the formula, a fresh set of long strands was sent into the second cell, which trapped any long strand with a 'subsequence' complementary to all three of its short strands. This process was repeated until a complete set of long strands had been added to all 24 cells, corresponding to the 24 clauses. The long strands captured in the cells were collected at the end of the experiment, and these represented the solution to the problem.

34

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

"NUMERICAL ANALYSIS OF STONE COLUMN FOUNDATION FOR CIRCULAR STORAGE TANK"
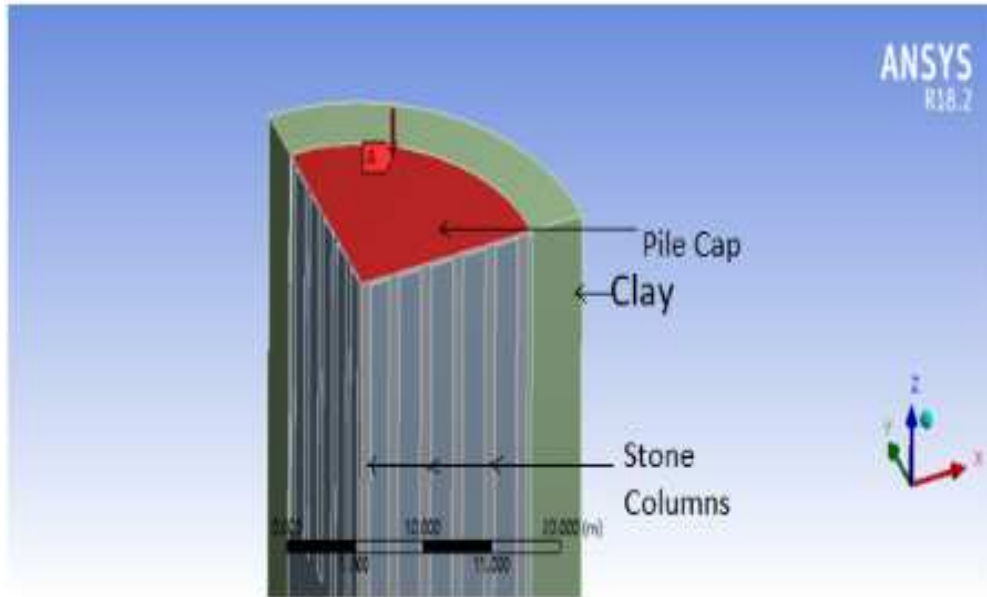### Ms. P. G. Baviskar

A cylindrical storage tank is a simple structure. The process involves installation of stone columns into the ground so that the overall stiffness of the ground gets increased. It has been found, after loading the internally arranged group of stone column experienced more settlement or stress than column at the edge. The cost of the conventional pile foundation with a reinforced concrete cap can be extremely high in relation to the cost of the tank i.e. the cost will be high while using the pile foundation so the alternate option for oil storage tank foundation is using the stone column. And as an alternate to a concrete cap, a layer of crushed rock of other granular soils is sometimes placed directly above the piles. There have been very less number of studies carried out on stone column foundation used under the storage tank. Generally the case studies are mostly seen for the storage tank and few investigations have been done using finite element methods. Numerous researches carried out on the stone column foundation under the large storage tank with granular cushion but there is no investigation done related to the gravel cushion on the group of stone column similarly less investigation done related to no. of stone column, arrangements of stone column and different spacing of stone column. The study aims to overcome the non-uniform stress distribution at gravel cushion pile cap and to analyse less deformation of stone column below circular oil storage tank by considering various parameters.

