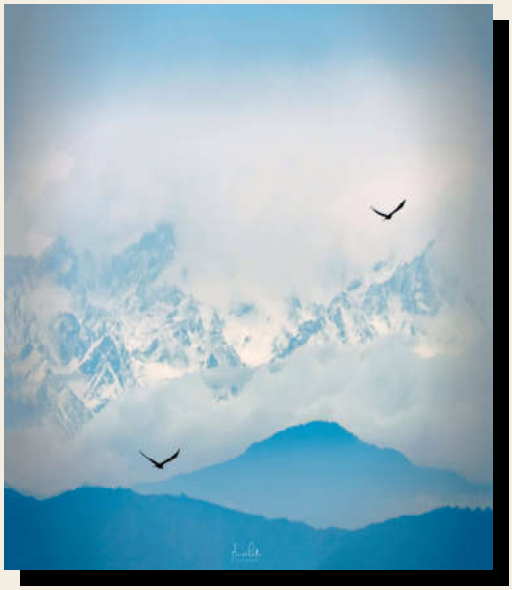
TechTime

A Newsletter Published by Department of Information Technology

Volume 3



Anish Dutta, 3rd Sem.

Vision

To produce competent IT professionals who will contribute towards the advancement of engineering, science and technology for the benefit of society, industry and academia.

Mission

- **To impart quality and value based education towards achieving excellence in teaching-learning and inculcate research environment.**
- **To produce successful graduates with professional ethics, responsibilities and commitment towards society.**
- **To enable graduates for providing effective solutions to real life engineering problems and thereby incorporate self-development entrepreneurship skills.**

HoloLens

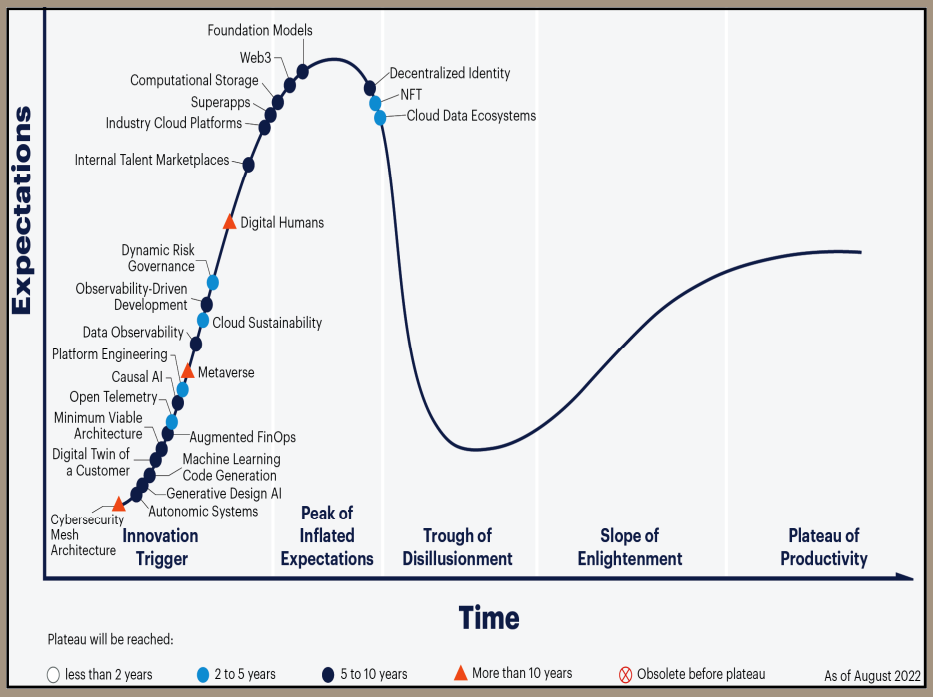
Pallab Saha, 7th Sem.

HoloLens is a pair of mixed reality head mounted smart glasses. HoloLens is essentially a holographic computer built into a headset that lets you see, hear and interact with holograms within an environment such as a living room or an office space. It is based on Augmented reality. Augmented reality (AR) is a live direct or indirect view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data. The history of augmented reality can be traced back to 1990 and work undertaken by Professor Tom Caudell as part of a neural systems project at Boeing.

Hololens has user interface so it takes voice, gaze and gestures as input command into its internal computer and do the projection of hologram. For projection, HoloLens use the HUD (head up display) method where two nano-projector located at each side of head and semi transparent visor which reflect the image as light on user's eye. Microsoft explains the holographic element in this way: "The key to a great holographic experience holograms that are light point rich, i.e. have a high holographic density, and are pinned or anchored to the world around you. To achieve this, HoloLens has been designed for optimal holographic density of 2.5K radiant. The more radiant and light points there are, the brighter and richer the holograms become."

2022 Gartner Hype Cycle for Emerging Technologies

As per Gartner Hype Cycle for Emerging Tech, 2022 fit into three main themes:



Theme 1: Evolving / expanding immersive experiences

Digital twin of the customer (DToC) is a dynamic virtual representation of a customer that simulates and learns to emulate and anticipate behavior. It can be used to modify and enhance the customer experience (CX) and support new digitalization efforts, products, services and opportunities. Other critical technologies in immersive experiences include: **Decentralized identity (DCI), Digital humans, Metaverse, Non-fungible token (NFT), Web3.**

Theme 2: Accelerated AI automation

Expanding AI adoption is a critical way to evolve products, services and solutions. It means accelerating the creation of specialized AI models, applying AI to the development and training of AI models, and deploying them to product, service and solution delivery. Autonomic systems are examples of accelerated AI automation. Other critical technologies in accelerated AI automation include: **Causal artificial intelligence (AI)**, **Foundation models**, **Generative design AI, Machine learning code generation.**

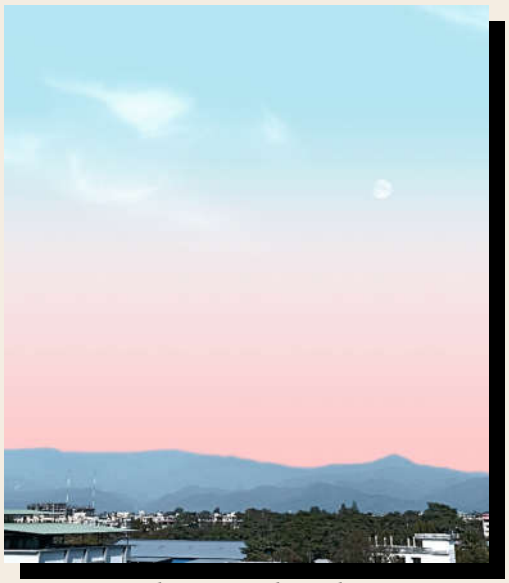
Theme 3: Optimized technologies delivery

These technologies focus on key constituents in building a digital business: product, service or solution builder communities and the platforms they use. Cloud data ecosystems exemplify optimized technologist delivery which provides a cohesive data management environment that ably supports the whole range of data workloads, from exploratory data science to production data warehousing. Other critical technologies in optimized technologist delivery include: **Cloud sustainability, Cybersecurity mesh architecture (CSMA), Data observability, Dynamic risk governance (DRG), Industry cloud platforms, Minimum viable architecture (MVA), Observability-driven development (ODD), OpenTelemetry.**

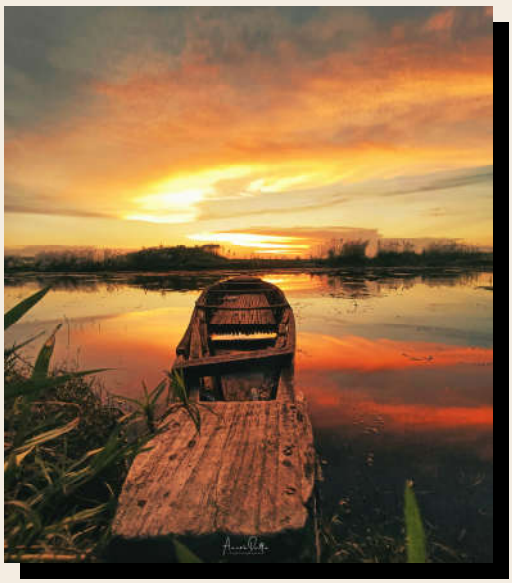
Source:https://www.gartner.com/en/articles/what-s-new-in-the-2022-gartner-hype-cycle-for-emerging-technologies?utm_medium=social&utm_source=twitter&utm_campaign=SM_GB_YOY_GTR_SOC_SF1_SM-SWG&utm_content=&sf259561840=1

Prof. (Dr.) Sirshendu Sekhar Ghosh, HOD-IT

Snaps by Students



Raushani Singh, 3rd Sem.



Anish Dutta, 3rd Sem.

Crypto-Currency

Bishal Das, 5th Sem.

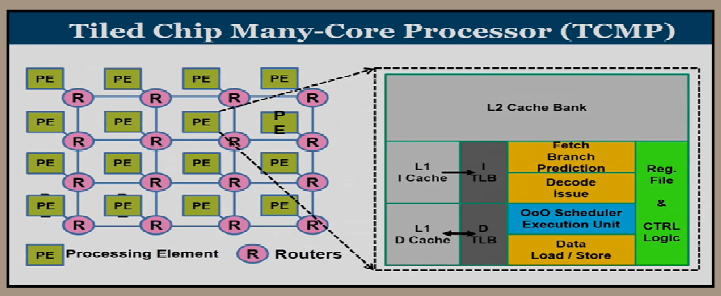
Cryptocurrency is an encrypted digital currency that is processed and validated through data mining and blockchain. The term has got wide popularity in recent times and it has become stronger by 400 percent of its initial value.

The process of using cryptocurrency for transaction is complex. There is no third party involved between the two who are transacting. Once a request is generated, a minor has to solve a complex problem after which the transaction is validated and kept in a public ledger. Public ledgers are like a storage bank where all the confirmed transaction are kept. The identity of the individuals is kept confidential. Bitcoin is one such cryptocurrency. It was the brainchild of Satoshi Nakamoto who in 2009 invented Bitcoin. Bitcoins are infused in the market through miners. Once a transaction is validated miners got Bitcoins as rewards. More number of transactions means more number of Bitcoins in the market.

But Recently RBI issued guidelines to banks and Non-Banking Financial Institution (NBFI) saying that any entity dealing in Cryptocurrency should be done away with. As there is a possibility that money through this can be channelled to fund terrorist activities, money laundering and other fraudulent activities. Given, the rising tensions between superpower and uncertainty about dollar fluctuation, Cryptocurrency can provide an alternative source. These can be made more secure through global norms and federations. With Cryptocurrency entering the internet world we can see great changes in this fast pace world.

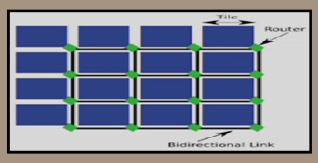
Network On Chip (NOC) in TCMP

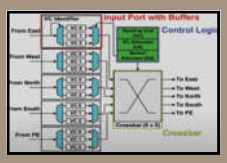
Prof. Subrata De

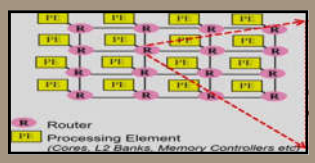


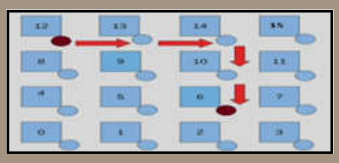
In TCMP each tile is a processing elements (PE) which house the processors and its associated levels of cache memories. And these processing elements are connected to routers (R). The **network on chip** (NOC) which is a packet based network, is going to connect multiple tiles. Tiles are interconnected by a set of routers and links.

