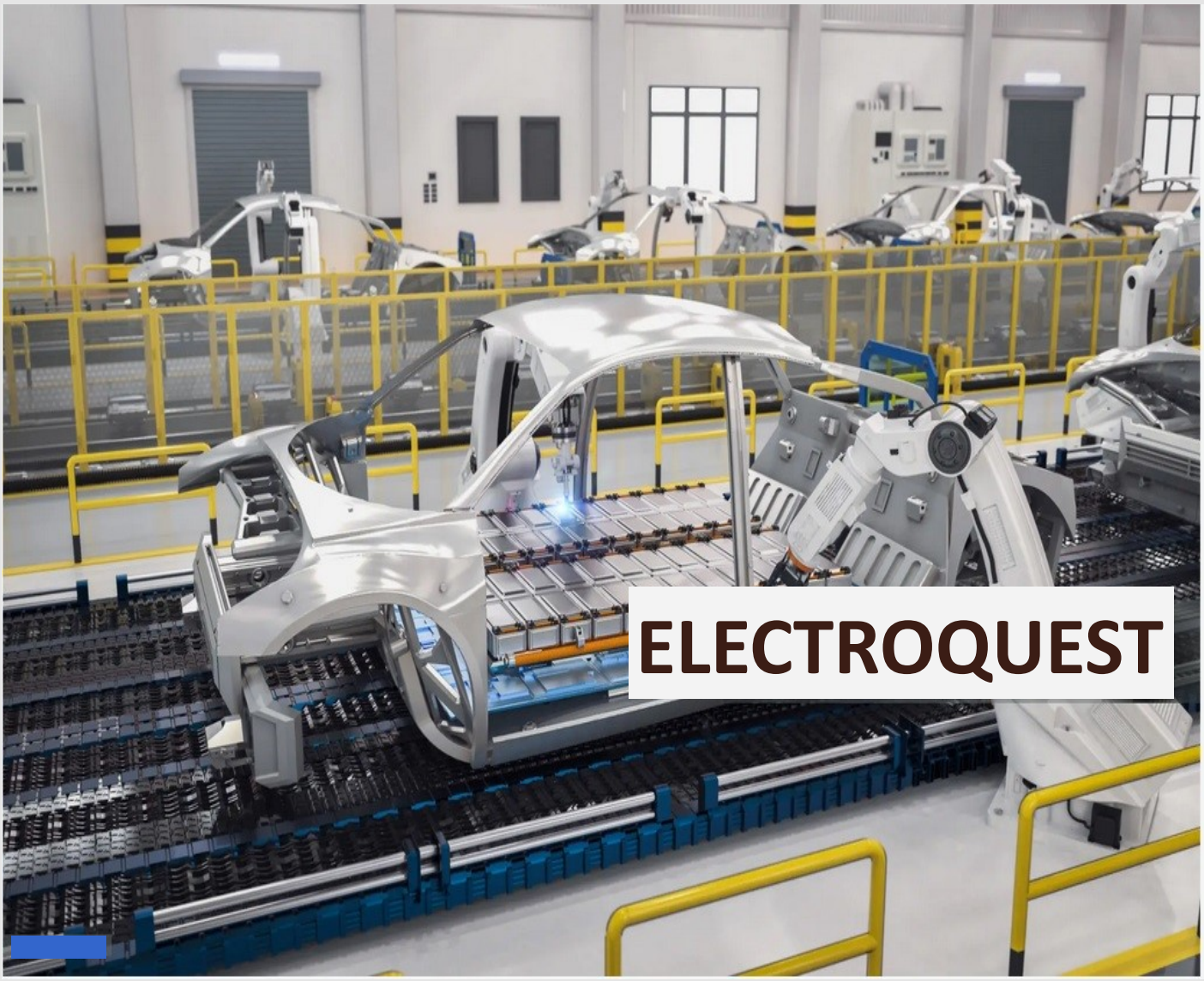
Dr. B. C. Roy Engineering College, Durgapur

Department of Electrical Engineering



ELECTROQUEST

VOLUME: 4

DECEMBER, 2023

Sangbedya Das, Student

Vision

To create a strong teaching, learning, innovation and research environment with inclusive improvement of students and global participation so that the institute is regarded as global center of learning through meaningful, devoted and determined efforts of all stakeholders.

Mission

Excelling in professional career and/or higher education and research in developing innovative technologies by acquiring sound knowledge in basic sciences, professional cores and interdisciplinary subjects of electrical engineering.

Imparting meaningful learning centric education in both professional core and inter disciplinary subjects with latest advancement to bridge the gap between industry and academia.

Inculcating a deep sense of organizational behavior, financial management, values, ethics, societal responsibilities and environmental awareness.

Developing communication skills in the students to help them adopt and contribute more under diverse and dynamic working climates.

Program Outputs (POs) of the course

PO	Graduate Attribute	Description of PO
PO1	Engineering knowledge	An ability to apply knowledge of mathematics, science, engineering and humanities for solving Engineering problems.
PO2	Problem analysis	An ability to define problems and provide solutions by designing and conducting experiments, interpreting and analyzing data and reporting the results
PO3	Design / development of solutions	An ability to design manufacturing systems that would encompass system design requirements as demanded by the Industry/customer
PO4	Conduct investigations of complex problems	An ability to identify, comprehend, analyze, design and synthesis of the information to solve complex engineering problems with proper validation.
PO5	Modern tool usage	An ability to develop skills and techniques to handle state art engineering tools necessary for engineering applications.
PO6	The engineer and society	An understanding of professional, health, safety, legal, cultural and social responsibilities.
PO7	Environment and sustainability	An ability to practice impact engineering solutions for economic, environmental and global development.
PO8	Ethics	An ability to apply ethical principles, responsibility and norms of the engineering practice
PO9	Individual and team work	An ability to function and lead a group of members for multi-disciplinary projects.
PO10	Communication	An ability to communicate, represent problem related to engineering society.
PO11	Project management and finance	An ability to use the modern engineering tools, techniques, financial skills and management principles to function as a member and leader in a

		team, to manage projects in multi-disciplinary environments.
PO12	**Life-long learning**	An ability to engage for resolving engineering problems and contemporary issues to acquire lifelong learning.

Program Specific Outputs (PSOs) of the course

PSO	Description of PSO
PSO1	Indentify, formulate and solve various real time problems of Electrical Machines, Power System, Control System, Power Electronics and Electrical Drives, Microprocessor, Digital Signal Processing and other interdisciplinary subjects with the knowledge of basic science and engineering science as prerequisites, design various types of machine and power system components with cost minimisation, explain Indian Electricity Rules, Energy Acts for safety of society, tariff and energy savings.
PSO2	Perform laboratory experiment in a group using various electrical technologies, both modern hardware and software tools like MATLAB, Mi-Power used in industry and prepare reports tabulating & analyzing the results/ data, drawing the circuit diagram & graphs to enable the documentation capability and solve engineering problems using programming languages like C, C++, JAVA which will help them in being recruited by software industries.
PSO3	Carry out project on new age technologies like renewable energy sources, power quality, energy management/savings, smart grid, wireless system, automatic control system, embedded systems based on modern technologies like IoT and defend their project work in front of experts which help in developing the capability of doing team work, satisfying the requirement of the present day working environment.
PSO4	Communicate; write term paper integrating various information in standard format to that of a research paper for effective & life-long learning, present seminar on recent developments in engineering & technology, fulfilling social, behavioural, managerial, ethical & cultural requirements.

