FUSE MECHANISM FOR DATA'S AGGREGATION USING FUZZY LOGIC TECHNIQUE FOR ONLINE MOBILE USERS

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Abstract- In recent days, data's have grown more and more as the users are getting exposed to different field, i.e., wireless networks, big data, database, etc. Data's are need to be collected, managed and formulated for the people based on the services provided in the outdoor environments. During data segmentation, the problem in data similarities and security based on traffic events are addressed using for online users. Data's should be materialized based on aggregation scheme and security issues in mobility based environment. Propose FUSE mechanism based on fuzzy logic concept and integrates with data aggregation technique which helps to improve the security aspect results in data similarities with no distortions. Here, fuzzifier is used along with membership function to eliminate the data information which looks imperfect. In performance analysis, the mean / division of vehicles is calculated by simulation time and packet delivery ratio of those data's that is transmitted over the vehicle. Thus the data aggregation for the transmission events are analysed and security aspects also been evaluated.

Keywords- Fuzzy Logic, Data Aggregation, VANETS, Fuzzifier and membership function.

I. INTRODUCTION

Internet (mobile users) [1] is one of the emerging technology for pedestrians and other moving objects. When considering the mobile communication between the users, we need to focus on the safety requirement of the user's information based on various approaches. In these networks, we are collecting the mobility information in the form of data. As we are collecting various information's about the mobile location, there are a lot of issues [2] to be addressed based on the collected data and their security. Here we are discussing about the data similarities while storing the data, information related to vehicle or traffic events that occur in the network. When the stored information's are materialized, but without having a secure way of transferring and storing the messages. There are more possibilities for the attacker to intrude into the database and could make changes to the database. It will make more distractions to the data storage unit. Till now data collection does not focus on both data similarities and security aspects.

But current mechanisms in vehicular networks focus mainly on security aspect of data collection. A vehicular network is making a major mark in the field of telecommunication. Mobile users are increasing more frequently current days; various mechanisms are developed to rectify the current issues in the network. In the propose FUSE mechanism is data centric and a probabilistic scheme is employed in data aggregation to achieve data selection in the information sets. Based on the data selection process, trusting of data correctness in information sets is achieved. The Fuzzy-based scheme is considered with a data aggregation with some data reliability depending on the type of application.

As a result, propose FUSE based on fuzzy logic is used in data aggregation for mobile users and it is based on the existing analysis results that fuzzy logic is successful in the data aggregation schemes. The upcoming solutions results in reliability and extensible in data aggregation and will provide better solutions compared to other existing solutions. This proposed Fuzzy Logic also addresses the security problem related to data aggregation schemes and to check whether the data correlation is successful or not. The paper is organized as follows, existing works are discussed in section 2, In section 3, propose a mechanism with fuzzy logic techniques are discussed. Section 4 discusses the performance analysis. In section 5, the conclusion is discussed.

II. RELATED WORKS

The current literature discusses data related problems, mainly on fuzzy logic, which is more trending now a days. The fuzzy logic controller is instantiated in subway systems in Japan and it got explored in various applications such as, image processing, machine Vision and decision support systems. The fuzzy logic concept is based on artificial intelligence, control theory, etc. These areas, mainly used for the purpose of data storage, synchronization and retrieval [2]. Mainly logic deals with more assumption or prediction strategies that could be relevant to the mathematical data sets and data information. These data aggregation outcomes could deliver the results in two possible ways and this could be made by little reasoning or logical thinking. Little more standards like Bayesian classification are discussed which in

turn deals with data statistics of probability outcomes based on various data-sets [3]. Currently these concepts are applied based on fuzzy based approach [4] to overcome traffic overload while combining more information which are similar or equal to the problem of data aggregation.

In the existing literature, data aggregation schemes are discussed based on two high level approaches which follows four way steps such as, decision, fusion, storing and dissemination. The main difference between these two approaches, data storage is cheap based on the above four way step process. Based on the four way process, Dietzel et al. [5] – [7] developed an architecture model based on data aggregation schemes in VANET networks. This architectural model includes certain steps such as decision component, fusion component, world mode and storage model and dissemination model. For the further standardization of data aggregation schemes, this work is further analysed to support the fuzzy component in data aggregation. Fuzzy logic is a new technology which has a major impact nowadays and it's a part of many domains includes, engineering, science, medicine and business. Fuzzy logic [5] helps in control theory in vehicular networks, which specifies in fuzzy logical controller with control values of high, medium and low and fuzzy helps in solving real time problems.

