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CENTRE FOR ENGINEERING EDUCATION RESEARCH
CMR HACKFEST HACKATHON PROBLEM STATEMENTS
1st, 2nd MARCH 2024

S.No.	Themes	Problem Statement	SDG Goals	Hardware/Software
1	Clean and Renewable Energy	Automatic Energy Saving System: Electricity is the critical need for progress of the livelihood. In many Indian cities, the maintenance of street lights has become a challenging and inefficient process due to the lack of a centralized monitoring system. Identifying faults, such as non- functioning lights, current leakage and cable breakage, relies on citizen grievances, leading to delays, increased costs, and safety concerns. Hence, an automatic system to be developed in searching for faults, diagnosing issues, and fixing them.	7.Affordable and clean energy 11.Sustainable Citities and Communities	Hardware & Software
2	Clean and Renewable Energy	Effective Energy Conversion System: Due to gradual reduction in fossil fuels there is a need for Renewable energy sources directly to generate electricity rather than conventional sources.The solution is to develop/design a model for trapping renewable energy into electrical energy.	7.Affordable and clean energy 9.Industry, Innovation and Infrastructure	Hardware
3	Clean and Renewable Energy	Solar Efficient System: In recent days, energy generation using solar panels are in high demand, due to lack of proper maintainance of the solar system energy generation is degrading to the levels. Hence, an automatic system to be developed for saving the solar energy.	7.Affordable and clean energy 9.Industry, Innovation and Infrastructure	Hardware & Software
4	Clean and Renewable Energy	Fitness Square : The problem involves the untapped potential of harnessing kinetic energy generated during gym workouts for power generation. The challenge is to design a non-intrusive, efficient system that captures and converts mechanical energy from various exercise machines into electrical energy. The solution should be scalable, cost-effective, and encourage widespread adoption in fitness centers. Successful implementation not only contributes to sustainable energy initiatives but also revolutionizes the fitness industry by promoting environmentally conscious practices.	3.Good health and well-being 7.Affordable and clean energy 9.Industry, Innovation and Infrastructure	Hardware
5	Health	Automatic Health Monitoring System: In present days, the patients belonging to rural and sub-urban communties do not maintain the diagnosis reports for which they frequently go for regular checkups wasting there valuable money. Thus, an automatic report maintaing system is to be developed to avoid repetative diagnosing of the patients.	3.Good health and well-being	Software
6	Health	Suggestive Automated Mental Health Identification System : Considering the increasing burden of the mental disorders, it is important to identify the people at the risk of developing mental disorder at early stage to take the necessary action. A solution is to be proposed to address the mental health issues at educational institution level in the early stage and suggest the basic treatment required.	3.Good health and well-being	Software

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7	Health	Automatic Sanitization System: Due to travelling of heavy passengers in the trains there is a possibility of getting infected with the people suffering from various diseases. To address the issue, a system is to be developed for proper sanitization without manual involvement.	3.Good health and well-being	Hardware & Software
8	Health	IoT Based Water Heater: Now a days Most of the people are using Electric Water Heater. In some occasions few people lost their life because of touching the water when the power supply is on. So to prevent this come up with latest technology to overcome the above problem.	3.Good health and well-being	Hardware & Software
9	Health	Industry Dust Collector: In recent days, most of the people are suffering from asthma and other health issues due to air pollution exclusively because of the dust coming out from the industries. An automatic system is to be developed to address this issue which can do air purification.	3.Good health and well-being	Hardware & Software
10	Health	Smart Public Toilet: Even in the most modern times, Public facing the problem with non hygienic toilet while traveling or going out. Here the problem statements aim to the development of an automatic self-cleaning, toilet system. Instead of water washing and all, the focus here is on ultraviolet disinfection, hot air drying, and smart saving of water. The final result is a toilet like that of a home. Also, there should be a provision to know the availability of the nearest toilets in working condition. In addition to the above, the smart toilet could also include the following features: A built-in air freshener: This would help to keep the toilet smelling fresh and clean. A motion sensor: This would automatically flush the toilet and open the lid when someone approaches. A built-in bidet: This would provide a more hygienic way to clean oneself after using the toilet.	3.Good health and well-being	Hardware & Software
11	Health	Sunstroke Protection System: During farming, farmers/Labours will be working in the sunlight due to which they may be affected with sunstroke and heavy sweat. Hence, there is need to develop a system to protect themselves from sun stroke and maintain good health conditions.	3.Good health and well-being	Hardware
12	Waste management	IoT Based Smart Waste Management System for Smart City: In the present day scenario, many times we see that the garbage bins or Dust bins placed at public places in the cities are overflowing due to increase in the waste every day. It creates an unhygienic condition for the people and creates a bad smell around the surroundings that leads to the spread of some deadly diseases & human illness. Design a "IoT Based Waste Management for Smart Cities " which can overcome these problems.	3.Good health and well-being 12.Responsible Consumption and Production	Hardware & Software
13	Waste Management	E-waste Monitoring System: The government and private organizations always require electronic items which may need to be replaced periodically to get benefited by the newly developed electronic gadgets/advanced features. Hence, there is a need to provide a software platform to collect, monitor and recycle E-Waste.	3.Good health and well-being 12.Responsible Consumption and Production	Software

