Hackathon Problem Statements

S.No	Themes	Problem Statement
1	Agriculture	**Effective Farming System:** The future of agriculture holds the opportunities & power to reshape our lives. Mechanized puddling, seeding, transplanting, weeding, and 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, and processing of agri-produce.
2	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.
3.	Agriculture	Developing solutions to analyse and predict climate change and seasonal variations affecting agriculture.
4.	Agriculture	Creating a system for real-time market intelligence and direct market access for farmers.
5.	Smart Education	**Smart Assessment Board:** The school teacher is planning to conduct a quiz competition on identifying states and the capitals of our country. Hence, school teacher needs a model through which teacher can conduct the competition easily
6.	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 a large amount of time that 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.
7.	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
8.	Smart Education	Enhancing the exam re-evaluation system to make it more efficient and transparent.

9.	Healthcare	**Automatic Health Monitoring System:** In present days, the patients belonging to rural and sub-urban communities do not maintain the diagnosis reports for which they frequently go for regular check-ups wasting
		their valuable money. Thus, an automatic report maintain system is to be developed to avoid repetitive diagnosing of the patients.
10	Healthcare	**Suggestive Automated Mental Health Identification System:** Considering the increasing burden of mental disorders, it is important to identify the people at risk of developing mental disorders at an early stage to take the necessary action. A solution is to be proposed to address the mental health issues at the educational institution level in the early stage and suggest the basic treatment required.
11.	Healthcare	An affordable health tracking system should be created to promote regular medical check-ups, especially in rural areas.
12.	Healthcare	Advancing AI and machine learning applications in prosthetics to enhance functionality for individuals with disabilities.
13.	Space Technology	**Development of software application for analysis and processing of dvbs2 receiver output stream i.e., raw BB Frames, GSE and TS in near real time.:** -1. Classification & identification of audio, video, data & protocol such as MPE, ULE, SIP, RTP, FTP, SFTP, HTTP, HTTPS, SNMP, POP, SMTP, SSH etc. 2. Classification Identification of encryption/scrambling if present in stream through headers and SI tables 3. Extraction of VoIP calls, audio and video programs, file, email, web-page etc in separate files. 4. Decoding and playing selected audio/video contents Preferred Language- Python, Lab-view, C/C++, VHDL/Verilog Expected Outcome- Algorithm/Software/GUI Preferred Platform- Windows/Linux
14.	Space Technology	**Domain Name Server (DNS) Filtering Service using Threat Intelligence feeds and AI/ML Techniques:** - DNS Filtering service helps block malicious domains and prevent malware from communicating with Command-and-control servers. It also aids in blocking phishing attacks, playing a crucial role in enhancing security and ensuring appropriate content access. The solution should provide a secure DNS resolver that blocks resolution of malicious domain names. It should be capable of detecting and filtering malicious domains using blacklists, threat intelligence feeds with support for STIX/TAXII protocol, and leveraging AL/ML for identifying malicious domains generated using domain generation algorithms or any other techniques employed by botnets. The solution should also be able to detect attempts at DNS tunnelling employed by malwares. It should allow the resolution of non-malicious domain names while blocking the resolution of malicious domains. Furthermore, the solution should support DNS over UDP, DNS over DTLS and DNS over HTTPS for DNS resolution. It should be scalable to handle a large volume of DNS queries and maintain an average DNS lookup time within 100 milliseconds. Additionally, the solution should support DNS caching for faster resolution. The solution should be capable of conducting both active analysis of DNS queries to filter malicious domains and passive analysis of DNS data provided in PCAP format or Zeek TSV format for the detection of malicious domains. It should also provide a web interface for monitoring statistics on malicious domains identified in DNS queries, as well as source IP addresses that generated those queries.

