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TECHNOLOGY AND MANAGEMENT

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CENTER FOR

SMART INFRASTRUCTURE

SMART CITIES
SMART ENERGY
SMART BUILDINGS
INTERNET OF THINGS

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Centre for Smart Infrastructure Research Center

Centurion University of Technology & Management, Odisha, India

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Energy is essential for development, and sustainable energy is essential for sustainable development —

—Tim Wirth

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Message from CEO, Smart Infrastructure

Dear colleagues, partners, and stakeholders,

At Smart Infrastructure, our mission is to revolutionize infrastructure systems by embracing cutting-edge technologies, innovative practices, and collaboration. We aim to create intelligent, efficient, and resilient cities, transportation networks, energy systems, and buildings.

Our key pillars of focus are knowledge generation, collaboration, innovation, career enhancement, R&D support, and publication. We strive to be a knowledge hub, conducting ground-breaking research and developing innovative solutions in Engineering and Technology. By collaborating with leading scientists, universities, organizations, and industry leaders, we accelerate innovation and leverage diverse perspectives. We foster an ecosystem that promotes innovative and entrepreneurial thinking, empowering our researchers, students, and staff to explore unconventional ideas and turn them into reality. Our goal is to push the boundaries of what is possible and unlock breakthrough solutions.

We extend our impact beyond academia by enhancing career opportunities for students through industry-institute interaction and value-added projects. By bridging the gap between academia and industry, we equip students with the necessary skills and experiences for success in the rapidly evolving field of smart infrastructure.

Supporting the R&D activities of our industry partners is crucial. Through consultancy services, we provide expertise, guidance, and tailored solutions for industrial projects. We understand the importance of translating research outcomes into practical applications and strive to drive real-world impact. Publication and knowledge dissemination are integral to our mission. We encourage RC members to publish their findings in reputable peer-reviewed journals, contributing to the global knowledge base. We also explore patenting opportunities to protect innovative solutions and foster commercialization.

Together, we have the power to transform infrastructure systems and build a sustainable future. We invite everyone to join us on this journey of collaboration, innovation, and inspiration. Let's work together towards a world where smart infrastructure becomes the foundation of progress and prosperity.

We express gratitude for the unwavering support and commitment received thus far. With confidence, we believe that by working together, we will achieve remarkable milestones and create a lasting impact.

Sincerely,

Dr. Ashish Ranjan Dash,

CEO, Smart Infrastructure

Contents

1. Introduction

The Centre for Smart Infrastructure was established in the year 2020 with an aim to develop low-cost, indigenous technologies through Research & Development (R& D).

1.1 Aim and objective of the RC

The main objectives of the Research Centre are:

- To be a renowned knowledge generator and repository for innovative technological and inclusive solutions in the areas of Engineering and Technology.
- To develop cooperation at national and international levels with universities, leading scientists, and Industries.
- To promote the introduction of innovative and entrepreneurial thinking.
- Enhancing the career opportunities for students through industry- institute interaction, and value-added projects in cutting- edge of technology.
- Supporting the Research & Development activities as a consultancy for industrial projects.
- Publication of research results in National and international peer- reviewed journals and filing patents.

1.2 Focus Area

- ***Smart Energy Systems:*** This focus area involves exploring innovative technologies and systems for energy generation, distribution, and consumption in infrastructure.
- ***Intelligent Transportation Systems***: This focus area involves studying and developing intelligent transportation solutions to improve mobility, safety, and sustainability.
- ***Sustainable Buildings and Infrastructure***: This focus area involves developing sustainable and energy-efficient building designs, materials, and construction practices.
- ***Data Analytics and Artificial Intelligence***: This focus area involves leveraging data analytics and artificial intelligence techniques to optimize the performance and operation of infrastructure systems.
- ***Internet of Things (IoT) and Connectivity***: This focus area involves exploring the application of IoT technologies and connectivity solutions in infrastructure systems.

- ***Urban Planning and Smart Cities:*** This focus area involves studying the integration of smart infrastructure technologies in urban planning and the development of smart cities.

1.3 Software Tools

We have access to the State of Art simulation tools such as MATLAB, 3D-experiences [BIM], Auto-CAD, REVIT, STAAD-Pro, Student Involvement

1.4 Student Involvement

The Centre encourages and involves Undergraduate & Postgraduate students and Research scholars besides faculty members to carry out the re- search activities.

1.5 Expected Outcomes

1. *Knowledge Generation and Repository:* The expected outcome is the generation of new knowledge through research activities and the establishment of a repository of innovative solutions that can be accessed by researchers, professionals, and industry practitioners.
2. *National and International Cooperation:* The expected outcomes include knowledge exchange, joint research projects, and shared resources that can contribute to advancements in engineering and technology.
3. *Promotion of Innovative and Entrepreneurial Thinking*: Development of a mindset that embraces creativity, problem-solving, and the ability to translate research outcomes into practical applications and entrepreneurial ventures.
4. *Enhanced Career Opportunities for Students:* Internships, industry collaborations, and value-added projects that can equip students with relevant skills and experiences sought by employers.
5. *Support for Industrial Projects:* By offering consultancy services, the center can provide expertise and solutions to industry-specific challenges, leading to the development of innovative and practical outcomes for industrial applications.
6. *Research Publication and Patents:* To contribute to the academic and scientific community's knowledge base by sharing research findings. Additionally, filing patents can protect and commercialize innovative solutions, potentially leading to technological advancements and economic benefits.

1.6 Activities being carried out

- We organize professional development workshops and FDP/SDP on problems identified by the research work conducted at the Center for the training of faculty academic staff and students to share research findings with them.
- Organization of Industry talks to educate the members about simulation tools.
- Product development
- Offering Domain/Skill, Certification Courses, and Internships.

2. Research and Projects

2.1 Projects

2.1.1 Polyhouse Automation

Polyhouse farming is a special kind of arrangement in which the crop field is completely or partially covered by transparent polyethene sheets. The nutrients are dissolved in water and supplied to plants through drip irrigation. The following parameters such as temperature, light intensity, humidity, and moisture of the soil should be adjusted in such a way that different plants can grow perfectly. Different sensors such as temperature sensor, light sensor, humidity sensor, and soil moisture sensor have been used for collecting data and send to the data base. Users can login to monitor and actuate globally. Monitoring data can be downloaded in CSV format.