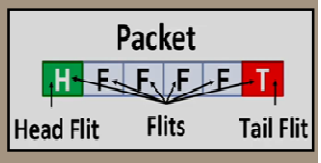
Packet is a basic unit of transfer in the network, whereas flit is the basic unit of transfer between a pair of routers. Data is moving from one router to another not in terms of packets, but they are in terms of flits. The packet is divided into smaller flow control units called flits. Upstream router should know the buffer availability of downstream router. Credit should be exchanged between routers by handshake signals. Functions of a Router: a) Buffering of flits, b) Route computation c) VC allocation d) Switch Allocation e) Switch Traversal f) Link Tra-











Student Achievements

- Anish Dutta from IT Dept. own the 1st prize in Uttarbanga Alok Chitra Protijogita in 2022.
- IT Dept. students attended Weapons Display Ceremony event at Trishakti Auditorium Sports Complex near Santushti Shopping Complex, Sukna organized by AAG, HQ 33 Corps celebrating Azadi ka Amrit Mahotsav on 10th August, 2022.
- **Computational Research Club (CRC)** launched and maintained by students of IT Dept. to provide a platform for the students to share their innovative ideas for implementing innovative project and thereby help them to publish in reputed journal and conference proceedings.
- Students of IT Dept. participated and won prizes in Cricket, Football and Volleyball tournaments in the Annual Games & Sports, 2022 organized by Siliguri Institute of Technology.

Augmented & Virtual Reality

Abinash Chhetri, 5th Sem.

Augmented reality (AR) and Virtual reality (VR) technologies are increasing in popularity. Augmented reality has thrived to date mainly on mobile applications, with games like Pokémon Go or the new Google Maps utility as some of its ambassadors.

To the extent that a VR system supports natural sensor motor contingencies (being able to use the body to perceive in a manner similar enough to perception in everyday reality) it will typically lead to participants experiencing "place illusion," the illusion of being in the place depicted by the virtual reality. A VR system may support (i) credible responses to the actions of the participant, (ii) contingent events that are directed specifically and personally toward the participant (for example a virtual human character smiles at the participant), and (iii) scenarios that are faithful to expectations when they simulate events that could occur in reality in a domain in which the participant has expertise. To the extent that these three are supported, the VR experience may become a plausible one, where participants have the illusion that the depicted events are really happening.

Salient Futures of these 2 technologies are:

1. LiDAR will bring more realistic AR creations to our phones
2. VR headsets will get smaller, lighter, and incorporate more features
3. Encouraging Active Learning

Faculty Achievements

- **Prof. Asit Barman** and **Prof. Sathi Ball** successfully attended and completed FDP on "5G Wireless Communication Technology"28 – 30 July, 2022 IEEE.

- **Prof. (Dr.) Sirshendu Sekhar Ghosh** successfully participated in IP Awareness / Training program under National Intellectual Property Awareness Mission (NIPAM) on 06th July, 2022 organized by Intellectual Property Office, India.

- **Prof. Debaditya Kundu** and **Prof. Ankita Sinha** successfully participated in the FDP on "Research Trends and Methodologies in Machine Learning"(RTMML-2022) during 25 – 29, July, 2022, organized by Departments of CSE., CSE (AIML), CSE (CS), CSE (DS) in association with IQAC, Haldia Institute of Technology, ICARE Complex, Hatiberia, Haldia, WB-721657.

- **Prof. (Dr.) Sirshendu Sekhar Ghosh** and **Prof. Sathi Ball** successfully participation in the FDP on "Cyber Security and Blockchain Technologies" during 25 – 29, July, 2022, organized by Amity Institute of Information Technology, Amity University, Kolkata.

Glimpses of Departmental Events

VOLUME IV ISSUE II

INFOCAST

A NEWSLETTER PUBLISHED BY THE DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

VISION OF CSE DEPARTMENT

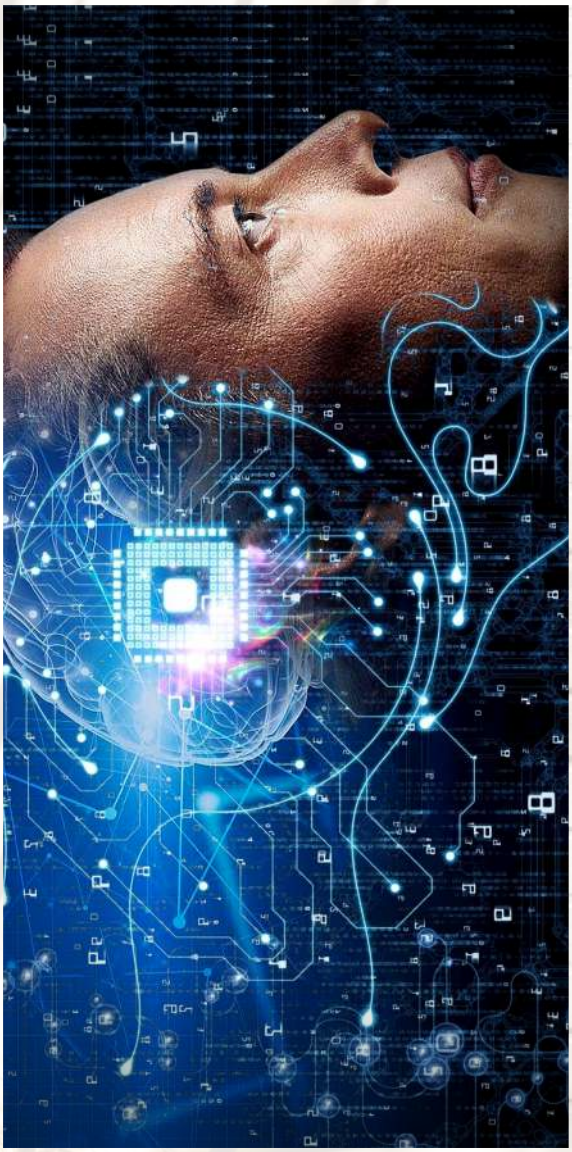
"TO BE A NATIONWIDE RECOGNIZED DEPARTMENT THAT PRODUCES VERSATILE COMPUTER ENGINEERS, CAPABLE OF ADAPTING TO THE CHANGING NEEDS OF COMPUTER AND RELATED INDUSTRY".

MISSION OF CSE DEPARTMENT

.TO IMPART QUALITY TECHNICAL EDUCATION WITH SKILLS, KNOWLEDGE AND ATTITUDE TO SUCCEED IN COMPUTER SCIENCE & ENGINEERING CAREERS.

·TO PROVIDE KNOWLEDGE OF EMERGING TRENDS IN COMPUTER AND RELATED INDUSTRY AND FOSTER AN ENVIRONMENT OF LIFELONG LEARNING.

·TO DEVELOP GRADUATE ENGINEERS WHO INVESTIGATE RESEARCH, DESIGN AND FIND WORKABLE SOLUTIONS TO COMPLEX ENGINEERING PROBLEMS WITH AWARENESS AND CONCERN FOR SOCIETY AND THE ENVIRONMENT.



ELON MUSK'S- HUMAN BRAINS WITH CHIPSET-HUMAN OR ROBOT!!

ELON MUSK'S COMPANY NEURALINK HAS BEEN EXPERIMENTING TO CONNECT SCIENCE WITH MEDICINE, RAISING NEW HOPES FOR THE LIVES OF PEOPLE WHO HAVE BEEN CRIPPLED BY ALZHEIMER'S, DEMENTIA, SPINAL FRACTURES.

NEURALINK HAS BEEN TESTING NEURAL INTERFACES ON ANIMALS FOR YEARS. IN A VIDEO RELEASED LAST YEAR, NEURALINK ALSO TESTED THIS CHIP ON GEEK PIG. NEURALINK SHOWED HIS ABILITY TO RECORD AND PREDICT ACTION BASED ON A WIRED CHIP PLACED IN THE PIG'S BRAIN IN THAT VIDEO. NOW MUSK'S COMPANY IS GOING TO USE ITS EXPERIMENT ON HUMANS.

ELON MUSK'S 'MIND-READING CHIP' WILL BE 10 TIMES SMALLER THAN A HAIR FOLLICLE. THEY WILL BE USED IN COMPLEX TASKS SUCH AS BRAIN SURGERY. THIS DISCOVERY IS AT AN EARLY STAGE, BUT IT IS BEING CONSIDERED AS AN IMPORTANT STEP TOWARDS CONNECTING THE HUMAN MIND WITH ARTIFICIAL INTELLIGENCE.

THE NEURALINK COMPANY HAS SO FAR TESTED THIS PARTICULAR CHIP ON 19 TYPES OF ANIMALS. THE COMPANY HAS SAID THAT ITS TESTING SUCCESS RATE IS 87 PER CENT. ALTHOUGH IT IS CONSIDERED IMPOSSIBLE TO CONNECT AI WITH THE HUMAN MIND, ELON MUSK IS KNOWN FOR MAKING IMPOSSIBLE FEATS.

EVERY SCIENTIFIC DISCOVERY HAS TWO ASPECTS. ANY POWER CAN BE MISUSED AT ANY TIME. IN SUCH A SITUATION, SUCH QUESTIONS ARE ALSO BEING RAISED ABOUT THIS PROJECT. BECAUSE IF A HUMAN MIND IS TAMPERED WITH AND CAN BE GIVEN COMMANDS THROUGH A COMPUTER, THEN IT CAN BE USED FOR SINISTER PURPOSES. EVEN THOUGH THE PROJECT IS STILL IN ITS INITIAL STAGES, PEOPLE AROUND THE WORLD ARE EXCITED TO KNOW WHAT THE ENDGAME WOULD BE LIKE.

BY- RAHUL SINGH. CSE 3RD YEAR SIT

SEMINARS

1.WEBINAR ON INNOVATION &ENTERPRENEURSHIP-POST COVID
2.SEMINAR ON HOW TO SHAPE A CARRER IN CYBER SECURITY
3.LIVE PROJECTION ON AI & ML WITH G MADAKASHIRA, SENIOR VP, VIRTUSA
4.WEBINAR ON ENTERPRISE ARCHITECTURE AND AWS
5.WEBINAR ON CHANGING SKYLINE OF NORTH BENGAL
6.WEBINAR IN AI, BLOCKCHAIN &SMART FACTORIES
7.WEBINAR ON COVID 19 AND MENTAL HEALTH
8.WEBINAR ON SYSTEM DESIGN
9.WEBINAR ON VIRTUAL INDUSTRY VISIT WITH RECENT INDUSTRY TRENS AND SENARIO
10.SEMINAR ON WEB DEV WITH NODE JS
11.WEBINAR ON FUTURE OF EDUCATION POST COVID 19 IN NORTH BENGAL

VSPEECH.AI'S ML MODEL

Ahmedabad-based VSpeech.ai was founded in 2015. The startup sensed an opportunity while working with Interactive Voice Response (IVR) call centres.
The company uses an advanced 8 KHZ Mono Engine to understand mixed-language inputs accurately.

Vspeech.ai runs on its own proprietary machine learning tools, which includes domain-based neural networks, generative adversarial networks and TensorFlow-based AI tools. The tech stack involves natural language understanding components on top of NLP/NLU libraries. VSpeech.ai builds its own supervised learning methods. The company owns server infrastructure and also has a parallel GPU system to train models, VSpeech.ai has also built its own IPA system to understand spoken and written languages effectively.
The software is delivered through HTTP/HTTPS, and Socket APIs. Vspeech.ai executes thousands of call transcriptions per day on scalable AWS infrastructure and deploys multiple API on different nodes. Most backend API is in Python and Node.js.

VSpeech.ai owns 75% of the market share in the voice solution segment in India.

DIDHITI RAJ CHAKRABORTY. CSE 2ND YEAR. SIT

HUMAN AUGMENTATION

Technologies that enhance human productivity and improve or restore capabilities of the human body or mind are an area of computing we refer to as human augmentation. Advances in such technologies are empowering, offering improvements to human health, quality of life, and functional performance.
Other types of human-augmentation technologies work with specific IT resources including the cloud, big data, and mobile computing. These include wearable devices such as watches or bracelets that link the human body to external sources of visual, audio, or text-based information.
Types of Human Augmentation
Human augmentation can be further divided into three main categories with different functions:
Replicating human ability: Human augmentations that restore or replicate typical human abilities fall into the category of replication. This includes things like prosthetic limbs for the disabled, hearing aids for the deaf, and voice synthesizers for the mute.
Supplementing human ability: Human augmentations that improve our ability to do something fall under the category of supplementation. This includes devices that artificially increase our strength, enhance our sight beyond normal limits, or increase our intelligence.
Exceeding human ability: Human augmentations that allow us to do things that we cannot do on our own fall into the category of exceeding augmentation. This includes things like the ability to fly, breathe underwater, see ultraviolet or infrared light, and smell chemicals not currently detectable by the human olfactory sense.
Many parts of the human body can be augmented, but here are few examples that show some of the directions augmentations can take:
EksoWorks creates exoskeletons for industrial and rehabilitation purposes. Their products are devices that users wear on their body (typically from the torso up) for artificial strength and endurance. These devices come in multiple variations for different tasks, to help users in areas like construction, auto manufacturing, and even physical therapy.
The Teslasuit is a wearable outfit that can control the wearer's temperature, provide haptic feedback, and track the wearer's movements. While this tech is currently being used for VR immersion, the ideas that have gone into its development can be translated easily into the realm of augmentation.
Skylight, a platform by Upskill, has partnered with Google to create smart glasses for aviation engineers. The glasses aid in the tightening of B-nuts, which are a critical component of jet engines. These nuts have to be tightened perfectly or the engine could fail. The Skylight glasses can detect when a worker is tightening a B-nut, and they use a wi-fi connected torque wrench to determine when a B-nut has been tightened perfectly.
Brain-Computer Interfaces (BCI) are interfaces that allow an individual to interact with a computer or machine using only their mind. While most of this technology is still conceptual, the possibilities are limitless. BCI is about sending information to a computer and allowing humans to receive new types of information from their computers in return.

