Team Contribution Report

Title: <u>Vehicle Movement Analysis and Insight Generation in a College Campus using Edge AI</u>

Team Member: Deepika M

<u>Contribution Summary</u>:

1. *Data Preprocessing*:
   - Developed and implemented preprocessing techniques for both image and CSV data.
   - Techniques included image resizing, normalization, and handling missing values in CSV data.
   - Explored data visualization methods to understand trends in vehicle entry/exit times and parking occupancy.
   - Created visualizations to identify areas requiring further analysis or model optimization, contributing to effective data-driven decision-making.

2. *License Plate Recognition (LPR)*:
   - Integrated Tesseract OCR engine to extract text from preprocessed license plate images.
   - Developed code to compare extracted license plate numbers against the approved vehicles database.
   - Ensured accurate identification of authorized vehicles and implemented restricted area access control.
   - Enhanced campus security by automating the identification process of unauthorized vehicles.
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3. *Movement Pattern Analysis*:
   - Analyzed timestamps within the CSV data to identify movement patterns for each vehicle.
   - Grouped entries based on vehicle ID and calculated entry/exit times.

- o Developed algorithms to calculate parking duration, providing insights into vehicle stay durations on campus.
- o Identified areas with high parking turnover, aiding in optimizing parking management strategies.

4. *Parking Occupancy Insights***:**
- o Calculated average parking occupancy per vehicle based on timestamps within the CSV data.
- o Visualized occupancy rates to identify parking lots with high or low utilization.
- o Provided valuable insights for optimizing parking allocation strategies.
- o Suggested the potential implementation of dynamic pricing models based on parking occupancy data.

*Summary***:**

In this project, I have significantly contributed to the development of an Edge AI-based solution by focusing on data preprocessing, license plate recognition, movement pattern analysis, and parking occupancy insights. My work has provided valuable insights into vehicle movement patterns, enhanced campus security, and improved parking management strategies. The successful implementation of these steps has laid a solid foundation for future refinements and integrations aimed at further optimizing campus security and management. I have also generated a powerful presentation of the overall content in order to present the process in an effective way to the audience.

ACKNOWLEDGEMENT

I would like to acknowledge the support and collaboration of my team member and supervisors who provided guidance and resources throughout the project. Their contributions were invaluable to the successful completion of this project.

DEEPIKA M