From the desk of the Head of the Department

Dr. Susanta Dutta, Associate Professor

Greetings to all the stakeholders from Electrical Engineering department of BCREC, Durgapur. It is a great pleasure to share 4th volume of e-magazine 'ElectroQuest '. The magazine provides an opportunity for the faculty, staff, students, alumni and guest members of EE department to showcase their inner talents and innovative ideas in form of technical write-ups, photography, literary items, science fiction and thought provoking articles.

I wish to congratulate the editorial team for their excellent effort in bringing out the current issue of ElectroQuest.

ElectroQuest has become a platform for expressing the ethos of the members of the department. It is undoubtedly helping us in attaining our philosophy of learning through academic rigour along with recreation and fun. Our motto is to strive for excellence in all fields. We are committed to all round development of the department and its members. This commitment is amply acknowledged by National Board of Accreditation. Our department is now NBA accredited, (717/1000): June 2022-2025]

Other noteworthy achievements made by the department are listed below:

Publication and Research Status: Session 2022-23 **** (July 2022 to 15th June, 2023)	
	No of Publication & Project
Journal (SCI)	10
Journal (Scopus)	2
Journal (Others)	0
Conf (Scopus)	43
Conf (Others)	3
Book Ch (Scopus)	5
Total Publication	**63**
IP Filed	3
Patent published &Grant	6
Sponsored Project grant	2

Adding feathers to its cap, AICTE IDEA Lab. of our college has now made its presence felt nationally. It is a matter of honour for us, that out of the 106 AICTE IDEA Labs in our country, IDEA Lab BCREC has attained Position-I among all labs for its remarkable performance throughout the last year.

It is a pleasure to inform you that our college has attained necessary requisites for autonomy. Therefore, our journey towards excellence is continuing unabated.

On the placement front, we are making records. Total 783 nos. BTech. Final year students got offer letters from reputed companies. The spirit of the BCREC family is touching new heights. Therefore, our quest for class and distinction is having its footprint felt on all fronts.

We hope that our all out efforts of nurturing the talents of members of department will deliver best results. With best wishes for the success of the e-magazine.

EDITORIAL

Dear Readers,

EE department is pleased to put forward 4th issue of e-magazine 'ElectroQuest'. The e-magazine has now become a medium which addresses our aspirations, expressions and dreams. Its essence is to portray the inner talents of the members of the department. The launch of the current issue is possible, with the cooperation of ever-enthusiastic members with an eye for excellence.

Since the publication of previous issue, our department and the institute have been making great strides in various fields. . It is a matter of pride and jubilation to inform you that EE department has scored a massive in performance evaluation by National Board of Accreditation. We are now NBA accredited. (June 2022- 2025) Our performance is undoubtedly commendable. Thus EE department has set up the benchmark.

As usual, technical, literary, science fiction, inspirational, and hand-drawn pieces can be found in the current edition of ElectroQuest. We sincerely appreciate the college administration's unwavering support and collaboration on all fronts. For their outstanding contributions toward the publication of this issue, we are grateful to Dr. Sunita Dey (BSH), Prof. Arka Banerjee (ME), Dr. Saibal Majumder (CSE, DS), Subhasis Datta (FMS). A special thanks to Dr. Shanti Gopal Pain (COE, CUSB) for providing his insightful write up. The editorial team would also like to express its gratitude to Souvik Singha, Sangbedya Das, and Akash Prasad for their exquisite drawings that further accentuate this issue's glory.

We would like to thank all those who contributed for successful publication of this issue of e-magazine.

Dr. Dola Sinha

Prof. Anupam Sinha

Prof. Kingsuk Majumdar

ATHLETIC MONITORING SYSTEM

Mriganko Sarkar, EE Student

Athletic Monitoring Systems have become increasingly popular in the sports and fitness industry, providing valuable data to athletes, coaches, and sports scientists. These systems leverage various technologies to track and analyse an athlete's performance, health, and training progress.

The key components and features typically found in a comprehensive athletic monitoring system:

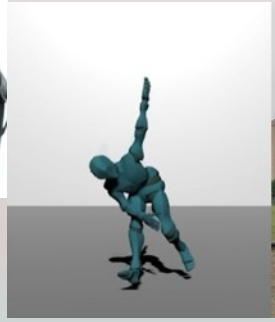
Wearable Sensors: Athletes wear wearable devices, such as smartwatches, fitness trackers, or specialized sports sensors, that are equipped with various sensors to collect data. These sensors may include accelerometers, gyroscopes, heart rate monitors, GPS, and sometimes more advanced sensors like electromyography (EMG) sensors.

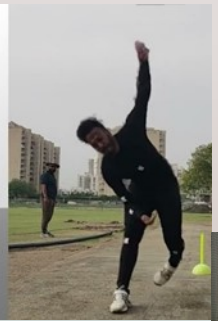
Biomechanical Analysis: Athletic monitoring systems often include biomechanical analysis tools that track an athlete's movements and form during training or competition. This analysis can help identify areas for improvement, optimize techniques, and prevent injuries.

Physiological Monitoring: The system may measure various physiological parameters like heart rate, heart rate variability (HRV), blood pressure, respiratory rate, oxygen saturation, and core body temperature. Monitoring these metrics can provide insights into an athlete's physical condition, fatigue levels, and recovery status.

GPS Tracking: GPS technology is used to monitor an athlete's position, speed, and distance covered during training or competition. This is especially valuable in sports like running, cycling, soccer, and other outdoor activities.

Performance Metrics: Athletic monitoring systems can track performance metrics such as speed, power output, cadence, jump height, reaction times, and other relevant metrics specific to the sport being monitored.





Data Analytics and Visualization: The collected data is processed and analysed using sophisticated algorithms and machine learning techniques. Advanced analytics provide athletes and coaches with valuable insights into performance trends and areas for improvement. Data is often presented in easy-to-understand visualizations and reports.
Injury Prevention and Recovery: By continuously monitoring an athlete's physical condition, training load, and recovery, the system can help prevent injuries and optimize the athlete's training regimen.
Cloud Connectivity: Many modern athletic monitoring systems have cloud connectivity, allowing athletes and coaches to access data remotely on various devices, share information, and collaborate with others.
Mobile Apps and User Interface: User-friendly mobile applications or web interfaces provide athletes and coaches with real-time feedback, training plans, and personalized insights based on the collected data.
Integration with Training Platforms: Some systems integrate with existing training platforms and sports performance software, making it easier for coaches and athletes to incorporate monitoring data into their training programs.

Criticism

Athletic monitoring systems includes concerns regarding privacy and data security, potential overemphasis on data-driven decisions, cost barriers limiting access for some athletes and teams, and the challenge of translating data into actionable training strategies effectively. Additionally, wearable devices usability and potential distractions during training or competition are also points of criticism.