In this study we can carry three dimensional numerical analysis of stone column foundation below storage tank to improve the bearing capacity, minimize the vertical settlement, deformation and equivalent stress of the foundation using different parameters. The study shows deformation result for chromatic parameters such as diameter (0.8m, 1.0m, 1.2m, 1.4m), depth (18m, 20m, 22m, 24m, 26m), spacing (2.5m, 2.75m, 3m, 3.17m), pattern (circular, Square, triangular) & number of stone column (41no., 61no., 81no.) as well as the pile cap of 2m thickness. By using this parameter optimum case will be found with less deformation and equivalent stress. This reinforcement technology consists of the crushed stone material as a stone column and gravel cap (i.e. pile cap) having different properties & ANSYS is finite element software package is use for analysis purpose of deformation and equivalent The stone column foundation is support the oil storage tank and increases the strength and stability of the soil. The stone column is used to reduce the settlement of the subsurface soil. In this paper we can use, three dimensional finite element analysis i.e. ANSYS were performed to check the deformation of stone column and soil present at site as well as to check the equivalent stress of stone column and soil.

35

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior
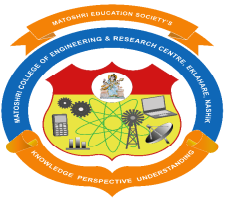
stress of stone column

..

"PROPERTIES OF SELF-COMPACTING CONCRETE WITH BASALT FIBER"

Ms. P. G. Baviskar

The major demand to design and preparation of a new generation of concretes is to give them good workability during the concreting process. Self-Compacting Concrete (SCC) is one of the most innovative materials in modern concrete technology. Using mineral additives in its composition provides change of the properties of concrete and provides significant economic benefits; moreover it is also an important element in the strategy of sustainable development.

Production and maintenance of concrete structures are accompanied by cracking, due to several reasons. Cracks, deformation or damage may be caused by shock, vibration and other dynamic loads; errors in calculations and reinforcement; disturbance of thermal processing and assembly technology; heterogeneity of strength, elasticity and stiffness of the materials used; and the loss of strength of the base. Each of these factors is most intensive at different stages of concrete hardening, and therefore their impact on the durability of concrete elements varies. The development of defects over time significantly affects the stress-deformed state of structural elements.

It is possible to prevent all the above mentioned causes of cracking in concrete or to reduce the degree of their influence on material properties by use of self compacting fiber reinforced concrete. Therefore, it is essential to study the influence of fibers on the properties of self-compacting concrete mixtures and concretes based on them.

36

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

The use of this composite will successfully resolve a number of specialized tasks: strengthening of bridge structures, runways, industrial concrete floors and others. Currently, the restraining factors in the process of implementation of reinforcement of concrete products with glass, polymeric, metallic fibers is low chemical resistance of these fibers in the environment of hardening cement paste, the high cost of synthetic fibers, with their low efficiency, and deficiency of metal fibers. All these flaws are completely absent in the basalt fiber.Using basalt fiber allows to a large extent to offset the major disadvantages of concrete - low tensile strength and fragility. Use of basalt fibers increases frost resistance, heat resistance, abrasion resistance, moisture resistance of the material; and three-dimensional reinforcement is provided, shrinkage deformations are reduced, significantly increases the fracture toughness, impact strength.

The use of this natural fibre is promising and there is much more to explore on behavior of this fibre in self compacting concrete. There will also be an advantage cost factor with acceptable strength as compared to other fibres. The work could be done on the properties of SCC added with basalt fibre depending on its orientation, distribution and different lengths.
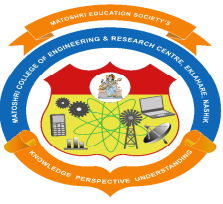

Process optimization for defluoridation by used tea powder and its activated carbon form using Taguchi method

Pallavi Davkhar

Fluoride is one of the most potent groundwater pollutants. Increasing fluoride concentration in groundwater has already become a serious problem across the globe. In India several states like Assam, Bihar, West Bengal, Rajasthan, Andhra Pradesh, Uttar Pradesh, Punjab, Orissa etc. are affected by high fluoride concentration in groundwater. Fluoride concentration between 0.5-1.5mg/L is beneficial, especially to infants for the prevention of dental caries or tooth decay, but concentration above 1.5 mg/L causes various forms of fluorosis, which include dental, skeletal and non-skeletal manifestation.

