THE AFTER COVID ERA

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Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus.

Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. Anyone can get sick with COVID-19 and become seriously ill or die at any age.

The best way to prevent and slow down transmission is to be well informed about the disease and how the virus spreads.

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ROLE OF HIGHER EDUCATION IN BUILDIN A GOOD SOCIETY

Dr. D. Sarkar
- Principal

The world has realized that the economic success of the states is directly determined by the quality of their education systems and that the most effective factor of production is human capital expressed in knowledge, skills, creative abilities and moral qualities of individuals in society. In the past decade higher education institutions have been buffeted by a complex set of pressures all over across the globe. Foremost among them is the growing importance of knowledge-led economies that have placed higher education at the centre of national competitiveness agendas. Higher education institutions are increasingly viewed as "economic engines" by policy makers and are seen as essential for ensuring knowledge production through research and innovation and the continuous education of the workforce. Tertiary education policy regarding quality in higher education is increasingly important on national agendas. The widespread recognition that tertiary education is a major driver of economic competitiveness in an increasingly knowledge-driven global economy has made high-quality tertiary education more important than ever before. The imperative for countries is to raise higher-level employment skills, to sustain a globally competitive research base and to improve knowledge dissemination to the benefit of society. Higher education has an important role both for the student, as an individual,and also for the society in which he lives. Higher education represents an aid for the growth and the development of the students and a key for a better life.For the society, higher education institutions can contribute to the creation of ideal citizens, who will help in keeping the society peaceful. In school,students very rarely get to experience life. When the students get enrolled in college, they are first of all away from their families, so this makes them independent.

Being good human being is most important than being successful person in your aims.

Kind, helpful, caring, understanding, patient, and loving are some of the words that come to mind when asked to list the qualities of a good person. One usually knows a person is good by what they do, such as performing thoughtful deeds.
Just like flowers in a garden, we are all here to play our part in making the world a beautiful place, so open out with the person to whom you love the most, spread your tools and cross all the boundaries people will always talk even if you loose then why not touch someone's life today by having simple person by heart and making him more stronger with glowing relationship.

Life is short and beautiful, so enjoy every moment in every possible manner to the extend of being a child who does not knows what is he /she doing.Keep that innocence in your relationship because sometimes we need someone to simply be there and not to fix anything or do anything in particular, but just to let us feel or know their presence and for being supporting and cared about what we are..Today's world is full of selfishness, even relationship have become so but then why not be different from the world and be what you are rather than being what another person wants you to be..It's a saying

"A person can achieve everything and anything by just being simple and humble"

So think being simple is your strength than your weakness.

First be a good person automatically success follows you.

আজকের স্বাধীনতা

- দেবনারায়ন পড়ুয়া

বহু বীরের প্রয়ানে অ গভীর আত্মত্যাগে

আজ স্বাধীন মোর অক্সিজেন,

মাতৃত্বের জরায়ু ছিন্ন করে, রাজপথে

আজ স্বাধীনতার সেই নগ্ন শিশু।

হে স্বাধীনতা, তুমি অমর হও,

অস্তিত্বে বাঁচো আমার,

দীর্ঘ জীবি হও আমার স্বপ্নে,

মুখোশের আড়ালে চাইনা উদযাপন।

যেখানে রয়েছে ধর্মের বিষবাষ্প, আর অভিশাপের কুসংস্কার,

সেথায় উদযাপনে মায়ের জয়গানে উদিয়মান পতাকা।

পরক্ষনে পরভোজীর স্বার্থের আঁচে আদর্শ অগ্নিদগ্ধ,

গাঢ় লাল মায়ের আঁচল ভিজিয়ে যায়,

রক্ষক যখন ভক্ষক হয়ে মায়ের পতাকা পদপৃষ্ঠে মাড়ায়।

YOGA & MEDITATION FOR HEALTH AND WELL-BEING

- Dhritiman Mondal
HOD, Civil Department

Yoga means "union" in Sanskrit. This union is said to occur between the mind, body, and spirit. The goal of yoga is to attain physical and mental well-being. This is achieved through meditation, proper breathing, holding of postures and exercise.

History of Yoga

The exact history and origins of yoga is uncertain; however, there are pieces that have been connected that allow us to make some conclusions that it had originated in India.

One of the earliest writings on yoga was found two millennia ago in a book known as Yoga Sutra.

Benefits of Yoga

- Increases lubrication of ligaments, tendons, and joints
- Increases muscle strength and tone
- Improves respiration, energy, and vitality
- Protects from injury
- Decreases anxiety, depression, and stress
- Decreases blood pressure and cholesterol
- Improves intelligence
- Improves sleep
- Improves self-esteem

YOGA & MEDITATION FOR HEALTH AND WELL-BEING

Meditation{ A part of Yoga }

Meditation is a technique in which the meditator seeks not only to reach a deep state of relaxation, but to quiet the mind.

Life Good practices :

- Drink more water
- Eat healthy food
- Learn something new
- Read books
- Keep yourself busy
- Avoid bright screens before bed
- Sleep on a regular schedule
- Meditate
- Enjoy nature
- Practice yoga
- Avoid certain medications

ভারত- আমার দেশ

-মৈনাক চ্যাটার্জী

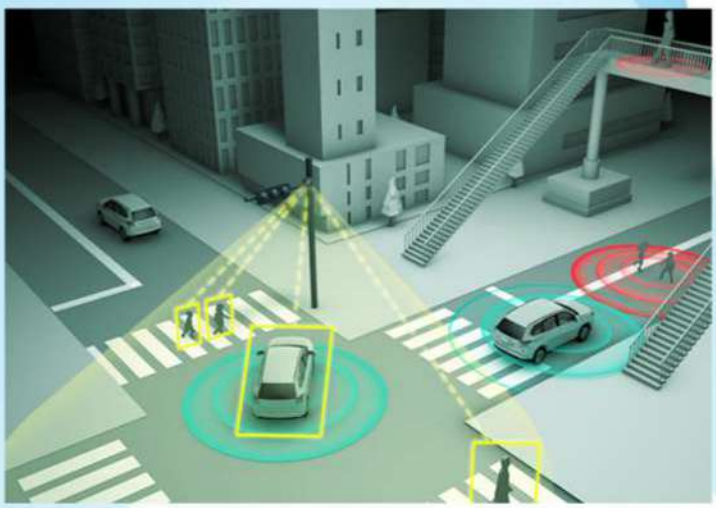
আমার ভারত, আমার দেশ, আমার জন্মভূমি,
তোমার কোলে জন্মে ধন্য হয়েছি আমি।
চারিদিক সবুজ ঘেরা, একি খেলা মাগো তোমার,
চতুর্দিকে রূপের গুনে মন কেড়েছে তুমি আমার।
কোথাও ছুটছে গঙ্গা মাতা কোথাও আবার কাবেরী,
কোনোখানে যে ভাগীরথী,কোনোখানে গোদাবরী।
দেওয়াল তুলেছে হিমালয়ে আর ঢেকেছে তার বটে,
উষ্ণ করছো থর মরুভুমি-এ, হাওয়া দিয়েছো অশ্বথে।
বাংলা হিন্দি অস্মীয় যে উড়ে তোমার বানী,
মারাঠি দ্রাবিড় দক্ষিণে তো মা আমার জ্ঞানী।
কাশ্মীর মাগো তোমার স্বর্গ, বঙ্গ তোমার রূপ,
উৎকল তোমার মন্দির গৃহ তব প্রার্থনা স্বরূপ।
হিন্দু- জৈন -শিখকে দিয়ে তুমি জন্ম,
ইসলাম - পারসিক - খ্রিষ্টানকে রেখেছো প্রজন্ম প্রজন্ম।
শত শত বছর ধরে সহ্য করেছে অত্যাচার,
কখনো কখনো তোমার বুকে নেমেছে অবিচার।
ইংরেজরা এলো পরে তার আগে মুঘল
রামকৃষ্ণ - বিবেকানন্দ জ্ঞান ছড়িয়েছে তোমার কোলে,
কবীর - নাঙ্ক - সাই তোমার মনের কথা বলে।
গান্ধী সুভাষ তিলক যে তোমার হাতিয়ার,
যুধ করেছে তারা স্বাধীনতা পাওয়ার।
তোমার প্রতীক তেরঙ্গা যখন ওড়ে আকাশে বাতাসে,
দেশাত্মবোধের হাওয়া খেলে যায় আমার দেহ প্রানে।
ভারত - ইন্ডিয়া - হিন্দুস্থান কত যে তোমার নাম,
মা বলেই ডাকবো তোমায় করি শত শত প্রনাম

INTELLIGENT TRANSPORT SYSTEM

- Rudradeep Das
Asst. Prof., Civil Department

• The Intelligent transportation system (ITS) is the application of information and technology in the transportation system, to improve the infrastructure of road and vehicle. The probable out come from this such as.