Conclusion

Athletic monitoring systems play a vital role in modern sports and fitness, offering valuable data to optimize performance, prevent injuries, and enhance training strategies. While they have numerous advantages, including data-driven insights and real-time feedback, there are challenges to address, such as cost, privacy concerns, and ensuring the balance between data-driven decisions and traditional coaching methods. When used responsibly and ethically, athletic monitoring systems can be powerful tools in empowering athletes and coaches to achieve their full potential.

What do students want from Teachers?

Suneeta De. Associate Professor, Dept of English (BSH)

2020 changed our world in so many different ways.

Learning Management systems took forward the path to continued education. The novelty of Google Forms, Google Classrooms, Google Form quizzes with instant results, Live worksheets with instant feedback and attendance of the 'face'/'display picture' took precedence over a student's active participation in a brick and mortar classroom

At least the 'shutdown' did not *stop* the continuity, or its semblance, of the process of education for those who had the privilege of data and device. The students adapted like fish to water, as did many on the correct side of the digital divide. Teachers of a certain level of digital (dis) comfort remained on the margins of this technical tsunami. Predictably though, one had to adopt and adapt to keep the home fires burning, sooner rather than later.

Cut to a post-Covid classroom today.

The learners as well as the teachers have grown used to technology, devices, 'sharing' digital content and using multimedia inputs. 'Chalk and talk' is a pedagogy that is considered unstimulating. The knowledge sharing that occurs now does not need the teacher, always. The world, being at one's finger tips has left the teacher vulnerable to being compared to higher standards of competence, in an instant.

Knowledge dissemination is not what is the only *ask* of a student from the teacher, in class. Knowledge is available online, in byte sized nuggets, with a background score and a well groomed presenter to boot! It is available in a language of one's choice, in one's own bedroom/ study, at a time when it suits the learner. The learner decides what, when and where s/he wants to learn. The timetable and the strictures of obeisance to the 'teacher' – have become irrelevant.

What, then , does the post-Covid learner want from their post-Covid Teaching Environment?

To my best understanding over the last 2 years of classroom teaching in person, the learner is not looking for information anymore.

The learner would like to be mentored in the subject in question. That may be achieved by taking the subject to the floor in terms of applicationality. Additionally, the learner does not want to remain 'passive' anymore. So, engaging the learner physically, with 'tasks', is a requirement. Total Physical Response (TPR) may need to be revived as a pedagogic tool, irrespective of subject. Projects, Experiential Learning (good old 'excursions' of the yore) and Service Learning are what might become mandatory in every domain, going forward.

For a subject that focuses on Interpersonal Skills and Communication, for instance, a video of the learners taken in the first weeks of class and compared to their term-end performance would be tangible proof of what milestones have been achieved. The curriculum inputs would include all forms of Blended Learning tools. The new age learner believes in a life of options, a drop menu, links (to content), shorts (YouTube), impatience for anything more than 200 characters, continuing for more than 3mins, not having the option to scroll, un-follow or unsubscribe. The classroom and the curriculum fail them here.

Learners require customization, individual attention, a certain level of 'pampering' (given the rising phenomena of 'mental health issues) and the continuation of being treated (in class) like the only child of the family, which many truly are.

Teachers are required to cater. This and emotional wisdom, patience, subject knowledge up-skilling, publications and conferences, organizing interactive events for learners, and evaluating the processes that form the bedrock of education, are all on the menu for the teachers that the learner has on her/his wish list of an ideal teacher. If one appears friendly, pleasing and smartly groomed while at it, things becomes all the better.

Let us not forget maintaining scrupulous *records.*

I hope our learners appreciate the efforts that one puts into the task of preparing for teaching – one 50 minute class at a time!

Sustainable Development – Role of Educated Engineers:

Prof. Anupam Sinha

'Sustainable development is development that meets the needs of present, without compromising the ability of future generations to meet their own needs.' - *Sustainable Development Commission*

Therefore, the main aspect of sustainable development is that we must keep in mind the future impact our present actions will have on planet earth. This calls for concerted and collective action by all countries, societies and individuals. Thus sustainable development means all inclusive development by utilising our resources in such a way that enables us to renew our resources or to ensure availability of the accessible resources for benefit of all of humanity. The advantage of the resources should be available to the present as well as future generations. The development should benefit all with equitable and just distribution among different societies and keeping the environment of the planet earth safe and habitable. Therefore, economic viability, environmental protection and social equity form the three fundamental aspects of sustainable development.

Role of Educated Engineers:

Education is the essential tool which equips individuals with necessary skills and acumen to successfully face the challenges posed by their work environment, professional career, and interpersonal relations. Education imbibes the habit of rational and logical thinking. It essentially encourages and fosters creativity and innovation among the learners.

By viable education young engineers shall be capable of having a deep understanding of environmental issues, a clear idea of eco systems and human habitats. It will help him to inculcate the qualities of ethical thinking, social welfare and become responsible citizens. The engineers shall have the role of key player in creation of society, with development of technology and material prosperity. Based on engineering knowledge they should ensure the best interest of the society. They should be able to find practical solution to engineering problems, which are addressing environmental concerns, society and are economically viable.

Contending with the challenges of Global climate changes, reducing the carbon footprint should form the prime concern of engineers. Emphasis should be on development and use of cleaner and renewable energy resources for our energy needs. The creative engineers with their novel ideas shall be able to find feasible solution to complex engineering problems, with multiple constraints. While formulating engineering problems and finding solutions, they should desist from exploiting Nature; rather work in tandem with Nature. Improved models of development with ever increasing perfection may be ushered into existence by creative and innovative engineers. This will help in planned technological development of society.

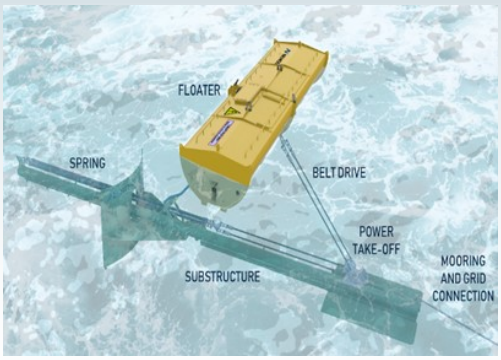
Therefore, educated, creative and innovative engineers should have a big role in sustainable development of society. They can ensure a clean and habitable world for us and the posterity.

Innovative Wave Power Plant

Rajdeep Choudhury, Student

In our growing world we need huge amount of power to develop our lifestyle. But due to growing climate concerns and energy price hikes, all's are showing interest in renewables energy to meet out energy needs.

In Innovative Wave Power Plant, the power of the waves used to generate electricity. The engineers have developed an innovative technology which offers a new affordable & clean electricity for us.



Innovative Wave Power Plant tested in the North Sea
The NEMOS wave power plant produces electricity in the middle of the sea. It is the first plant that is expected to perform successfully both technically and economically.

Key Facts:

Wave energy has historically been uncommercialized due to the complexity but new technology can easily extract the energy from the ocean waves.

Commercializing wave energy has enormous potential - the World Energy Council predicts that wave energy can produce twice the amount of electricity which the world currently produces.

More than half the world's population lives within 100 km of a coastline, and in many locations, the power of the waves is available around the clock.

A new technology in wave power is Floating Oscillating Surge Wave Energy Converter,

This converter could generate about 100 kilowatts energy, enough to power about 35 homes. Ac team of Stevens Institute of Technology uses an advanced control system to allow device operators to maximize power production based on wave conditions.

