**Introduction**

It is difficult to get travel information in mixed traffic by typical methods such as traffic detectors, GPS, or probe cars due to the high number of vehicle and chaotic order of them in the road, especially in peak hours. Lack of information makes operators difficult in control traffic in big cities. Passive data collection could be a great solution since this method could provide a huge amount of traffic data automatically with relatively low required budget, which is good for developing countries where mixed traffic normally takes place. By using Wi-Fi scanner, the signal from smart devices, like smartphone, tablet, or laptop, will be tracked, and travel time of vehicles in mixed traffic could be estimated.

**Overview of experiment**

To verify the usage of Wi-Fi scanner, experiments were conducted in Hanoi (Vietnam), a typical example of mixed traffic with the dominant rate of motorbike. Two-days trial in Aug 2016 and three-days experiment in Apr 2017 were conducted in the arterial road connect the city center and suburban area. Wi-Fi scanners were set up along this road during morning peak until evening peak to get the traffic information. Probe vehicle also be used to verify the actual travel time in this segment.

**How Wi-Fi scanner works**

Each smart device has its own unique media access control (MAC) address. Wi-Fi scanner could track this MAC address, and by the matching process among MAC address, Wi-Fi scanner location and recorded time, travel time of smart device carrier, which could be known as driver, will be defined.

**Results and future works**

Wi-Fi scanner could provide big data for traffic analysis: In 12-hours experiments in Apr 2017, nearly 1,000,000 MAC address signal were recorded. The distribution of captured information proportion with the real traffic volume imply that based on recorded data, traffic volume could be draftedly estimated.

Noise data of Wi-Fi scanner data based is a large value: Due to the sensibility of smart devices as well as the Wi-Fi scanner itself, and some situations, such as drivers stop for working or shopping, the raw data contains noise that do not have transportation meaning. In general, after cleaning process, about 10% of raw data could be used for travel time estimation purpose.

Travel time of traffic flow could be defined: after data processing and compare with traffic volume from video camera, Wi-Fi scanner can detect around 3% of all trips in this route. Based on the travel time information of each MAC address, travel time graph of traffic flow could be demonstrated like the figures below.

Challenges and future works: Since information about exact location of MAC address is unknown, the way to use time value effectively and precisely need to be improve. In the future, validation data from probe vehicle will be use more to fortify the travel time estimation method.