- Transport safety.
- Transport productivity.
- Travel reliability.
- Informed travel choices.
- Environmental performance.



• In the modern cities the traffic congestion shows a big problem in our society due to high population density and growth, increasing number of motor vehicle. Effect of this is issue reduces transportation infrastructure, delay of travelling, air pollution and fuel consumption.

• To avoid this problem, ITS has been developed and some ideas were so much beneficial for the development of transportation system.

1. Real time information of private transports and public transports:- Though these information pedestrians and other road users get information of delays and how to avoid it. This also improves the road safety.

2. The uses of graphical information system (GIS) maintain the data base of transport density of an area. GIS also helps to maintenance of road. 3. "Smart card ticketing" reduces time of waiting of the traveller and it gets total information of travelling to the operators.

4. Detailed route planning information for public and private transport users

5. Parking guidance to reduce search parking of vehicle.

6. Public transport information in both formats.

7. Traffic signal controlling improves efficiency of traffic flows. 8. Sophisticated booking and scheduling software helps maximise vehicle utilization in a demand responsive transport scheme.

সাধকের প্রার্থনা

- রুদ্রসোম সি

অন্ধকার কে দূরে সরিয়ে
আসবে নতুন দিনের আলো,
সেই আলো কেই সঙ্গী করে
কল্যাণের দীপশিখাটি জ্বালো।

মনের আঁধারকে দূরে ঠেলে
বরণ করো সজীব সত্যকে,
লজ্জা,সংকোচ,ভয় মুছে ফেলে
বিনাশ করো ভীষণ মিথ্যাকে।

পরাজিত হোক সেই মিথ্যাচারী
দগ্ধ হোক সে তোমার রুদ্রশিখায়,-
হয়ে ওঠো তুমি এক বিদ্রোহকারী
তোমার নিজের ভীষণ স্বমহিমায়।

হয়তো ক্ষতবিক্ষত হবে তুমি
কিন্তু সে-ই হবে পরাজিত;
বিজয় মাল্যখানি পরে তুমি
হবে কল্যাণের পথে উপনীত।

কঠিন হও অশুভ'র প্রতি
কল্যাণ করো তোমার আলিঙ্গনে;
মঙ্গল কর্মসাধনে হও ব্রতী,
আর ফুল ফোটাও সত্যের প্রাঙ্গণে।

সমস্ত সুন্দরের সাধক তুমি
আর সমস্ত কল্যাণের বাহক,
আবার মিথ্যাকে দমন করে
তুমিই তো মিথ্যার সংহারক;

তোমার ভীষণ দ্বিমূর্তির মহিমায়
তুমিই তো সেই অসীম বীর;
দেখিয়ে দাও আলোর দিশা
ভেঙে দাও আঁধারের প্রাচীর।

দাও হে মোরে মনের শক্তি,
এই হোক আমার শেষ প্রার্থনা...

IS TIME TRAVEL POSSIBLE ?

- Chayan Das
3rd year, CSE

In science fiction , space and time warps are used for rapid journeys around the galaxy or for travel through time. But today's science fiction is often tomorrow's science fact. So what are the chances of time travel?
In 2009 the British physicist Stephen Hawking held a party for time travelers. The twist was he sent out the invites a year later (No guests showed up). Time travel is probably impossible. Even if it were possible, Hawking and others have argued that you could never travel back before the moment your time machine was built.
General Relativity was a major intellectual revolution that has transformed the way we think about the universe. Einstein had realized that space and time are intimately connected with each other. One can describe the location of an event by four numbers. Three numbers describe the position of the event and the fourth number is the time of the event.
Of course, we are all time travelers' as we are swept along in the current of time, from past to future, at a rate of one hour per hour.
But, as with a river, the current flows at different speeds in different places. Science as we know it allows for several methods to take the fast-track into the future. Here's a rundown.
According to Einstein's theory of special relativity, when you travel at speeds approaching the speed of light, time slows down for you relative to the outside world. So all we need for time travel is a spaceship that will go faster than light. Unfortunately in the same paper Einstein showed that the rocket power needed to accelerate a spaceship got greater and greater the nearer it got to the speed of light.
The next method of time travel is also inspired by Einstein. According to his theory of general relativity, the stronger the gravity you feel, the slower time moves.

As you get closer to the center of the Earth, for example, the strength of gravity increases. Time runs slower for your feet than your head.
And anyway, the effect is not that strong so it's probably not worth the trip.
Assuming you had the technology to travel the vast distances to reach a black hole (the nearest is about 3,000 light years away), the time dilation through travelling would be far greater than any time dilation through orbiting the black hole itself.
(The situation described in the movie Interstellar, where one hour on a planet near a black hole is the equivalent of seven years back on Earth, is so extreme as to be impossible in our Universe, according to Kip Thorne, the movie's scientific advisor.)
The most amazing thing, perhaps, is that GPS systems have to account for time dilation effects (due to both the speed of the satellites and gravity they feel) in order to work. Without these corrections, your phones GPS capability wouldn't be able to pinpoint your location on Earth to within even a few kilometers.
General relativity also allows for the possibility for shortcuts through spacetime, known as wormholes, which might be able to bridge distances of a billion light years or more, or different points in time.
Many physicists, including Stephen Hawking, believe wormholes are constantly popping in and out of existence at the quantum scale, far smaller than atoms. The trick would be to capture one, and inflate it to human scales – a feat that would require a huge amount of energy, but which might just be possible, in theory.
In conclusion, rapid space travel and travel back in time can't be ruled out according to our present understanding. They could cause great logical problems, so let's hope there's a Chronology Protection Law to prevent people going back and killing there parents . But science fiction fans need not to lose heart. There's hope in some theories.

OMNIDIRECTIONAL WIRELESS CHARGING SYSTEM FOR HOME USE

- Debajyoti Sanyal

A new wireless charging technology opens the door to developing charging stations for
consumer use.
Although not a mainstay yet for power transfer, wireless chargers offer a unique and hassle-free way for charging portable electronic devices. No need
for an electric outlet is required, which conventional wired chargers rely on. But the main obstacle for creating a reliable wireless charger that is also omnidirectional is that power transfer occurs quite inefficiently owing to the fluctuating strength of the charging field in a location. Any orientation in the wrong spot wouldn't lead to efficient results. This issue can be solved by using several transmitter coils connected to several power sources for creating a strong charging field. However, this approach increases the complexity of the transmitter. While feedback can properly orient the charging field, the control systems themselves are also complicated and expensive.

To solve this problem, researchers at Aalto University have recently developed an omnidirectional charging system that allows devices placed anywhere around it to get charged with uniform strength. The development addresses the challenge present in existing power transfer system around offering a convenient and reliable design for consumer use

The key to the new design is a cylindrical power coil. The wire at the top of the coil is wound in the opposite direction to the wire at the bottom of the coil, with a z-shaped bridge connecting them. Since the current flows through
these windings in opposite directions, they produce complementary magnetic fields. One field flows out from the middle of the cylindrical coil, around the top winding, and back in through the top. The other flows out from the middle, around the bottom coil, and back in through the bottom.

This results in an even magnetic field around the middle of the charging coil.
Receivers placed anywhere within that area charge efficiently, regardless of their position or orientation.

“This was just a proof of concept,” said Yining Liu, researcher and a doctoral
candidate at Aalto University. “Now we can work to improve the efficiency –
maybe to around 90% – and also the power.”
Based on simulations of the electromagnetic field around a consumer device,
the researchers found that the level of exposure conformed to the requirements in safety regulations. However, further safety study is required
for full usage.

The new design complements recent work from the same research group, which made it possible to transfer power to multiple, moving receivers in a charging area. The two technologies address different dimensions of the challenge of wireless charging: freedom of movement for industrial applications and free placement for consumer, tabletop devices.