NAYAN KUMAR SINHA . CSE - 2ND YEAR. SIT

PHOTO GALLERY

RAHUL SINGH CSE 3RD YEAR

SUBHADEEP KUNDU CSE 3RD YEAR

AGNIVA SENGUPTA CSE 2ND YEAR

DEEP DHAR CSE 2ND YEAR

PUBLICATION UPDATE

LIST OF RECENT PUBLICATIONS:

1: Sumit Banik, Sagar Banik, Aniket Ghosh, Anupam Mukherjee, “Probabilistic Estimation of COVID19 using Patient’s Symptoms”, International Conference on Machine Intelligence & Data Science Applications (MIDAS 2020), University of Petroleum and Energy Studies (UPES), Dehradun, Uttarakhand 248007. India, September 2020, DOI: 10.1007/978-981-15-9873-9

2: Anupam Mukherjee, Anupam Ghosh, “Heterogeneous Decomposition of Predictive Modelling Approach on Crime Dataset Using Machine Learning”, International Conference on Innovation in Modern Science and Technology (ICIMSAT 2019), 20-21 September 2019.

3: Anupam Mukherjee, Sourav De, Siddthartha Bhattacharyya, “Chicago Crime Data Analysis Using PIG in Hadoop”, 4th IEEE International Conference on Research in Computational Intelligence and Communication Networks (ICRCICN 2018), https://ieeexplore.ieee.org/document/8718725

4: Anupam Mukherjee, Sourav De and Siddhartha Bhattacharyya, “Indian Crime Data Analysis in Hadoop Framework”, 7th International Conference on Computing, Communication and Sensor Network (CCSN 2018), 2018.

5: Anupam Mukherjee, Sourav De, Siddhartha Bhattacharyya, “A Survey on Big Data: An Emerging Imparity and Revolution in DigitalWorld”, International Journal of Hybrid Intelligence (IJHI), 2019. DOI: 10.1504/IJHI.2019.103575

6: Satadal Chakraborty, “Elastic Window for Multiple Face Detection and Tracking from Video”, Advances in Intelligent Systems and Computing (AISC) Series, Springer, CIPR 2019: International Conference on Computational Intelligence in Pattern Recognition, 2019, IIEST, Shibpur

7: Mithun Roy, “Most Influential Node Selection in Social Network using Genetic Algorithm”, Fourth International Conference on Research in Computational Intelligence and Communication Networks (ICRCICN), 2018, IEEE, ISBN: 978-1-5386-7638-7, RCCIIT, Kolkata

8: Mithun Roy, “Overlapping Community Detection using Clique Proximity and Modularity Maximization”, Fourth International Conference on Research in Computational Intelligence and Communication Networks (ICRCICN), 2018, IEEE, ISBN: 978-1-5386- 7638-7, RCCIIT, Kolkata

9: Sutapa Bhattacharya,Dhrubasis Sarkar ," A Study on Information Diffusion in Online Social Networks" Proceedings of International Conference on Frontiers in Computing and Systems. Advances in Intelligent Systems and Computing, vol 1255,Springer, Singapore,pp 279-288(2020)

GLIMPSES OF STUDENTS ACHEIVMENTS

ALUMNI SPEECH

The healthy environment of Darjeeling and the competitive environment of the college provided me with a subtle learning platform which has helped me to develop a keen interest in learning technical things. Currently, I am working with McAfee, I am very lucky that I am a part of this institution, which provided me with a platform to reach here. All the professors are very helpful here and they guided me all the time in every situation. Different sessions and events have boosted my confidence to a great extent. At last but not least I would like to mention that this institution has provided a lot of confidence and courage to face difficult situations in life. These four years have given me memories as well as friends for life which I can never forget. It's just an awesome and unforgettable journey of my life.

MAYANK MISHRA
CSE- 2018 PASS OUT BATCH

EVENTS ROAD MAP

BASANT UTSAV 2021

SWARASWATI PUJA 2021

MEDHA RATNA UTSAB

OUTREACH PROGRAM 2020

NETAJI JAYANTI

REPUBLIC DAY 2021

EDITORIAL TEAM: MR ANUPAM MUKHERJEE, MS SUTAPA BHATTACHARYA, MS. MOUMITA GHOSH
STUDENTS OF CSE:
RAHUL SINGH, SAURAV SUMAN, BIKRAM GOSH, MADHUSUDHAN ANAND
BARNALI BASAK
DEEP DHAR , FALGUNI SARKAR , SHREYA , ALOK KUMAR

Electrowrite

A Newsletter Published By EE Department, SIT

VOL 7 ISSUE 1

Vision & Mission

Vision

To emerge as a leading Department of Electrical Engineering that caters to the latest needs of power sector, electrical & allied industry in the region.

Mission

To evolve as an innovative & globally competent Electrical Engineering department that contributes to the socio - economic growth of region by utilizing the advancement in Electrical Engineering by providing conducive learning and interactive environment to stu-

...In The News

Hon'ble Prime Minister of India announced the launch of the *National Hydrogen Mission (NHM)* on India's 75th Independence Day, 15th Aug 2021, saying that the aim is to make the country a global hub for the production and export of green hydrogen. The hydrogen has a potential to be a game changer in the energy arena— its versatility allows it to be utilised in transportation, power generation and industry. The increasing concerns about climate change will provide a driving factor to quickly induct it into the energy mix of a country to achieve the target of becoming a low-carbon economy.

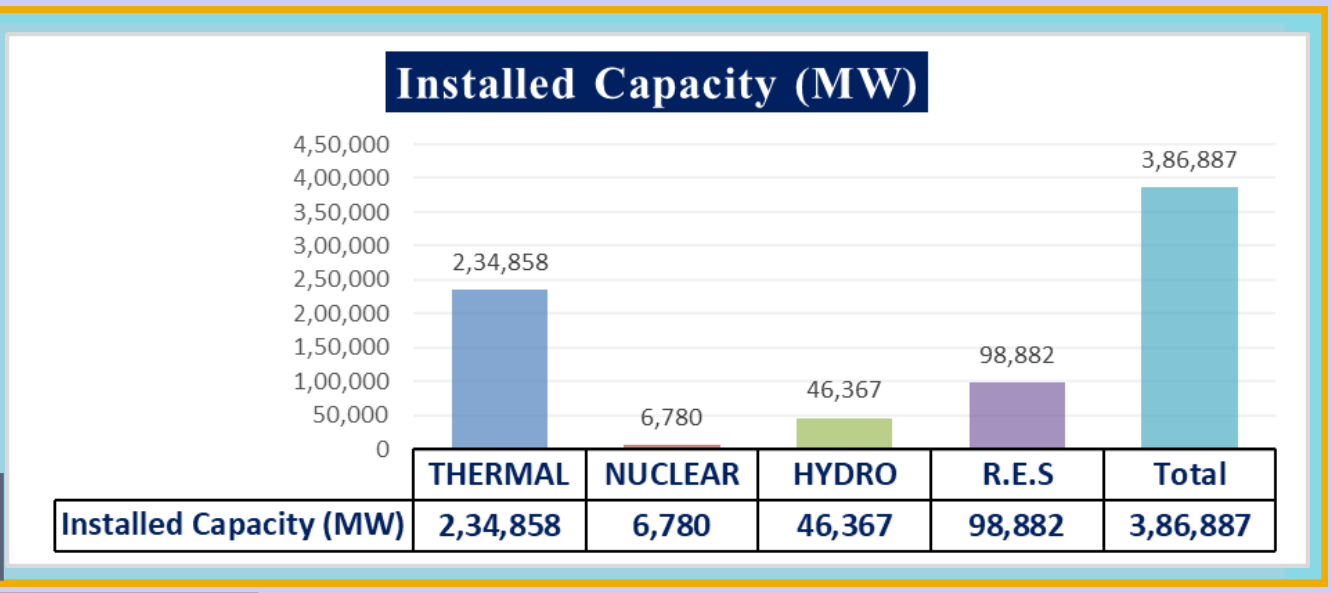
The PM's announcement takes forward the proposal, made in the 2021 Budget, for the launch of NHM that would enable the generation of hydrogen "from green power sources". While the details of the NHM are yet to emerge, India has taken several exploratory steps.

Work is in progress on a pilot project on Blue Hydrogen, Hydrogen CNG (H-CNG) and Green Hydrogen. Hydrogen is being blended with compressed natural gas for use as transportation fuel as well as an industrial input to refineries. 50 buses have been rolled out as part of a pilot project in Delhi that use blended hydrogen in compressed natural gas (CNG) with plans to scale it up in the coming months across the country.

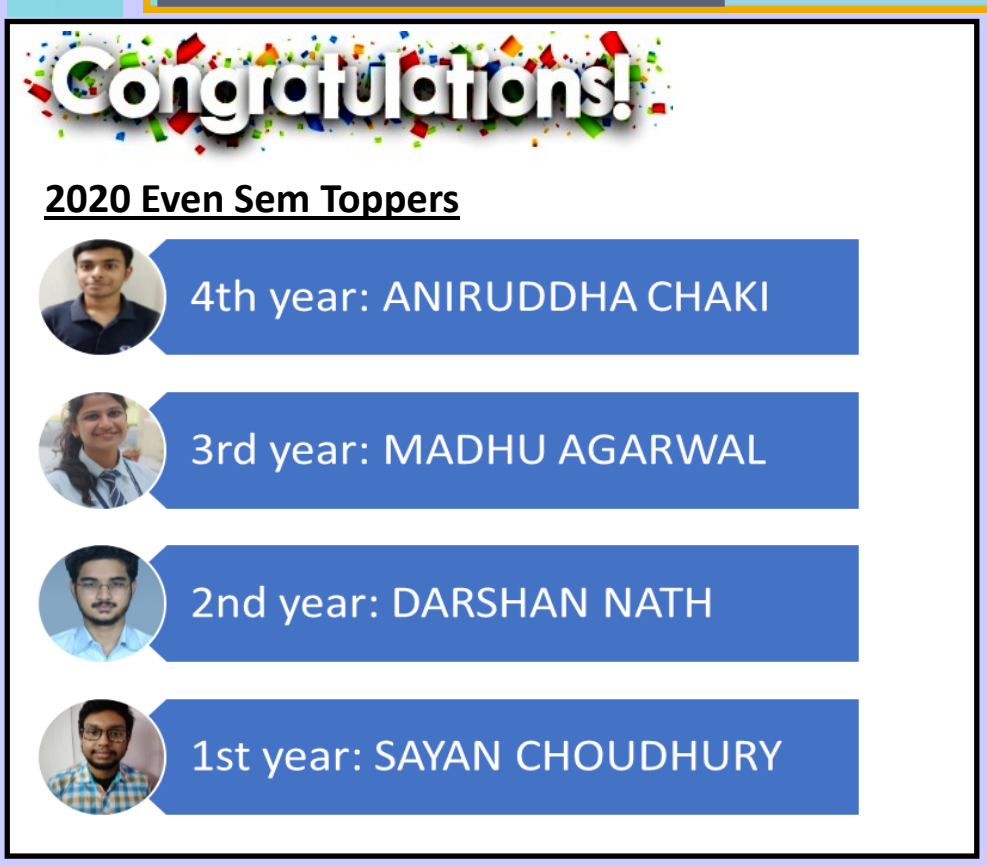
INDIA'S POWER
India's Total Power Generation Capacity

As on 13.08.2021

https://npp.gov.in/publishedReports



	THERMAL	NUCLEAR	HYDRO	R.E.S	Total
Installed Capacity (MW)	2,34,858	6,780	46,367	98,882	3,86,887



2020 Even Sem Toppers

4th year: ANIRUDDHA CHAKI

3rd year: MADHU AGARWAL

2nd year: DARSHAN NATH

1st year: SAYAN CHOUDHURY

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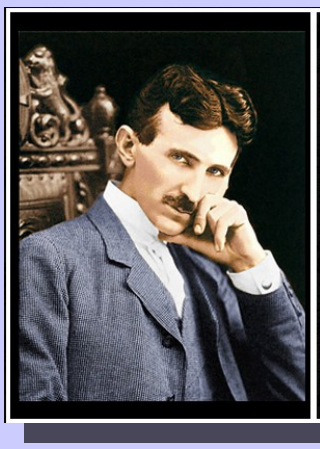


Electric power is everywhere present in unlimited quantities and can drive the world's machinery without the need of coal, oil, gas, or any other of the common fuels.

