SNS College of Technology

Coimbatore.

SCRAPS TO INNOVATION

Problem Statements :

1. Smart Automation

- A Chatbot is a computer program that uses Artificial Intelligence (AI) and Natural Language Processing (NLP) to understand customer questions and automate responses to them, imitating human conversation. As of now, various Acts, Rules and Regulations, DGMS Circulars, CoI Proceedings, etc. are applicable to Mining industries. These are some of the Acts and Rules: The Coal Mines Act, 1952 Indian Explosives Act, 1884 Colliery Control Order, 2000 Colliery Control Rules, 2004 The Coal Mines Regulations, 2017 The Payment of Wages (Mines) Rules, 1956 Additionally, land-related laws i.e. CBA, LA, RandR related queries can also be incorporated to develop Robust Management Information System. Hence it is proposed to make a chatbot available 24/7 for stakeholders and customers which can answer all their queries regarding the rules, acts, and circulars.

- Despite prohibition of hazardous cleaning of sewers and septic tanks (manual cleaning of sewers and septic tanks without safety kits, safety devices and without adherence tosafety precautions) it is still being resorted to in many parts of the country. As a result,the reports of death of workers while cleaning sewers and septic tanks are still being highlighted by media. Presence of gases like hydrogen supplied, ammonia, methane, carbon monoxide and Sulphur dioxide in sewers and septic tanks, beyond certain limits, make the atmosphere in the sewers and septic tanks, hazardous, resulting in fatal accidents. Cleaning of sewers and septic tanks can still be risky even with the use of PPE Kit, Safety devices. Solution: At present, there are gas monitors of various kinds, which are available. There is a need of a device which can monitor the availability of these gases while a worker is on the job of cleaning, so that the persons/supervisor available outside the sewer/septic tank can get alarm/notification that the atmosphere in the sewer/septic tank is not suitable for entry/working in a sewer or septic tank. This device can save the lives of many people working in sewers and septic cleaning operations.

- A mobile application that helps you limit your water and electricity usage to a predetermined goal by outlining the behavioural change that would be required to meet those targets. Behavioural nudges ought to be embedded in the user experience based on deep research about the best practices of efficient water and electricity usage from around the world.

2.Smart Education:

- Right to education is key concern for government and at school level; drop out ratio is high due to poverty and social, economic reasons. If government have drop out student analysis on following different categories, it will be very useful in framing different policies. 1. School wise 2. Area wise 3. Gender wise 4. Caste wise 5. Age/standard wise Expected Output: Focused interventions on the high dropout rates.

- Educational Gamification Platform: Develop an educational platform that uses gamification to make learning engaging and effective. Create a prototype of a game-based curriculum for a specific subject or age group.

3.Transportation & Logistics:

- Designing of dashboards for Real-time monitoring of Construction projects using IOT devices and backend Artificial intelligence/ML tools to track Resources in the form of equipment/manpower, monitor their efficiency and safety in all situations.

4.Smart Vehicles:

- In Hydroelectric Projects (HEPs), monitoring and upkeep of HRT (Head Race Tunnels) is a critical task for the proper operation and safety of the plant. For Inspection of the HRTS, the HRT needs to be flushed/ emptied & inspected which is a cumbersome process. In order to avoid interruption during the operation of the plant, services of a Remotely Operated Vehicle (ROV) for inspection of the HRT in submerged condition could be considered for deployment.
- Operating a dragline, a large excavation machine used in mining and construction requires precision, skill, and a deep understanding of the operating environment. However, there is a need for a smart guidance and support system that assists dragline operators by providing real-time information, alerts, and guidance, ultimately enhancing their performance and ensuring safe and accurate operations. The challenge is to develop an in-cab smart guidance and support system that empowers dragline operators with the following capabilities: Real-time Environmental Awareness: Develop a system that utilizes computer vision or sensor-based technologies to provide dragline operators with real-time information about their surroundings. This includes detecting and alerting the operator about potential hazards, obstacles, or unsafe conditions, such as proximity to other equipment, uneven terrain, or approaching vehicles. Operational Guidance and Monitoring: Create an interface that offers intuitive guidance and instructions to the dragline operator based on real-time data analysis. The system should provide visual cues, overlays, or augmented reality displays that assist the operator in achieving precise digging, loading, and dumping operations, optimizing productivity, and minimizing material loss. Performance

Monitoring and Analysis: Implement mechanisms to track and analyze the performance of dragline operators in real time. The system should capture relevant operational data, such as cycle times, digging depth, fuel consumption, and maintenance requirements, to provide feedback and performance metrics that can be used for continuous improvement. Operator Training and Skill Development: Design interactive modules or simulations within the system that facilitate operator training and skill development. The system should provide virtual scenarios, real-time feedback, and performance benchmarks to help operators enhance their skills, decision-making abilities, and overall efficiency. Integration and Scalability: Develop a solution that can seamlessly integrate with existing Dragline systems and infrastructure. The system should be compatible with the dragline's control systems, sensors, and data sources, ensuring reliable data transmission and compatibility across different dragline models or manufacturers. By addressing these aspects, the proposed in-cab smart guidance and support system will enhance the situational awareness, operational efficiency, and safety of dragline operators. It will empower operators to make informed decisions, optimize their operations, and contribute to the overall productivity and success of mining or construction projects.