TPL 3.0

PHASE I - IDEATHON

PROBLEM STATEMENTS

1. Cybersecurity and networking security

1. **CN01 - Detection of Fake Profiles**

   Cybercriminals are creating fake profile and carry out defaming/Political & Religious Propaganda on a large scale against individual or Organizations/Government Bodies and they are creating unrest among the society.

   Desired Solution: The solution will be detected Fake profiles and Similar Fake Profiles across the Social Media and Create Social Media Profiling with detailed metadata of respective user and it shall be capable to assist to trace back anonymous suspects

2. **CN02 - Proxy & VPN Detector**

   Cyber Offenders are masking themselves with Proxy and VPN services.

   Desired Solution: The solution should scan and detect the given IP address (IPv4/IPv6) is Original IP or Proxy/VPN enabled IP address and also the application should fetch the details of Who is Records of respective IP or Website input

3. **CN03 - Detection of Malicious/Rogue/Honey-Trap Chatbot's at Social Media/other Web Platforms**

   Typically, malicious links are used to lure a victim into malicious bots are used by cybercriminals to do their personal motives.

   Desired Solution: The solution will detect malicious SPAM and SPIM bots/Zombie Bots/Malicious File-sharing Bots/Fraud Bots on cyber space and provide advisory scanning or detection solutions to public/LEAs.

4. **CN04 - Detection of Malicious Content/Web Links related to Cyber Frauds**

Typically, malicious links are used to lure a victim into clicking through to a payload that is hosted on third-party sites rather than the malicious content being directly available from the social media platform. One-click exploits such as those used for account takeover could easily be distributed via social media and, when clicked, could exploit the victim in terms of profile takeover or misguiding users for fake advertisements.

Desired Solution: The solution will detect malicious links and its origin signature (first uploaded person-profile URL, name, email, number etc.) on a real time basis and provide advisory report to the public and corresponding agencies about those links source credibility.

5. **CN05 - Tracking & Tracing of Fake News**

Fake news has been a hot topic in the last few years in the form of Troll Farms and these Hoax News attempt to create public unrest like Lynching, Cyber Mobbing, Subvert and influence the public perceptions using social media platforms.

Desired Solution: The solution will detect Fake news like Offensive Text-(Comment, Post, Feeds), Offensive Images(Original or Morphed Pictures) and Offensive Multimedia Videos (Original or Fake Videos) across the Social Media websites using keywords crawling, APIs, Reverse Image and AI/ML/Data Mining techniques and original source of posting and nearer/proximate profiles.

6. **CN06 - Detection of Child Predators/Cyber Harassers on Social Media**

Online predators try to gradually seduce their targets through attention, affection, kindness, and even gifts, and often devote considerable time, money and energy to this effort. They are aware of the latest music and hobbies likely to interest kids. They listen to and sympathize with kids' problems. They also try to ease young people's inhibitions by gradually introducing sexual content into their conversations or by showing them sexually explicit material.

Desired Solution: The solution will detect suspect profiles based on child grooming behavior patterns followers, hate speech provokers, stalking and bullying mentality profiles and explicit content explorers (postings, comments) on social media platforms and other websites.

7. **CN07 - Crime Data Analytics and Geographic Information System (GIS)**

Crime Data Analytics and Geographic Information System (GIS) over the crime and criminal data available in CCTNS for Network Analysis, Hot Spots, Patterns, Visualizations and Trends.

Desired Solution: The solution will represent the criminal data in a map using GIS. The criminal data should be updated regularly so that it replicates the crime map. Here is a website that is useful for better understanding https://spotcrime.com/map

8. **CN08 - Secure File/data transfer between Airgap Network**

An air gap is a security measure implemented for computers, computer systems or networks requiring airtight security without the risk of compromise or disaster. It ensures total isolation of a given system - electromagnetically, electronically, and, most importantly physically - from other networks, especially those that are not secure.

Desired Solution: The solution should allow end-users to smoothly transfer files from one network to another in a safe and controlled manner. It could be a software/hardware solution or combination of both. Pen drive or CD/DVD is not allowed as a part of solution. It should support commonly used file formats. It should ensure the files are malware free and should not compromise the security of target network/machine.

9. **CN09 - Criminal/Suspect Profile Generator using OSINT Techniques**

Cyber Criminals are using internet (Both Surface, Deep and Dark Network) as mean and target for executing their crimes, In this regard Cyber criminals tracing and tracking of their digital footprints are very import to LEAs.