WAVE POWER PLANT in WORLDWIDE: -

The world's largest-ever wave power plant is set to be built by Israel's Eco Wave Power (EWP) on Turkey's Black Sea coast following inking of deal with Oren Ordu Enerji.

The phased, 77MW plant, based on a fixed, modular array of steel floats hinged to piston-equipped arms that pump a working fluid via a subsea umbilical pieline to an onshore generator in time with the rise and fall of incoming waves, would be built starting with a 4MW pilot in the port of Ordu. **Ocean Energy Europe**, has said 100GW of installed capacity could be installed off EU by 2050.

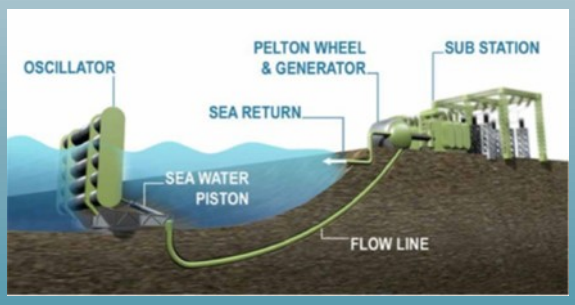
- World total wave power plant capacity is about more than 100 GW.
- China has developed several small Tidal Power projects at Jiangxia and at mouth of Yalu.
- World's first commercial Tidal stream power station was installed in Strangford Lough (Northern Ireland). Fast tidal stream (approx. 4m/s) was able to generate 1.2 MW.
- Many more tidal generation projects are at planning stage in South Korea, Portugal, Australia, US, UK, Russia, Philippines and India.
- In history tidal basins were used in Europe to drive mills to grind grain before AD 1100.

Rank	Power station	Country	Capacity (MW)
1	Sihwa Lake Tidal Power station	South Korea	254
2	La Rance Tidal Power station	France	240
3	Annapolis Royal Generating Station	Canada	20
4	Jiangxia Tidal Power Station	China	3.2

WAVE POWER IN INDIA:

India has a long coastline of 7517km marked along by numerous estuaries and gulfs which makes it attractive for the development of wave energy projects. India's wave power potential is around 5-15 MW/m, so the theoretical estimated potential to be around 40-60 GW.

IIT Madras and CRISIL have identified some locations for wave power development along the west coast of India in Maharashtra, Goa, Karnataka, Kerala & Kanyakumari. The CUF for wave energy in India is in the range of 15-20%.



Vizhinjam Wave Energy Plant:

Wave energy research in India was initiated in 1983 when the Department of Ocean Development of Government of India provided funds to IIT, Madras for carrying out the research. This led to the establishment of a 150 kW Pilot wave energy plant in 1991 at Vizhinjam in Thiruvananthapuram, Kerala.

Vizhinjam Wave Energy Plant was the world's first wave power plant working on Oscillating Water Column (OWC) technology. This technology utilizes the increase of water level in the caisson, after that the air inside is compressed, which is then used to drive an air turbine.

After a long duration of use, it was planned to be utilized for powering a Reverse Osmosis Desalination plant in 2004. This project also was not successful and the wave energy plant was finally decommissioned in 2011.

Benefits:

Wave energy is a clean and renewable source of energy.
Since waves are always present, so it's consistent in electricity generation is more than wind and solar.
They can be a good source of energy generation for off grid coastal areas and islands.
Wave energy often used to power the desalination plants.
Wave energy turbines when combined with offshore breakwaters, can help the protection of seashores.

Challenges:

Technological challenges include low turbine efficiencies, high turbine costs, unavailability of grid connections at potential sites, lack of experience and unpredictable environmental conditions.
Due to inadequate data, it is challenging to estimate the wave power plant on marine ecosystem.
Moreover, investment in wave power is risky because of high capital cost and lack of operational experience.

Note: According to Karnataka Electricity Regularity Commission (KERC) – a) The cost of project is ₹60cr, b) Price of power ₹4.70/unit, c) Space needed to build - 5km, d) Wind speed at beach – 28km/hr.

Transformation of rural to urban: A curse or boon to mankind

Dr. Sourav Paul and Dr. Sneha Sultana, EE

The continuous conversion of rural areas into thriving urban centers is a prominent and widespread phenomena that is influencing the development of human civilization. This transformation, driven by economic growth, industrialization, and technical breakthroughs, is sometimes seen as a double-edged sword that offers humankind both chances and problems. Many transformations occur as rural areas become urban areas, impacting environmental, economic, and social dynamics. This article explores the complex relationship between the transition from rural to urban areas and how it affects both people and the wider world. Strong infrastructure development is a sign of urbanization. Urban landscapes transform rural regions via major upgrades to roads, bridges, schools, hospitals, and other infrastructure. In addition to being a representation of advancement, this change is essential for meeting the demands of an expanding metropolitan population. Modern infrastructure not only promotes economic expansion but also raises urban dwellers' standards of living. The transition from rural to urban settings is inextricably tied to possibilities and goals related to the economy. Urban areas, which are frequently defined by commercial and industrial activity, draw people looking for greater job opportunities and higher wages. Cities turn into furnaces of economic vitality that promote entrepreneurship, innovation, and a wide range of employment options. Many people stand to benefit from this economic attraction, which may lower poverty, enhance access to education, and raise living standards generally. Cities frequently act as centers for healthcare and education, providing citizens with access to top-notch services. People who move from rural to urban regions might seek chances for higher education, which opens doors to career advancement and economic mobility. Better access to medical services is also ensured by the concentration of healthcare institutions in metropolitan areas, which enhances general wellbeing. The shift from rural to urban areas represents a significant social and cultural shift in addition to a physical one. Urban centers, which are known for being cosmopolitan, operate as melting pots for many cultures, encouraging exchanges and interactions between them. This diversity creates a dynamic tapestry of human experiences by enhancing social ideals, fostering artistic expression, and sculpting distinctive cultural landscapes.

Notwithstanding the possible advantages, the quick transition from rural to urban settings presents a number of difficulties that should be carefully considered. Urbanization is typically accompanied by problems including resource depletion, overcrowding, inadequate infrastructure, and environmental deterioration. Migration from rural to urban areas can cause close-knit rural communities to break apart, which can exacerbate societal problems including alienation, urban poverty, and overburdening social services.

The ecology usually suffers as a result of urbanization. The growth of cities is associated with a rise in air and water pollution, deforestation, and biodiversity loss.

Urban areas can have a significant ecological imprint that endangers ecosystems and exacerbates climate change. For the sake of the planet's health and the welfare of its people, urban growth and environmental sustainability must coexist in harmony. People are moving into cities at a rate that is frequently faster than the infrastructure that is needed. Urban systems can become overburdened by inadequate water supply, sanitation, and transportation, which can result in traffic jams, inefficiencies, and a general decline in quality of life. To lessen these difficulties, sustainable infrastructure development and effective urban planning are essential.