Fuzzy controller architecture is introduced by Mamdani in 1975 and it holds its self-components such as, fuzzifier, Interference engine and defuzzifier. Fuzzy control system is a conventional technique used in controlling the human skills related to VANETs. It is designed to control process based on I/O of fuzzy rules, i.e. IF-THEN rules based on human real time problems. Fuzzifier is the process of transforming crisp effect into suitable fuzzy sets, i.e. high, medium and low based on degree membership functions. Interference engine has the capability to perform human decision based on reasoning to control strategy desirably and it is also kernel part of fuzzy logic controller. Fuzzy rule base acts as a storage which contains knowledge of the operation going to possess. Defuzzifier is used to extract the non-fuzzy decision based on the fuzzy control action made by interference engine. In the existing works, they focus on the data segmentation problem in VANET and now we are focusing this same problem integrated with location tracking for the mobile users.

In the existing schemes related to fuzzy logic controller does not clearly explain the solutions for those mishaps occurs in fuzzy logic controller architecture. The fuzzy based approaches mainly consider the importance related to flexibility based on data aggregation. As a result, propose a fuzzy logic is used in data aggregation for the mobile users and based on the existing analysis results that fuzzy logic is successful in the data aggregation schemes [6]. The resulting solutions results in reliability and extensibility in data aggregation and will provide better solutions compared to other existing solutions. The propose FUSE also addresses the security problem [7] related to data aggregation schemes and to check whether the data correlation is successful or not.

III. SYSTEM MODEL

Propose FUSE architecture based on the Fuzzy-based decision components for data aggregation scheme [8] and [9]. The input parameters are related in the fuzzy logic controller and the output is valued by 0's and 1's (high, medium and low) by representing correlated data and non-correlated data. In the existing schemes does not consider the architecture design without influencing the parameters related to the relation between the sets of information. This parameter changes will not affect the architectural changes of fuzzy logic controller, but new changes will be implemented with some advantages. In the architectural components, fuzzifier is extended with some new added parameters of membership function and new rules for rule base components. This proposed solution can be extended with some security mechanism in data aggregation for mobile users. Fuzzy logic helps in solving the problem with the integration of interference system, fuzzifier and membership function.

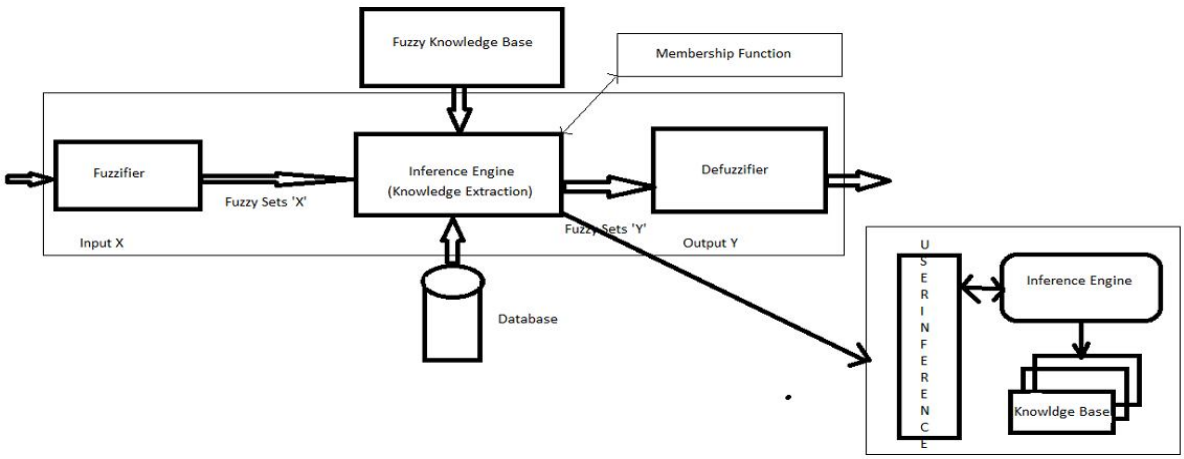


Fig. 1. FUSE System Model

$$\mu_m(x) = \sum_{j=1}^{n} p_j * V_j \text{---------- (1)}$$

Whereas,
A → Membership function with fuzzy set 'μ'.
qj→Order of positive numbers such as q1, q2,…, qn which contains fuzzy datasets of {P1(x), P2(x), . . ., Pn(x)}
j→1, 2, …, n.

