THE TECHNOCRACY
STUDENTS' TECHNICAL COMMITTEE, NIT RAIPUR

AAVARTAN'22-23

VIGYAAN
DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

PROBLEM STATEMENTS

CSE01. Automated character movement sprite generation using computer vision for video games

Generation of video game assets is a complex and time consuming process. A lot of time is taken for generation of human-like character movement sprites and assets. This process can be automated using some computer vision based technologies, wherein we can generate sprites for character movements by asking a stunt person to perform actions while recording their body structure using a camera and using this data for asset generation.
Note : The mediapipe framework might provide good help in this problem.

CSE02. P2P secure wireless offline file transferring application

Sharing files on mobile devices often becomes a very complicated process for regular non-tech savvy people. The majority of the available solutions are either mobile brand specific or not too serious about the privacy of the users and perform vast amounts of data collection. The goal of this project would be to create a file sharing application which should be P2P, i.e. there is no central server in the middle and should be secure while fully capable of working offline.

CSE03. Masked face recognition application

During the Covid-19 pandemic, almost everyone wore face masks to prevent the spread of the disease. However, this led to issues in many currently existing facial recognition applications which had been trained to directly detect and recognize unmasked human faces. So design an application which is capable of detecting and recognizing masked human faces.
For this purpose, participants can refer to the following dataset
:https://github.com/X-zhangyang/Real-World-Masked-Face-Dataset

However, if one requires they can also use a dataset procured by their own means, provided they link the resources in the presentations.

CSE04. Iot + ML based - Draught information management system

Droughts are an environmental disaster shaking the lives of millions of people in the affecting area and surrounding places. Early drought prediction can help significantly reduce the harmful effects that droughts bring upon us. IoT systems can be used for collection of weather and soil data. Drought prediction can be done with the help of ML models using this collected data. Since there are already similar open models existing, bonus points shall be granted for further improvement on them.
Sample dataset : https://www.kaggle.com/datasets/cdminix/us-drought-meteorological-data

CSE05. Design improved algorithms for running diagnostics on memory and for checking for memory failures.

There are several memory diagnostic software tools which are capable of running diagnostic tests on memory in order to check for any memory errors such as Memtest86. They are usually in the form of bootable software distribution on CD-Rom or USB. Design a simple similar software for checking for any errors and improve upon the already existing software.

CSE06. A land survey robot for land area and quality estimation for construction purposes.

For construction purposes, it is often essential to perform a survey of a plot, get an estimation of its quality and area and divide it into subplots. This task which is commonly done with the help of workers, can be automated and made efficient by using a survey robot. Along with a microcontroller, the robot can be equipped with a Zigbee module to aid communication.

CSE07. Misinformation detection surrounding the scenario of COVID-19 on Twitter

Twitter, while being a great source for sharing information and making voices heard, has also become a breeding spot for misinformation, and the topic of COVID-19 pandemic has been no exception. There have been a lot of debates surrounding the effectiveness of various medicines and claims regarding the number of actual patients. Now that 3 years have passed since COVID virus was first found, we can perform better analysis regarding the authenticity of various tweets. So, perform analysis on various tweets from the last 3 years, by scraping the data from twitter and classifying the information.

CSE08. Search and rescue operation bot using reinforcement learning

Oftentimes in cases of calamities, human rescuers rescue people by putting their lives on the line. Instead we could employ self operational robots that would help in these operations. The challenging task here, often is navigating through the rubble that has been generated due to the catastrophe. This is where the advantage of reinforcement learning can be taken as based on the certain policies, the agent is capable of navigating through the environment and generating the

safest path for victims to navigate through. For the purposes of this project, a simulation would also be sufficient for demonstration purposes.