Fig. 1. Inauguration of Phenotyping Unit

Need of Polyhouse Automation

- Polyhouse is a type of greenhouse where specialized polythene sheet is used as a covering material under which the crops can be grown in partially or fully controlled climatic conditions.

- Modern-day polyhouses are built on G.I. steel frame and are covered with plastic, which is fixed on the frame with aluminum grippers. So, the farmers become confused and follow rough, inaccurate thumb rules.

- The white plastic film used for covering is of high quality; 200 microns thickness, with 3 years guarantee against degradation due to UV and weather. Mostly drip irrigation system is installed inside a polyhouse for watering purpose.

- Polyhouse protects the crops from wind, rain, radiation, precipitation and other climatic factors.

- It creates microclimate surrounding the crops that help in maximum growth regarding production and quality.

- Polyhouse crops can give you maximum profit in a minimum area under cultivation.

- With a maximum level of automation, the number of manual activities, dependency on labor and overall labor cost is reduced.

Product/Technology/IP Strategy

The proposed automation system is based on the internet of things (IOT), it is cloud of interconnected physical devices which are used to communicate with each other with help of internet.

- Several polyhouses can be monitored in single web or app
- Monitoring and Actuation can be done globally
- Each parameter like temperature, humidity and moisture sensor can be controlled for individual polyhouse