The fuzzy membership function is formulated in equation (1) and represented in Table. 1 which discusses the fuzzy interference system functionality components as fuzzifier with membership function [μm (x)]. A fuzzy interference system helps in creating the forms for our customization as,

[X is High] (AND / OR) [Y is Low] (AND/ OR) …
Then
[Z is output 'n']

Table 1: Membership function calculation

No.	FR (Membership function)	Inference Metric
1	0.7	5
2	0.3	7
3	0.3	6
4	0.6	9
5	0.6	8

On the above form, the fuzzification is identified as X which is HIGH and rule is denoted as AND / OR. Fuzzifier helps to extract the input which is converted into fuzzy input data sets using a member function in equation (1)

$$u \in U \subset Rn \text{ to a fuzzy set } A \subset U$$

Fuzzy sets are fuzzified using knowledge based extraction of rule form in which the corrupted noises are removed and they are moved to the inference engine. Interference Engine and knowledge base are from the expert system based on the collection of data, i.e., classifier, Diagnosis, etc. Defuzzifier helps to convert the fuzzy sets back to the extracted value. Propose FUSE architecture in fig. 1 is based on data aggregation scheme helps in reduced data dissimilarities and security aspects are improved which are justified in the performance analysis.

IV. PERFORMANCE ANALYSIS

Fuzzy based mechanism is analysed with the simulation in fig. 2

The variant has been visualized in the form of graphical representation to showcase the difference in activities through comparison of simulation and mean deviation in Fig. 3. Whereas in Fig. 4 the transmission range and delivery ratio are compared [10] and [11].

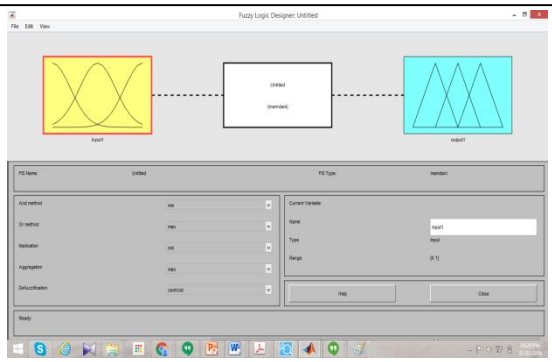


Fig. 2. Fuzzy Simulation

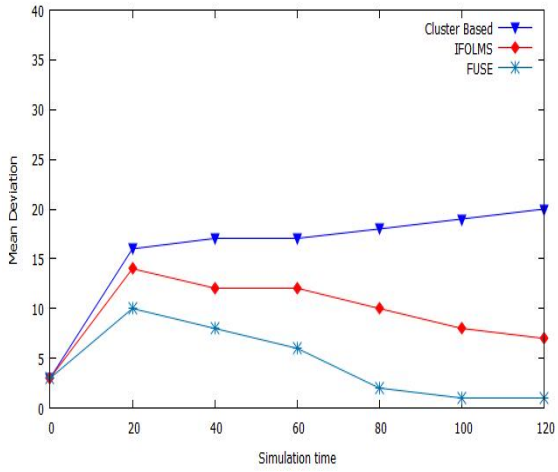


Fig. 3. Comparison simulation Vs Mean Deviation

CONCLUSION

The data's which is getting evolved day by day need to be saved, processed, and need to be proceeded for the forthcoming future generations to get accustomed to the log that is being maintained all through the years. For this we are in need of databases for storage. Here Fuzzy logic holds major components like fuzzifier, inference

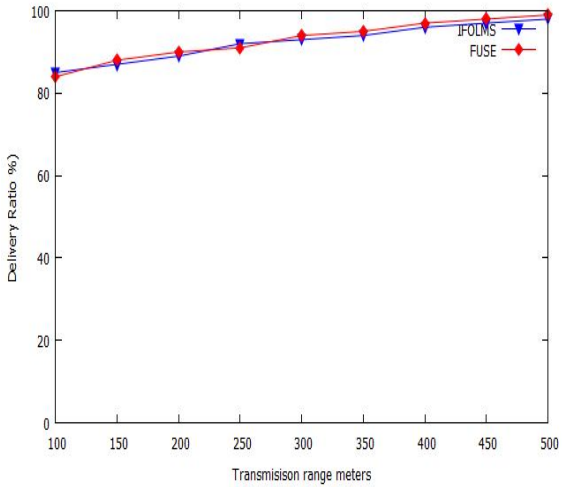


Fig. 4. Comparison Transmission Range Vs Delivery Ratio

engine, defuzzifier and knowledge rule. By using these components we have developed a FUSE mechanism to overcome the issues like data

similarities and security issues that takes place inside the fuzzy logic. Analysis has been carried out based on mean deviation, packet delivery parameters for mobile users. The work can also be extended in some other fields like web services, Big data, etc. to solve out the issues that occurs during data processing.

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