— Nikola Tesla —

Electrowrite

VOL 7 ISSUE 1

Industrial Integration in Smart Electric Vehicles

Dr. Chiranjit Sain, Assistant professor, Department of Electrical Engineering

With the introduction of Information and Communication Technology, the systematic progress of industrial engineering facilitates a huge infrastructural development for industrial sectors. Specifically, industrial engineering interacts with the every recent advancement in the environment for solving such complex problems. A wide variety of methods have been adopted by the use of information technology and industrial electronics to enhance the environmental safety in recent days. The use of renewable energy such as solar, wind, etc., and the smart grid integration improves the industrial sustainability in a wide area network. The use of smart electric vehicles tremendously decreases the urban emissions which improve the charging patterns. Basically, electric vehicles play as a decentralized energy resource establishing a storage capacity in the electricity demand. Smart charging infrastructure improves flexibility in the energy scenario which in turn increases stability and maximum capacity investment. In fact, the urban establishment and the mobility follow innovative business policies to improve the energy efficiency for industrial integration. The rapid progress of renewable energy sources signifies large quantity of non-dispatchable sources of generation into the energy management system. Smart charging system is used to control the power of charge to synchronize with the system capacity, use of optimized renewable energy and the customer demands. Digitization helps customer communication such as their involvement in the programme and the charging infrastructure. In few countries, the communication between the electric vehicles and grid supports frequency regulation facility to the grid electricity and generates funding. However, in most of the countries, the particular facility is yet to be tested for commercialization. The charging infrastructures of smart electric vehicles integrate the decentralized generation and storage capacity for optimum load profile. Furthermore, the impact of Internet of Things (IoT) and the industrial integration enhances the energy efficiency of smart electric vehicles and maximizes the grid infrastructure. In the recent days, with the advancement of ICT tools, different kinds of wireless charging system for electric vehicles have been adopted. Various charging methods such as near-field wireless technology, magnetic resonance-based wireless charging and the permanent magnet coupling-based wireless charging have been recently attracted in various smart cities for industrial information integration. For the sake of sustainability and environmental safety, the role of wireless charging system plays a major role in the recent electric vehicles. Wireless power transfer (WPT) reduces the utilization of battery which in turn reduces the overall weight and the

Coordinated AC frequency versus DC voltage control in a hybrid AC/DC micro grid

Intermittent nature of renewable energy generation and variable AC and DC loads are factors that offer great challenges to power management in AC/DC hybrid microgrids. In this context a coordinated AC frequency versus DC voltage control (CFVC) scheme for the contemporary renewable energy based hybrid AC/DC microgrids is investigated. The proposed control strategy enables appropriate power interactions between the AC and DC subgrids while sharing power fluctuation in coordination. Both the subgrids support each other in accordance with their normalized relative changes in AC frequency and DC voltage. The proposed CFVC scheme is designed using modern controller, optimization technique is adopted for computing the design parameters, viz. the controller gains and set-point orders. A typical photovoltaic (PV) wind-battery based hybrid AC/DC microgrid is modelled and investigated, and the effectiveness of the proposed scheme is validated under the renewable power variations and load perturbations.

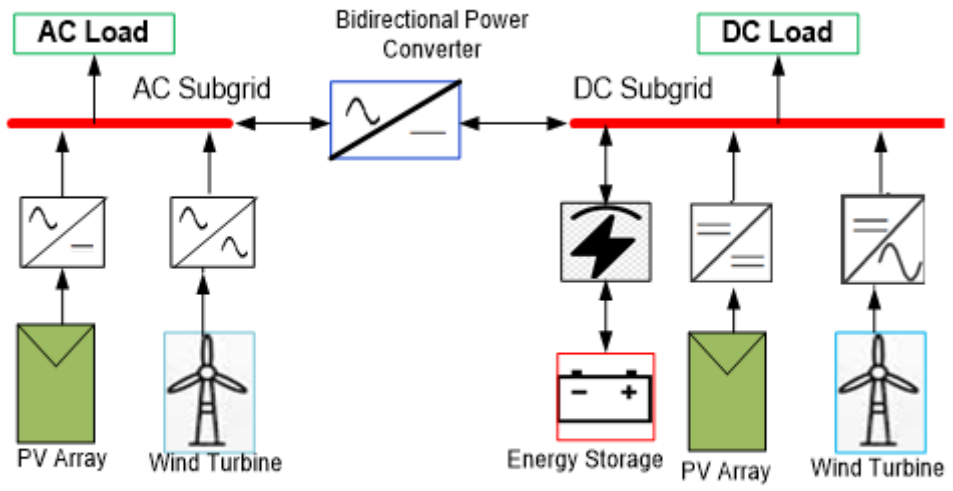


FIGURE 1 Investigated hybrid AC/DC microgrid

The investigated microgrid is divided into AC and DC subgrids. The two subgrids are interlinked by a bidirectional power converter (BPC) for power interaction to improve reliability in the power service. The system is depicted in Figure 1. The AC subgrid contains the wind and PV based AC DGs, whereas the DC subgrid contains the DC DGs (wind and PV). As shown in Figure 1, only the DC subgrid has the energy storages in view of economy, and need to provide AC power support for the AC subgrid. The hybrid AC/DC microgrid is modeled and simulated to investigate the performance of the proposed CFVC scheme.

A vital point is governing of the power exchange among the AC and DC subgrids. At the time of power fluctuation either in the DC or the AC subgrid, the subgrids require to support each other for sharing the fluctuation in coordination.

The CFVC scheme achieves power balance in each subgrid by controlling renewable generations as well as regulating the interchange power through the BPC. The frequency deviation in AC subgrid and voltage deviation in DC subgrid are the indications of power mismatches in respective area. If the power of the AC subgrid is in surplus (or shortage), frequency (f) tends to be higher (or lower). Similarly, as the energy storages are controlled by the DC droop tactic, if the power of the DC subgrid is in surplus (or shortage), DC voltage (V_{dc}) tends to be higher (or lower). For the purpose of linearization, the square of the DC voltage is controlled instead of the DC voltage itself, which helps in smooth regulation of the power flow through the BPC while obtaining the DC voltage support in DC subgrid.

Thus, after considering $P_{dc} - V_{dc}^2$ droop in power control in DC subgrid. Voltage and power relation is considered as

$$\Delta V_{dc}^2 = R_{dp} \Delta P_{dc} \qquad (1)$$

Where R_{dp}, droop coefficient of DC voltage-power relation, ΔV_{dc}, ΔP_{dc}, deviations in voltage and power in DC subgrid. The DC subgrid affords the frequency support for the AC side and the AC subgrid affords the voltage support for the DC side. Thus, changes in the DC voltage and AC frequency occur even though the power variation is in anyone, either in AC or DC side. In the aspect, a droop control tactic is comprehended to relate with the power interaction. The control principle is being established as

$$\Delta V_{dc} = M_{dp}\,(f^* - f) \tag{2}$$

Where f, f* system and rated frequency. Eqn. (2) implies that the DC voltage and AC frequency increase or decrease concurrently to share the power fluctuation in coordination. The droop coefficient M_{dp} has an important implication on the power interaction as it is required to change the power in both the subgrids in synchronization. Therefore, the load types and capacities of the two subgrids need to be considered in determining M_{dp} value, as

$$M_{dp} = \frac{\left(\frac{P_{ac}^{Total}}{P^{Total}}\right)^{-1} \frac{P_{ac}^{Key}}{P_{ac}^{Total}}(V_{dc}^{U} - V_{dc}^{L})}{\left(\frac{P_{dc}^{Total}}{P^{Total}}\right)^{-1} \frac{P_{dc}^{Key}}{P_{dc}^{Total}}(f^{U} - f^{L})} \tag{3}$$

$P^{Total} = P_{ac}^{Total} + P_{dc}^{Total}$ is the total power capacity of the overall microgrid. f^L and f^U are the lower and upper limits of the allowable frequency in AC subgrid, respectively. V_{dc}^{L} and V_{dc}^{U} are the lower and upper limits of the allowable voltage in DC subgrid, P_{ac}^{Key}, P_{dc}^{Key} key loads capacities of the AC and DC subgrids respectively.

AC subgrid is modelled to derive the frequency response and DC subgrid is modelled to derive the DC voltage response. And, additional control strategy is adopted to regulate interactive power flow through the interconnecting BPC and a supplementary feedback loop is to act with the BPC power flow deviation (ΔP_{ic}). The area capacity factor is $a_{12} = -\frac{P_{ac}^{Total}}{P_{dc}^{Total}}$. Moreover, in each subgrid model, generation participation factors for wind (GPF_w) and PV (GPF_{pv}) are included to account for different generation capacities. K_{bc} is the factor accounting for wind turbine blade characteristic.

Subgrid control error (CE) describes a linear combination of frequency deviation, voltage deviation and interactive power flow change, as

$$CE_i = B_F \Delta F_{AC} + B_V \Delta V_{dc} + + \Delta P_{ic} \tag{4}$$

Change in AC/DC subgrids interactive power can be expressed as

$$\Delta P_{ic} = \frac{1}{r_d}[\Delta V_{DC}^2 - m^2 \Delta F_{AC}^2] \tag{5}$$

The CFVC control strategy helps to support AC and DC subgrids for appropriate power interaction concerning the normalization relative changes in AC frequency and DC voltage. The power interaction between the AC and DC subgrids also accounts for the load types and capacities of both the subgrids.