Summary in a nutshell

Economically, socially, and ecologically, the process of turning rural regions into urban ones is intricate and varied. Unquestionably, technology offers chances for advancement, economic expansion, and cross-cultural interaction, but it also presents obstacles that must be addressed with careful thinking and sustainable methods. Navigating this revolutionary path requires striking a balance between environmental care and urban growth, fostering inclusivity, and protecting cultural heritage. Transitioning from rural to urban areas is a complex process that calls for careful navigation rather than being either a clear blessing or a severe curse. The sustainability and prosperity of future generations will depend on humanity's capacity to maximize the positive effects of urbanization while reducing its negative effects. We need to have a comprehensive vision that puts social justice, environmental sustainability, and cultural heritage preservation above all else when we design our urban environments. The transformation of rural areas into urban ones can only benefit humankind if it is done so in a way that promotes harmony between urban dynamism and the principles that unite us as a species.

A Journey from a Researcher to an Entrepreneur

Dr. Dola Sinha

On the day of May 2021, at evening 5:30, my phone started ringing. "Dola, wouldn't you like to participate in the PowerPoint presentation?" the other party says as I take up the phone.

"You have applied for the RKVY Raftaar scheme. We have shortlisted you and sent you mail with details of today's presentation," he said, and I then gradually understood what he meant.

"But I didn't receive any correspondence from you—I suppose it's in my spam folder. If you could just give me five minutes, sir—I'll be right there." I told him.

I joined the meeting completely unprepared and was given only five minutes to pitch my idea. It was the day when everything was shut down because of the COVID-19 epidemic. It came as a complete surprise, even though I had done everything and discussed all the small things in detail. After one month, on June 12, I received an email from MANAGE (National Institute of Extension Management) Hyderabad, informing me that I had been selected for a two-month training program. They also informed me that an elimination procedure would be initiated with the training and that only twenty participants out of forty would be awarded the financial grant. From day 1, I accepted this challenge and promised myself that whatever it may be I won't be eliminated till the end. The program was demanding full attention, quick response, and lots of activities; courses began promptly at 10:00 a.m. and ended at 6:00 p.m. Two hours of break in the middle. I adjusted my classes of BCREC from 9 am to 10 am and in the middle 1 hour.

They specifically asked that we must maintain an attendance rate of 90% (minimum) during training or face immediate termination. During the first half of the training, there was a question-and-answer session, group work, and other different types of competition; we had to be on high alert the whole time. In the second half, there was a one-on-one session with an expert member, but only the first ten people could get the scope. They were asked to fill out a form for that session at the first one, and the eleventh person couldn't participate and their attendance went down. As a part of this training, we are required to do extensive coursework, fieldwork, and interaction with the farmers throughout this program and provide them with the videos as proof. I have always had a lot of support from my teammates, Chaity, Kinshuk, and Suchismita. We gained a lot for our business, promotion, revenue-earning methods, digital platform handling, website design, newest digital technology for promotion, Omni channel management, cash management, opportunity flow, grant-in-aid proposal writing, and attractive PPT making.

My sincere thanks go out to Mr. Alokhnath C. R., our favorite coordinator for making the most of our two months working with MANAGE. Our beloved leader "Alok Sir" was incredibly careful with us because he was both knowledgeable and compassionate. Adjectives become insufficient when used to characterize such an individual. During this time, we made many acquaintances across India, including Suyog Kulkarni and Varsha from Mumbai, Alito from Nagaland, Aruneswar from South India, and countless more. Near the conclusion of the two months of training, my attendance rate was 98.5% and after elimination, we were then only 25.

Professor Murthy served as a judge for our practice presentation. He was an exceptional critic and an exceptional human being. Because of his criticism, everyone was on edge. Me and Suyog performed better and our confidence levels rose, I'll never forget how much happier we felt after satisfying him. With this, our winning journey starts.

In the first CIC, we have just five minutes to pitch our proposal to the entire MANAGE team and an impartial third party. Since it was an elimination process as well, we were extra cautious. However, now that we're used to the system, we can finish our presentation well and explain everything in a flash. There was no provided list, so I have no idea how many of us made it through Phase 1, as MANAGE had provided a letter of acceptance to the selected person only. Following that, we patiently awaited the ministry's second and last CIC round. We need to finish the legal procedure of opening the company at the first and second CIC meetings. Yes, ANKURAAN (The magical journey from seed to seedling) is the name and tagline of our joint venture. In the second CIC, we were given just three minutes to present our ideas, with the remaining seventeen minutes being reserved for questions and answers. The assessment team included members from the Indian Ministry of Agriculture as well as specialists from throughout the country. We were able to finish our presentation in only three minutes thanks to the training we received from MANAGE. My presentation was well-received by the ministry, and I attribute my success to my engineering experience, which allowed me to clearly describe the product's value proposition as well as its recent technological developments. MANAGE provided me with training on both the engineering and the business side and helped to carry out the statistical analysis of TAM SAM and SOM.

Along the way, in 2020, I had the pleasure of meeting Professor Vijay Nadiminty of PJTSA University in Hyderabad. After getting his advice and training session, I was able to crack the first level of RKVY Raftaar without any preparation. We were able to approach the proposal writing with fresh eyes. Thanks to his one hour session. The reason is, that it goes against our grain of thought. So, I was able to ace the first round when I received the first call from MANAGE;

Additional difficulties arise as the mechanical fabrication phase begins. Finding equipment with a proper rating and desirable structure is just searching needle in a haystack. The limitations of cost-quality-weight were a constant source of contention for us. We finally found a supplier in Ahmedabad who could supply us with DC motors at the required rating with the help of a digital marketing platform after a tremendous amount of searching. However, we must still make compromises in terms of weight. A fully-equipped workshop is required for this kind of construction. Dr. Chandan Bandyopadhyay stepped up to the plate and became an integral part of Ankuraan's efforts to resolve this issue. Our production manager, Mr. Tarun Dutta, poured his heart and everything into making the bot. In his pursuit of putting his dream into action, he does not spare any effort. The supportive atmosphere fostered by Sovan Bhattacharya , Saibal Majumder and Debkanta sir of BCREC has been invaluable to the growth of my startup team. Thanks to their assistance, we were able to finish the first milestone and go on to the next one. We are thankful to Abhishek sir of Aparajita Solar and Krishna sir of AICT Pvt. Ltd, Chitra Madam of SBI, Durgapur, Mr. Yuvraju sir and Dr, Sarvanan sir Director, MANAGE, Mou (EE), Moutusi (ECE), Sushanta da (CSE) and other faculty members of BCREC. Mr. Ravi Sharma, Senior Finance manager, BCREC stretched his hand for official document verification, and Mr. Sougata Ganguly CA for audit during the submission of 1st review report.

Please keep me and my ANKURAAN in your prayers as we are working hard to get our product to market as quickly as possible and successfully run.

We can still remember the advice of Dr. APJ Abdul Kalam that, "we must have a dream before our dreams come true".

Will come soon with the story of "**The next-phase-struggle**".....

(To be continued.....)

Student Psychology Overview

Angika Anjan, Student

Student psychology refers to the study of the psychological factors that influence and affect students' behavior, emotions, cognition, and overall well-being in an educational setting. It is a branch of psychology that focuses on understanding the unique challenges, developmental stages, and learning processes that students go through during their academic journey. Student psychology encompasses various aspects, including:

Learning and cognition: Understanding how students acquire knowledge, process information, and develop problem-solving skills. This area explores memory, attention, motivation, and the impact of different teaching methods on learning outcomes.