A REVIEW ON ARTIFICIAL INTELLIGENCE, CHALLENGES INVOLVED & ITS APPLICATIONS

INTRODUCTION

Artificial intelligence has become the important part of human life and changing this life tremendously.AI has not even changed the life style but it also affected a variety of domains of life like education, health and safety. Artificial Intelligence is helping people to get education, to drive safety, to enjoy various games, to get better medication etc. Its various applications can be visible in school and colleges, hospitals, transportation and houses. The technology tycoons, researchers, governments all are working to make Artificial Intelligence more useful and practical in various domains of life. Big companies like Yahoo, Google spend a lot to find out the new applications of Artificial Intelligence so as to innovate and offer services to people. AI has changed the life style of people and the way they use technology. Artificial Intelligence can be felt in smart phones, GPS, video games etc. This article presents the facts and applications of Artificial Intelligence mentioned in various research articles and reports. It further elaborates the changes made by Artificial Intelligence in various domains of life. It is important to understand the meaning of some terms before discussing the applications. Artificial Intelligence is the commotion of manufacturing machines intelligent since intelligent means to work with insight in the given environment. AI is the science of creating smart computer programs and related to tasks of using computers to understand human thoughts and decisions. It is a subpart of computer science which makes them intelligent and advanced. Artificial Intelligence is interacting researchers also to realize its applications in a variety of domains of life.

ARTIFICIAL INTELLIGENCE VS HUMAN INTELLIGENCE

Human intelligence works naturally and takes decisions by using cognition. On the other hand artificial intelligence works on a model that behaves like humans. Artificial Intelligence is an artificial thing and Human Intelligence is a natural thing. Human intelligence works in the form of signals & artificial intelligence is digital. Artificial Intelligence is based on hardware and software but human intelligence is not based on these issues. Some researchers consider machines equally important and capable as human intelligence.

EXAMPLES OF AI TECHNOLOGY

• **Automation:** It is the process of making a system or process function automatically.Robotic process automation, for example, can be programmed to perform high-volume,repeatable tasks normally performed by humans.

• **Machine learning:** It is a branch of artificial intelligence which allows computers to be trained directly from examples & data. Through enabling computers to perform specific tasks intelligently, machine learning systems can carry out complex processes by learning from data, rather than following pre-programmed rules. Increasing data accessibility has endorsed machine learning systems to be trained on a bulky pool of examples, while growing computer processing power has supported the critical capabilities of these systems. Within the field itself there have also been algorithmic advances, which have given machine learning better power.As a outcome of these advances, systems which performed at noticeably below- human levels can now go better than humans at some definite tasks. Many people now cooperate with systems based on machine learning each day, for example in image recognition systems. Now-a-days the concept of machine learning is used in many applications and is a core concept for intelligent systems.

• **IN MEDICAL FIELD:** Artificially intelligent computer systems are used extensively in medical sciences. Common applications include diagnosing patients, end-to-end drug discovery and development, improving communication between physician and patient, transcribing medical documents, such as prescriptions, and remotely treating patients.

APPLICATIONS OF ARTIFICIAL INTELLIGENCE

Machine learning algorithms are widely used in variety of applications like digital image processing(image recognition), big data analysis, Speech Recognition, Medical Diagnosis, Statistical Arbitrage, Learning Associations, Classification, Prediction etc. Artificial Intelligence will keep on playing a gradually more significant role in the different fields.

CONCLUSION

The article illustrates the concept of artificial intelligence, with its various challenges and applications. The article also highlights the various examples of Artificial intelligence technology such as automation, machine learning, and also in medical field.

Subhakshan Chakraborty
1st year

Scientists cheer India's ambitious carbon- zero climate pledge

– Md. Afroz
Asst. Prof. Civil Department

India's 2070 goal could help limit global warming to 1.5 °C, say researchers — but it will require the nation to juggle steep emissions cuts with lifting a significant proportion of its population out of poverty.

India, the world's third-biggest emitter of greenhouse gases, has pledged to achieve net-zero carbon emissions by 2070. The ambitious commitment, made on 1 November at the high-stakes COP26 climate meeting in Glasgow, UK, brings India in line with other big emitters, including the United States, China, Saudi Arabia and the European Union, which have made similar promises.

Although scientists welcome the offering — which could contribute to the world limiting global warming to 1.5 °C — they also caution that India's pathway to carbon zero remains uncertain.

"It's an ambitious target," says Apurba Mitra, a climate-policy researcher in New Delhi with non-profit research organization the World Resources Institute. "It has put net-zero on the table."

"It's great; a very bold announcement," adds Vaibhav Chaturvedi, an economist at New Delhi think tank the Council on Energy, Environment and Water, who works with the Indian government on climate modelling.

The surprise announcement came less than a week after some of India's top politicians had said they would not set a deadline for when the nation might achieve net-zero emissions. Even most government officials had no idea it was coming, say researchers.

Commitment and credibility

At COP26 — which runs for another week — Prime Minister Narendra Modi further promised that India would expand its renewable, hydro and nuclear power capacity to 500 gigawatts by 2030, and that half of the nation's power-generating capacity would be based on renewable energy by that year. India will also reduce by one billion tonnes the carbon it is projected to emit this decade, he said, although the country has not yet made a formal submission to the United Nations Framework Convention on Climate Change.

The promises signal India's commitment and credibility, says Navroz Dubash, a climate scientist at the Centre for Policy Research, a think tank in New Delhi. But the country now needs to lay out a clear road map for how it will achieve net zero — and establish monitoring mechanisms to ensure that emissions are falling, he says.

Modi did not specify what would be covered in India's pledge — all greenhouse gases, or carbon dioxide alone. That detail has also been missing from some other nations' initial net-zero pledges.

But the details matter, says Joeri Rogelj, director of research at the Grantham Institute for climate science at Imperial College London. Climate modelling shows that the world, on average, has to hit net-zero carbon dioxide emissions by 2050, and net-zero greenhouse-gas emissions by 2070, he says, to limit global warming to 1.5 °C above pre-industrial levels — the most aspirational goal of the 2015 Paris climate agreement.

If India's target for 2070 refers to all greenhouse-gas emissions, it will help the world on its path to the 1.5 °C goal, he says. But, "given India's development state, and its important needs to still lift large shares of its population out of poverty, this would be a very ambitious net-zero target for India", adds Rogelj.

Important shift for India

However, experts think it is more likely that India's plan is to reach net zero only for carbon dioxide by 2070, and not tie itself to commitments on other greenhouse gases. This would make it harder for the world to limit warming to 1.5 °C, he says. "This would be less ambitious, yet still an important shift in India's perspective and how it visualizes its future," Rogelj adds.

And the world could still hit the 1.5 °C target if low- and middle-income nations take longer to reach net-zero carbon dioxide, as long as wealthy nations set targets for even earlier than 2050, says Mitra.

Even hitting net-zero for carbon dioxide alone by 2070 is very ambitious for India, say climate-policy researchers who have been working with India's government to model emissions-reductions scenarios.

The modelling is particularly complex and uncertain in the case of India, says Dubash. Most wealthy nations that have net-zero targets have already hit peak carbon emissions; their emissions are now beginning to fall, making it simpler to find downward trajectories.

But India is expanding its economy rapidly, and its emissions peak is nowhere on the horizon, says Dubash. Modellers must account for India's emissions growth, find the probable peak and then explore pathways to net zero, he says.

All of this depends on how swiftly growing Indian cities will urbanize, populate and develop. "When you multiply out all these uncertainties, you end up with an enormous range of possible trajectories," says Dubash.

Climate-modelling scenarios

A report published last month by Chaturvedi and his colleague Ankur Malyan explores an emissions peak in 2040, followed by net-zero carbon dioxide in 2070. The scenario includes a 99% reduction of coal-based power generation by 2060, an increase in solar capacity to 1,689 gigawatts by 2050 — enough to power hundreds of millions of homes — and the large-scale development of hydrogen as a fuel source, among other drastic shifts.

In a February report, the International Energy Agency modelled a scenario in which India hits net zero in the mid-2060s — a feat that, it notes, would require close to 200 gigawatts of battery capacity by 2040 to store solar and wind energy. That kind of capacity is unheard of globally at present.

Such choices would require research and development into battery storage, hydrogen technology and smart grids, says Chaturvedi, who notes that India's net-zero announcement is a clear signal to industry that it should invest in decarbonization.