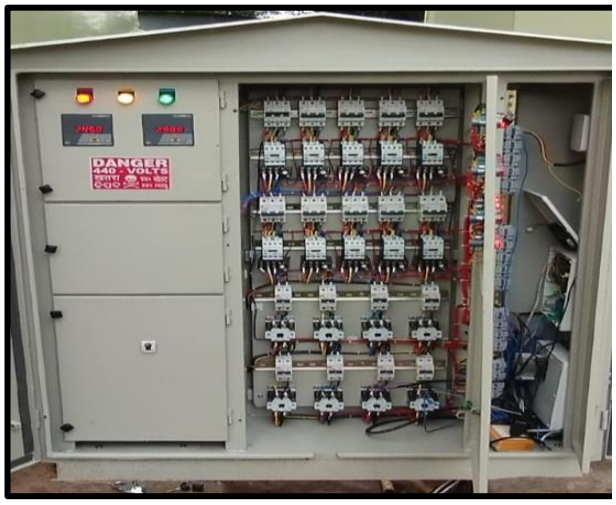

Fig. 2. Control Panel

Fig. 3. IOT Controller box

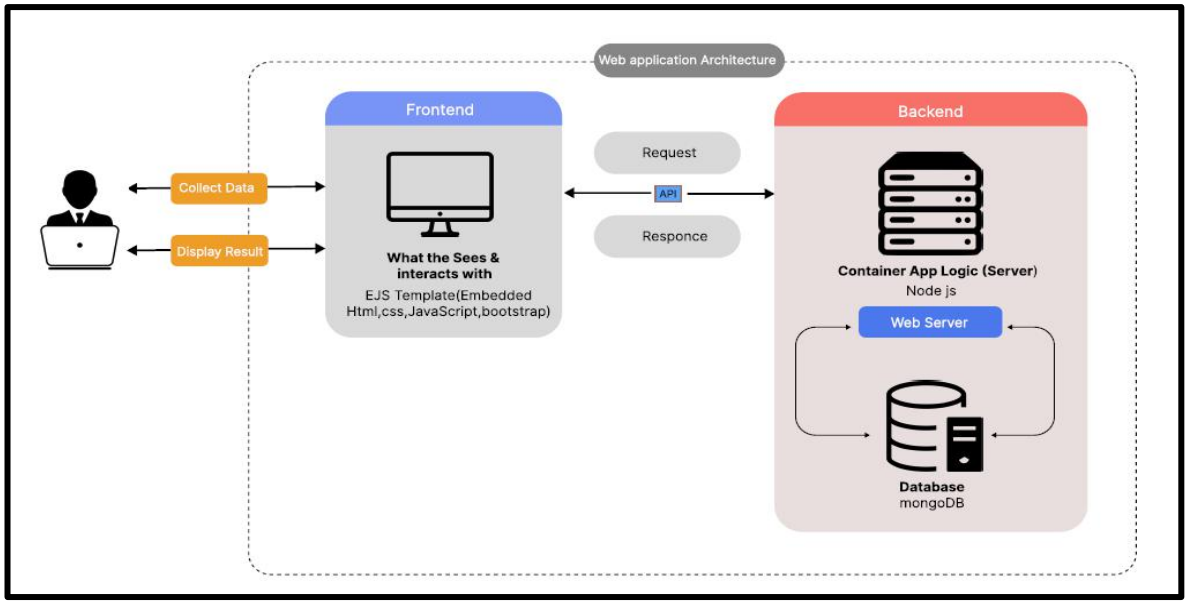

Fig. 4. Web Application Architechture

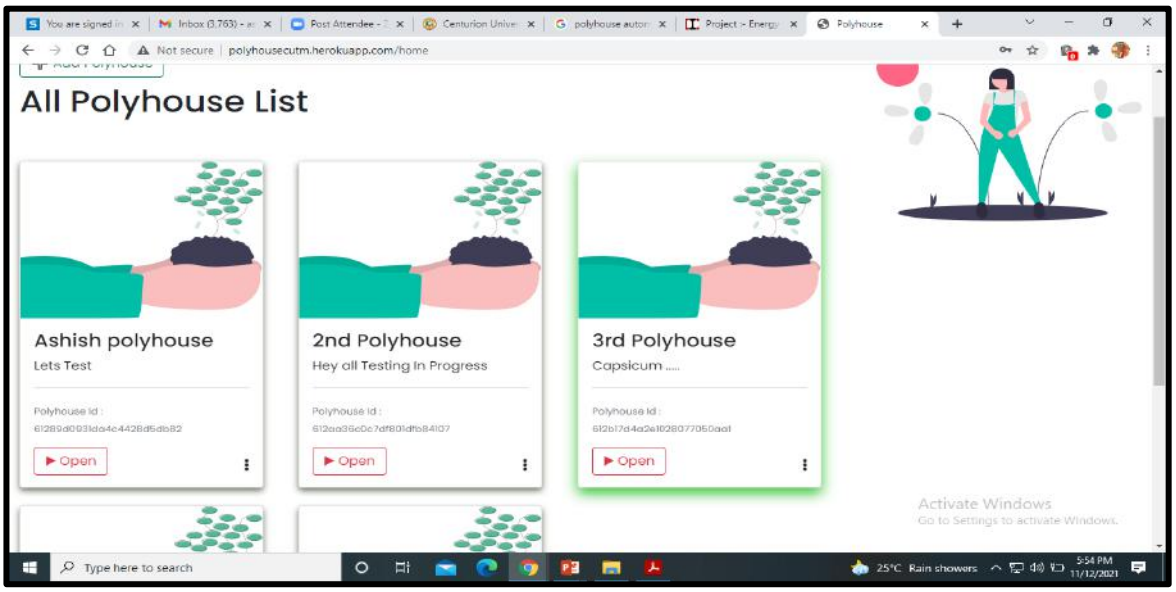

Fig. 5. Web and database management

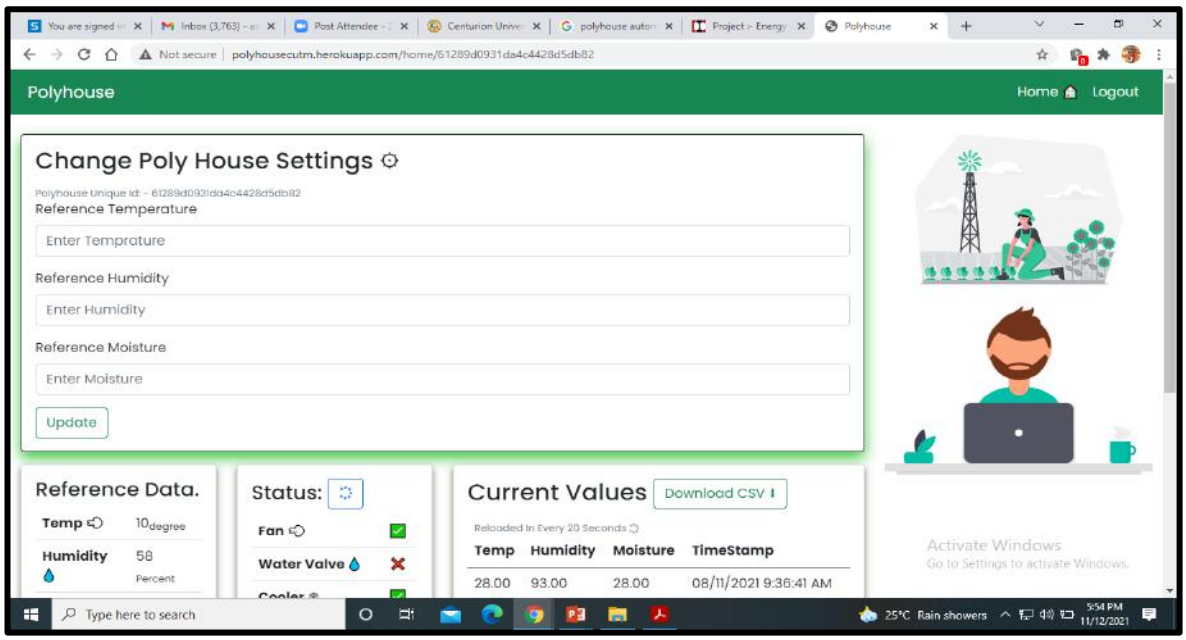

Fig. 6. Web and database management

Fig. 7. Automated polycarbonate-based polyhouse (Inside)

Fig. 8. Automated polycarbonate-based polyhouse (Outside)

Fig. 9. Polyhouse at Ranadevi, Paralakhemundi campus

Fig. 10. Forced ventilated polyhouse

Automated Polyhouse by our proposed Technology

Table 1. List of different automated polyhouse projects

Name of the polyhouse	Size	Type	Controlling option
Ranadevi 1	12.5m 8m	forced ventilation	Temp, humidity, soil moisture
Ranadevi 2	12.5m 8m	OPEN ventilation	humidity, soil moisture
Ranadevi 3	12.5m 8m	OPEN ventilation	humidity, soil moisture
Vizianagaram	24m 24m	forced ventilation	Temp, humidity, soil moisture

Specifications of Actuators

Table 2. Detail specification of the actuators used in automated polyhouse

Name	Size	Rating
Exhaust Fan	5.6m×8m Blade: 5.6 *ft* × 3.8 *ft*	3 phase, 1 hp
Fan Pad	*20 ft* × 60 *ft*	Colling cellulose
Solenoid valve	40 mm	220V AC
Dripper	16 mm	2 LPH
Fogger	24 mm	Four Way
Pressure motor	-	Single phase, 0.5 hp
Submersible motor	-	Single phase, 0.5 hp

Automation of open Agricultural fields

- A smart IOT-based control mechanism is developed which remotely manages water and nutrient system with the help of IoT/Cloud system. It manages the supply and distribution of water and nutrient to small and marginalized farmers from a shared water and nutrient resource and manages the operations. The dynamic water demand-supply management is based on real time data from meters communicating with the Cloud Network. Water and nutrient can be supplied automatically in a controlled fashion to the fields. This not only conserves water and reduces cost of water, but also keeps the water level in good conditions, and improves water ecosystem. It also conserves the soil fertility using precision nutrient.

- Intelligent control algorithms control the pumps for irrigation. The solution is applicable to all types of irrigation systems, whether conventional grid-connected or solar off-grid, existing or new, AC or DC, submersible or surface. This creates a viable option to share irrigation pump in a financially sustainable model, saves O&M costs, and increases the life of pump. The solution can be used for stand-alone solar-water-pumping systems, pumping system powered with microgrids, or traditional pumping system powered by the grid electricity. The focus is on shared resources, water conservation, and sustainable business model.