Developmental psychology: Examining the physical, cognitive, emotional, and social changes that occur as students progress through different stages of development, from early childhood through adolescence and young adulthood.

Motivation and engagement: Investigating the factors that drive students to participate actively in their education, set and achieve goals, and remain engaged in the learning process.

Emotional well-being: Studying the emotional challenges students face, such as stress, anxiety, depression, and how these emotions can influence their academic performance and overall quality of life. Social interactions and relationships: Analyzing the impact of peer relationships, teacher-student interactions, and the school environment on students' social development and academic success.

Educational interventions and support: Developing and implementing strategies and support systems to help students overcome academic difficulties, enhance their strengths, and promote overall well-being.

Educational decision-making: Understanding how students make choices related to their academic and career paths and exploring factors that influence these decisions.

Student psychology plays a crucial role in improving the educational system, as it helps educators, parents, and policymakers gain insights into the needs and challenges of students. By understanding student psychology, stakeholders can develop effective teaching methods, design appropriate interventions, and create supportive environments that foster optimal learning and personal growth.

Ingenious Horizons

Dr. Saibal Majumder (CSE, Data Science)

At one point in time, there lived a bright young engineer named Alex Mitchell in the midst of all the activity at Horizon University. Alex, who was well-known for his originality and creative thinking, was constantly testing the limits of what appeared feasible. Rumors about his possible project circulated throughout the halls as his last year drew near, generating interest and excitement.

Alex was self-motivated to make a mark in the renewable energy industry, which he loved. The enormous difficulty of the task spurred innovative thinking on his part. He finally came up with an innovative idea—a solar-powered, self-sustaining mobile charging station—after months of devoting himself to the subject. His goal was to meet the increasing demand for mobile devices while also bringing sustainable energy to underserved communities.

Incorporating state-of-the-art photovoltaic cells and energy storage devices, the solar charging station guarantees a constant supply of electricity, even when lighting is scarce. The unique feature of Alex's concept was its modular architecture, which made it easy to adapt to the demands of the community and scale or down as needed. Rather than being a simple fix, it was a groundbreaking breakthrough with numerous potential uses.

Prominent members of the academic and business communities took notice of Alex's research as word of it spread. We were all impressed by his commitment and inventive strength. Given the support and guidance he received from the institution, he was able to realize his dream. A solar charging station prototype was brought to life, demonstrating not just technical skill but also a practical use that has the potential to impact people's lives for the better.

In the midst of placement season, leading firms fought for Alex's interest. Technical prowess and the capacity to think creatively beyond the box were both on display in his endeavor. Interviewers were impressed by his self-assurance as he described the creation's complexities, which spoke volumes about his ability to think creatively and efficiently. Because of the great potential of Alex's solar charging station, one business, SolTech Innovations, gave him a generous compensation plan. They saw that Alex's inventiveness was a strength that would propel their business ahead, and they were excited to introduce his idea to the competition.

Alex Mitchell felt accomplished when he started his career after graduating with honors. Going from an aspirational engineering student to a highly sought-after inventor, he exemplified the potential of creative thought and its influence in scholarly and professional settings. In addition to molding his own future, the "Ingenious Horizons" that Alex had dreamed of helped make the world a better and more sustainable place

রেখা

অর্ক ব্যানার্জী , সহকারী অধ্যাপক, মেকানিক্যাল ইঞ্জিনিয়ারিং

একটা পথ আঁকতে গিয়ে

পেনসিল এঁকে-বেঁকে ছুঁয়ে গেল

প্রাইমারি স্কুলের খেলার মাঠ,

গ্রামের এক প্রান্তের আরেকটা পুকুরঘাট,

যেখানে সাবান-তেলের বাটি নামিয়ে রেখে

একটা রেলস্টেশানের স্পর্শক বরাবর

পেনসিল ছুটে পৌঁছল একটা শহরের কলতলায়,

সেখানে পথের বক্রতাকেন্দ্র

একটা ঘুবচি গলির মধ্যে পড়ে রইলো কয়েকটা বছর।

কলেজের ক্যান্টিন, কমনরুম ঘেঁষে বাঁক নিতে

মিছিলের সামনে উদ্যত রাইফেলের চোখে চোখ রাখল।

তারপর একদিন নতি কমে যায়

সমস্ত গতিশীল বস্তুর সরণরেখার ;

একটা অফিসের বাস সোজাসুজি আসা-যাওয়া করতে থাকে রোজ দুইবেলা।

তারপর, ত্রিকোণমিতি শেখায়

কিভাবে ছায়া দীর্ঘ হয় শরীরের থেকে...

এই বেলা যথেষ্ট অবসর, বোঝার বয়স হয়

প্রতিটি বক্ররেখাই আসলে

যথেষ্ট কাছ থেকে দেখলে, সরলরেখা।

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Artificial Intelligence: An Indispensable Tool from the past for Future Engineers

Prof. Soham Dey, EE

Artificial Intelligence - explores a realm that has captivated human imagination for decades and is now weaving its way into the very fabric of our existence. AI has become a driving force in shaping the landscape of modern technology, revolutionizing the way we live, work, and interact with the world around us. Artificial Intelligence, or AI, is not merely a technological innovation; it is a paradigm shift, a leap forward into a world where machines not only perform tasks but learn and adapt, mimicking, and sometimes surpassing human intelligence. It's a journey that started with theoretical musings on the possibility of machines thinking, evolving into a complex tapestry of algorithms, data, and computation that now surrounds us.

Historical evolution of AI:

This journey takes us back to the roots of AI, where visionaries like Alan Turing laid the groundwork for machines that could simulate any human intellect. Over the years, AI has evolved from rule-based systems to the dynamic and self-improving algorithms we witness today. It is a journey of exploration, innovation, and continuous refinement, fuelled by the insatiable human quest for knowledge and progress.

1. **Dartmouth Conference (1956):** The term "Artificial Intelligence" was coined during the Dartmouth Conference in 1956. John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon gathered to explore the possibility of creating machines that could simulate human intelligence.

2. **Early Symbolic AI (1950s-1960s):** The initial years focused on symbolic AI, where researchers attempted to create intelligent systems through symbolic reasoning and rule-based logic. Programs were developed to mimic human problem-solving and logical reasoning.

3. **Machine Learning Emerges (1950s-1960s):** The concept of machine learning, a crucial aspect of modern AI, began to take shape. Researchers like Arthur Samuel worked on creating systems that could learn from experience, paving the way for the development of algorithms capable of improving performance over time.

4**. AI Winter (1970s-1980s):** Due to over-optimistic expectations and unmet promises, the field experienced a period known as the "AI winter," marked by decreased funding and waning interest in AI research. Many believed that achieving true artificial intelligence was more elusive than initially thought.

5. Expert Systems (1980s): Despite the challenges, the 1980s saw a resurgence in interest, particularly in the development of expert systems. These systems utilized knowledge bases and rules to mimic the decision-making processes of human experts in specific domains.

6. **Rise of Neural Networks (1980s-1990s):** The 1980s witnessed a renewed focus on neural networks, inspired by the human brain's structure and functioning. Although progress was made, the computational power required for training deep neural networks was often prohibitive.