Desired Solution: The solution should focus on tracking, tracing of cyber criminals with their digital foot prints like Name, Email, Phone Number, User IDs etc. And the solution will scan & search other associated data from public available records from internet and create summary report against the target suspect

10. **CN10 - Cyber Crime Prevention**

Cyber bullying involves posting and sharing wrong, private, negative, harmful information about victim. In today's digital world we see many such instances where a particular person is targeted. We are looking for the software solution to curb such bullying/harassment in cyber space. Such solution is expected to (1) work on social media such as twitter, Facebook, etc. and on SMS, etc. (2) should alarm the authorities (3) facility to report such incidents to authority. Additional useful features are welcome.

11. **CN11 – Open problem statement**

2. Renewable resources

1. **RR01 -** Develop a technology to make uncertainty in energy production in renewable energy to make integration simpler.

2. **RR02 -** Develop a technology to overcome the power quality issue in renewable system

3. **RR03 -** How to reduce installation cost of a renewable system

4. **RR04 -** Develop a technology to analyze the live data of renewable energy system for predicting it's performance

5. **RR05 -** Design a turbulent turbine near rivers to empower the production of electricity in rural areas.
6. **RR06 -** Develop a low cost energy storage technique for renewable energy plants.

7. **RR07 -** Design a special type of spinning blades and mechanical parts for producing electricity using tides without causing any damage to aquatic animals.

8. **RR08 -** Design a low cost corrosion resistant mechanical part for production of electricity using tides.

9. **RR09 -** Develop a technology to produce electricity from lighting source

10. **RR10 -** Focus efficient ways to capture the lighting source.

11. **RR11 – Open problem statement**

3. Agriculture & Green World

1. **AG01 -** Creation of Portal for farmer to get cropping knowledge whatever language they need.
2. **AG02 -** Development of kit to detect chemicals used for the preserved of food.
3. **AG03 -** Automatic irrigation system.
4. **AG04 -** Is landfill degraded waste can be used as land manure?
5. **AG05 -** Alternate method of farming that reduces the use of land area.
6. **AG06 -** Formulating of a method to enhance the organic matter content to make land suitable for farming
7. **AG07 -** Standardizing microbiome of soil to have good cultivation and creation of website /app for updating.
8. **AG08 -** Portal for determining good quality crop based on the environment in different location.
9. **AG09 -** Development of kit to test the quality of the soil.
10. **AG10 -** Developing simple and unique technique that increases the plant ratio in environment to increase oxygen content.
11. **AG11** – Open problem statement

4. Healthcare

Problem statement 1: HC01

Improvisation of health checkup centers in rural areas and provision of teleconsultation facilities including storage of patient's data linked with their Aadhar card and can be retrieved during emergency situations after validation using biometrics.

Problem statement 2: HC02

There are good medical facilities in our country with little awareness amongst the population. A software solution needs to be provided that performs all the following functions,

1. Checking availability of nearby medical facilities, based on their search.

2. Eligibility criteria for availing medical government schemes, as applicable.

Problem statement 3: HC03

Design an app to write formatted prescriptions based on dictation from doctor & it should be signed by doctor and also sent via email ID or message to patient directly.

Problem statement 4: HC04

An innovation likely an app that could help people in tracking their health conditions and give a remedy for the disease or infection identified which is based on AI.

Problem statement 5: HC05

Now a days during this pandemic the most common problem is the usage of mask. Many people are just wearing it to their chins and not using it in a correct way. So design a device that tells whether they wore the mask properly or not. Especially this can widely implemented in schools where children don't know the correct procedure of wearing masks.

Problem statement 6: HCO6

Efficient Alternative to an Ambulance

According to a report by the BBC, there were 1, 46,133 deaths in India due to road accidents. Around 30% of these deaths occurred because of a delayed ambulance. That's not all, according to the Government of India's reports; more than 50% of heart attack patients reach the hospital 400 minutes late.

This is a vast problem with ambulances in India. Develop a solution like uber Ola cab services can also be used in case of emergency which is directly linked to hospitals as like zomato, swiggy linked with restaurants. Even we can also prioritize patients accordingly with the issue.

Problem statement 7: HC07

Designing an automated monitoring system that checks the medical products used in a clinic or hospital as it would examine the product. It should also check whether the medicine is expired or not and the medicine is matched with the dose?

IOT has plenty of applications in medical sector and can deal with it.

Problem statement 8: HC08

Design and develop an affordable sensor system which is capable of monitoring multiple health parameters such as BP, Oxygen levels (SpO2), temperature and giving an indication whenever it exceeds or recedes the respective level.

