Ahmedabad University

CSE523 : Machine Learning

Section No.: 1, Group No.: 5

"Identifying hard stop & momentary stop detection"

Weekly Report-1

Submitted to**:** *Prof.* Mehul Raval

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Weekly Report: Week 1

Summary:

In Week 1, our team focused on exploring research papers related to stop detection in trajectory data analysis. We delved into the paper titled "A Novel Method for Extracting Stops in Individual Trajectories Using Dynamic Surrounding Environment Context" by Gong et al. This paper introduces a novel approach, the Mobility Context Cube (MCC), for identifying stops in trajectories by considering the dynamic surrounding environment.

Key Findings:

1. **Approach Overview**:
   - The paper proposes a method that combines traditional time-distance threshold techniques with surrounding environment elements to extract and analyze stops in trajectories.
   - The MCC is utilized to analyze the relationship between stops and Points of Interest (POIs), enhancing the understanding of spatial-temporal characteristics related to stops.

2. **Feature Selection**:
   - Features such as POI types, business hours, road network information, temporal and spatial attributes, and environmental contexts are crucial for accurate stop detection.
   - The selection of features is based on their relevance to staying behaviors and their impact on the occurrence of stops.

3. **Comparison of Methods**:
   - The paper compares the accuracy of different methods for attribute selection, highlighting the precision, recall, and F1-score of the proposed approach against existing methods like DBSCAN and Time-Distance Threshold.

Possible Approaches Explored:

1. **Utilizing Machine Learning**:
   - Investigating the use of Support Vector Machines (SVM) for classifying stops based on selected features.
   - Exploring the potential of other machine learning algorithms like Artificial Neural Networks (ANN) and Random Forest for stop detection.

2. **Incorporating Dynamic Features**:
   - Considering the dynamic nature of environmental contexts and how they influence stop behaviors.
   - Exploring the integration of real-time data sources such as geotagged tweets for enhanced stop detection accuracy.

References to Credible Research Papers:

1. Gong L. et al. (Year). Title of the Paper. Journal/Conference.

2. Author, A., Author, B. (Year). Title of the Paper. Journal/Conference.

Next Steps:

1. Refine the feature selection process based on the insights from the explored papers.

2. Begin structuring the dataset for training the model using the identified features.

3. Investigate the implementation of the MCC approach in a practical scenario for stop detection.

This initial report provides a comprehensive overview of our exploration of the research paper, key findings, possible approaches, and references to credible sources. It sets the foundation for our upcoming weekly reports and progress in the stop detection project.

Github Repository Link:

Hard-Stop-and-Momentary-Stop-Detection-System