Perhaps the biggest limitation for now is that Indian currently has just a handful of climate modellers. "The capability is so limited," says Chaturvedi, who says many more will be required to guide the policies of the state and national governments in coming decades.

ADVANCEMENT OF CABLE STAYED BRIDGE IN INDIA AND CASE STUDY OF VIDYASAGAR SETU

- Md Mainuddin
Asst. Prof. Civil Department

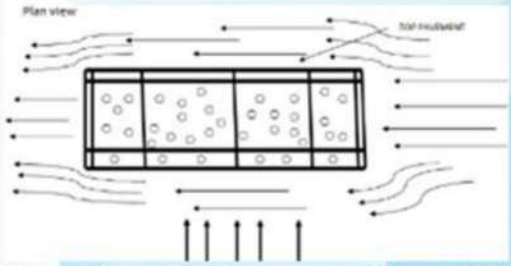
Abstract: Cable-stayed bridges have been compared to the masts of majestic sailing ships, proclaimed as monuments and recognized as engineering marvels. Construction technology and material science for bridges have been an important part of advancing cable stayed bridge technology. As in India these bridges are subjected to heavy vehicle load as well as most of the states are in seismic zone iii and ii the advancement of cable stayed bridge is needed. Material advancements introduced into bridge applications include self-consolidating concrete, stainless steel, higher strength concretes and composite fibers. New sensor and data communication technologies allow for real time monitoring of bridge information. Over time, technology has also changed the way bridges are designed, with enhancements in software and hardware to model structural behavior, refine elements of the design and produce final designs more quickly.

Why this structure is chosen: Cable stayed bridge is an innovative structure and is preferred to conventional steel suspension bridges for long span mainly due to the reduction in moments in the stiffening girders resulting in smaller section of the girders leading to economy in overall costs. A manifestation of constructional excellence, Vidyasagar Setu is longest cable stayed bridge in Asia. Kolkata, as per the Bureau of Indian Standards map, is between seismic zone 3 and seismic zone 4 but Professor S K Nath of the Department of Geophysics and Geology, IIT Kharagpur, feels many areas of the city face high seismic threat. Top metros like Delhi, Mumbai, Chennai and Kolkata fall under moderate to high risk seismic zones of the country.

Design Concept Overview: The concept of a cable-stayed bridge is simple. A bridge carries mainly vertical loads acting on the girder. The stay cables provide intermediate supports for the girder so that it can span a long distance. The basic structural form of cable-stayed bridge is a series of overlapping triangles comprising the pylon, or the tower, the cables and the girder. All these members are under predominantly axial forces with the cables under tension and both the pylon and the girder under compression. Axially loaded members are generally more efficient than flexure members. This contributes to the economy of a cable-stayed bridge.

Technical Overview: The cable stayed bridges can be subjected to different kind of loads like Live Load, Dead Load, Wind Load, Seismic Load, Dust Load, Accidental Load , Errection Load, Frost Load, Thermal expansion ,Corrosion. As well as it have to overcome such natural fury like hurricane Tsunami, Heavy Vibration due to heavy load. Modern techniques can be very effective to overcome this type of problems.

Making the bridge Hollow using truss:
It will allow the wind to pass.
It will help to reduce the generated vertical force.



Making the Pylons Hollow High strength steel: If the Pylons are made by hollow section then the dead load will be reduced and for high strength steel the strength of the bridge will be same or even more.

Use of Pendulum: At the time of earthquake the pendulum will be very effective. The pendulum will move along – x direction when the pylons move along +x direction. That will reduce the magnitude of movement of the pylons. Thus the pylons will be safe from collapse.

Use of CFRP (Carbon Fibre Reinforced Polymer):

The pylon as well as the fibres can be corroded .So the corroded members can be warped by CFRP. That will be so effective than replacing the member.

Conclusion:

The Second Hoogly Bridge at Howrah, West Bengal is one of the latest state-of-the-art bridge in Kolkata. Evolution of bridges from Simply-Supported to Balanced Cantilever to Suspension Bridges to Cable Stayed Bridges took years. The challenge was to span a large gap without disturbing the navigation of wide rivers. Two other important issues that will come up in future are health monitoring and maintenance. Non-linearity due to built-in stresses makes determination of eigen-values, which are signatures of a simple structure, is no longer straight forward. Hence these questions should be addressed. Monitoring instruments for assessing changing parameters such as deflection, time-depending material properties, joint slippage, corrosion, etc. are to be assessed and rectified if necessary.

Did TESLA Really Invent Electric Car?

Pratik Sarkar
Asst. Prof., Electrical Engineering

'TESLA' is at the top of the news for making a modern electric car. Perhaps In the modern days, it is known to everybody. But it is not so popular that the car was named after Nikola Tesla, an electrical engineer and a genius inventor. While Tesla's star began to fade long ago, Tesla, Inc. (the car company) has contributed to something of a Nikola Tesla revival. Marc Seifer, the author of "Wizard: The Life and Times of Nikola Tesla mentioned that It's a sociological fact that Elon Musk took the Tesla name and launched Nikola Tesla into the stratosphere. "Tesla's risen to the surface again, and now he's getting his due"- the author further added.

Now, who is Nikola Tesla? He was a giant of innovation because of his contributions in the fields of electricity, radio and robotics. In the age of Westinghouse, Edison, J. P. Morgan and Marconi, he invented, predicted or contributed to the development of hundreds of technologies that play big parts in our daily lives -- like remote control, wireless transmission, neon and fluorescent lights, laser beams, x-rays, robotics and, of course, the alternating current (A.C.) systems, the basis of our present-day electrical system. In 1931, Tesla was on the cover of Time magazine. But the cruelty of time, he died as a poor man in 1943 after years devoted to projects many of which did not receive adequate financing. Yet his most significant inventions resonate today. The man has certainly left so many marks on the world of modern technology — which is no doubt the reason that Elon Musk and others took inspiration from him when they were coming up with a name for the electric-vehicle startup Tesla Motors (which has now blown up to become a notable player in the car market).

But how much, exactly, did Nikola Tesla have to do with the development of the technology of electric cars? For sure, the AC induction motor was developed by him (at the same time as, and autonomously from, Galileo Ferraris, who also "invented" the same). But was there a lot more to it? Given some of the more fantastic stories out there (mostly originating in biographies of the man written long after his death). One of the most persistent of those stories is the one that puts onward the idea that Nikola Tesla created an electric vehicle (a Pierce-Arrow modified version) that could be powered wirelessly, and eliminated the need for a battery. Now, what is the truth? Nikola Tesla made an electric car? And he did it all without batteries?? Way back in 1931???

A version such stories about Tesla's car is found in the book - Secrets of Cold War Technology – Project HAARP and Beyond, by Gerry Vassilatos. According to the story, Tesla had used a brushless AC electric motor and replaced the stock gasoline engine. The motor was described to have been rotating by a "cosmic energy power receiver" consisting of a box that was measuring about 25 inches long by 10 inches wide by 6 inches high. It was containing 12 radio vacuum tubes and connected to a 6-foot-long (1.8 m) antenna. The car was said to have been driven for about 50 miles at speeds of up to 90 mph during eight days. This same basic story comes up on many websites, some more reputable and dependable than others, but all format of the stories remains the same. In such stories it was claimed that one person is said to be taken for the ride in the modified car was Peter Salvo (who claimed to be a nephew of Tesla), and the area of the ride was around Buffalo, NY.

Now let's do a fact check. Nikola Tesla's actual grandnephew, William Terbo, has in the past commented that Nikola "did not have a nephew by the name of Peter Savo." So who is Peter Salvo?. What is the "cosmic energy power receiver" that was used in the modified car? We certainly have no answer.

Unfortunately, the story is sometimes referred to as the “Nikola Tesla electric car hoax”. There is no evidence (absolutely none at all) that such a car or technology ever existed in the past. So from where did this electric car story come from? And why is it so persistent? It is suspected that the story is so resilient for several reasons, first and foremost being that Tesla has an almost god-like status among many people, especially people inclined to be at best, more open-minded and imaginative, and at worst free-energy crazy.

Now let us discuss the fact of electric vehicles. If we look around the history of electric cars, the invention of the electric car is attributed to various inventors in the mid 19th century. An early type of electric motor created a small car model powered by the then-new type of engine was invented by In 1828, Ányos Jedlik, a Hungarian. In 1834 in Vermont, the first American DC electric motor was invented by Thomas Davenport. However, the most viable way to store electricity in the car through rechargeable batteries did not exist until 1840. The maximum speed of these earliest electric cars was, however, low due to technical limitations, - approximately 32 km/hour. At the turn of the century, 40% of American cars were powered by steam, 38% by electricity and 22% by petrol. Most of the early electric cars were massive and with lavishly designed wagons with a luxurious interior full of expensive materials. The upper class of very rich customers stood out for owning such cars. The sale of electric cars had its peak in 1912. However, after success at the beginning of the century, electric cars began to lose their position in the car market. By the time the automobile industry entered the 1920s, cars that used IC engines overtook the electric car, the downfall of which was attributed to lack of horsepower battery charging time and distance covered on one charge. And hence, electric cars lost in the market demand and failed to be a viable commercial product. Although several years passed without public attention, in the seventies and eighties the energy crisis became the most discussed matter of concern which then led to renewed interest in electric cars.

Now, come to the present day, who is the founder of Tesla Car? Is it Elon Musk? The answer is a big NO. Contrary to popular belief, the company was founded in 2003 by two Silicon Valley engineers Martin Eberhard and Marc Tarpenning, who “wanted to prove that electric cars could be better than gasoline-powered cars.” Elon Musk is the present CEO of that organization.

So, in a conclusion, neither Nikola Tesla nor Elon Musk’s Tesla (Tesla Motor Inc.) invented the electric car. So definitely a question arises why the globe is so mad about Tesla Motors? Firstly, a technological breakthrough. Tesla’s battery innovations have given it the efficiency in terms of range and cost that has allowed it to defy many of the issues that have plagued many other electric vehicles (EV). Other technological advancements like autopilot or advanced driver-assistance systems incorporating full self-drive systems, solar Roof or solar shingles have also made the vehicle unique. Second, business model, controlling the complete customer experience including purchase and servicing which is controlled through an app and its charging network, which is dominant in the US and Europe. Third, design breakthroughs that can be found in their minimalist but functional interiors, with a touch screen to control much of the car's features, and not much else; appealing to those who were attracted to the shift to minimalism, sophisticated and aesthetics products. Finally, process breakthroughs were created not just in terms of manufacturing (e.g. the world’s largest casting machine ever made) but also in Tesla’s relationship, or lack of relationship with car dealerships, instead favouring a direct distribution model which has reduced costs and complexity (e.g. the cars are built to order and immediately dispatched to buyers, reducing inventory costs).

So in a nutshell, Tesla Motors has innovated many things in their electric vehicles in terms of user experience, technological advancement and market strategy.

After a rocky first few years, Tesla has secured a significant share of the EV market, reaching around 12% of global EV sales in 2020 to 14% in 2021 overtaking the Volkswagen Group which was second with a 12% market share in 2021. The company is also expanding its manufacturing facilities worldwide, as well as growing its supercharging station network. With the company finally in profit and expanding, will the company be successful in its grand ambitions? Only the future will tell.

Reference: The German Federal Archive, www.nytimes.com, www.tesla.com, www.wikipedia.org, www.energy.gov, cleantechnica.com, medium.com, economictimes.indiatimes.com

Picture: Lohner-Porsche Electric Coupe, year 1899

Picture: Woods' Victoria Hansom Cab, year 1899

Picture: Tesla Roadster

Picture: german electric car, year 1904

Picture: Tesla Model X

Why 2022 Is a Break Year in Cyber security

- Pubali Das
Asst. Prof. CSE

In February 2020, Amazon prevented the largest distributed denial of service (DDoS) attack in history. At that time, e-commerce security experts declared the attack as “a warning we should not ignore”. But as we move into 2022, it is not only e-commerce security that we must think about. Political unrest between many superpowers has already got some media outlets making predictions of a “Cyber Cold War”.

In October 2021, the US held a forum with 30 countries to form a global Counter-Ransomware Initiative. The online meeting hosted by the White House National Security Council is the first significant step toward forging a unified defensive front and law enforcement collaboration on major cyber security issues, such as the illicit use of crypto currency.

Imagine switching on the news in the morning to hear reports of a massive coordinated cyber-attack against your country. Hackers have infiltrated the highest levels of government and critical infrastructure, taking out banks, energy. utilities, transportation hubs and hospitals.

While it may seem far-fetched, this scenario is entirely possible today. As technology advances and political unrest continues to fray international relations—particularly between powerful countries—enterprises need to do more to protect their systems from attack.

we must evolve and adapt our defences to protect against the next wave of large-scale threats we will face.

This article aims to share our experiences in creating a secure enterprise in 2022. To do so, we will outline the top seven cybersecurity threats over the coming year. We will give you a high-level overview of each threat and explain:

- What the threat is
- How it will play out in 2022

Threat 1: Ransomware

Ransomware was the biggest threat of the past year. It is a highly complex attack pattern that takes many forms and follows many steps to achieve its objective

Crypto ransomware or encryptors : Most popular ransomware. It encrypts valuable files and data so that users cannot access them. Attackers demand payment to decrypt the files and make them accessible.

Lockers or No encrypting Ransomware: Locker does not encrypt files but locks users out of their devices. A lock screen displays the ransom demand and how to make a payment for unlocking the device.

Doxware or Leakware: Also known as extortion ware, this type exfiltrates sensitive data and threatens to release them if a ransom is not paid (a combination with Crypto is also seen these days).

Scareware: Claims to have detected a virus on your device and floods the screen with pop-ups. It asks for payment to resolve the issue. It sometimes locks the device but does not damage files.

Ransomware as a Service (RaaS): RaaS is a market with people specializing in different activities. Each person gets a share. This ransomware is sophisticated, and the attack is well planned out.

2022 Predictions

We predict ransomware will remain a significant threat in 2022. We see ransomware evolving along a few tracks:

Attackers will find more and more initial exploits to quickly reach high-value targets and increase the size of their ransom demands substantially. As an example, cloud admin accounts are targeted for compromise as the beach head.

Critical infrastructure will become the battleground of nation-states. Targeting the critical infrastructure of a rival nation will become a common pattern. Well-organized cybercriminals will also eye critical infrastructure for high-value ransom.

Data exfiltration will evolve as a significant method for ransom in addition to encryption and hence target trade secrets, intellectual property, and sensitive databases.

Cloud console capture and locking out the entire organization from their cloud, thereby threatening business operation shutdown will also evolve as ransomware. This type of attack will not involve any data or encryption.

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Organized cybercriminals and nation-states will continue to target supply chains to scale their campaigns— in particular; they will continue to target Managed Service Providers (MSPs) and service providers to large enterprises, government.

Threat 2: Supply Chain Threats

These attacks are simple to understand. With a supply chain attack, a threat actor will target and compromise a 3rd party provider as a means of gaining a foothold into the larger organizations that they serve— for example, a SaaS company.

From there, the attacker can spread through the company's products and compromise their hundreds or thousands of customers.

Now that every organization depends on a large, sophisticated, and highly-interconnected supply chain, cybercriminals can use this threat to break into any network they want — from the smallest group to the largest government agency.

2022 Predictions

Unfortunately, we predict more large-scale supply chain attacks like SolarWinds in 2022. We agree with Forrester's findings that organizations are even more vulnerable to these threats — now that they have practically doubled their supply chains to improve their resilience — and that 60% of upcoming security incidents will involve supply chain issues.

We also predict that the sophistication, persistence, and scale of the SolarWinds attack will become commonplace. In SolarWinds, the attackers performed reconnaissance for eight days before injecting the malware, waited six months to replace source files with backdoor code, and waited another month before deploying malware to target systems within an update.

So, if organizations lack visibility and governance over their vendors' security, SolarWinds-scale attacks will become a regular occurrence in 2022.

Threat 3: Vertical Specialized Threats

Cybercriminals are developing customized attack patterns that exploit the unique security challenges faced by specific industries. This specialization is not a new trend; attackers have always adopted their attacks to geography or a particular sector. What we are seeing now is increased customization of TTPs.

Every vertical — in every geography — is now a rich target, and cybercriminals are developing highly specialized attacks to target everyone from retail to healthcare to non-profit.

