KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY
Deemed to be University U/S 3 of the UGC Act, 1956
Established : 1997 SCHOOL OF COMPUTER ENGINEERING

SUMMER INTERNSHIP CONTRIBUTION REPORT

ON THE TOPIC

VEHICLE MOVEMENT ANALYSIS AND INSIGHT GENERATION IN A COLLEGE CAMPUS USING EDGE AI

NAME OF THE TEAM: Tech Turtles

Under the guidance of

University Mentor

Prof. Ipsita Paul

KiiT School of Computer Engineering

Intel Mentor

Archana Vaidheeswaran

Intel Unnati training

SPECIFIC TASKS AND RESPONSIBILITIES

TEAM MEMBER NAME: VAIBHAV KUMAR BHARDWAJ

RESPONSIBILTY:- TEAM LEADER

Vaibhav Kumar Bhardwaj played a pivotal role in developing a robust Optical Character Recognition (OCR) model for vehicle movement analysis and insight generation in a college campus using edge AI. Leveraging the power of Tesseract and TensorFlow Lite, they successfully created a model capable of accurately extracting text from images scanned from webcam or CCTV cameras.

Being a **responsible leader** of this team I also played a vital role in providing the **ideation** for the project.

MAJOR CONTRIBUTION

Comprehensive Architecture Design: I meticulously crafted the OCR model architecture, incorporating a hybrid approach that leveraged the strengths of both Tesseract and TensorFlow Lite.

Extraction of data into CSV file: I played a significant role in detecting the images and extracting the data into the CSV file and also making sure that no redundant data should be present inside the file.

CODE SECTION CONTRIBUTION: The code section that is handled by me was object recognition model and as well as extracting the license plate numbers into the CSV file.

CHALLENGES FACED

According to me while handling the model in easyOCR the I was facing some error so I shifted to tesseract , thus making its confidence level to 99%. On the decrement of object detection area the error made by easyOCR was overcame.

COLLABORATION WITH TEAM MEMBERS

1. One of my team member named Shouvik collaborated with me on the hybrid approach of using TensorFlow lite and tesseract in which we made the model and ensured its rigorous training.
2. I also collaborated with my another team member named Priyanshi regarding the matplotlib and visual interpretations of various graphs that we found as an outcome.

SPECIFIC TASKS AND RESPONSIBILITIES

TEAM MEMBER NAME: SHOUVIK GHOSH

RESPONSIBILTY:- Developed the EDGE AI model

Shouvik Ghosh played a vital role in the development of a high-precision, real-time car number plate detection system. My expertise in computer vision, machine learning, and TensorFlow enabled me to create a robust model capable of accurately identifying and localizing car number plates in diverse image and video conditions.

MAJOR CONTRIBUTION

Object detection model: My major contribution lies over this section in which I aligned my passion of training the model with the project idea. I started with detection model with the help of TensorFlow and then shifted to TensorFlow Lite through the converter so that the model can run efficiently in the edge devices.

Extraction of dummy dataset from Gemini: I used Gemini for extracting the dummy campus authorized vehicle dataset. I also used Gemini to extract the timestamp for the number plates that were detected and recognised by the model.

CODE SECTION CONTRIBUTION: The code section that is handled by me was object detection model and as well as matching the authorized database with the number plate data that was being detected by the model.

CHALLENGES FACED

The major challenge that I faced while executing this task was integrating the timestamps to the number plate that were detected and recognised by the model. To overcome this problem I used Gemini for integrating the timestamps and generating the dummy datasets.

COLLABORATION WITH TEAM MEMBERS

1. I collaborated with Vaibhav who used tesseract for the object recognition using the object detection model that was developed by me.
2. The dummy datasets that I had generated were used by Priyanshi to develop the vehicle movement analysis and the park lot allotment analysis.

SPECIFIC TASKS AND RESPONSIBILITIES

TEAM MEMBER NAME: PRIYANSHI TIWARI

RESPONSIBILTY:- Handled the analytics section

Priyanshi Tiwari played a role in the data analysis and visualization component of the project. My proficiency in data manipulation using Python libraries such as Matplotlib and Seaborn was instrumental in deriving actionable insights from the project data.

MAJOR CONTRIBUTION

Data visualization: I helped to gain the data insights from the available data sets. I used matplotlib and Seaborn libraries of python to extract the vehicle movement pattern and how the parking lots were allotted during that period of time.

PPT and Report: I combined all the data from my team members and presented in a form which can be easily understood and evaluated.

CODE SECTION CONTRIBUTION: The code section that is handled by me was visualization of data using matplotlib and Seaborn.

CHALLENGES FACED

One of the challenges that I faced was utilising the in and out timestamps of the vehicles efficiently in order to synchronise the entire system accurately. I overcame this by modifying my code to accurately analyse the time stamp format of the vehicle.

COLLABORATION WITH TEAM MEMBERS

3. I collaborated with Vaibhav while preparing the report.
4. I used analysis based on the datasets that were generated by Shouvik.