Monitoring Parameters

In this project on speed breeding, we will monitor several key parameters to ensure the success and efficacy of our breeding program. These parameters may include the

- Light spectrum intensity, and duration,
- Temperature and humidity levels of the growth chamber.
- The nutrient levels
- pH balance,
- water quality
- Percentage of CO_2 of the growing medium to ensure optimal plant growth and development.

2.1.2. Image Processing Based Plant Disease Detection for polyhouse Application

Green plants are very much important to the human environment; they form the basis for the sustainability and long-term health of environmental systems. In this project, we have proposed a system using Nodemcu (ESP8266)/raspberry pi to detect healthy and unhealthy plants & alerts the farmer by sending email.

Technologies	Software
→ Open CV → Python → Webserver → KERAS 2.2.4	→ Matlab Software → Jupyter Notebook
Controller	**Algorithm**
→ NodeMcu(ESP8266) → Rasberry pi	→ Capture the RGB format image → Convert RGB shading regards to the predefined space in that structure → Apply image segmentation → Clustering

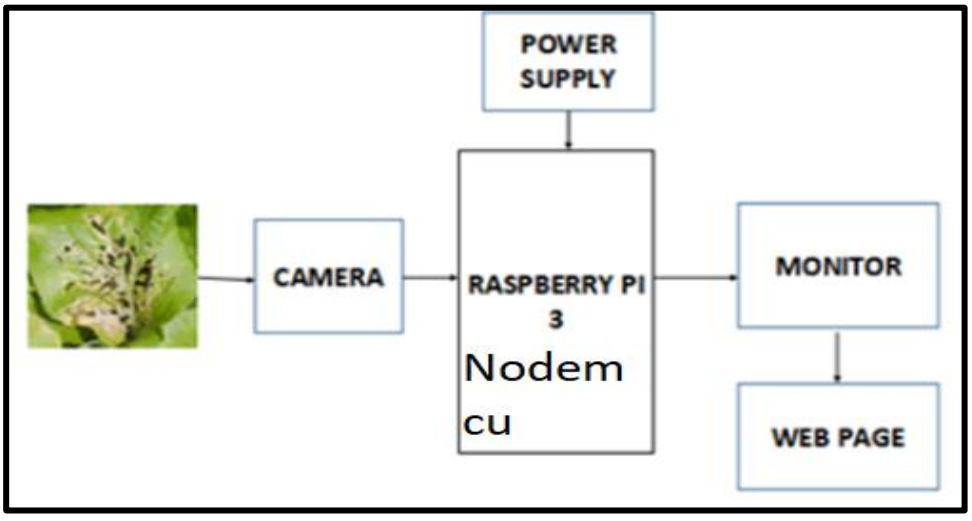

Fig. 11. Schematic presentation of Plant Disease Detection through image processing

2.1.3. Design of RFID based attendance system

RFID stands for radio-frequency identification, and it uses electromagnetic fields to quickly identify and track tags that are attached to objects. These tags store critical information on your employees so you can know exactly when they enter and exit the building. The outcome of the product is Students able learn about RFID technology, Students able learn controller programming, Student able learn web page designing and data base management, finally able design a prototype model.

Fig. 12. Prototype of RFID

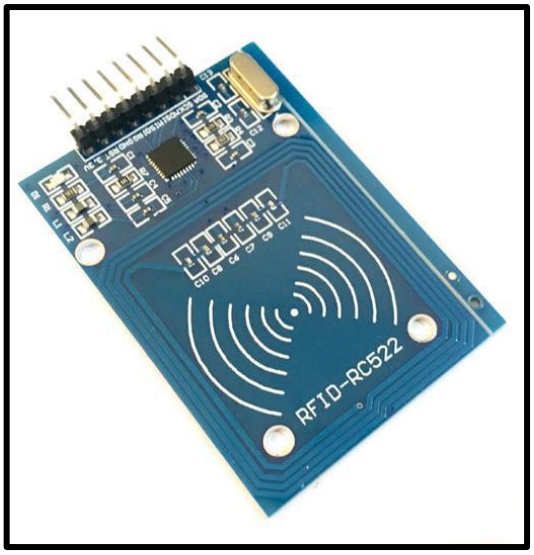

Fig. 13. Controller board of RFID

2.1.4. Development of Microgrid inside the campus

A microgrid is a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid.

About	Main Components of Microgrid
→ The concept of microgrid is considered as a collection of loads and micro-sources which functions as a single controllable system that provides both power and heat to its local area. → Comprises of various small power generating sources that makes it highly flexible and efficient.	→ Distributed Generation → Loads → Energy storage system → Static disconnect switch → Controller → Mode switching device

→ It is connected to both the local generating units and utility grid thus preventing power outages. → Enables local power generation for local loads → Excess of can be sold to the utility grid.	Point of Common Coupling