15.	Space Technology	**Quantum Secure Email Client Application: -** Email communication is a fundamental part of modern business and personal interactions. However, conventional encryption mechanisms are susceptible to various threats, including eavesdropping, man-in-the-middle attacks, and data breaches in the post quantum era. Quantum Key Distribution (QKD) offers an unprecedented
		level of security by distributing secure keys to two users over a quantum channel and these keys
16.	Transport & Logistics	**Frequent dislodgement of belt conveyor along hilly terrain for various reasons :-** The 14.6 km long cable belt conveyor passing over complex hilly terrain suffers belt dislodgements due to various reasons resulting in the sudden loss of production. Solution Desired: Capture reasons for belt dislodgements across its 14.6 KM length from past data and using suitable ML software, prediction of belt dislodgements should be done beforehand to take corrective and preventive actions.
17.	Blockchain & Cyber Security	**Dashboard for real-time monitoring of construction projects :-** 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**.**
18.	Blockchain & Cyber Security	**Data Compression for Backbone Network: -** you can develop a data compression system for a backbone network that efficiently compresses data, reduces network bandwidth requirements, and optimizes network performance while considering the specific requirements and constraints of the network environment.
19.	Blockchain & Cyber Security	**IT System log analyser: -** CRPF units/offices and personnel are deployed in different locations of CRPF. There is no centralized system to analyse the log of the IT system by the experts to assess threats and breaches. Proposed Solution: A centralized system should be developed for analysing the systems deployed at the different locations of the country Expert per problems statement

20.	Disaster Management	**An application under which all rescue agencies are registered and which can display the location of other rescue relief agencies during natural/man-made calamities:-**To build such an application. there is need to create a central database where all rescue agencies can register their information, including their location, contact details, and areas of expertise. This information could be entered manually by agency administrators, or automated using GPS or other location tracking technologies. Once the database is populated, the application would need to be designed to display this information in an easy-to-use interface: It could include a map that shows the locations of all registered rescue agencies, along with filters that allow users to narrow down the results based on specific criteria, such as the type of disaster, the resources available, or the time since the last reported activity. In addition to displaying the locations of rescue agencies, the application could also include features for communication and collaboration. For example, agencies could send alerts or requests for assistance to each other directly through the application, or collaborate on shared resources such as medical equipment or transportation. Security and privacy would be major considerations in building such an application. It would be important to ensure that only authorized users have access to the database, and that sensitive information such as personal contact details is protected. Overall, building an application that allows rescue agencies to coordinate their efforts and provide aid more effectively could be a valuable tool for responding to natural or man-made disasters.
21.	Disaster Management	**Projection of the extent of inundation corresponding to the forecasts of flood levels in a river: -** Many states in India are regularly affected by flooding especially in monsoon season. Central Water Commission (CWC) issues flood warnings in all flood-prone districts based on the regularly measured water gauge level. Flood warnings are issued by CWC to the state administration, whenever the gauge levels cross the danger mark. In all such cases, the severity of the problem is essentially indicated in terms of flood levels. However, the major concern of the state administration is regarding the difficulty faced in assessing the spatial extent of flooding for mapping rescue and relief works. Large volumes of imagery corresponding to varied flood inundations are expected to be available with NRSA and other freely assessable sources. The past imageries corresponding to a specific forecast site can be collected and each imagery be stamped with the observed water level of that particular date and time. An AI-ML-based GIS application can be developed to process the available imageries for projecting new imageries using suitable interpolation/extrapolation of 2D information corresponding to specific flood levels within a given range. The participants of SIH are expected to develop the above-mentioned application using open-source software and demonstrate its utility for any one of the CWC's forecast sites (List will be shared) with readily available imageries. Participants can also seek to add value by incorporating tools for making critical infrastructure, filtering outliers, pointing out accuracy levels of projected inundation, etc.

22	Fitness & Sports	**Self-identifying the mental health status and getting guidance for support: -** Considering the increasing burden of mental disorders (as evidenced in National Mental Health Survey 2016), it is important to identify the people at risk of developing mental disorders at early stage to take the necessary action. Primary Health Care Centre is a gatekeeper of the Indian public health care delivery system and also an opportunity to screen patients for the risk of developing mental disorders. There are some validated tools available for screen of the persons for risk of developing psychiatric disorders, however, ready availability, response from patients, interpretation and quick guide for taking action based on the interpretation of the tool score is still challenges for effective and efficient utilization of the screening tool. Expected Output: Mobile application for screening of mental health. Users: Public as well as Frontline Health workers.
23.	Robotics and Drones	**Al-Based Drone Application**: - Systems for Drone-based assessment of large size Catchment areas of Hydro Power plants and monitoring the progress of the treatment plan.