PUBLICATIONS

Title of paper	Name of the author/s	Name of journal	Volume No.	Page No.	Year of publication	ISBN/ISSN number
Performance Optimization for Closed Loop Control Strategies towards Simplified Model of a Permanent Magnet Synchronous Motor Drive by Comparing with Different Classical and Fuzzy Intelligent Controllers	Chiranjit Sain et al.,	International Journal of Automation and Control, Inderscience Publications	Vol. 14, No. 4	469-493	2020	DOI: 10.1504/IJAAC.2020.10020855
Modelling and Comparative Dynamic Analysis due to Demagnetization of a Torque Controlled Permanent Magnet Synchronous Motor Drive for Energy-Efficient Electric Vehicle	Chiranjit Sain et al.,	ISA Transactions, Elsevier	Vol. 97	384-400	2020	DOI: 10.1016/j.isatra.2019.08.008
Updated PSO Optimized Fuzzy-PI Controlled Buck Type Multi-Phase Inverter Based PMSM Drive with an Over-Current Protection Scheme	Chiranjit Sain et al.,	IET Electric Power Applications	Vol. 14, Issue 12,	2331-2339	2020	DOI: 10.1049/iet-epa.2020.0165
Design and Optimization of a Fuzzy-PI Controlled Improved Inverter based PMSM Drive Employed in Light Weight Electric Vehicle	Chiranjit Sain et al.,	International Journal of Automation and Control, Inderscience Publications	Accepted for publication (In Press)		2020	
Wind Energy Infiltrated Multi-Area Power System: Optimized 2-DOF-FOPID Controller for LFC	Indrajit Koley et al.,	International Journal of renewable Energy Research	Vol. 10, Issue 2	743-756	2020	1309-0127

Title of paper	Name of the author/s	Title of Proceedings	Name of the Conference/ seminar/ Workshop	Year
Intergration Of Solar And Wind Energy For Interruted Power Supply	Rubi kumari, Subhajit Roy	Intelligent Techniques and Applications in Science and Technology - Proceedings of the First International Conference on Innovations in Modern Science and Technology	International Conference on Innovation in Modern Science and Technology	2019
Load frequency control of a thermal-wind integrated power generating system with IDD controller	Indrajit Koley	Intelligent Techniques and Applications in Science and Technology - Proceedings of the First International Conference on Innovations in Modern Science and Technology	International Conference on Innovation in Modern Science and Technology	2019
Load Frequency Control of a Wind Energy Integrated Multiarea Power System With CSA Tuned PIDD Controller	I koley	IEEE Xplore	IEEE International Conference on Smart Technologies for Power , Energy and Control (STPEC) 2020	2020
Electrical Conductivity Study of Nano-Phased Materials: Frequency and Temperature Dependency	Subhajit Roy		International e-Conference on Recenet Advances in Physics & Material Science-2020 (IC-RAPMS-2020)	2020
Different Control Mechanisms of a PMSM Drive for Electrified Transportation-A Survey	Chiranjit Sain	SOCCER-2020	International (Virtual) Symposium on Control. Communication and Robotics,	2020

Name of the faculty	Title of the book/chapters published	Year of publication	ISBN/ISSN number	Name of the publisher
Dr. Chiranjit Sain	A Sate of the Art Review on Solar Powered Energy Efficient PMSM Drive Smart Electric Vehicle for Sustainable Development	2020	ISSN: 1865-3529	Springer
Dr. Chiranjit Sain	Power Flow Control and Stability Analysis using TCSC FACTS Controller	2020	ISBN: 978-620-2-55661-3	Lap Lambert Academic Publishing, Germany
Dr. Chiranjit Sain	A Noble Control Approach for Brushless Direct Current Motor Drive Using Artificial Intelligence for Optimum Operation of The Electric Vehicle	2020	ISBN: 978-1-119-68190-8	Scrivener Publishing, Wiley
Dr. Chiranjit Sain	A Comprehensive Study on Induction Motor and Permanent Magnet Motor Drives for Electric Vehicles Application	2020	ISBN: 978-1-119-68190-8	Scrivener Publishing, Wiley

Electrowrite

VOL 7 ISSUE 1

ALUMNI SPEAKS

"The starting point of all achievement is desire-Napoleon Hill"

This Desire, to achieve something in life is what SIT instilled in me during my tenure in the college. The constant efforts of the faculty and the bold platform that this college has provided me, laid the foundation stone of what I am today. The professors and the technical team of the Electrical Department who are the heart and soul of the entire department make it worth the time I spent here to learn and grow in my career and also learn the basic ethics of what professionalism is all about. I thank Siliguri Institute of Technology and wish it loads of success ahead and also wish my juniors all round success as well.

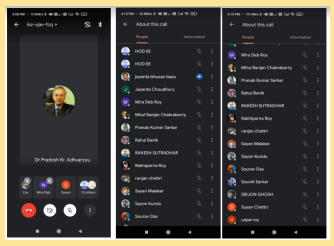
Abhishek Poddar

Department of Electrical Engineering (2013-2017)

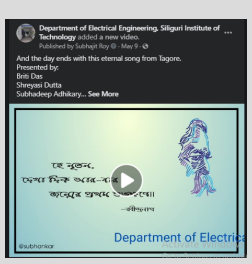
EVENTS AND ACTIVITIES

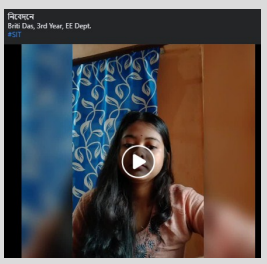
Parents-Teachers Meeting for 2022 pass out batch
12.05.2021

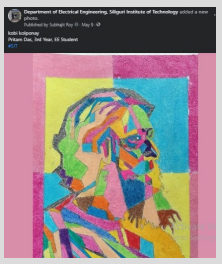
Parents-Teachers Meeting for 2023 pass out batch
03.05.2021

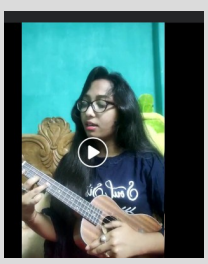


Celebration of Rabindra Jayanti
09.05.2021



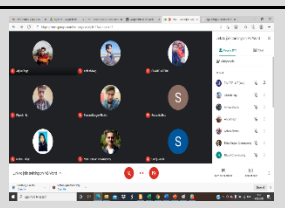


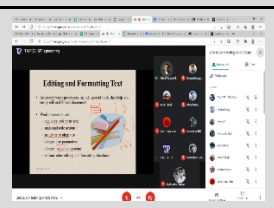


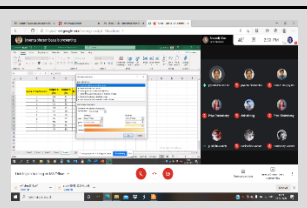


Training on MS Office for 1st Year Students

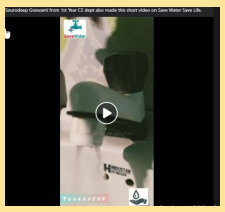
19.02.2021 to 23.02.2021

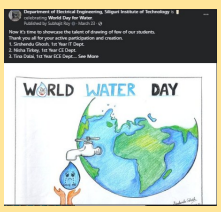


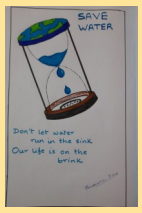


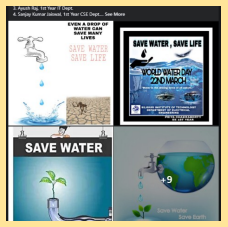


Celebration of World Water Day
22.03.2021

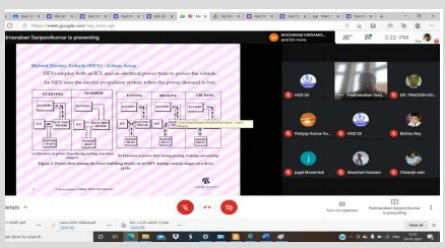


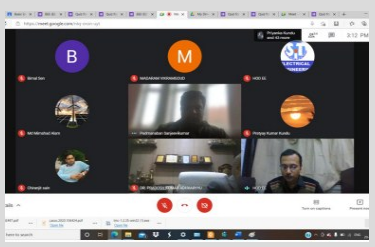






National Webinar on "Power Electronics and Electric Vehicles"
29.01.2021

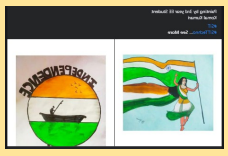


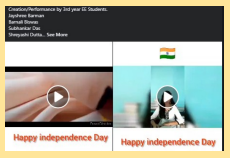


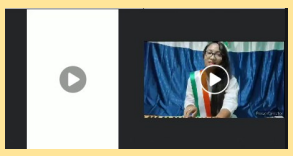
Celebration of 125th Birthday of Netaji Subhash Chandra Bose
23.01.2021

Webinar on Career Counseling
19.08.2020

Celebration of 74th Independence Day
15.08.2020







Celebration of Basanta Utsab
06.03.2020

ELECTRONIKA-2022

5th Edition

"The secret of getting ahead is getting started"

- Mark Twain

About the Department

The Department of Electronics and Communication Engineering of Siliguri Institute of Technology (NAAC Accredited) was established in the year of 1999. At present the department runs about 10 state of-the-art laboratories for undergraduate and R&D activities. The department consist of qualified and experienced faculty and technical staff with noteworthy research background.

VISION

To become a nationally recognized center of excellence that produces skilled, innovative and ethical engineers relevant for academics and industry.

MISSION

• To offer qualitative Electronics and Communication engineering education and professional ethics of global standards through innovative methods of teaching and learning with practical orientation so as to prepare students for successful career / higher study.

• Foster culture of innovation and research in the field of Electronics & Communication engineering.

• To provide best learning environment to the students, faculty and staff members conducive to creating excellence in technical education.

Message from the Principal

Prof. Dr. Mithun Chakraborty
Principal, SIT

The fact of launching the "Electronika"-2k22 edition by the faculty, staff and students of ECE department of Siliguri Institute of Technology gives me immense pleasure. It is indeed a matter of pride and satisfaction having this newsletter which showcases the progress in the areas of academic, extracurricular, faculty and students' achievements of the department. Electronika"-2k22 is focussed on all sorts of activities undertaken by a department and opens the opportunity to enhance the writing skills among the members. This will not only benefit the students with the information of their departmental achievements but also motivate and aspire others to know the heights achieved by the ECE department. I congratulate the Editorial Board of this News Letter who have played a wonderful role in accomplishing the task in record time. I express my deep sense of gratitude to HOD, Dr. Debajyoti Misra for undertaking the task and successful completion of the same. Also my heartfelt Congratulations to staff members and Students for their fruitful effort. With all my Best Wishes.

Message from the HOD

Prof. Dr. Debajyoti Misra
Head of the Department, Electronics and Communication Engineering , SIT

I'm pleased to announce that the **Department of Electronics and Communication Engineering (ECE)** has released its Newsletter for Academic Year 2021-22, which details the different activities and achievements of our faculty and students. I wish that this would ignite the fires of enthusiasm in students' minds and generate fervour for innovative research ideas among the faculty of ECE.
The sole vision of the department is to produce confident technologists with human qualities and Indian ethos. The department provides a great learning environment with a team of highly qualified faculty members to inspire the students to develop their technical skills and inculcate the spirit of team work in them. My best wishes to the **Electronika** editorial board for continuing to do such excellent work for academia.

STUDENTS CORNER

ELECTRONIKA 2K22

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Ms. Enakshi Pal has been selected in Accenture plc and Persistent.

accenture

virtusa
Accelerating Business Outcomes

Mr. Mainak Dasgupta has been selected in Amdocs and Virtusa.

Capgemini

Ms. Kankana Choudhury, Mr. Satwik Chatterjee, Mr. Soumyadeep Halder, Ms. Srishti Pal, Mr. Mukesh Kumar Sahani and **Mr. Pratim Kumar Das** have been placed in Capgemini.

It was a great accomplishment for **Ms. Ruparna Dutta, ECE 3rd year** for being officially declared as a planetary defender on NASA'S Double Asteroid Redirection Test on November 6,2021.

ARETEANS

Mr. Jaydeep Sarkar has been placed in Areteans.

ACS SOLUTIONS

Mr. Nur Hasan and **Ms. Sakchi Lama** have been placed in ACS Solution.

DIGITAL PRODUCT SCHOOL

Mr. Swarup Das, ECE 2nd Year, has successfully completed Internship as a Software Engineer Intern at Digital Product School.

CGI
Experience the commitment

Mr. Abhisek Mahato has been selected in CGI.

ERICSSON

Mr. Argha Sen has been selected in Ericsson Global India Ltd. and Celebal Technology.

CELEBAL TECHNOLOGIES

NPTEL

Mr. Biraj Ghosh and **Mr. Aditya Gupta** from **2nd year, ECE** have successfully completed NPTEL courses conducted by IIT's and IISC and got Elite in their NPTEL Course.

Ms. Soni Kumari, ECE 3rd year, has successfully completed the course on " What is Data Science" an online course authorized by IBM and offered through **Coursera**.

nagarro

Ms. Priyanka Kundu has been selected in Nagarro.

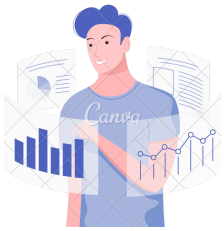
ITC INFOTECH
Business-friendly Solutions

Ms. Sweta Jaiswal has been placed in ITC Infotech.

Ms. Basudha Ball, Mr. Rahul Roy and **Mr. Sumit Kumar** have been placed in Tata Consultancy Service (TCS).

Mr. Roshan Kumar Vats has been selected in Tiger Analytics.

Mr. Subhranil Sarkar, ECE 2nd year has successfully completed Internship as a UX/UI Designer Intern at Blackspektro Solutions Private Limited.



Mr. Subhajit Dey has been placed in Turing.com.

Mr. Rinku Roy has been placed in Celebal Technology.

Mr. Debasish Ghosh and **Mr. Pratim Kumar Das** have been placed in Walkover.