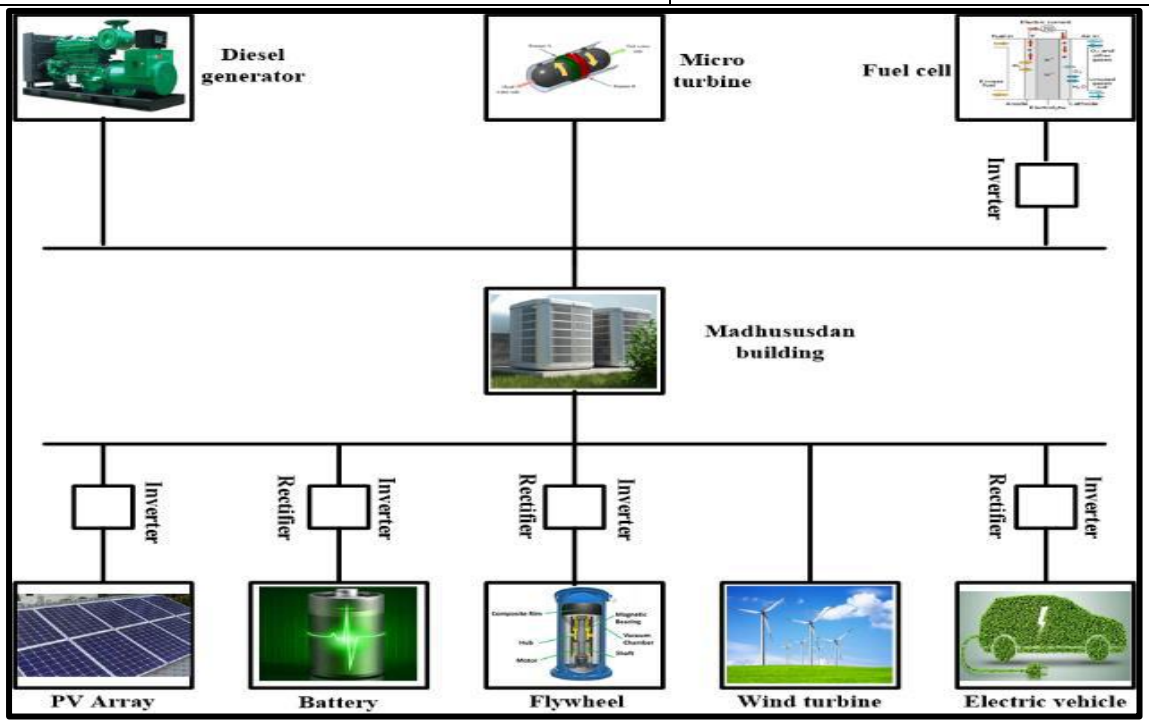

Fig. 14. Schematic diagram of Microgrid

2.1.5. Economical Design and analysis of windmill inside Campus

The majority of wind turbines consist of three blades mounted to a tower made from tubular steel. There are fewer common varieties with two blades or with concrete or steel lattice towers. At 100 feet or more above the ground, the tower allows the turbine to take advantage of faster wind speeds found at higher altitudes. The objectives of the plant are to design and develop a efficient solar energy harvesting system for our society and to develop a Portable & adjustable structure for optimum energy production.

→ For the installation of the wind power plant inside the CUTM, BBSR campus, the following literature studies have been carried out: -

→ The wind data (Speed, Direction) for the required location (CUTM, BBSR) for the last 5 years has been collected from IMD Pune.

Fig. 15. Installed Microgrid inside campus

2.1.6. Installation of Solar tree inside campus

A solar tree is a structure incorporating solar energy technology on a single pillar, like a tree trunk.

About
→ Solar trees are intended to bring visibility to solar technology and to enhance the landscape and architecture they complement, usually in a commercial or public context. → Likewise, the arrangement of solar panels in a solar tree must ensure maximum efficiency in harnessing the solar energy. → In botanical context phyllotaxy is the arrangement of leaves over a stem. → One panel should not be covered by the shade of the upper panels.
Objective
→ A solar tree is a decorative means of producing solar energy and also electricity. It uses multiple no of solar panels which forms the shape of a tree. The panels are arranged in a tree fashion in a tall tower/pole.

→ This project work aims on solving this problem by providing supplement power through a SOLAR TREE with a battery storage system which can provide a steady-state power at different slots of time as per requirement

Proposed Design

Nine numbers of 75 Wp Polycrystalline Solar panels will be used to provide 675 Wp power at output.

Table 3. Components of Polycrystalline Solar panel

#	Items	Specification	Qnty	Make
1	Poly Solar Panels	75 W 12 V system	9	NOVA
2	PWM Controller	12 V 40 A	1	
3	Or MPPT Micro Controller	110-240 V, 4 A	1	Schneider
4	Solar Battery	12 V 40 Ah	2	Luminous
5	Connecting Wire	1-2 mm		
6	DCDB	30-40 A	1 or 2	
7	Mechanical Structure	GI		

Table 4. Load Estimation

Load (DC)				
Appliances	**Watts**	**Qnty**	**No. of hour uses**	**Consumption**
LED Light	9	5	4	180
Fan	12	6	6	432
Multi Mobile Charging Point	40	1		40
Or Irrigation				
Solar Water Pump	0.5 or 1 HP	1		
LED Light	5	4	4	80
Fan	12	2	6	144
Multi Mobile Charging Point	40	1		40

Table 5. Cost Estimation

#	Items	Qnty	Approx. Cost (Rs.)
1	GI Mechanical Structure with Leaf	1	25,000
2	Civil Foundation	1	5,000
3	Battery (12 V 40 Ah)	2	12,000
4	Solar Pump Set (12 V 0.5 HP)	1	20,000
5	Multi Mobile Charging Point (12 V)	1	2,000
6	Charge Controller (PWM)	1	5,000
7	Wire/DCDB/Cashing		3,000
8	Miscellaneous		3,000
		Total (Rs.)	75,000

Fig. 16. On-going installation of solar tree

Fig. 17. Installed solar tree

Fig. 18. Working of the installed solar tree inside campus

2.1.7. Installation of Solar power plant inside campus

About
Solar energy is radiant light and heat from the sun that is harnessed using a range of technologies such as solar power to generate electricity. Now a days solar energy is mostly used in our domestic or industrial purposes. The solar panel will be used to create the solar energy by the help of photovoltaic cell. It consumes the sun light and convert it into the electricity. A solar power plant is a facility that converts solar radiation, made up of light, heat, and ultraviolet radiation, into electricity suitable to be supplied to homes and industries.

Objective
→ To design and develop a efficient solar energy harvesting system for our society. → To develop a Portable & adjustable structure for optimum energy production.

