**Efficacy of Bluetooth-Based Data Collection for Road Traffic Analysis and Visualization using Big Data Analytics**

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**Introduction:**

In this paper the authors were mainly focusing on the traffic data analysis in real time. There is the utmost need for improving these methodologies as day by day there is a huge impact of an increase in the population.

According to the authors, the present traffic analysis system is based on Fixed timing system in more than 90% of the places. This cannot be an efficient way of dealing with the traffic as a lot of time is being consumed before getting to work.

Despite this fixed timing system, there was a project developed under Los Angeles Automated Traffic Surveillance Control (ATSC) in 1984 where they placed magnetic sensors, speed-capturing sensors to observe the behavior of traffic. With the help of this project there was a 16% increase in speed of vehicles and 12% decrease in time delay.

In this paper, Authors are trying to develop a new way of collecting this data which is generating continuously. They are trying to replace the present style which uses the above-mentioned sensors with Bluetooth sensors. Also, the usage of WIFI, GSM based sensors was also going on in research. The authors are trying to conduct an experimentation of gathering the on-going traffic from the occurrence of the streaming data.

This data obtained can be useful for performing data cleaning, transformation, analysis and visualization using certain data science environments and tools.

**Technical Contributions:**

So according to the experimentation conducted by the authors, The whole scenario was developed in an area of the city Delhi in India. They placed two Bluetooth scanners 500 meters apart on the side of the road and the Bluetooth signal receiving sensors are placed near to the scanners in a building where all the necessary equipment is kept.

They tried to gather the data for a month period to be precise and they would collect daily in the morning and also in the evening maintaining a cycle of 15mins.

The scanners would capture the Media Access Control (MAC) IDs from the nearby devices and send the signal output to the receiving sensors from time to time. From this obtained data they can determine the speed of the device, which is moving, the time it was captured and also the direction.

These devices are identified based on their MAC IDs and also the scanners and the sensors need to be monitored daily by the people. From the observation of the scanners, 60% – 65% of the detected devices were smartphones to our surprise and rest of them were Bluetooth enabled audio, video devices speakers etc.,

The Data obtained in the sensor internal memory can be collected using appropriate Bluetooth softwares and proper analysis can be done using SQL, R etc., as the obtained data would be in CSV format. The Penetration rate of those Bluetooth devices can be calculated using Videography techniques.

Based on this experimentation, they found that in both of the ways of traffic, one way was observed to be more time taking than the other due to a greater number of vehicles on that side. Also, the volume of the devices decreased from morning to evening. This type of data collection can be very good for getting better analysis of traffic data as the data is continuous and accurate.

**Improvisations:**

Before discussing improvisations, I would like to express some of the disadvantages of this methodology.

The main drawback of using this methodology is that it is very costly as mentioned by the author itself. But it is not only costly based on the value of the equipment which is being used but also according to the infrastructure for setting up the recording scenario in real time because, the receiving sensors must be closer to capture the data sent by the Bluetooth scanners.

Now there should also be a greater number of devices if we can consider building the system on a bigger environment like highways, roads in bigger cities etc., and also getting proper environment for the receiver sensors and human power to maintain this approach.

Coming to the improvisation part, Bluetooth signals have very less signal strength compared to the WIFI signals for that reason they cannot transfer their signals for longer distances with good efficiency. Bluetooth signals are very weak signals when having an interaction with physical objects during data transmission. They also use very high power for transmitting data over longer distances.

If I had a chance to meet the authors, I would try to know what are the future advancements in this project and I would definitely try to work with them for an infrastructure which would be very helpful and able to give a maximum efficiency for the data transmission in lower costs and I would try to implement the experimentation using the Mobile network like 4G,5G services along with WIFI services to compare all the results and also I would try to repeat this experimentation in different kinds of traffic scenarios.