Various technologies have been developed for defluoridation from drinking water by coagulation, membrane filtration, ion exchange etc. But due to high cost for processing such technology may not be appropriate for developing countries. Therefore there is a great need for environmental friendly and low cost technology. One such low cost technology is adsorption and which is effective for defluoridation.

Different types of adsorbents are used for defluoridation. Researchers mostly focusing on use of inexpensive and waste materials such as corn cob, clays, rice husk, cow dung etc. So, the present study investigates potential use of used tea powder for defluoridation from water. The batch adsorption studies were conducted using synthetic water. The aim of this study is to device simple and cheap defluoridation method that could be easily adopted in urban and rural communities.

37

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Study on grey water treatment by adsorption

Mayuri Jadhav B.E. Civil

Grey water is all wastewater that is discharged from a house, excluding blackwater (toilet water). This includes water from showers, bathtubs, sinks, kitchen, dishwashers and washing machines. It commonly contains soap, shampoo, toothpaste, food scraps, cooking oils, detergents. Treated grey water that fulfills the requirements can be viewed as a sustainable source of irrigation or service water, especially in water scarce countries. The health risks relating to grey water are well known, but are concerned low compared with those associated with sewage water.

Among the possible techniques, primary treatment contains a sedimentation tank that is used to coarsely screen out oils/greases and solids. In secondary treatment system, chemical and biological treatment processes are used to remove most of the organic matter such as filtration and constructed wetlands. Tertiary treatment involves Fixed film biological rotating drums, membrane bioreactors, biologically aerated filters, activated sludge and membrane treatment.

For grey water treatment the adsorption process by solid adsorbents shows potential as one of the most efficient methods for the treatment and removal of organic contaminants in wastewater treatment. Adsorption has advantages over the other methods because of simple design and can involve low investment in term of both initial cost and land required.

The adsorption is widely used for treatment of industrial wastewater from organic and inorganic pollutants and meets the great attention from the researchers. In recent years, the search for low-cost adsorbents has intensified. Materials locally available such as natural materials, agricultural wastes and industrial wastes can be utilized as low-cost adsorbents. Activated carbon produced from these materials can be used as adsorbent for water and wastewater treatment.

USE OF ECC BY PARTIAL REPLACING CEMENTWITH SLAG SAND

Mrs. S. T.Borole

ECC is developed by Dr.Victor .C. Li at the University of Michigan. ECC is made up from basic ingredients cement, silica sand, Poly Vinyl Alcohol (PVA) Fiber, superplasticizer. Fly ash, slag, silica fume is also used with cement to increase paste content.

Engineered Cementitious Composite (ECC) is application at construction sites. It should also check the possibility of partial replacement of cement and sand with slag sand obtained as waste product by the iron industries to developed in 2001 by Vector . C. Li to increase the ductility of the normal cement concrete (CC). It is class of High Performance Fiber Reinforced Cementitious Composite (HPFRCC) with high ductility 3-5%

38

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

 Bendable concrete also known as Engineered Cementitious Composite (ECC) is class of High Performance Fiber Reinforced Cementitious Composite (HPFRCC) next to the DUCTAL. Investigate the properties of ECC with normal Cement Concrete (CC) & also the effect of partial replacement of cement by 10%, 20%, 30% by slag sand less than 500 micron. You can find out tested of split tensile strength. The splitting test is much used method to determine the tensile strength of concrete which greatly affect the extent & size of cracking in structure.

39

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

NAAC ACCREDITED

Matoshri College of Engineering & Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opposite to Nashik-Aurangabad Highway, Nashik, Maharashtra 422105

Website: engg.matoshri.edu.in/Email: matoshricoe.hr@gmail.com
Contact: 0253-2406600/1/2/3
Toll free No.:1800 233 6602