S.No.	Themes	Problem Statement	SDG Goals	Hardware/Software
14	Waste Management	Automatic Garbage Alerting System: Addressing the widespread plastic pollution on the outskirts of cities or villages requires a multi-pronged approach involving community engagement, government policies, education, and sustainable waste management. It is necessary to suggest a tracking system that has an integrated mechanism for sorting plastic trash, since this is a straightforward and cost-effective technique to categorize and monitor plastic garbage. Following the sorting process, the tracking system then tells the server of the total amount of plastic garbage produced by each home. Also homes that give out more plastic should trigger an alarm by sending a text message to nearby mobile devices	3.Good health and well-being 12.Responsible Consumption and Production	Hardware & Software
15	Transprotation & Logistics	Smart TransBot System: There is a packaging box manufacturing company in Hyderabad. From the production unit to the storage area, the workers need to transport them. However, the management is searching for a bot that can pick up and place the 15 cm by 10 cm by 10 cm packing box on the conveyor.	9.Industry innovation and infrastructure	Hardware & Software
16	Transprotation & Logistics	Advanced E-Commerce: The integration of augmented reality technology in shopping malls aims to improve the traditional shopping experience by allowing shoppers to virtually try on clothing and accessories in real-time, offering accurate size and fit simulations, a diverse range of virtual products, and seamless integration with e-commerce platforms.	9-Industry Innovation and infrastructure	Software
17	Transprotation & Logistics	Conveyer Belt Fault Detection: In a industry, the long cable belt conveyor is supported on pulleys. A steel rope runs over these pulleys while the belt sits over them. The conveyor is operated by pulling the steel ropes with a drive motor. The rope gets elongated due to pulling force leading to breakage of its strands. Similarly, the belt also gets worn out causing stoppage of conveyor operation unpredictably. In order to overcome this, we require a solution to predict the condition of belt well in advance.	9.Industry innovation and infrastructure	Hardware & Software
18	Transportation & Logistics	Multi Terrain Bot: The probe which in most cases is referred to as a Bot, which passes through hurdles that mere humans cannot withstand. One can't help but be fascinated by the amount of work that needs to be put in to make Bots that are endurant and versatile to work at different atmospheres. There is a need to build a manually controlled, wireless, Bot that has the capacity to move through a predefined path would consist of varied terrain, having potholes, water and other kinds of terrains. The dimensions of the Bot is restricted to 20cm, 20cm and 20cm.	9.Industry innovation and infrastructure	Hardware & Software
19	Transportation & Logistics	Shortest Path Finding Bot: The probe which in most cases is referred to as a Bot, that follows the shortest path as specified in the arena which consumes less amount of time. There is a need to build a manually controlled, wireless Bot which can accommodate in 20cm, 20cm and 20cm dimensional box meeting the requirements specified.	9.Industry innovation and infrastructure	Hardware & Software

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20	Transportation & Logistics	Smart Railway Wagons : CIL has been supplying coal to its consumers by Rail through Railway Sidings. The railway wagons at such sidings are loaded through contractual means by payloaders. The loading of wagons by contractual arrangement often results in overloading or underloading Railway wagons. The rules of Penal overloading and underloading are notified by Railway. Any penalty for overloading charged by the Railway for any consignment is payable by the purchaser. However, in case of underloading of wagons, credit for idle freight is adjusted in coal bills. Thus any idle freight for under-loading is borne by CIL. During 2021-22, the expense for under-loading was nearly Rs.593 Cr. whereas the contract for wagon loading itself was only Rs.276 Cr. Hence, a digital solution in the form of sensor/ IoT is needed to prevent the under-loading and overloading of Railway wagons.	9.Industry innovation and infrastructure	Hardware & Software
21	Agriculture	Effective Farming System: The future of agriculture holds the opportunities & power to reshape our lives. Mechanized puddling, seeding, transplanting, weeding, harvesting of field and plantation crops. Mechanization of hilly agriculture, horticulture, and protected cultivation. There is a need to provide cost-effective systems for enhancing the efficiency of existing agro-machineries for assessing quality, grading & sorting, processing of agri-produce.	2. Zero Hunger 13.Climate Action	Hardware & Software
22	Agriculture	Crop and soil management System: Farmers face several challenges related to crop selection, soil management, disease identification and other factors, which can impact agricultural productivity and sustainability. To address these challenges, we need an application to help farmers for full fledged farming.	2. Zero Hunger	Software
23	Smart Education	Smart Assesment Board: School teacher is planning to conduct a quiz competition on identifying states and its capitals of our country. Hence, school teacher needs a model through which teacher conducts the competition easily.	4.Quality Education	Hardware & Software
24	Smart Education	Language (Text) Translate System: A large portion of resource materials and other texts are only available in English. Experts at their own level translate it which consumes large amount of time which could have been utilized in developing novel methodologies. The Challenge is to develop a system that can translate text from English to other Indian regional languages with minimum human input for proof reading and with very high accuracy.	4.Quality Education	Software
25	Smart Education	Audio & Video Translate System: A large portion of audio & videos are available in English. It consumes large amount of time by the experts in respective languages to convert them into required languages which could have been utilized in developing novel methodologies. The Challenge is to develop a system that can translate audio/videos from English to other languages effectively without any distortions and time consuming process with minimum human involvement.	4.Quality Education	Software
Teams can select their own problem statemt under Open Innovation Theme				