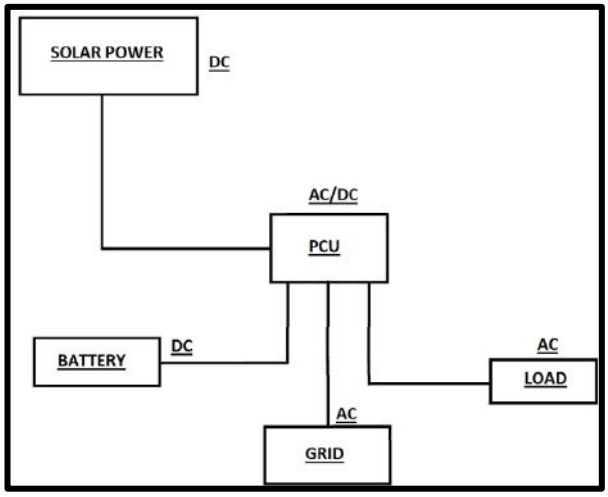

Fig. 19. Schematic diagram of solar power plant

Fig. 20. Installation of solar power plant

2.1.8. Repair and Maintenance of 32kwp Solar Power Plant

About
In CUTM Bhubaneswar Campus, a 32.5 kWp capacity grid interactive solar PV system was installed in 2018. It was running smoothly with full capacity. In view of cyclone Fani on May, 2019 we had dismantled the entire system for safe keeping. It is now reinstalled with our own manpower and synchronized to grid with full capacity operation, which was inaugurated by Hon'ble VC Prof. (Dr.) Supriya Pattanayak on 14/12/2021.
Objective
→ To design and develop an efficient solar energy harvesting system for our society. → To develop a Portable & adjustable structure for optimum energy production.

System Specification

Table 6. System Specification

Specification	Unit- 1	Unit- 2
Max Load that can be connected	11 kW	11 kW
Max units of energy (kWh) usage per day	37.3Units	37.3Units
System Voltage	240 V	240 V
Solar Module with mounting structure	16.25 kWp	16.25 kWp

Solar battery with battery rack	400 Ah, 240 V	400 Ah, 240 V
Solar Power Conditioning Unit – Single Phase	20 kVA, 240 V	20 kVA, 240 V
Cables & Consumables	1 Set	1 Set

Table 7. Total System Capacity: 32.5 kWp

No. of Shops connected	10nos.
Average solar irradiation in ODISHA state	1156.39W/sq.m
Average Energy over the year (considering 5.5 sunshine hours)	5.5 Sunshine Hours
Carbon dioxide emissions mitigated is	905 tonnes.
This installation will be equivalent to planting	1448 Teak trees over the life time. (Data from IISc)

Fig. 21. Installation of solar PV system

Fig. 22. Controller of solar PV system

Fig. 23. Inauguration of 32.5 kWp capacity grid interactive solar PV system by Hon'ble Vice-Chancellor, CUTM, Odisha

2.1.9. EV Charging Station

Air pollution creates a key role in climate change and its impact on our health and wellbeing. The transport sector contributes a major part to air pollution (40-70%) in Indian cities. To decarbonize the transport sector, the electric vehicles (EVs) deployment with clean technology sources is a suitable option in the country. In this invention, a 2 KWp of solar rooftop photovoltaic (SRTPV) system has been used to charge four numbers of lead acid batteries (12V each) through an EV charging station (EVCS). In peak hours, the 2 KWp SRTPV produces 8-10 units/day. Around 4 hours is enough in peak time to charge the batteries of the EV. It is economically cheaper than those with grid configuration/conventional charging.