2022 Predictions

We predict an increase in these attacks, and attackers specialize further. For example, more attacks will specifically target Operational Technology (OT) in healthcare, manufacturing, and utilities. Attacks will intensify in these sectors, with OT becoming the new threat vector.

FSI will continue to be a key target, but attacks will more and more pivot towards business applications, including SWIFT, ATMs, Internet Banking, payment gateways, customer billing, and transactional software.

IoT is becoming an integral part of new innovative solutions in many industries. But the use is higher in specific sectors, for example, transport with automotive and aerospace taking the lead. IoT-based threats are still not mainstream but will start becoming so in the light of business use cases in these sectors.

Deepfake type of innovative attacks will be predominantly used for political interference and influence. The potential for deepfake to be used for fraud in multiple industries remains a future possibility, but large-scale use is still a couple of years away.

Threat 4: Cloud Threats

Organizations have moved a lot of their infrastructure to the cloud over the last two years. Cloud technologies are evolving rapidly, and change is the only constant.

This leads to many security gaps in the deployments. Cloud threats typically exploit weak configurations and poor security practices in these deployments. This allows cybercriminals to compromise cloud-based assets even when security tools are layered over them. In addition, most organizations also leverage multiple clouds to run their workloads. This further increases the threat exposure.

2022 Predictions

Cloud will become the primary attack vector for initial infiltration into an organization. We are already seeing this trend in ransomware attacks. Most organizations are still learning to secure all aspects of cloud infrastructure. This leads to security gaps in storage, console, and workloads that are easy for an attacker to compromise and establish a presence in the customer cloud infrastructure.

We predict that most breaches will happen from misconfigurations, and many organizations will suffer an incident with one or more cloud services they adopted over the past year. Specifically, we predict organizations must defend themselves against the following cloud threats:

Cloud consoles will be heavily targeted for account take-over. Once the cloud console is compromised, the threat actors gain complete control of the infrastructure. Azure AD, AWS IAM, GCP IAM, etc., will become focus areas for threat actors.

We will start seeing hybrid and multi-cloud attacks: Here, attackers use hybrid or multi-cloud infrastructure first to compromise one of the clouds or on-prem infrastructure and then laterally move into other parts of the organization.

Container Exploitation will evolve into a high-impact threat vector. There are numerous ways that containers can be compromised. An easy way for attackers to compromise containers is by exploiting misconfigurations. There have been attempts to compromise the base image in the docker container repository. Compromising the Kubernetes orchestration layer is yet another path. Containers can become the beach head for major security incidents in 2022.

Crypto-Jacking from the Cloud: Here, attackers compromise cloud servers and use their CPU to mine cryptocurrencies (not new but growing).

Threat 5: API Threats

API protection mechanisms are at a nascent stage today, but business use of API is becoming mainstream – leading to the classical gap threat actors seek. Threat actors have therefore begun to exploit API vulnerabilities and configuration weaknesses.

In an API threat incident, the attacker exploits an unsecured API and takes advantage of the fact that communications through APIs can potentially bypass all other security controls (due to the encryption at the application layer).

2022 Predictions

2022 could be the year of infancy for innovative API attacks, which will become mainstream in 2023. It will not be surprising if a few significant breaches occur riding on API threats. We predict API threats will grow in sophistication and begin to bypass traditional controls that are API blind. In addition, we expect more threat actors will start to target APIs in their attacks directly and become a more common and standard attack technique by 2023.

API attacks in 2022 will focus on a few patterns. API threats are expected to exploit misconfigured authentication and authorization controls as easy initial vectors. Threats will take advantage of the excess user authorizations that might be granted by default. Threats will also exploit unsecured API endpoints with injection flaws, including SQL, NoSQL command injections.

Threat 6: External Remote Services Threats

Remote work is here to stay, and cybercriminals continue to target the wealth of remote access services that make the new workforce possible. Security Researchers have also recently identified that threat actor groups are even selling access to hacked networks through compromised VPN, RDP credentials, and the like.

2022 Predictions

Because the remote work infrastructure is not changing, we predict attackers will continue to use the attacks they focused on throughout 2020 – 2021. That includes attacks targeted Remote Desktop Protocol (RDP), Virtual Private Networks (VPNs), Virtual Network Computing (VNC), Citrix Virtual Desktops, Windows Remote Management, and the like. Attackers will continue to exploit these vectors for initial intrusions, lateral movement, and persistence.

We also predict they will continue to access these services through the same general techniques. Namely, they will perform credential pharming or target exposed services that do not require authentication, exploit vulnerabilities in these services, or gain direct access to internal systems through tools like VPNs that tunnel directly into the heart of the organization's digital infrastructure.

Finally, we predict a related increase in mobile device threats. More employees continue to work remotely and use their mobile phones and tablets to do their jobs.

As a result, these devices are now more likely to carry sensitive company data, and they have begun to come under attack with targeted threats by criminals. Mobile devices also provide the collateral benefit of breaking into homes, automobiles, banking accounts through compromising respective applications running on the running on the mobile device.

Threat 7: Conventional Attacks

Finally, we must remember that conventional attacks — like phishing, social engineering, network security attacks, DDOS, web application attacks, and common malware — will always be in play. Ultimately, cybercriminals continue to refine and deploy these attacks for one simple reason – they continue to work.

2022 Predictions

We expect that conventional attack patterns and techniques will continue to play a significant role in the cybersecurity landscape. Cybercriminals will continue innovating and improving these attacks and leveraging new technologies to launch them with increasing speed, scale, and sophistication. For the most part, cybercriminals will use conventional attacks as one step in a more significant and complex attack pattern. For example, they might exploit known asset vulnerabilities to create an initial intrusion at the start of a ransomware campaign.

We expect to see conventional threats used in more modern expressions of cybercrime. For example, we expect criminals to use attacks like social engineering to grab credentials and access to an organization and then sell that access to more significant threat actors (instead of taking advantage of it themselves).

Band gap engineering of ZnO nanorods by doping of rare-earth ions and its applications

Partha P. Pal

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The II-VI semiconductors are well known for their tunable band gap. The tunning of band gap of these semiconductor materials is very significant in respect to their enhanced performance during their applications in optoelectronics as well as in photocatalysts. Zinc-oxide (ZnO) is one of those materials having a wide tunable band gap (~3.37eV). The band gap can be easily manipulated with suitable amount of external ion impurity. Researchers have found that the trivalent rare-earth ions are very much suitable candidates for doping in ZnO in order to have an influence on its band-gap. Though there are several works describing this band-gap manipulation, most of them are studied on bulk ZnO and quite a few works are there on nano-crystalline ZnO. Especially, in case of nanorods, there is hardly any work related to tunning of band gap.

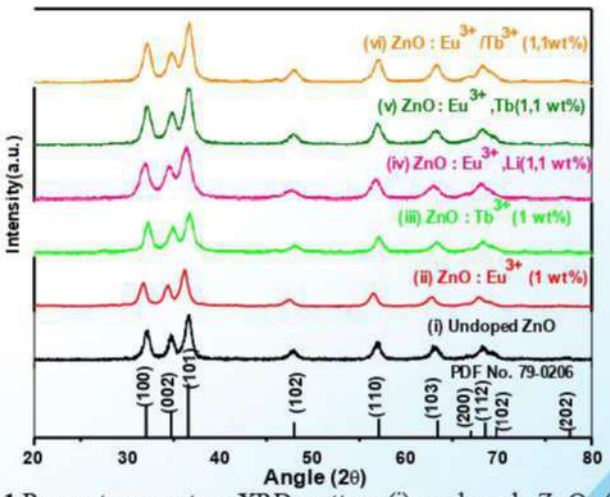


Fig. 1. Room temperature XRD pattern (i) undoped ZnO, (ii) ZnO:Eu^{3+}(1wt%), (iii) ZnO: Tb^{3+} (1wt%), (iv) ZnO: Eu^{3+},Li^{+}(1,1wt%), (v) ZnO: Tb $^{3+}$,Li^{+}(1,1wt%), (vi) ZnO: Eu^{3+}/,Tb^{3+}(1,1wt%), along with the standard XRD peaks for ZnO (PDF No. 79-0206)

