

CHAPTER 8

CONCLUSION AND FUTURE SCOPE

Considering the undeniable fact the couple of hours are wasted every year for a human being on the road. Various causes that lead to this situation include road accidents, traffic jam due to rush hours or traffic lights. These events may be avoided by identifying an alternate path at that moment. Therefore, path maps need to be generated from source to destination under different situations on the road. User can pick the best path depending upon the accident, rush hours or during any other unusual event.

This research work aims at generating the efficient path maps on distributed RSUs using data mining approach. To achieve this, this research is divided into three objectives. First objective is, to propose a DCS that tends to improve the throughput, effective packet delivery ratio, and work on minimizing latency. Second objective is, to extract the possible paths from the data collected using association rule base mining on distributed RSUs. Third objective is, to predict the common and most frequent paths on the basis of position, direction, time of day, and during any accident or jam.

8.1 Contributions

In the verge of achieving first objective, that is to propose an efficient DCS from the vehicles, a detailed survey is conducted on existing DCSs. The existing DCSs do not assure security in terms of authenticity and are vulnerable to number of attacks like DoS. Therefore, a reliable and secure authentication process is required that must be incorporated before collecting data from the vehicles on the road. Several authentication process exist in literature, for example, digital signature, pairing, IRE, and many more. But, these are still vulnerable to attacks like DoS, masquerading, eavesdropping. Moreover, they do not provide V2I and inter RSU authentication separately. Therefore, discrete event based threat driven authentication approach has been proposed. This authentication approach utilizes asymmetric cryptography, re-encrypt key and time based arbitrary numbers to offer authentication among the

vehicles on road and between RSUs and vehicles. The proposed authentication approach is analyzed by using Petri Nets and Veins framework. With the help of Petri nets model and its reachability graph, it has been observed that the proposed authentication approach acquires the reachability and liveness property. By working on Veins framework, observation was made on proposed authentication approach working better as compared to existing authentication approaches.

Once complete authentication process is over and trust is established among the vehicles and the RSUs, the next step is to initiate the data collection process from the vehicles on the road and maintain the data on RSUs. To figure out the data collection mechanism, the existing DCSs are evaluated based on their communication overhead, packet delivery ratio, and latency. Later, PI is evaluated for each DCS and based on the result it can be deduced that among all existing DCS, PI of VIB-CP is the highest as it has less communication overhead, high packet delivery ratio, and low latency. But VIB-CP do not provide authentication support, therefore, IAVIB-DP is proposed to offer authentication between RSU and vehicle before startup. According to this scheme, vehicle after a fixed threshold say Th_{So} broadcasts its AP_t list to every adjacent RSUs and then reset the AP_t list to NULL. VIB-CP and IAVIB-DP are evaluated and compared on basis of packet delivery ratio, communication overhead, and latency. Results of comparison reflect that IAVIB-DP is better in comparison to VIB-CP as it has low latency, high packet delivery ratio, and less communication overhead.

After the data is collected from different moving vehicles using secure DCS, a database is maintained for different possible paths from a particular source to a given destination. Using this pool of information, final decisions are to be made for choosing the best path in any unusual situation like accident, morning rush hours, patient having critical condition in ambulance etc. For doing so, logical behavioral arrangements of vehicles are captured to analyze the information about the paths traversed by the vehicles. Afterwards, frequent mining approach is used to fetch the common and frequent paths opted by the vehicles during their journey for path predictions. Proposed scheme in this research work is well compared with existing schemes mentioned in [77],[117]-[118] on the basis of extracted frequent motion arrangements and confidence of the association based rules. Association based rules

are generated by applying constraints from the selected arrangements. Minimum support and confidence is required to accept the arrangements for further decision making.

This research work helps the novice to avoid delay by providing a smart way of getting the best path map at particular time of day and in case of unusual situations such as accident, morning rush hours, patient having critical condition in ambulance, and many more.

8.2 Future Scope

With the change in trend of lifestyle in the fast moving world of technology, people on road want to reach their destination in shorter span of time and on the best path way. VANET is providing solutions to warn moving vehicles regarding unusual events like accidents on jams on road. Moreover, people on road want the optimal path to be picked during these events.

This research work tends to improve the mechanism used to figure out best path along a road starting from a specific source and ending at a specific destination. Staking at future, VANET is more likely to provide incompatible solutions for time saving along with the safety

Considering the future aspect in VANET, to offer extra security with increase in potential throughput and minimizing the effect of delay, a variety of operations of data transmission can be evaluated in VANETs by implementing more efficient encryption strategies. The research work carried out inspires the novice to go for the best scheme available for collecting data in VANET. Additional security services such as integrity and confidentiality can be offered to the transmitted data by incorporating them in the proposed IAVIB-DP scheme

Moreover, this research work can be further extended in different application and project areas like smart vehicle, smart city, vehicle cloud, automated vehicle behavior standardization.