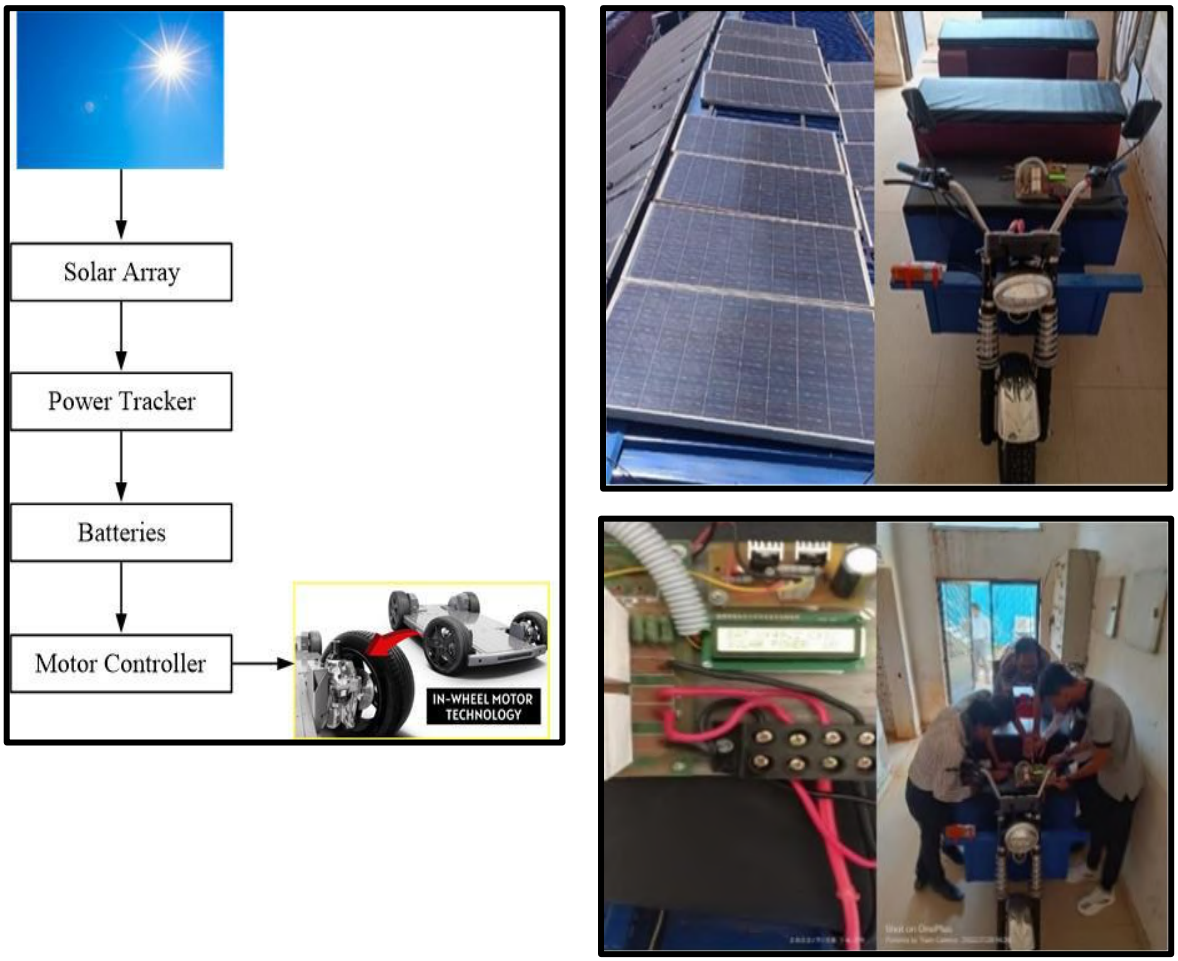

Fig. 24. Solar rooftop photovoltaic (SRTPV) system

2.1.10. Development of solar parabolic trough collector

About
A parabolic-trough collector (PTC) is a linear-focus solar collector, basically composed of a parabolic-trough-shaped concentrator that reflects direct solar radiation onto a receiver or absorber tube located in the focal line of the parabola
Objective
→ To develop the prototype for water heating and cooking purposes. → To model the prototype by using Catia software and temperature analysis by using ANSYS software
Learning Outcomes
→ The student will be able to understand the concept and design of parabolic trough collector → It will generate maximum temperature up to 200-300^0 C

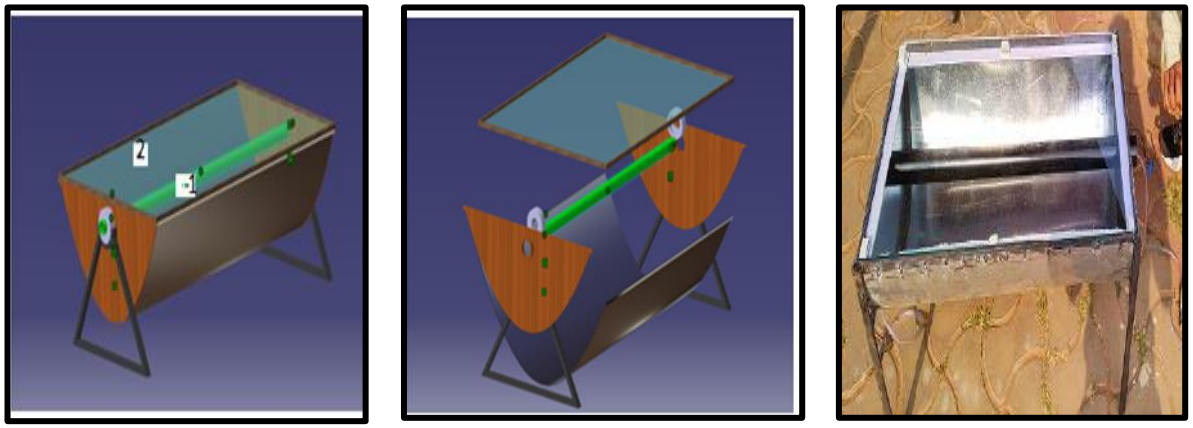

Fig. 28. Prototype of a solar parabolic trough collector

3 Publications, Patents, Internships and Workshops

3.1 Journals

	Dr. Ashish Ranjan Dash
1	Lenka, R. K., Panda, A. K., Dash, A. R., Senapati, L., & Tiwary, N. (2022). A unified control of grid-interactive off-board EV battery charger with improved power quality. *IEEE Transactions on Transportation Electrification*.
2	Lenka, R. K., Panda, A. K., Dash, A. R., Venkataramana, N. N., & Tiwary, N. (2021, January). Reactive Power Compensation using Vehicle-to-Grid enabled Bidirectional Off-Board EV Battery Charger. In *2021 1st International Conference on Power Electronics and Energy (ICPEE)* (pp. 1-6). IEEE.
3	Damala, R. B., Patnaik, R. K., & Dash, A. R. (2022). A simple decision tree-based disturbance monitoring system for VSC-based HVDC transmission link integrating a DFIG wind farm. *Protection and Control of Modern Power Systems*, *7*(1), 25.
4	Behera, R. R., Dash, A. R., & Panda, A. K. (2021, August). Cascaded Transformer coupled Multilevel inverter-based Shunt Active Power Filter. In 2021 Asian Conference on Innovation in Technology (ASIANCON) (pp. 1-6). IEEE.
5	Behera, R. R., Dash, A. R., & Panda, A. K. (2022). A novel cascaded transformer coupled multilevel inverter with reduced number of switches for high power applications. *World Journal of Engineering*, (ahead-of-print).
6	Behera, R. R., Dash, A. R., Patel, R., & Panda, A. K. (2023, January). Implementation of a novel Hebbian least mean square techniques to a Cascaded MLI based SAPF. In 2023 International Conference on Power Electronics and Energy (ICPEE) (pp. 1-6). IEEE.
7	Damala, R. B., Dash, A. R., & Patnaik, R. K. (2022). Change detection filter technique-based fault analysis of HVDC transmission line. *World Journal of Engineering*, (ahead-of-print).
8	Dash, A. R., Patel, R., Mangaraj, M., & Panda, A. K. (2021). Implementation of an Efficient SVPWM Technique to a Cascaded Multilevel Inverter-Based SAF. In *Advances in Smart Grid and Renewable Energy: Select Proceedings of ETAEERE 2020* (pp. 437-446). Springer Singapore.
	Dr. Rajendra Kumar Khadanga
9	Khadanga, R. K., Das, D., Kumar, A., & Panda, S. (2023). Sine augmented scaled arithmetic optimization algorithm for frequency regulation of a virtual inertia control based microgrid. *ISA transactions*.
10	Nayak, S. R., Khadanga, R. K., Panda, S., Sahu, P. R., Padhy, S., & Ustun, T. S. (2023). Participation of Renewable Energy Sources in the Frequency Regulation Issues of a Five-Area Hybrid Power System Utilizing a Sine Cosine-Adopted African Vulture Optimization Algorithm. *Energies*, *16*(2), 926.
11	Khadanga, R. K., Nayak, S. R., Panda, S., Das, D., Prusty, B. R., & Sahu, P. R. (2022). A Novel Optimal Robust Design Method for Frequency Regulation of Three-Area Hybrid Power System Utilizing Honey Badger Algorithm. *International Transactions on Electrical Energy Systems, 2022*.
12	Sahu, P. R., Lenka, R. K., Khadanga, R. K., Hota, P. K., Panda, S., & Ustun, T. S. (2022). Power System Stability Improvement of FACTS Controller and PSS Design: A Time-Delay Approach. *Sustainability*, *14*(21), 14649.