7. **Machine Learning Renaissance (2000s-Present):** Advances in computing power, the availability of vast datasets, and improved algorithms contributed to a resurgence in machine learning. Techniques like support vector machines, decision trees, and ensemble methods gained prominence.

8. **Deep Learning Revolution (2010s-Present):** The current era is characterized by the dominance of deep learning, a subfield of machine learning that leverages neural networks with multiple layers (deep neural networks). Breakthroughs in deep learning have fueled remarkable achievements in image recognition, natural language processing, and game-playing AI.

9. **AI in Everyday Life (2010s-Present):** AI has become an integral part of our daily lives. Virtual assistants like Siri and Alexa, recommendation algorithms on social media and streaming platforms, and autonomous vehicles are just a few examples of AI applications that have become commonplace.

10. **Ongoing Developments (2020s):** AI continues to evolve rapidly, with ongoing developments in areas such as reinforcement learning, explainable AI, and the integration of AI with other emerging technologies like quantum computing and 5G.

In the subsequent sections of our exploration today, we will unravel the intricacies of AI, examining its fundamental components such as machine learning and natural language processing. We will venture into its practical applications, from the conveniences of virtual assistants to the profound impact it has on healthcare, industry, and beyond.

The Building Blocks:

Understanding the fundamentals of AI is crucial. The core components of AI includes machine learning, natural language processing, and robotics. AI explore how these building blocks come together to create intelligent systems capable of learning and adapting.

Machine Learning:

A deep dive into the engine that powers much of AI—machine learning. Discussing supervised and unsupervised learning, reinforcement learning, and neural networks, AI executes how machines can be trained learn from data and improve their performance over time.

AI in Everyday Life:

AI is no longer confined to research labs. We can absolutely feel the ubiquitous presence of AI in our daily lives, from virtual assistants like Siri and Alexa to recommendation algorithms shaping our online experiences.

AI in Healthcare:

One of the most promising applications of AI is in healthcare. AI is now revolutionizing diagnostics, drug discovery, and personalized medicine.

AI in Industry and Automation:

The impact of AI on industries is profound. This section delves into the role of AI in automation, predictive maintenance, and quality control. AI is now reshaping manufacturing processes, supply chain management, and the concept of smart factories.

The Human-AI Partnership:

Emphasizing the importance of collaboration, this section explores the concept of human-AI partnership. There are scenarios where AI augments human capabilities, leading to more efficient problem-solving, research, and decision-making.

Challenges and Ethical Considerations:

While AI presents tremendous opportunities, it also raises ethical concerns. There are various issues such as bias in algorithms, job displacement, transparency and explain ability, Data Privacy and Security Risks: that come with the widespread adoption of AI.

Yet, even amidst these challenges, there is an undeniable sense of optimism. The future of AI holds promises of advancements that could redefine the very essence of creativity, collaboration, and the human-machine partnership. This article investigates how AI is not just a technological tool but a collaborator, augmenting human capabilities and ushering in new possibilities.

Artificial Intelligence stands at the forefront of technological innovation, reshaping the world as we know it. So we have seen an extensive journey of AI, from its historical roots to its present applications and future potential. As we navigate the ever-evolving landscape of intelligent machines, understanding and responsibly harnessing the power of AI will be key to unlocking its full benefits for humanity. So, let us open our minds to the potential, acknowledge the challenges, and together, contemplate the responsible and ethical integration of AI into our lives. The age of intelligent machines is upon us, and together, we shall navigate its complexities, shaping a future where the collaboration between human ingenuity and artificial intelligence knows no bounds.

Integrating sensors and actuators for a robust BIOT-enabled smart farming

Balaram Halder, Kishaloy Banerjee, Dipankar Adak, Students

Dr. Subhasis Datta (FMS), Dr. Kamalika Tiwari (EE) and Dr. Santigopal Pain (COE, CUSB)

Improved farming efficiency is a result of the Internet of Things (IoT) and its two performers: sensors and actuators. Sensors sense the physical environment and relay that information to devices, which trigger actuators, the doers of the IoT-enabled ecosystem, to take specific actions based on real-time data. Sensors gather information about soil temperature, humidity, and other physical parameters for environmental monitoring. Sensors are used to monitor the qualities of the soil, including temperature and humidity. Actuators then use this information to automate processes such as fertilization, sowing rates, and pesticide application which results in the most economical use of resources. Thus, the Internet of Things (IoT), together with actuators and sensors, improves productivity. The IoT-enabled ecosystem is based on real-time data by sensors that perceive the environment and communicate that information to devices.

The Vigilant Eyes: Sensors

The heart of every IoT network is sensors, acting as the watchful eyes of the physical parameters governing farming resources. These devices come in various forms, from temperature sensors and motion detectors to sophisticated environmental monitors. Their primary task is to perceive changes in their surroundings and convert this information into valuable data just like a smart home adjusting its real-time temperature readings or a smart city optimizing traffic flow through intelligent sensors monitoring vehicle movements.

The Hands That Respond: Actuators

The IoT-enabled system reacting hands, or actuators, are on the other side. The conversion of digital intelligence into tangible actions is handled by these devices. Actuators give sensors' data life, whether they're used to remotely operate robotic arms in a smart factory or tilt solar panels to optimize energy absorption. In an IoT system, the actuator can act on data collected by sensors to create an outcome. Actuators receive data from sensors, which enables them to precisely schedule and carry out operations like push, pull, injection, trigger, etc to the agricultural equipment. The IoT ecosystem is driven by this smooth cooperation, which makes automation efficient. These are the instruments that translate digital intelligence into physical actions. They perform decisions that maximize ease of use and efficacy, acting as a bridge between the digital and physical worlds.