Congratulations to **Mr. Biraj Ghosh** and **Ms. Aishwarya Maitra** from **2nd Year,ECE** for being winner at the event "**Softcraft**" at TECHNOVISION 2K22.

Ms. Shreya Chattopadhyay, Mr. Debasish Ghosh, Mr. Souhardya Paul , Ms. Sushmita Mukherjee , Ms. Shroyeta Chakraborty and **Mr. Subhajit dey** have been placed in Wipro.

Mr. Jaydeep Sarkar has been placed in ACS Solution.

- Heartiest congratulation to **Ms. Neha** and **Ms. Suchana Singh** of **3rd year ECE** for winning the event **"Carrom Competition"** held in Annual Games and Sports at SIT on May 22, 2K22.

- **Mr. Aniruddha Das** of **3rd Year, ECE** was the 1st Runner-up in the event **"Softcraft"**,at TECHNOVISION 2K22, at SIT.

- Congratulation to **Ms. Shiwani Ojha** from **3rd year ECE** for being the winner at the event **"Hardware Yoddha"** at TECHNOVISION 2K22.

- **Ms. Sristi Paul** and **Ms. Basudha Ball** of **4th year ECE** won the **"Women's Badminton Doubles"** in Annual Games and Sports, SIT.

- Congratulations to **Mr. Sourav Singh** of **3rd year ECE** and **Mr. Saptaparna Goswami** of **2nd year ECE** won the **Champion's Trophy** in **Basketball** in Annual Games and Sports, SIT.

- Congratulations to **3rd year ECE** student **Mr. Biplab Sarkar** who got 1st position in the **"Table Tennis"** competition and won the 1st Runner-up trophy of men's **"Badminton Doubles"** in Annual Games and Sports, SIT.

- The students of **2nd Year ECE** had organised a **"Freshers Welcome Program"** for the 1st year students, where the students of all different years had actively participated.

DEPARTMENTAL ACTIVITY

ELECTRONIKA 2K22

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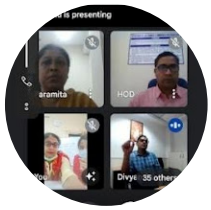
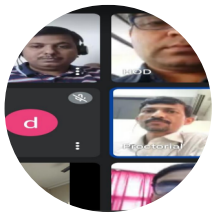
- An **Alumni Interaction Program** on the theme **"Recent Industry Trends in Electronics and Communication Engineering for Better Employability"** was organised by the **Department of Electronics and Communication Engineering, SIT** on February 23, 2022. The speakers of this program were our **Ms. Vishaka Subba**, Senior software Engineer at Robert Bosch Limited, India, and **Mr. Tapas Roy**, Software Developer, NXP Software.



- **Department of Electronics and Communication Engineering, SIT** had organised a **Webinar** on **"Fundamentals of Intellectual Property Rights"** on March 07, 2022 for the students and another on **"Role of IPR in Academia and Research"** for their faculty and staff.



- **Department of Electronics and Communication Engineering, SIT** had organised a **Webinar** on **"Career Options and Opportunities for Electronics and Communication Engineers."** on March 15, 2022. The speaker of the event was **Mr. Renjith C.V**, Electrical Architect/Product Designer at Philips India LTD, Pune , India.

- **The NDLI Club unit, SIT** in a collaboration with the **department of Electronics and Communication Engineering, SIT** and organised a **Webinar** on "**Importance of Reading for Self Development"** on March 16, 2022. The speaker of that event was **Mr. Arunabha Sengupta**, Executive member of Akhil Bharat Vivekananda Youth Mahamandal, Kolkata (ABVYM).

- **Department of Electronics and Communication Engineering, SIT** had inaugurated a new technical club **"Cyber Physical System Club (CPS)"** on March 24,2022. The aim of CPS club is to produce competent engineers who can design and develop new technology based engineering systems.

- An inspiring and motivating lecture on **"Recent Tends & Future Prospects of VLSI Technology"** was organised by the d**epartment of Electronics and Communication Engineering, SIT** for 2nd Year and 3rd Year ECE students on April 18, 2022. **Prof. Dr. Subir Sarkar, HOD ECE,** Jadavpur University was the honorable guest lecturer of that event.

- The **Department of Electronics and Communication Engineering, SIT** had organised a **Webinar** on **"Recent Industry Trends in Electronics and Communication Field."** on April 20, 2022 for all 2nd, 3rd and 4th year students and also for their faculty and staffs. The speaker of the event was **Dr. Padmanava Sen**, Research Group Leader, RF Design Enablement Group, Barkhausen Institut, Germany.

FACULTY PUBLICATIONS

- **S. K. Ghosh, A. Ghosh, S. Chakraborty, L. L. K. Singh and S. Chattopadhyay**, "Design Approach Toward Compact Circular Sector Microstrip Antenna With Low Cross Polarization," IEEE Antennas and Wireless Propagation Letters, March 2021, DOI: 10.1109/LAWP.2021.3050701.
- **S. K. Ghosh, A. Ghosh, S. Chakraborty, L. L. K. Singh and S. Chattopadhyay**, "The Influence of Feed Probes on the Modes of Circular Sector Microstrip Antennas: An investigation," IEEE Antennas and Propagation Magazine, August 2021, DOI: 10.1109/MAP.2019.2958520.
- **A. Mukherjee, S. Mandal, D. Ghosh and B. N. Biswas**, "Influence of Additive White Gaussian Noise on the OEO Output," in IEEE Journal of Quantum Electronics, February 2021, DOI: 10.1109/JQE.2020.3038464.
- **M. Saha, M. K. Naskar, B. N.Chatterji**, "Human Skin Ringworm Detection Using Wavelet and Curvelet Transforms: A Comparative Study", International Journal of Computational Vision and Robotics, April 2021, DOI: 10.1504/IJCVR.2021.115158.
- **M. Parai, S. Srimani, K. Ghosh and H. Rahaman**, "Multi-source Data Fusion Technique for Parametric Fault Diagnosis in Analog Circuits," Integration, the VLSI Journal, Jan. 2022. DOI:10.1016/j.vlsi.2022.01.005
- **D. Ghosh, A. Mukherjee, S. Mandal, N. R. Das, B.N. Biswas**, "Controlling birhythmicity in a new Dual Loop Optoelectronic Oscillator with an injection locked van der Pol oscillator", Physica D: Nonlinear Phenomena, August 2022, DOI: 10.1016/j.physd.2022.133324.

FACULTY ACHIEVEMENT

- **Prof. Dr. Sudip Kumar Ghosh** was awarded **PhD.** degree for the thesis on **"Qualitative and Quantitative Analysis on some Characteristics of Circular Sector Microstrip Antennas"** from Mizoram University in 2022.

ALUMNI'S MESSAGE

I would like to thank my alma mater, **Siliguri Institute of Technology**, for helping me with guidance and support. The faculty ensured that all the students improved both academically and as a person. I am grateful to the department of ECE, for helping me grow as an individual.

Ms. Haimantika Mitra
Developer Advocate @AppWrite
ex Microsoft

WALL MAGAZINE 2K22

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Ravi Kumar Byahut,3rd Year-ECE

It was really a great experience for me to work on **ELECTRONIKA-2K22**. In this newsletter we highlighted the success stories of our department, which is moving ahead day by day .I also want to thank Anindita mam and Aditi mam for giving us this great opportunity.

Swarup Das,2nd Year-ECE

It was truly great to be a part of the annual newsletter **ELECTRONIKA-2K22** and designing it. It shows how the department is growing each and every year with great minds and achievements. I'm thankful to Anindita Mam and Aditi Mam for this opportunity.

We welcome your comments and ideas for future issues

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Novus

VOLUME : 1

A MAGAZINE

PUBLISHED BY THE DEPARTMENT OF CIVIL ENGINEERING

Siliguri Institute of Technology

INDEX

VISION

The Vision of Civil Engineering department is to inculcate human values,self confidence and independent thinking in tackling diverse real-time problems so that the students are capable of serving the country and the human society at large and standout to be the foundation head of new ideas & innovations.

MISSION

1) To impart good technical knowledge to students.
2) To organize workshops,seminars & training programs for upgrading the performance of students and facultiy.
3) To establish Industry-Institute Interaction.
4) To open the door of research world,so that the students feel an urge for higher studies and innovation
5) To fulfill the needs of the society in various fields related to civil engiineering

Message from the Editors

Dear Readers,

It gives us an immense pleasure to publish our first edition of Departmental Magazine. This inaugural issue is a brief account of the Departmental Mission & Vision through important events and achievements of our students & Alumni`s.It is expected that wide support for this mission will be provided through the reader`s valuable suggestions and comments.This is only a small step towards a long journey.To achieve progress and to meet objectives we have to cross numerous milestones.This maiden issue of Magazine should inspire all of us for a new beginning enlightened with hope,confidence and faith in each other in the road ahead.

Happy Reading !!

Research Papers
Plastic Roads

INTRODUCTION: The disposal of plastic is a major problem everywhere in today's scenario.The plastic we use mainly consists of low-density polythene and non-biodegradable.The burning of these plastic wastes causes environmental pollution. Laboratory experiments conducted on bituminous materials proved that waste plastic enhances the property of the mix. The improvement in the property of bituminous mixes provides a solution for disposal of plastic in a useful way. Since bottles, containers, plastic strips used in packing are increasing day by day. As a result, the amount of waste plastics is also increasing. This leads to various environmental pollution. These wastes produced today will remain in the environment for many years leading to various environmental concerns. Therefore it is very necessary to utilize the wastes effectively using modern techniques in each field. Many by-products are produced in making plastic bags. The wastes consisting of carrying bags, cups, and other utilized plastics can be used as a coating on aggregate and coated aggregates can be used for road construction. The mix polymer coated aggregate and modified bitumen have shown greater strength. The roads which are constructed using plastic wastes, which are known as plastic roads are found to perform better compared to those constructed with conventional bitumen. The Indian Center for Plastics in the Environment (ICPE) has been promoting the use of plastic waste in construction of asphalt roads.

There are two kinds of plastic roads:
1) The plastic road is constructed with modular, hollow and prefabricated road elements which are made from consumer waste plastics.
2) Plastic roads consist of an asphalt mix with plastic waste incorporated with asphalt mixture.

Advantage of Plastic Roads:
In hot climates, road surfaces with neat bitumen can cause bleeding, may develop cracks in cold climates and possess fewer load bearing capacity. This can cause serious damage because of the higher axle load of vehicles in present condition due to rapid infrastructure development. The useful life of the bituminous layer decreased to 7 to 8 years from an average life of 5 to 6 years. The use of plastic waste materials with bitumen mixes enhances the pavement performance. The cost of construction of the road is also low. In this way we can protect the environment to some extent.

Laboratory Experiment Result:
The penetration value of the bitumen mixes decreases with increase in the percentage of polymer. It is because the addition of polymer increases the hardness of bitumen. The ductility of the bitumen mixes also decreases due to addition of polymer.

The decrease of value of ductility is due to interlocking of polymer molecules with bitumen. Flash and fire point of the bitumen mixes increase with increase in the amount of polymer. That is why plastic road surfaces are less affected by fire hazards. It also shows that the bitumen blend has better resistance towards water. It is also due to the binding property of polymer bitumen mix. The Marshall Stability Value is high.The softening point also increases due to increase in addition of plastic to the bitumen. Higher is the amount of plastic added, higher is the softening point value. It is due to the chemical nature of polymer added. The increase in the value of softening points results in less bleeding during summer. Since bleeding accounts for increased friction between the tyre of a moving vehicle and road surface, and on the other hand it accounts for slippery conditions in rainy periods. These two adverse conditions can be overcome by polymer bitumen blend.

Significance of Plastic Roads:

I. The total material cost of the project is reduced almost by 8%.

II. The modified bitumen with plastic gives better results as compared to ordinary bitumen.

III. The optimum content of plastic with bitumen should be 5% to 10%.

IV. Since plastic has a property of absorbing sound, the use of plastic roads will help in reducing sound pollution caused by heavy traffic.