13	Das, D., Khadanga, R. K., & Rout, D. K. (2023). A matching game framework for users clustering and resource allocation with wireless power transfer in a CR-NOMA network. *International Journal of Communication Systems*, *36*(2), e5376.
14	Khadanga, R. K., Kumar, A., & Panda, S. (2022). A modified grey wolf optimization with cuckoo search algorithm for load frequency controller design of hybrid power system. *Applied Soft Computing*, *124*, 109011.
15	Khadanga, R. K., Das, D., Kumar, A., & Panda, S. (2022). An improved parasitism predation algorithm for frequency regulation of a virtual inertia control based AC microgrid. *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects*, *44*(1), 1660-1677.
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3.2 Patents

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15. Ms. Debashree Debadatta Behera published a patent on POWDER MANUFACTURING UNIT, Designed Indian patent granted, patent no: 377791-001.

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3.3 Conference and Book Chapters

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26 Ms. Debashree Debadatta Behera Attended and presented a paper Simulation of Solar Operated Grass Cutting Machine Using PVSYST Software in 13th International Conference on Material Processing and Characterization (ICMPC-2022)

27 Ms. Debashree Debadatta Behera Attended and presented a paper on performance evaluation of the Absorbing Plate of a Hybrid Solar Dryer for Potato Dryingat the Second International Conference on Sustainable Energy, Environment and Green Technologies (ICSEEGT 2022) organised by Poornima College of Engineering, Jaipur,

Rajasthan, India from 24-25 June 2022.

28 Ms. Debashree Debadatta Behera Attended and presented a paper on “Sustainable Energy Business Model and Strategies for Marketing of Clean Energy Products in Rural Areas of India” at the Second International Conference on Sustainable Energy, Environment and Green Technologies (ICSEEGT 2022) organised by Poornima College of Engineering, Jaipur, Rajasthan, India from 24-25 June 2022.

29 Ms. Debashree Debadatta Behera Attended and presented a paper Genetic programming approach to predict the performance characteristics of WEDM taper cutting process in 13th International Conference on Material Processing and Characterization (ICMPC-2022)

30 Ms. Debashree Debadatta Behera Attended and presented a paper on “Architecture for Diffusion of Clean Energy Products in Rural Areas of Odisha” at the National Seminar on Sustainable Development with Women Empowerment organised by KIIT-DU and OUAT in association with India Science Congress Association from 2-3 March 2022.

31 Ms. Debashree Debadatta Behera Attended and presented a paper on “Framework for Diffusion of Clean Energy Products in Rural Areas of India” at the 34th World Conference on Applied Science, Engineering and Technology held at Dubai, UAE from 23-24 March 2021.

32 Ms. Debashree Debadatta Behera Attended and presented a paper on “Consumer’s Perception in Adoption of Clean Energy Products in Areas of South Odisha”, International Conference on Contemporary Issues in Business Management & Economics (ICCIBME-2021)

33 Ms. Debashree Debadatta Behera Attended and presented a paper on paper titled “Architecture for adoption of Clean Energy products in Rural Areas of India” in National seminar on sustainable development with Women Empowerment and got certificate.

34 Ms. Debashree Debadatta Behera Attended and presented a paper on “Use of Clean Energy for Sustainable Livelihood in Rural Areas: A Case from South Odisha” at the International Conference on Advancements in Sustainable Technology (ICAST-2021) organised by GIFT and IFERP, from 17-18 December 2021

35 Mr. Deepak Kumar Sahu Attended and presented a paper titles as "Stochastic Response of RC Frame and RC Box Girder Bridges using HDMR" at the international Symposium Socio-Technological Aspects of Seismic Disaster and Mitigation STASDM-2022 on 23rd and 24th June 2022 at IIT Guwahati.

36 Rama Prasanna Dalai, Smita Jana, Surya Narayan Sahu published a book chapter on DEMAND SIDE MANAGEMENT.

37 Surya Narayan Sahu, Rama Prasanna Dalai published a Conference paper on Electrical System Design for an Educational Institute using ETAP Software in International Conference on Recent Innovations in Science, Engineering and Technology,2020.

3.4 CEO Retreat at Sai Resorts Vishakapatnam

CEO Retreat at Sai Resorts Vishakapatnam

3.5 Faculty Awards

“Provost Research Award 2022” by Centurion University of Technology and Management in recognition of research publication during 2017 to 2022 under the category of "Distinguished Achiever Award/Associate Professor".

Dr. Ashish Ranjan Dash, receiving
the award from Provost, CUTM, Odisha

Dr. Rajendra Kumar Khadanga receiving
the award from Provost, CUTM, Odisha

3.6 Future Plans

The center tries to foster an inclusive, equitable, and diverse culture of excellence and continuous strategic improvement. Further, it attempts to leverage partnerships and collaboration with other Research centers to drive research and innovation. We thrive for translating and commercializing research findings for societal impact, which would advance the university's research brand and reputation.

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THE SMART INFRASTRUCTURE RESEARCH CENTER IS A DEDICATED FACILITY FOCUSED ON ADVANCING RESEARCH AND INNOVATION IN THE FIELD OF SMART INFRASTRUCTURE. IT SERVES AS A HUB FOR INTERDISCIPLINARY COLLABORATION, BRINGING TOGETHER EXPERTS FROM VARIOUS DISCIPLINES TO DEVELOP CUTTING-EDGE TECHNOLOGIES AND SOLUTIONS FOR INTELLIGENT INFRASTRUCTURE SYSTEMS. THE CENTER CONDUCTS RESEARCH IN AREAS SUCH AS SMART CITIES, SUSTAINABLE TRANSPORTATION, ENERGY-EFFICIENT BUILDINGS, AND RESILIENT INFRASTRUCTURE, AIMING TO IMPROVE THE FUNCTIONALITY, EFFICIENCY, AND SUSTAINABILITY OF URBAN ENVIRONMENTS.

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