Problem statement 9: HC09

Implementation of a computerized pharmacy Management system with inventory stock alert .The main aim is to improve accuracy & enhance safety & efficiency in the pharmaceutical store**.**

Problem statement 10: HC10

Design a pressure monitoring system for blood pressure patients which would alert the patient and if it blood pressure is high it should direct to the physician based on the history of medication and automatic monitoring of oral medicines.

HC11 – Open problem statement

4. Automation with Artificial Intelligence and Machine Learning

1. Credit card fraud detection: **AM01**

Now a day the usage of credit cards has dramatically increased. As credit card becomes the most popular mode of payment for both online as well as regular purchase, cases of fraud associated with it are also rising. Provide an appropriate solution for this issue using any algorithms.

2. Sentiment Analysis: **AM02**

Sentiments are feelings, opinions, emotions, likes/dislikes, good/bad.
The task is to identify the emotions like positive statements, negative statements and complex statements by the plain text in a conversation/ chat. The text should be irrespective of all languages.

3. Social Distancing System: **AM03**

This is a social distancing system where the camera can identify and test people who are not following social distancing amid COVID. The system can be used for social gatherings done in an indoor setting, where people can check whether social distancing is followed or not. The system leverages a histogram of oriented gradients to detect people and calculate pairwise distances.

4. Speech Understanding: **AM04**

Given an utterance from a user, identify the specific request made by the user. A model of this problem would allow a program to understand and make an attempt to fulfil that request.

5. Touch-less Display Interfaces on Edge: **AM05**

With businesses moving towards kiosks for better service delivery, touchless interaction of the available devices has been critical amid COVID. This gesture and speech navigation is the solution to such challenges. This project will showcase how to create a human-computer interaction module to control edge devices.

6. Smart Attendance System: **AM06**

Smart Attendance System is a model where you have to create your own classroom environment like Zoom App and keep track of the attendance of students real-time. The user makes the work of the teachers easy, where now they just have to take a screenshot, give a date, select an excel file and upload the screenshot. The system will automatically record the data in the respective excel sheet. Such a system can be helpful for the new normal where schools and colleges are running on online classes.

7. Medical Diagnosis: **AM07**

Given the symptoms exhibited in a patient and a database of anonymized patient records, predict whether the patient is likely to have an illness. A model of this decision problem could be used by a program to provide decision support to medical professionals.

8. Customer Segmentation: **AM08**

Given the pattern of behavior by a user during a trail period and the past behaviors of all users, identify those users that will convert to the paid version of the product and those that will not. A model of this decision problem would allow a program to trigger customer interventions to persuade the customer to covert early or better engage in the trail.

9. Sign language detection: **AM09**

Understanding the exact context of symbolic expressions of deaf and dumb people is the challenging job in real life until unless it is properly specified.

10. Reading Text from the Image using tesseract: **AM10**

Pytesseract or Python-tesseract is an Optical Character Recognition (OCR) tool for python. It will read and recognize the text in images, license plates, etc. Here, we will use the tesseract package to read the text from the given image.

11. Open problem statement: **AM11**

6. Waste management

1. **WM01 -** Design a smart e-waste collecting machine so, that components present in e waste can be reused and e-waste are disposed correctly.
2. **WM02 -** Design a container for crops/grains, in which leakage of grains should reduce and it should be easily accessible, low cost, eco-friendly materials. The containershould be water resistible.
3. **WM03 -** Design a device for Road-cleaning purpose [the device should be both manual and automatic].Dust and sand deposited in corner-edge of the barriers and also for and any other waste in roads.
4. **WM04 -** Design a disposal toilet from best out of waste, and it should be H2o resistant and low cost.
5. **WM05 -** In order to save the environment. Design a model in which woods for construction purpose, house modelling are replaced with solid fiber. It should be low cost and long life.
6. **WM06 -** Design a Garbage separating system which identifies bio-degradable and Non-biodegradable.
7. **WM07 -** We all use roads and it have also become basic necessity to lead our day-to-day life it is because of the concreate and tare. It does-not allow water to the ground level it automatic reduces the Ground H2o level and come-up with me an alternative solution for it.
8. **WM08 -** Design a smart waste collection system that allows citizens to segregate the various types of solid waste they want to dispose and the municipal authorities to efficiently collect the same.
9. **WM09 -** Utilization of spent acid generated in manufacturing of cation exchange resin.
10. **WM10 -** Utilization of spent acid generated in manufacturing of ion exchange resin.
11. **WM11 -** Development of business models for collection and utilization of single use plastic and various other industrial wastes.
12. **WM12 – Open problem statement**