V. The bitumen mixed with polymer, as a road construction material improves the quality and performance of the road.

VI. There is no effective radiation of UV Rays.

VII. Zero maintenance cost.

Plastic Roads in Use:

Many countries like Australia, Indonesia, United Kingdom, USA, South Africa, and Vietnam have used the technology which can incorporate plastic waste into asphalt mix. In India, the technology for plastic roads was developed by a man named Prof. RajagopalanVasudevan. He is a Professor of Chemistry at Thiagarajar College of Engineering, Madurai. He is known as the plastic man of India. He developed the technique for reuse of plastic waste to construct better, more durable and cost effective roads. Chennai is the first city in India to implement this technology. In November 2015, The Central Government of India made it mandatory for all road developers in the country to use waste plastic, along with bituminous mixes for construction of roads. This is an initiative which falls in line with the Government's Swachh Bharat Mission which aims to address India's garbage crisis. A survey done in December 2019, India has built a total 21,000 miles of roads using plastic waste. There are total 33,700 km of plastic roadways in the country. It is said that almost one million plastic bags are used every one km of ROAD.

CONCLUTION : The use of waste plastics on the road helps us to provide a better place for burying the plastic waste. It will end the disposal problem of plastics. At the same time, better roads are also constructed. This technique will also help us to avoid the general disposal technique of waste plastics namely land-filling and incineration which have certain burdens on ecology

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On Use Of Conventional Ways In Civil Engineering

1)
A) Rice Husk Ash Concrete

Rice husk ash is used in concrete construction as an alternative of cement. The rice paddy milling industries give the by-product rice husk. Due to the increasing rate of environmental pollution and the consideration of sustainability factor have made the idea of utilizing rice husk. To have a proper idea on the performance of rice husk in concrete, a detailed study on its properties must be done. About 100 million tons of rice paddy manufacture by-products are obtained around the world. They have a very low bulk density of 90 to 150kg/m3. This results in a greater value of dry volume. The rice husk itself has a very rough surface which is abrasive in nature. These are hence resistant to natural degradation. This would result in improper disposal problems. So, a way to use these by-products to make a new product is the best sustainable idea.

The rice husk ash has good reactivity when used as a partial substitute for cement. These are prominent in countries where the rice production is abundant. The properly rice husk ashes are found to be active within the cement paste. So, the use and practical application of rice husk ash for concrete manufacturing are important.

B) Green Concrete

Green concrete is defined as a concrete which uses waste material as at least one of its components, or its production process does not lead to environmental destruction, or it has high performance and life cycle sustainability.The goal of the Centre for Green Concrete is to reduce the environmental impact of concrete.

There are a number of alternative environmental requirements with which green concrete structures must comply and the Advantages are:

• CO_2 emissions shall be reduced by at least 30 %.
• At least 20 % of the concrete shall be residual products used as aggregate.
• Use of concrete industries own residual products. Use of new types of residual products, previously land filled or disposed of in other ways.
• CO_2-neutral, waste-derived fuels shall substitute fossil fuels in the cement production by at least 10 %.
• NO environmental pollution and sustainable development.
• Green concrete requires less maintenance and repairs.
• Green concrete having better workability than conventional concrete.
• Good thermal resistant and fire resistant.
• Compressive strength behaviour of concrete with water cement ratio is similar to conventional concrete.
• Flexural strength of green concrete is almost equal to that of conventional concrete.

2) Solar Tubes

One 10-inch solar tube gives you around the same amount of light as three 100-watt bulbs. That's enough to illuminate a 200 sq. ft. room well enough for office work or light a 300 sq. ft.
A tube lined with highly reflective material leads the light rays through a building, starting from an entrance-point located on its roof or one of its outer walls. A light tube is not intended for imaging (in contrast to a periscope, for example), thus image distortions pose no problem and are in many ways encouraged due to the reduction of "directional" light.
The entrance point usually comprises a dome (cupola), which has the function of collecting and reflecting as much sunlight as possible into the tube. Many units also have directional "collectors", "reflectors" or even Fresnel lens devices that assist in collecting additional directional light down the tube.
At night, the solar tube light the solar panels leading to use of solar powered LED lights at night.

Name: Suchandra Chakraborty
Dept.: Civil Engineering
Year: 2nd
Semester: 4th

Gallery

Abhishek Kumar Mahato
Sem: 4th
Batch: 2019-2023

Joseph Mohanta
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Suraj Aich,Sem: 4th,Batch: 2019-2023

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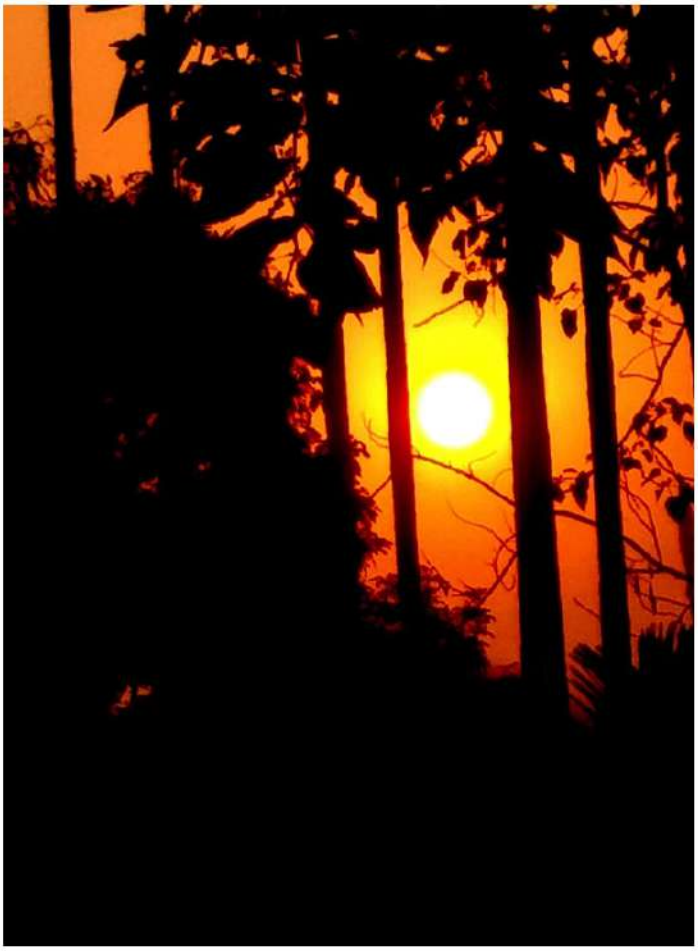

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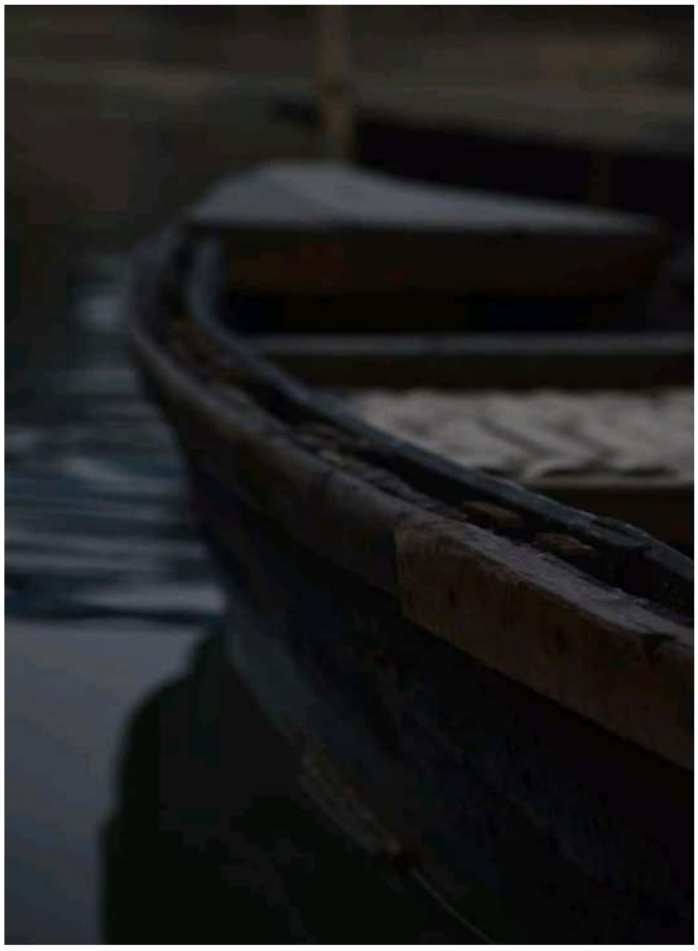

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Project by students of 4th Year

"Innovative uses of Recycled and Waste Materials for sustainable development in Construction"

Prof. Mahadeb Das[1] , Debojyoti Mantri[2], Debadrita Majumdar[3], Abhishek Roy[4], Gokul Barman[5], Debojit Bask[6], Anannya Guha[7], Moubani Waddedar[8], Debosree Roy[9], Preetam Deb[10], Arpan Mandal[11], Sanchita Sarkar[12], Bhaskar Sarkar[13], Pritama Roy[14].
4TH YEAR; 8TH SEMESTER; 2017 – 2021 BATCH

1) ABSTRACT: The compressive strength of concrete varies if we use different SCM's. So In this respect, this research has investigated compressive strength of 93 numbers of concrete cube M30, of size 150X150x150 of equal 28 day design strength concretes made with natural aggregates and OPC43 cement mix containing 10%, 20% & 30% RGS as a partial replacement to natural sand and 5%, 10% & 15% SCM's as a partial replacement to OPC43. In this test we have observed that the desired target strength of concrete is reached with the partial replacement of OPC 43 by SCM's and we can replace cement with these materials for better sustainability in field of construction.

2) KEY WORDS: Sustainability, Supplementary Cementitious Material, Crushed Glass, Recycled Glass Sand, Control Cube, Rice Husk, Zeolite Powder, Fly Ash

3) ABBREVIATIONS: SCM's = Supplementary Cementitious Material, CG = Crushed Glass, RGS = Recycled Glass Sand, C = Control Cube, RH = Rice Husk, ZP = Zeolite Powder, FA = Fly Ash.

4) INTRODUCTION:

Sustainable construction is the practice of creating a healthy environment that's based on ecological principles. According to Professor Charles J. Kibert, sustainable construction focuses on six principles: "conserve, reuse, recycle/renew, protect nature, and create non-toxic and high quality". Sustainable building isn't just good for the environment, although that is a fantastic reason to adopt sustainable practices. There are many benefits to adopting eco-friendly methods in the construction industry.

Recycling glass is one of the many ways we can help reduce pollution and waste. Instead of letting landfills pile up with glass objects that are a threat to safety and the environment, we can use it again. Sand is a common fine aggregate used in construction work as a fine aggregate. Substitution of normal sand by Recycled Glass Sand [RGS] will serve both solid waste minimization and waste recovery.

Supplementary Cementitious Materials (SCMs) are materials that, when used in conjunction with Portland cement, Portland limestone cement or blended cements, contribute to the properties of hardened concrete through hydraulic and pozzolanic activity.

Ordinary Portland cement is recognized as a major construction material through our world. Many researchers all over the world are focusing on utilizing the industrial or agricultural waste material such as Rice husk, Zeolite, Fly ash, Baggage ash, Blast furnace slag and Silica fume are used as replacement of cement and when agricultural waste is buried under controlled condition that gives good properties like amorphous silica pozzolanic properties etc. Therefore it is possible use Rice husk, Zeolite and Fly ash as cement replacement to improve strength and reduce cost of construction and these materials provide a significant contribution to sustainable construction. The use of these materials in concrete production consumes less energy and offers improved efficiency and building performance

5) OBJECTIVE:
The objective of using Zeolite, Rice husk, and Fly ash is to increase the strength of concrete by means of compressive strength replacing cement, to reduce the use of concrete. The using of Recycled Glass Sand [RGS] will reduce the use of natural sand and will help to reduce pollution. And the use of Rice husk, Fly ash and Recycled glass sand will also reduce the cost of construction as well as the disposal problem of waste materials.