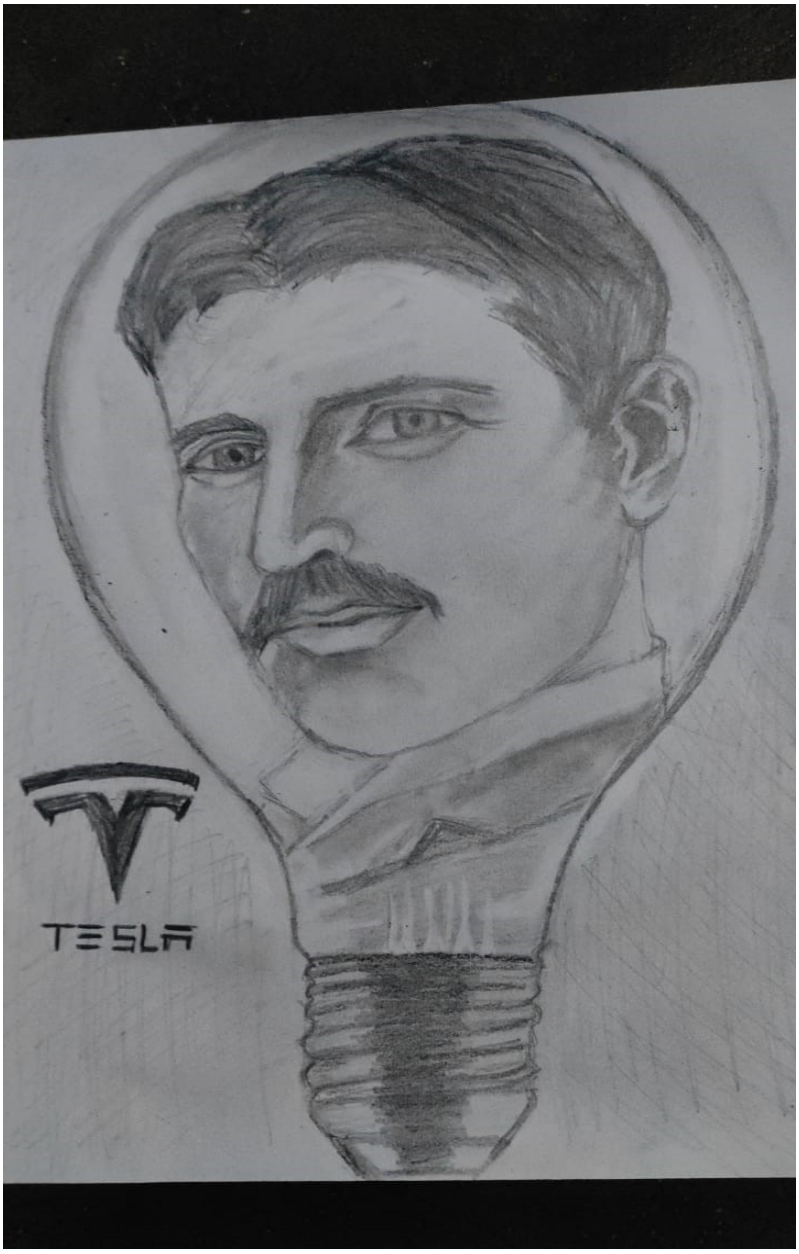
Challenges and Future Horizons

As a way to minimize resource use and fulfil the growing worldwide need for food, smart agricultural farming has gained popularity. Crop production is sustainably demanded by population pressure.

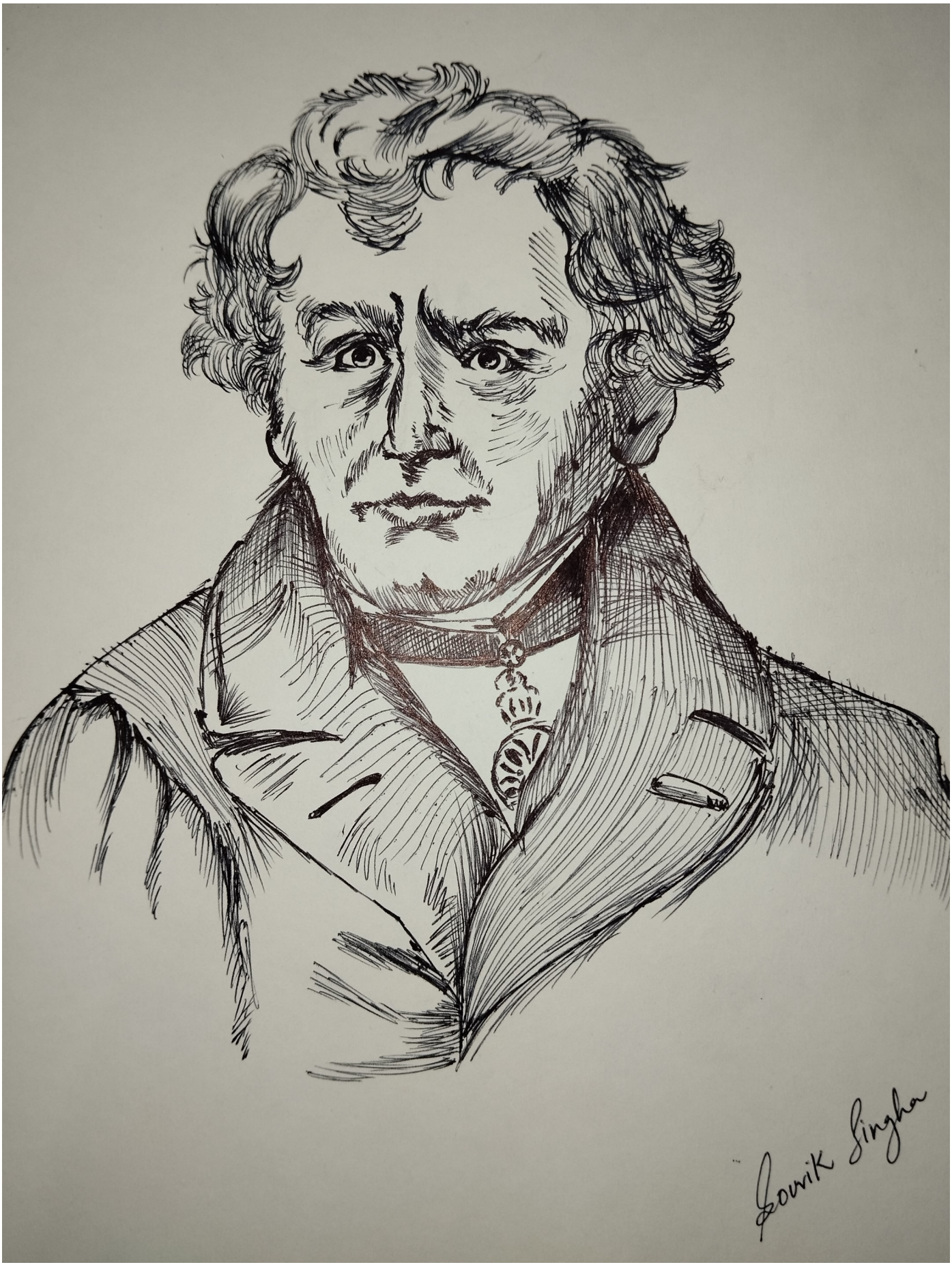
The constraints of organic crop management include the need to get past issues with data gathering, storage, security, and sharing about crop growth; monitoring irrigation and soil conditions as well as fertilizer use during harvest; rising commodity prices; and traditional food supply chain systems that lack a direct link between the producer and the consumer. Stakeholders create and manage data at different stages according to their capabilities and requirements. Data must be unchangeable and clear. Blockchain technology is used in smart agriculture to handle data via the Internet of Things (IoT).

Since we are dependent on the capabilities of sensors and actuators, issues like data security, privacy concerns, and standardization must be carefully considered; however, as technology develops, so do the solutions to these issues. As we approach the brink of a future with greater connectivity, it is evident that the interaction between sensors and actuators is what propels the Internet of Things' transformative potential. The complex dance that these devices perform between data and action opens doors to innovation, improving the efficiency, sustainability, and interconnectedness of our lives. Therefore, the IoT paving the way for a day when the digital and physical worlds seamlessly merge.

Blockchain-based IoT, which emphasizes man-machine cooperation, is therefore a must for Industry 5.0, or sustainable agriculture production. A distributed application-based approach for smart agriculture using Industry 5.0 technology is the need of modern farming. Because the current IoT-based agricultural systems are isolated, there are worries about data manipulation, security, and single points of failure. The study's goal is to create a reliable, safe automated system with BIoT technology that will enable the Internet of Things and do away with data tampering in organic agricultural growing using blockchain technology. Farmers may be able to make data-driven decisions because of the blockchain's ability to securely store data gathered by IoT devices.



Akash Prasad, Student



Souvik Singha, Student