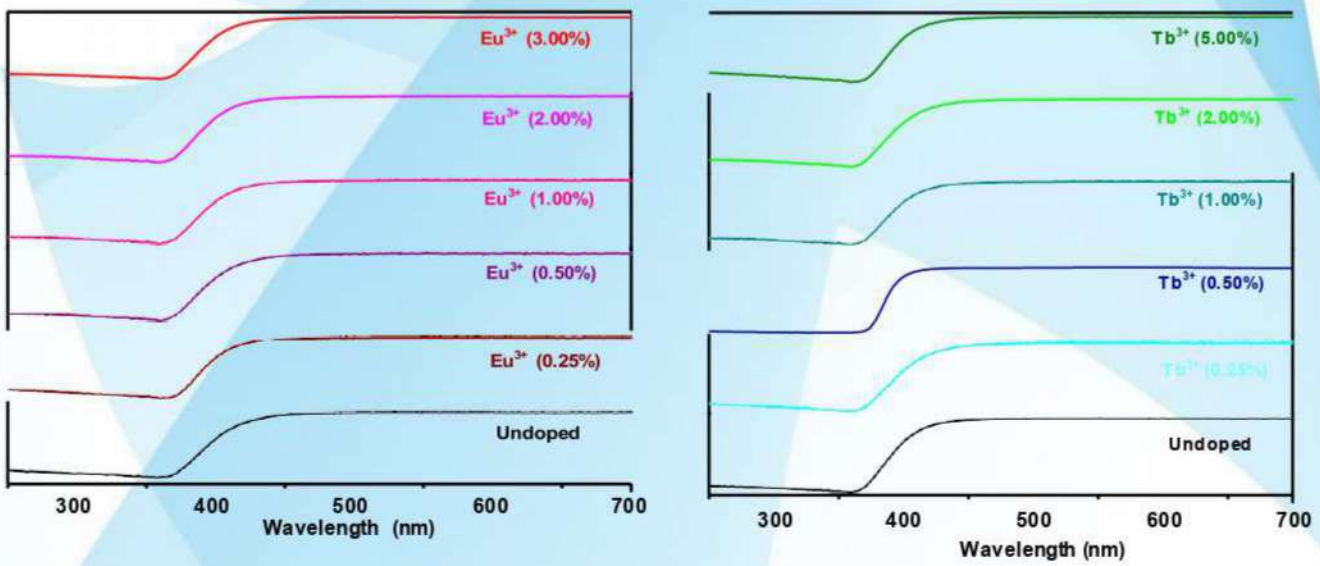


Fig.2. (a) Diffuse Reflectance spectra of the annealed undoped, Eu^{3+} doped ZnO nanorods of different Europium concentrations. (b) Diffuse Reflectance spectra of the annealed undoped and Tb^{3+} doped ZnO

nanorods of different Terbium concentrations. Synthesized by a very low-cost chemical co-precipitation method. The concentration of rare-earth

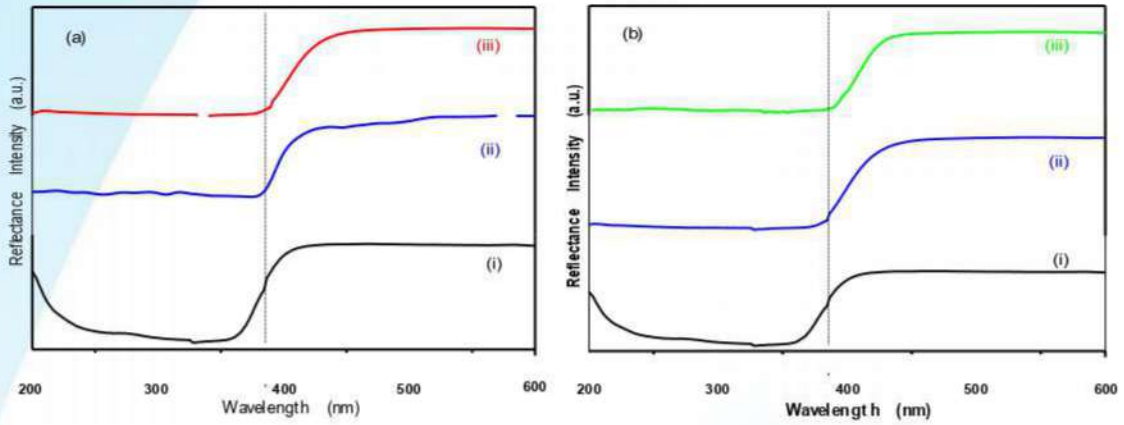


Fig.3. Room temperature diffuse reflectance of the (a) (i) Undoped ZnO, (ii) ZnO:Eu^{3+} (iii) Li^{+} co-doped ZnO:Eu^{3+} nanorods (b) (i) Undoped ZnO, (ii) ZnO:Tb^{3+} (iii) Li^{+} co-doped ZnO:Tb^{3+} nanorods

ions in ZnO is varied from 0 to 3 wt%. The effect of Li^{+} ion incorporation is also studied as a charge compensator. This is to find the effect of charge compensation on band gap value when

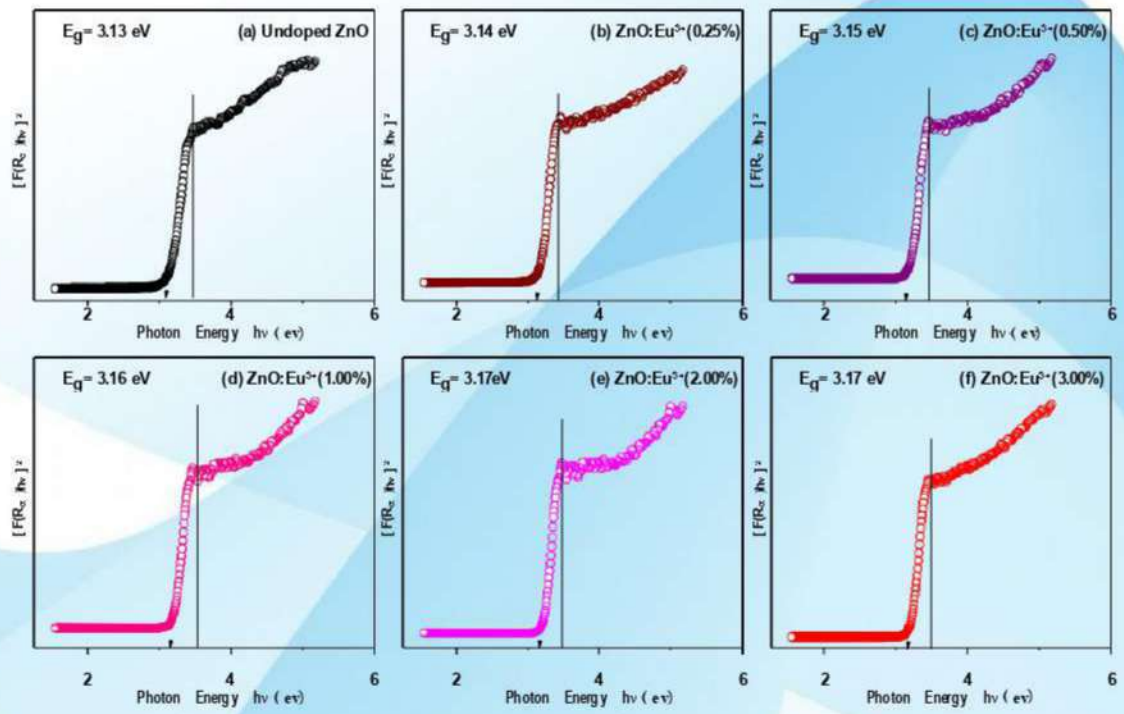


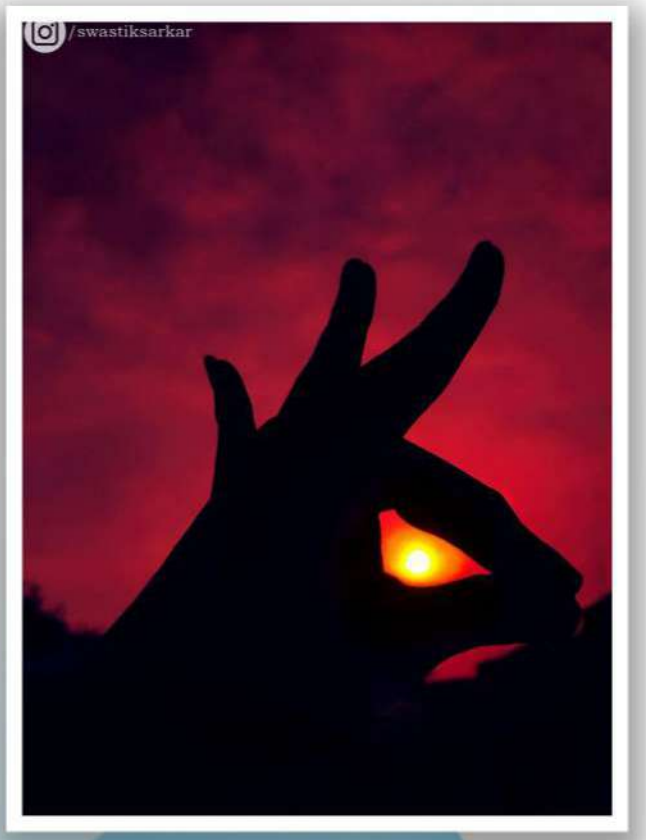
Fig.4. Kubelka –Munk plot for band gap calculation from the ZnO:Eu^{3+} refletance spectra for different Eu^{3+} concentrations