6) LITERATURE REVIEW: After establishing the definition of sustainable development in the Brundtland Report reducing natural resources by using mineral admixtures and re-using waste materials have gained importance from the environmental perspective. The extraction of natural resources for concrete production is inevitable [Brundtland; 1987].
Glass dust waste was used as a partial replacement for sand at 10%, 20% and 50% of concrete mixes. Compression strength for 7, 14 and 28 days concrete of age were compared with those of concrete made with natural fine aggregates. The results proved that highest strength activity given by glass dust waste after 28 days [Nur Liza Rahim, Roshazita Che Ama, Norlia Mohamad Ibrahim, Shamshinar Salehuddin, Syakirah Afiza Mohammed, Mustaqqim Abdul Rahim; AUGUST 2014]. For hardened properties, the use of green colored RGS with 25% replacement level improved compressive strength slightly [Limbachiya, 2009, Tan and Du, 2013; Bostanci et al., 2018].The use of RGS at 20% replacement level achieved higher compressive strength compared to plain concrete at 28 d [Guo et al. 2018].The Use of RHA and bacterium enhances the durability properties of concrete. Conclusion of RHA as replacement of cement in concrete resulted in decrease in water absorption and permeable pore space, the best performance was achieved with 10% RHA wherein 28-d compressive strength was36.1 Mpa [Rafat Siddique, Karambir Singh].The concrete with 10% Portland cement replacement with Zeolite gave compressive strength after 28 days within a range of 58–116 MPa, depending on the water to cementitious material ratio [Chan and Ji].
Observed an increase in compressive strength of concrete for up to 20% of Zeolite used as Portland cement replacement but this was achieved with an increasing amount of superplasticizers in the mixtures containing Zeolite [Najimi et al.].
The experimental results show that uses of %20 FA (fly ash) as replacement of Portland cement cause a slight difference in strength properties of concrete samples. Economic benefit can be achieved by using fly ash as a pozzolanic addition in the concrete mixture. As a conclusion, use of such additions, waste materials, provides both durable and economic concrete structures and ecologic balance [Abdulhalim KaraGin and Murat DoLruyol, MAY 2014]

7) MATERIAL: -
CEMENT [OPC 43]: cement is a binder, a substance used for construction that sets, hardens, and adheres to other materials to bind them together.
SAND: - Sand is a granular material composed of finely divided rock and mineral particles.
STONE CHIPS: - Stone chips is a form of construction aggregate, typically produced by mining a suitable rock deposit and breaking the removed rock down to the desired size using crushers.
ZEOLITE: - Zeolite is micro-porous, aluminosilicate minerals commonly used as commercial adsorbents and catalysts. Zeolite occurs naturally but is also produced industrially on a large scale. It is a natural product and it will be used partially by replacing cement.
FLY ASH: - Fly ash or flue ash, also known as pulverised fuel ash, it is a coal combustion product that is composed of the particulates (fine particles of burned fuel) that are driven out of coal-fired boilers together with the flue gases. It will be used partially by replacing cement.

RICE HUSK: - Rice hulls (or rice husks) Most of the ash is used in the production of Portland cement.[1] This fine silica will provide a very compact concrete. The ash also is a very good thermal insulation material. The fineness of the ash also makes it a very good candidate for sealing fine cracks in civil structures, where it can penetrate deeper than the conventional cement sand mixture. It will be used partially by replacing cement.

GLASS BOTTLES: - Glass bottles are the waste material that is collected for using it partially with natural sand. Substitution of normal sand by Recycled Glass Sand [RGS] will serve both solid waste minimization and waste recovery. It will be used partially by replacing natural sand.

PLASTICISER: - It also known as high range water reducers, are additives used in making high strength concrete. Plasticizers are chemical compounds that enable the production of concrete with approximately 15% less water content.

8) MIX DESIGN: -

Concrete mix design for M30 grade concrete is prepared according to IS code 10262 – 2009 as follows-

I) Target strength:-

f'ck = fck + 1.65S
= 30 + 1.65x5
= 38.25 N/mm2

II) Water cement ratio:-

For M30 grade concrete maximum water cement ratio is 0.45 [IS456:2000; Table 5].
Assume W/C ratio = 0.36.

III) Water Content:-

From table-2 of IS10262 maximum water content for 20 mm aggregate size is 186 lit [for 25 mm slump].
For 1 mm slump = 186-(3/100x186) = 180.4 lit.
Superplasticizers are used so water content reduced 20%.
So, Water content = 180.4-(20/100x180.4)
Water content = 144 lit

IV) Cement Content:-

W/C ratio = 0.36
Cement content = 144/0.36= 400 kg/m3

V) Volume of Coarse aggregate & Fine aggregate:-

From table 3 of IS10262 volume of aggregate for 20 mm aggregate size (zone-1)
W/C ratio of 0.50= 0.60
[For every +-0.05 change in w/c ratio
The rate of change is -+0.01]
So, volume of coarse aggregate 0.36 = 0.63
Volume of fine aggregate = 1 – 0.63 = 0.37

VI)Mix calculation:-

1. Volume of Concrete = 1 m3

2. Volume of cement= (mass of cement/ specific gravity of cement) x (1/1000)
= (400/3.15) x (1/1000)
= 0.127 m3

3. Volume of water= (144/1) x (1/1000)
= 0.144 m3

4. Volume of chemical admixture (superplasticizers) : - (1.6/1.145) x (1/1000) = 0.0014m3
[0.4% of cement content].

5. Volume of all in aggregate = [1-(0.127+0.144+ 0.0014)]
= 0.728 m3

6. Mass of Coarse aggregate = 0.728x 0.63x 2.74 x 1000
= 1257 kg

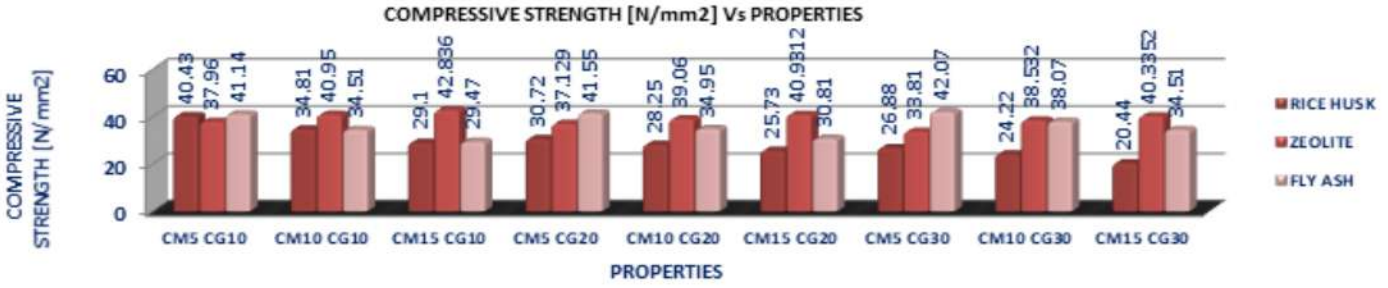
7. Mass of Fine aggregate = 0.728 x 0.37 x 2.74 x 1000
= 738 kg

	Sample Name	Cement	Rice husk %	rice husk	Zeolite %	Zeolite	Fly ash %	Fly ash	Sand	Crush glass dust %	glass dust	Coarse aggregates	Water, W/b 0.36	Dr fixit 0.4%
Control	C-1	5250	-	-	-	-	-	-	9001.65	0%	-	8692.95	1906.8	21
	C-2	5250	-	-	-	-	-	-	8101.5	10%	900.165	8692.95	1906.8	21
	C-3	5250	-	-	-	-	-	-	7201.32	20%	1800.33	8692.95	1906.8	21
	C-4	5250	-	-	-	-	-	-	6301.1	30%	2700.495	8692.95	1906.8	21
Rice Husk	RH5-CG10	4987.5	5%	262.5	-	-	-	-	8101.5	10%	900.165	8692.95	1906.8	21
	RH10-CG10	4725	10%	525	-	-	-	-	8101.5	10%	900.165	8692.95	1906.8	21
	RH15-CG10	4462.5	15%	787.5	-	-	-	-	8101.5	10%	900.165	8692.95	1906.8	21
	RH5-CG20	4987.5	5%	262.5	-	-	-	-	7201.32	20%	1800.33	8692.95	1906.8	21
	RH10-CG20	4725	10%	525	-	-	-	-	7201.32	20%	1800.33	8692.95	1906.8	21
	RH15-CG20	4462.5	15%	787.5	-	-	-	-	7201.32	20%	1800.33	8692.95	1906.8	21
	RH5-CG30	4987.5	5%	262.5	-	-	-	-	6301.1	30%	2700.495	8692.95	1906.8	21
	RH10-CG30	4725	10%	525	-	-	-	-	6301.1	30%	2700.495	8692.95	1906.8	21
	RH15-CG30	4462.5	15%	787.5	-	-	-	-	6301.1	30%	2700.495	8692.95	1906.8	21
Zeolite powder	ZP5-CG10	4987.5	-	-	5%	262.5	-	-	8101.5	10%	900.165	8692.95	1906.8	21
	ZP10-CG10	4725	-	-	10%	525	-	-	8101.5	10%	900.165	8692.95	1906.8	21
	ZP15-CG10	4462.5	-	-	15%	787.5	-	-	8101.5	10%	900.165	8692.95	1906.8	21
	ZP5-CG20	4987.5	-	-	5%	262.5	-	-	7201.32	20%	1800.33	8692.95	1906.8	21
	ZP10-CG20	4725	-	-	10%	525	-	-	7201.32	20%	1800.33	8692.95	1906.8	21
	ZP15-CG20	4462.5	-	-	15%	787.5	-	-	7201.32	20%	1800.33	8692.95	1906.8	21

TABLE.8 [A]: -MIX DESIGN TABLE (7.2 litters for each type-3cubes)

9) GRAPH: -

Graph comparisons for Compressive strength of RH, FA, ZP, and C



9. a.: Graph comparisons for Compressive strength of RH, FA, ZP

9. b.: Graph comparisons for Compressive strength of RH, FA, ZP, C

9. c.: Graph comparisons for Compressive strength of RH, FA, ZP, C

9. d.: Graph comparisons for Compressive strength of RH, FA, ZP, C

9. e.: Graph comparisons for Compressive strength of RH, FA, ZP, C

9. f.: Graph comparisons for Compressive strength of RH, FA, ZP, C

9. g.: Graph comparisons for Compressive strength of RH, FA, ZP, C

10. RESULT: -

1. 9.a : Graph comparisons for Compressive strength of RH, FA, ZP: Here, we can observe that ZP shows much better compressive strength in comparison with Fly Ash and Rice Husk.

2. 9. b.: Graph comparisons for Compressive strength of RH, FA, ZP, C: Here, we can observe that ZP15 CG10 shows much better compressive strength in comparison with SCM's.

3. 9. c.: Graph comparisons for Compressive strength of RH, FA, ZP, C: Here, we can observe that FA5 CG20 shows much better compressive strength in comparison with SCM's.

4. 9. d.: Graph comparisons for Compressive strength of RH, FA, ZP, C: Here, we can observe that ZP5 CG30 shows much better compressive strength in comparison with SCM's.

5. 9. e: Graph comparisons for Compressive strength of RH, FA, ZP, C:Here, we can observe that C1 (CG0) shows much better compressive strength in comparison with SCM's.

6. 9. f: Graph comparisons for Compressive strength of RH, FA, ZP, C:Here, we can observe that C1 (CG0) shows much better compressive strength in comparison with SCM's.

7. 9. g.: Graph comparisons for Compressive strength of RH, FA, ZP, C:Here, we can observe that C1 (CG0) shows much better compressive strength in comparison with SCM's.

11. CONCLUSION: -

a. The Data analysis of Compressive Strength shows that ZP15 CG10 has the highest compressive strength value amongst the rest SCM's.

b. The Data analysis of Compressive Strength we see that in Control Cube, ZP & RH with increase in CG content the Compressive strength decreases.

c. The Data analysis of Compressive Strength we see that in Fly Ash with increase in CG content the Compressive strength increases.

d. The Data analysis of Compressive Strength we see that in FA& RH with increase in CM content the Compressive strength decreases.

e. The Data analysis of Compressive Strength we see that in ZP with increase in CM content the Compressive strength increases.

From the above points it can concluded that with the increase in CG, only FA increases proportionally whereas, for RH & ZP it shows an inverse relationship. Also, for increase in CM, only ZP increases proportionally whereas, for RH &FA it shows an inverse relationship.

It can be said that the desired target strength of concrete is reached with the replacement of (5% of RH at CG10), (10% of ZP, 15% of ZP at CG10, CG20 and CG30 respectively), (5% of FA at CG10, CG20 and 10% and 5% of FA at CG30).

Hence, we can replace cement with these materials for better sustainability in field of construction

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