研究企画発表実施報告書

Report of Master's Thesis Research Plan Presentation

Student ID No.	m5282019	提出日 Submitted Date	2024 / 12 / 06
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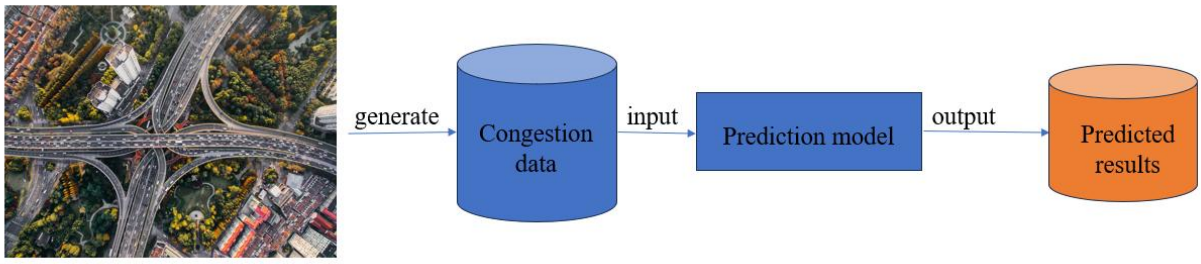
研究名 Research Title	Building Energy Efficient Traffic Congestion Prediction System		

実施報告概要　Summary of the presentation

The presentation titled **Building Energy-Efficient Traffic Congestion Prediction System** explores a novel approach to predicting traffic congestion using a Multi-Task Learning (MTL) model aimed at enhancing scalability and reducing computational costs in large-scale transportation networks. Our motivation is Urban traffic congestion affects mobility, energy efficiency, and environmental sustainability. Existing systems focus on speed but neglect real-time congestion, weather, and energy considerations. This research addresses these gaps by integrating traffic and weather data with energy-efficient modeling. By doing so, the system seeks to provide actionable insights for improving urban transportation infrastructure.

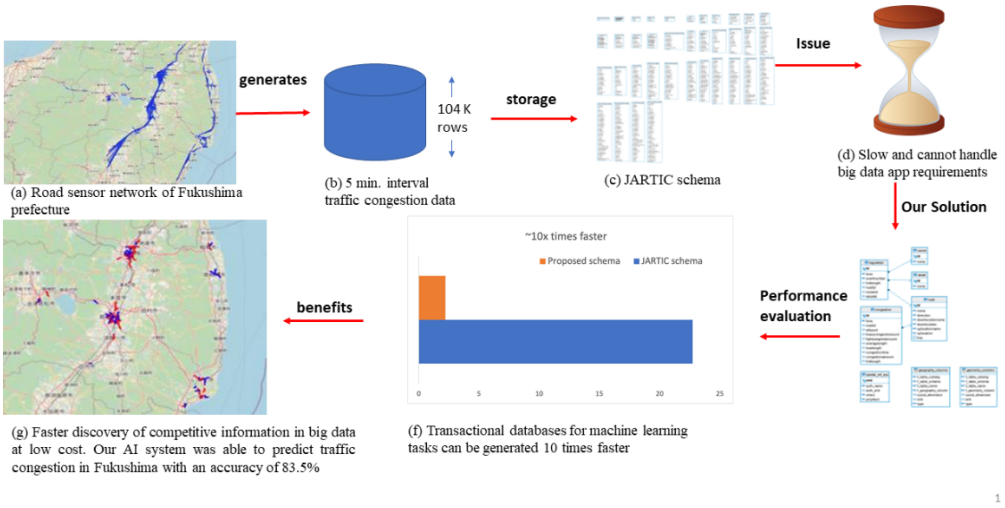
So, our main goal is to develop a traffic forecasting system using MTL-NN, optimized for power and memory consumption, and integrate rainfall data to recommend safer, congestion-free routes. The system will balance efficiency and usability to address both environmental and user-centric needs.

The study involves developing an MTL-NN model for traffic prediction, evaluating power and memory efficiency, integrating traffic and rainfall data, and implementing a route recommendation system prioritizing minimal congestion and rainfall. Additionally, the system will leverage advanced optimization techniques to ensure real-time usability and scalability.



Large scale transportation network

Future work involves integrating traffic data with rainfall data to develop a system that recommends optimized routes and compares them with Google's suggested routes for enhanced decision-making.



Q/A Contents:

Questions asked by Prof. DEMURA Hirohide:

Q. What is novelty in your work?

A. Multitask learning for shared ad task-specific layers for different road segments.

Q. How will you combine the traffic data with rainfall data to compare with Google's recommended route? What is the formula?

A. This formula is confidential and cannot be shared. Work is currently underway in Aizu Cluster B—iTransportation Lab.

Questions asked by Prof. PEI Yan:

Q. Can you define the problem statement clearly?

A. The problem lies in the inefficiency of traditional models that predict traffic congestion independently for each road segment, leading to overfitting, scalability issues, and high computational costs. There is a need for a scalable, energy-efficient system capable of accurately forecasting traffic across large-scale networks.

実施後の計画変更点・考慮点・コメント Revised and/or concerning points after the presentation

I thought I had explained the terminology, but it was pointed out during the presentation, so I need to explain it more clearly.

I should explain my points more clearly and slowly to ensure better understanding.

Please erase italic writing when you prepare the form. Front side

他の学生の発表への感想・コメント等 Impressions and comments on presentations by other students
I attended the presentations by NAKAMURA Zen, LIN Tsang-Yu, and CHENG Yu-Cheng, and found their topics very interesting. **NAKAMURA Zen:** The overall presentation was good. However, he needs to speak more loudly to ensure clarity for the audience. This can be improved with additional practice and preparation. **LIN Tsang-Yu:** He needs to better manage his time and focus on bringing essential content relevant to the research seminar. Apart from this, his presentation was well-delivered. **CHENG Yu-Cheng**: The presentation was detailed, and the explanation was excellent. Everything about it was perfect. From Yu-Cheng's presentation, I realized the importance of improving my presentation skills by emphasizing key topics and words, which are crucial for effective communication. Additionally, I need to include details about my conference and research paper in my presentations.

研究指導教員記入欄 Following columns must be fill out by research advisor			
研究企画発表での各審査委員の評点 Score of Research Plan Presentation	審査員1 Referee 1 (　　/80)	審査員2 Referee 2 (　　/80)	審査員3（研究指導教員） Referee 3 (Research Advisor) (　　/80)
	審査員3名の評点の平均点 Average of scores given by 3 referees　(　　/80)【A】 *小数点以下切り捨て Round down (truncate) to the nearest integer		
報告書の評点 Score of Report	1. 発表時の内容がよくまとめられているか Good summarization of the presentation 2. 発表時の指摘された事項へのコメントが記載されているか Description of comments on the items pointed out by referees at the presentation		報告書の評点 Score of Report (　　/20)【B】
総合評点 Total Score	【A】＋【B】(　　/100)		
研究指導教員 コメント Research Advisor's Comments			

研究指導教員 Research Advisor _____ 印 Seal

Reverse side