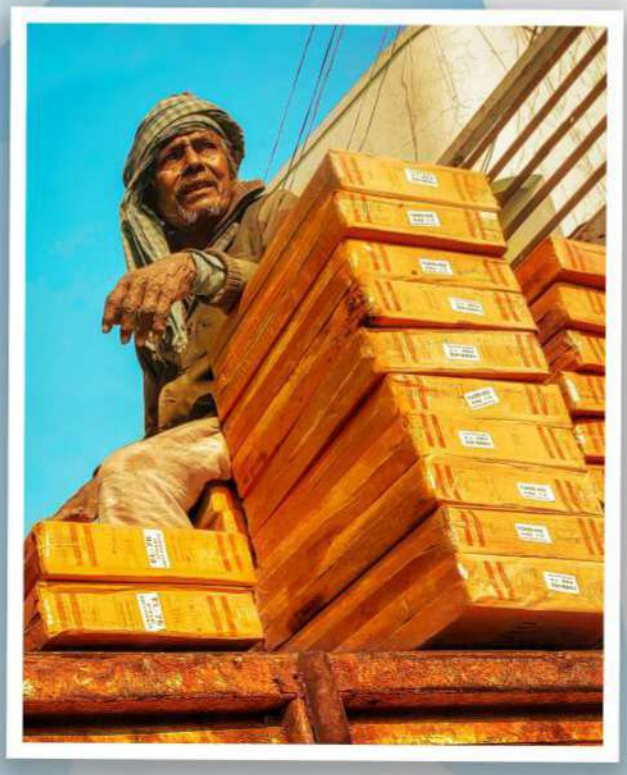
divalent Zn^{2+} are replaced by trivalent Eu^{3+}, Tb^{3+}. To find the bandgaps, diffuse reflectance studies of ZnO:RE^{3+} (RE=Eu, Tb)and ZnO:RE^{3+},Li^{+} were carried out. Diffuse reflectance of Eu/Tb ZnO was calculated.

Band gaps of the samples were calculated using the Kubelka-Munk relation. The band gap energy calculated for the RE^{3+} (RE=Eu, Tb) doped ZnO nano rods were found to be in the range

3.13eV~3.17eV. The band gap values obtained in our studies are much lower than that of bulk with the absorption edge position obtained in diffuse reflectance data. In case of oxides, there are large number of oxygen vacancies which are able to change the structure of the energy band with the enhancement of the deformation degree of O 2p orbits. It causes the shifting of the absorption edge towards higher wavelength and decrease in the bandgap value for Li^{+} co-doped ZnO:RE^{3+} samples.

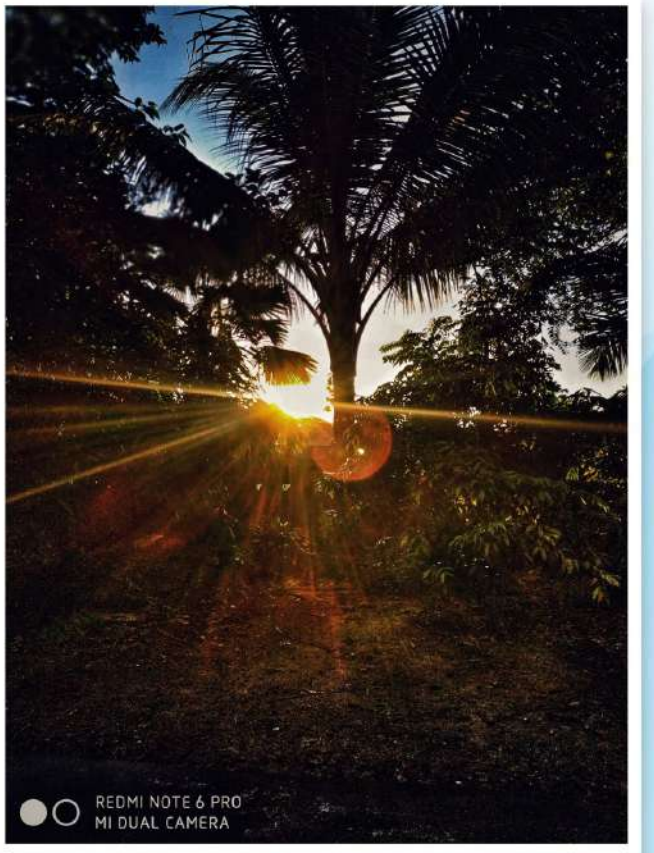
Thus, controlling the band gap is very important because it determines the upper wavelength limit of light absorption in a material. So, for example, more efficient photovoltaic cells can be fabricated that have stronger solar light absorption.



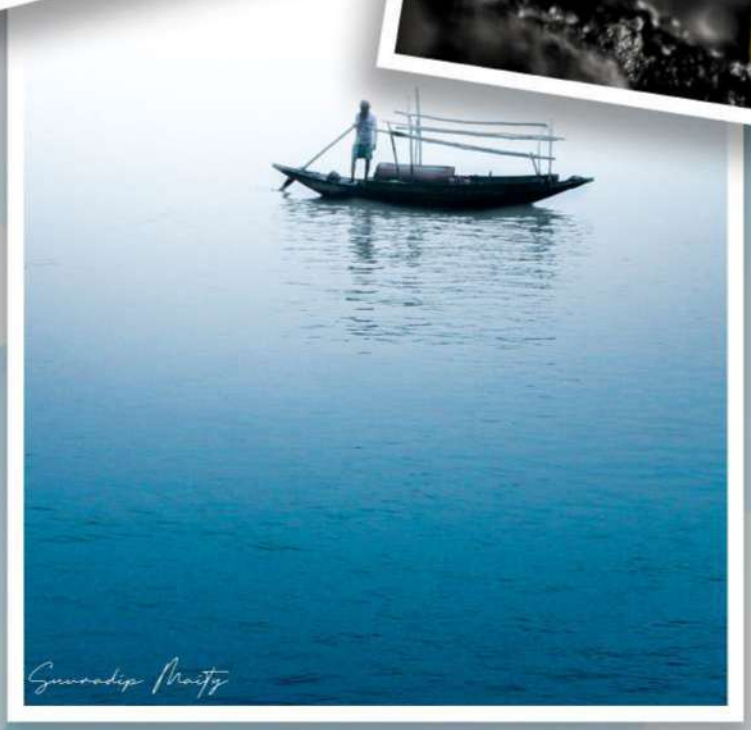


Swastik Sarkar

Dream Institute Of Technology



Sayak Sarkar
Dream Institute of Technology



Suvradip Maity

Thank You

We stand here today to address an issue that has affected us all in one way or another - the COVID-19 pandemic. As we all know, this pandemic has had a profound impact on the world, disrupting lives, economies, and healthcare systems across the globe. However, in the midst of this crisis, we have also seen incredible acts of kindness, compassion, and resilience.

First and foremost, I would like to express my deepest sympathies to anyone who has lost a loved one or been directly affected by this virus. The pandemic has shown us that our lives can change in an instant, and that we must cherish every moment with those we love. Let us take a moment of silence to honor those who have passed away due to COVID-19.