REASEARCH MEETING AT NIHON UNIVERSITY (APRIL 2019)

M2Smart
NewsLetter

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JCC IN TOKYO

3rd Joint Coordination Committee (JCC)
by Haruka Katarao, M2Smart Resident Coordinator

Fruitful discussion in the fully bloomed cherry blossoms in Tokyo!

The 3rd Joint Coordination Committee (JCC) was conducted at Nihon University on 5 April 2019. Led by Prof. U.B. Desai, Director of Indian Institute of Technology Hyderabad (IITH), 5 IITH researchers visited Tokyo and exchanged opinions with the researchers from Nihon University, Tokyo Institute of Technology and Nagoya Electric Works. We also had a participation from Japan Science and Technology Agency (JST).

Prior to the JCC meeting, the researchers gathered at Nihon University Funabashi Campus for group meetings.

Welcomed by the fully bloomed cherry blossoms in the campus, it was a good opportunity for each group's researchers to discuss directly their research progress.

JCC meeting in Nihon University

On Estimation and Reduction of CO2 Emissions from Vehicles

By Bheemarjuna Reddy Tamma, M2Smart Co-Project Manager

The 3rd Joint Coordination Committee (JCC) meeting took place at Nihon University campus on 5th April 2019. Researchers from IIT Hyderabad, Nihon University, Tokyo Institute of Technology, and Nagoya Electric Works had presented progress made since the last JCC meeting in terms of testbed setups at IITH campus and Ahmedabad city, joint research works carried out, and dissemination of the results as conference/workshop articles and demos. For efficient detection/classification/tracking of heterogeneous vehicles present on Indian roads using CCTV videos, JCC recommended Group-1 to develop an open dataset for vehicles plying on Indian roads. Since CO2 emission reduction is the primary goal of the project, JCC brainstormed on various methodologies to be adopted for CO2 emission estimation on Indian roads. Subsequently, the researchers would employ the developed methodologies for estimation of energy and CO2 emission reduction by route choice and mode choice provided using IoT based traffic management system i.e., VMS displays and Multimodal App (MMA) for Smartphones. Since testbeds are ready, the focus now is on carrying out R&D activities in order to meet the project goals.

Group meeting at Nihon University

by Satoshi Takahashi, Group 1 Co-Leader

On April 4, the day before the JCC meeting, research members from Japan and India had a meeting at the Nihon University Funabashi Campus. At first, Dr. Tsuboi, the project leader, confirmed the research theme, research plan, and the future schedule. Then, the leaders of each research group introduced about the progress of research and exchanged opinions among all members.

•Group 1 [Sensing]: Vehicle recognition by AI image processing, motorcycle recognition by 3D sensor and LIDAR.

•Group 2 [Big Data Analysis]: Examination of PM2.5 generation measurement method, analysis of the operating trajectory data of BRT in Ahmedabad City, and collecting traffic information from news and social media.

•Group 3 [Multimodal Application]: Construction of traffic micro simulator, analysis of questionnaire results on public transportation usage in Ahmedabad.

Meeting in Nihon University

•Group 4 [CO_2 Reduction]: Research on approach of CO_2 reduction evaluation by modal shift.

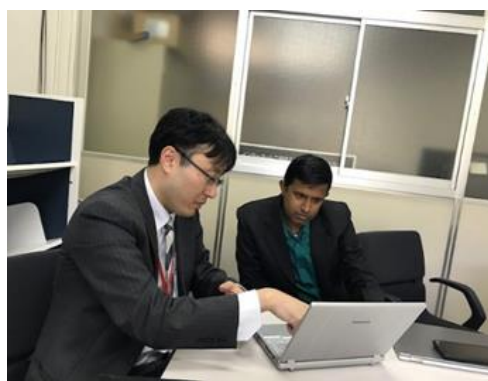Furthermore, Dr. Digvijay Pawar reported the status of upcoming IITH testbed.

Lastly, the researchers were divided into the 4 groups to have focused discussions and chalk out next steps. Through the face to face discussions, the relationship of trust between researchers became strong, and it became a very meaningful meeting.

Group 1

Group 2

Group 3

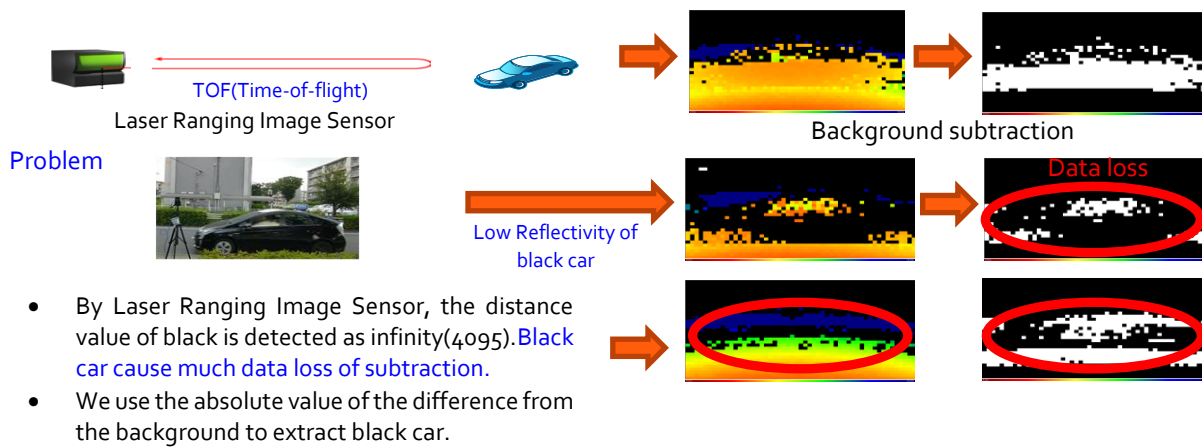*Group 4*

Vehicle Detector using Laser Ranging Image Sensor

by Lin Teng, Group 1

TOF(Time-of-flight)
Laser Ranging Image Sensor

Background subtraction

Problem

Low Reflectivity of black car

Data loss

- By Laser Ranging Image Sensor, the distance value of black is detected as infinity(4095). Black car cause much data loss of subtraction.
- We use the absolute value of the difference from the background to extract black car.

Vehicle Detection and Tracking using Deep Learning

by Debaditya Roy, Group 2

JCC Meeting

Intersections are a common source of idling vehicles that produce greenhouse gases. Hence, estimating the density of traffic at intersections in crucial in understanding which intersections contribute most in terms of pollution. Further, by analyzing the capacity of traffic at intersections we can determine the composition of traffic (number and type of different vehicles) and the average waiting time at an intersection. Our preliminary analysis is based on the detection of the various vehicle types at five intersections at Ahmedabad, namely, Paldi, Shivranjini, Nehru Flyover, Swami Vivekananda Bridge, and APMC market. We employed a convolutional neural network known as Single-Shot Detector (SSD) to achieve 75% accuracy in detection of motorbikes, autorickshaws, cars, buses, and trucks from aerial videos of the intersections. Then a Markov Decision Process (MDP) based tracking system was utilized to track the various detected vehicles across the intersection. Our method can accurately track and count the vehicles at all these intersections that can be utilized for capacity analysis and greenhouse emission studies.

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