Problem Statements

1. **Non availability of low cost software that may keep suppliers, customer and other parties from receipt of the order till supply of finished goods**
   We know that from a journey of raw material to finished goods, it involves many vendors, suppliers and other parties till the ordered good are manufactured and supplied. At present software are available but the cost of the same is very high, so small scale industries cannot afford it. Security of the supply chain has to be taken into consideration.

2. **Certification using Blockchain**
   Reduce the duplicate certificates online using certification using blockchain. The aim is to build a decentralized application using smart contracts and to create a immutable document that can be easily verified for authenticity. The certification solution should enable easy issue of certificates by the authorities and easy and checking for authencity.

3. **Online Toll Payment System**
   Each user should be able to load money on the app or the site for a corresponding car number. The designed app should be able to scan the car's number plate and to authorize the toll payment based on the balance loaded. The app should provide receipt directly to the user. The app should be capable to reduce the manual toll booth load.

4. **AI Based Automation System according to the presence of the user**
   Predicting the environment of the home/office, the system deployed will adjust the environment according to the needs and requirements of the user like turning on the AC/Fans, Heating the geyser in the morning before the user wakes up, etc.

5. **Notification segregator app**
   Today almost everyone uses a smartphone. Current advancement in technologies of hardware and software improved capabilities of smartphones, which resulted in more no. of apps installed. Almost, every installed app provides notifications to us multiple times in a day these results into piled up notifications. It's very hard to find the important notification in that pile. We have an option to turn off these notifications for a particular app using settings provided in OS. But many of us don't want to turn off notification instead we want to prioritize them or group them. As a solution to this problem develop an app which will provide total control over notifications and can automatically segregate and form groups of these notifications such as social networking app, phone calls and messaging apps, news, learning apps, games, etc. Segregation can be done based on the predefined database and this database can be improved continuously by AI or ML based algorithms which will analyze preferences from no. of users. user should be able to alter and form groups, priorities etc. based on

his requirements. Again make a provision in the app such that it will store the history of notification for a particular app. Include more functionality based on your judgment.

6. Auto categorization of similar contextual images [Image Processing]

Create A system for Image Classification, The images will be provided along with the label. For the new image is given, you need to predict the suitable category.

7. Bill Pattern Recognition Using Computer Vision [Computer Vision]

Train a system to recognize multiple patterns of bills (in image formats) and derive the list of items, total, discount, store name, address.

8. Differentiating Two Documents

Given two documents find out how similar they are by finding out cosine distance between them

- Find out 100 non-trivial words in two documents.
- Find out their respective frequencies.
- Build a vector, of size 100, of frequencies of these words for both the documents, say documents A and B.
- Find out the cosine of the angle between them

$$\cos\theta = \frac{\vec{a}\cdot\vec{b}}{\|\vec{a}\|\cdot\|\vec{b}\|}$$

9. Homefood Sharing

There are certain dishes that we particularly like (e.g. homemade Idli Sambar, ladyfinger/bhendi sabji, so on). And chances are, that we could probably taste the sambar/bhendi ki sabji of say, 15-20 people, max, that too only on certain events when everyone in the family or friends meet at home. We are talking about home cooked food here. So if one wants to try Bhendi Ki Sabji made by 100 different hands, 100 different cooking-personalities, there is no way to do that today. These 100 cooking-personalities/housewives/anyone who cooks is anyway going to create a supply when they make food for their own family. Now if that supply could be extended a bit, like say for 2/3/5 people more, then foodies would have an option to go and try food made by different cooking-personalities.

The requirement is to develop an app where housewives/cooks can post the food they are cooking for their family for breakfast/lunch/dinner along with the cost of the dish/food and users can see the menu people have at their homes, the same menu that they are going to have for their breakfast/lunch/dinner and if one likes something, one can book an order with the housewife so she will make an extra plate for you. The transaction completes when you go to the home, have your food, pay by cash/online, and leave with a review!

10. Track stray dogs with GPS tracker

Stray dogs have a lifestyle of their own, they have their distinct personalities. One way to learn the behavior of stray dogs is to have a GPS tracker installed on them and track their movements. Use AI to find patterns.

11. Using BlockChain for Payments

The vast majority of payments that banks handle today are done between human being and machines or human beings and other human beings. In future, however, as more and more devices become smarter, the bulk of the payments are going to be M2M or Machine to Machine. Most of these transactions are going to be very small, so it would not make financial sense to keep using the same outdated techniques to process those payments. This is where Blockchain Technology combined with smart networks comes into effect.

12. Learning to Summarize Radiology Findings

Source: https://nlp.stanford.edu/pubs/zhang2018radsum.pdf

The Impression section of a radiology report summarizes crucial radiology findings in natural language and plays a central role in communicating these findings to physicians. However, the process of generating impressions by summarizing findings is time-consuming for radiologists and prone to errors. We propose to automate the generation of radiology impressions with neural sequence-to-sequence learning.

Data: IU-CHEST: Preprocessed test data from the Indiana University Chest X-ray dataset, originally downloaded from the NLM Open-i website. It contains 2691 unique reports, used as a test dataset in the paper. All included data uses a JSONL format, with each line being a json string with three key-value pairs: background, findings, impression.

13. Identify bias in the model by non-intrusive techniques

Machine learning models are increasingly used to inform high stakes decisions about people. Although machine learning, by its very nature, is always a form of statistical discrimination, the discrimination becomes objectionable when it places certain privileged groups at systematic advantage and certain unprivileged groups at systematic disadvantage. Biases in training data, due to either prejudice in labels or under-/over-sampling, or model training process yields models with unwanted bias. You are required to analyze the provided model of healthcare utilization and associated data to find bias and prejudices in a given model and list these biases. You can create your own set of rules and metrics and will also be provided with certain rule sets that are known.

14. Fall detection of elderly using image analytics

According to the World Health Organization approximately 28-35% of people aged 65 and above fall each year. For those over 70 years of age the percentage of fall is 32%-40%. The frequency of falls increases with age and frailty level. In fact, falls exponentially increase with age-related biological changes, which is leading to a high incidence of falls and fall related injuries in the ageing societies. If preventive measures are not taken in the immediate future, the number of injuries caused by falls is projected to be a 100% higher in 2030. In this context, assistive devices that could help to alleviate this major health problem are a social necessity. Indeed, fall detectors are being actively investigated. As a part of this hackathon we will be designing a fall detection system. The main objective of is to alert when a fall event has occurred.

15. "Surya-Namaskara Yoga Pose Detection"

Team is required to classify and identify **Surya Namaskara Yoga** poses. A video is given as input to the model which will then require to classify all the 12 poses of Suryanamaskar. Team is required to formulate strategy to identify key frames, image/video preprocessing and training the model. Result should be video summarization of all poses with labels. Please make certain assumptions about camera angle , possible sides (e.g. front side) of person performing the yoga, single/multiple people performing yoga (problem is to consider only one person) , and only one iteration of entire yoga.

Data: Video/data can be scrapped from several websites like YouTube, Pinterest, Facebook, Instagram, Google etc. Team may try to setup project over google colab to perform the training since training may need good number of GPUs. Suggestion is to consider shorter videos less than 2-3 minutes.

Validation: Validation will be performed using key frames identification, number of video used for training, image/video processing, possible models used for training, training/validation loss/accuracy graph.

Sample Surya Namaskara Poses stated as follows: