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PMLC- Predictions of Mobility and Transmission in a Lane-Based Cluster VANET Validated on Machine Learning

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Abstract—VANET refers to a massive network system, to communicate with each vehicle or infrastructure a precision protocol, an advanced view and routing system is required. This means of communication should be appropriate for all kind of vehicles. In this proposed PMLC protocol, which was built on cluster routing in a lane-based road environment. The network requires optimal solutions to form the cluster and choose its leader. All road environment characteristics are chosen, and multilayer estimations are generated to obtain specific deviations and variations, which are calculated based on data transfer and vehicle movement, and exact values are found using the machine learning system. The neural network processes the inputs, selects the required leader, and sends the data to the destination. At the end of this explanation, the execution of this protocol is depicted graphically.

Keywords- VANET; Cluster Routing; Lane-Based Road; Leader Election; Neural Optimization; Machine Learning Process

I. INTRODUCTION

The wireless connections made by vehicles are very subtle. The speed of vehicles on the roads varies from very fast to very slow. As well as they will travel very quickly from one vehicle to another near or in a different direction. So, their contact time will be very short. In this scenario the protocol also requires a proper network setup to send the data over the wireless connection. Roads are divided into two, three or four lanes when traveling on national highways. Thus, they require proper routing to share data on the roads. That network will erode very quickly. You need to find it and update the routing again. This method is applicable to all types of vehicles traveling on the roads. Vehicles can communicate directly with each other, or they can communicate with road side units in an infrastructural manner. In this infrastructure, the road side unit connects to the internet server through the gateway and adds information or receives the information and gives it to the vehicles. This creates VANET connections as shown in Figure.1.

In this network, data is collected by simulation and the data is processed by a machine learning system and its performance is tested. This allows to determine the quality of the network. The data should be initially evaluated through the training set, then convert another to a testing set to determine the correctness of the data. If the correctness is low, select the parameters needed to create the network again, repeat iteratively this process to get more precision.

In proposed, the VANET framework is developed in the form of traffic with the model of vehicles traveling on the roads. The design explains how to optimize the wireless communication systems required on the roads and how to transmit data and regulate difficulties. Every vehicle in the network has some features. The cluster is formed in the network by those features. Leaders are selected in each cluster. The cluster network is constantly updated at regular intervals. It involves cluster forming, merging, cluster switching, selecting a new leader, and stabilizing the network connection. This allows data transfer on the VANET to take place over a short period of time.

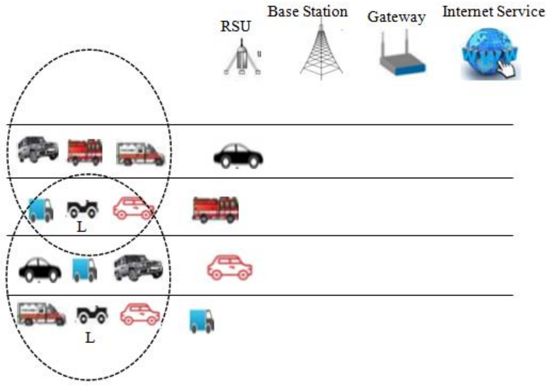

Figure.1 VANET Communication

In this VANET proposal, the vehicle adhoc network is developed as well as the path selection is based on a clustering system. The data transmitted in it is optimized and provided by the machine learning system. The parameters for creating this network are selected and recorded. To get the vehicle's location perception, location-knowledge global positioning system - GPS-enabled vehicles operate on the network. This allows the vehicles to know the current location by GPS and use it during the distance calculation with the neighboring vehicle. For data transfer in this network we need to select a vehicle with a low noise channel to act as a leader among all the neighboring vehicles in a group. For this, the quantity of noise in the channel of each vehicle in the group will be detected and removed their ID from the leader selection of those neighbors. This method minimizes data loss by selecting the leader who will broadcast the data. and this leader will be at the center of the group.

In this paper, in the second part, the previous ideas about VANET research are told. In the third part, the proposed method PMLC of this research is described. In the fourth part, the results and discussions of this study are explained. In the final part, the conclusion of this complete discussion and the particulars of its future work are stated.

II. RELATED WORK

One of the most essential properties of a mobile ad-hoc wireless network is the mobility of the nodes. Modeling the communication scenario is exceedingly difficult due to the highly movable nature of vehicles. For error-free efficient packet transmission in the VANET paradigm, the mobility model must encompass the behavior of moving vehicles both individually and in groups [3]. Communication is at the heart of all VANET networks; nodes quickly move, necessitating a faster and smarter communication method to handle emergencies [1].Environmental elements become considerably more complex in urban scenarios than on highways since message propagation is frequently stopped due to the dynamic movement of cars, diverse road patterns, and much more impediments such as buildings and trees [8]. This is accomplished through the use of sensors embedded in the vehicle. Roadside units, such as cellular bases for data delivery to vehicles, are not permitted to use central access points. Because the mobile nodes are often restricted to highways, they exhibit a characteristic controlled mobility pattern [15]. However, because the network scale of VANETs is expected to be very large, the open-medium nature of these networks, as well as the high-speed mobility of a large number of vehicles, necessitate the establishment of an efficient route between network nodes that should be adapted to the network's rapidly changing topology [2]. This research presents a family of road-based VANET routing algorithms that produce paths made up of a series of road crossings with a high possibility of network connectivity using real-time vehicular traffic information. [7].A innovative user-oriented cluster-based approach for multimedia distribution over VANETs that may customise multimedia content and delivery based on the preferences and profiles of the passengers. Cluster formation and cluster head selection are two approaches employed [13]. Because all of the vehicles are mobile, a mobile network that can self-organize and operate without infrastructure support is required. As microelectronics advances, it becomes possible to incorporate node and network devices into a single unit and wireless connections, i.e. ad hoc network [4]. The latter makes it challenging to create efficient routing methods for automobile contexts. Adapting routing protocols to quickly changing network topologies is crucial for many automotive safety applications, as failure to route collision avoidance messages to their intended cars might render these messages useless [14]. The control channel is also used to announce the services that are available. If the vehicle discovers a service of interest on the control channel, it will switch to one of the service channels to access the service. The service channels will provide several more value-added capabilities, such as the announcement of points of interest in the driver's location [9]. The structure's topology A route-based strategy has been developed. Route instability occurs as a result of an established route consisting of a group of nodes between the source and the destination that are impacted by often broken routes in the presence of significant vehicle mobility. Before transferring data, nodes share a significant amount of routing overhead [11]. The critical period between an accident and receiving medical assistance for the victim can frequently mean the difference between life and death. Unfortunately, few few are worth that valuable time because most are terrified of legal ramifications. This delay can also be caused by congested traffic and waiting for the ambulance at traffic lights, as well as bystander negligence [5]. In the high-contention case, the proposed forwarding optimization yielded noticeable benefits. Even without employing the optimization, the scenario with obstacles produced superior results. This was due to lesser network contention and the fact that RBVT protocols forward data along the roads rather than across the roads [12]. This advancement of automobiles to smart vehicles lays the way for a great potential that leads to a variety of services ranging from traditional road safety to smart communication in smart cities. Based on the term Internet of Things, the term Internet of Energy has evolved, which is widely utilized in the industrial sector to satisfy the demands for optimal energy production consumption [10]. VANET functionalities are employed to provide awareness to the vehicle driver in the event of a traffic jam, as well as knowledge of the road traffic situation in order to avoid rear-end incidents on the highway. VANET communication is accomplished through the use of WAVE as a wireless medium [6].

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III. PLMC DESIGN AND IMPLEMENTATION

A. Network Model

This network is built in internet of things IoT mode. It has a set of vehicles $V = (v_1, v_2 .., .. v_n)$, road side units R_{SU}, base stationB_S, gatewayG_W, and internet serverI_S. Each vehicle will communicate with its nearest vehicle orR_{SU} to build vehicle to vehicle communication or vehicle to infrastructure communication. Thus, broadcasting a hello message to communicate with a nearby vehicle. Depending on the communication region C_R average neighbor counts A_N computed.

$$A_N = \frac{V}{C_R}$$

Similarly, R_{SU} will continue to broadcast its presence through a broadcast message. So, the vehicle will be in contact with the R_{SU} next to it.Similarly, the G_W and the B_S on will continue to broadcast its presence. This allows the R_{SU} to communicate with the $G_W$and the gateway with the B_S . Radically, this allows the entire network to be connected and each vehicle cognitively selects the appropriate channel.

B. Cluster Formation

The vehicles traveling in network will travel as a group depending on its coverage, one lane or more lane can be combined in this group depending on the coverage. Like this many groups are formed on one road. These groups can be divided into high speed, normal speed, and low speed depending on the speed of the vehicle. Each group interacts at a specific interval. A leader is selected in each group and through them the data is shared to the members in that group. Large-scale network transmissions can be made by contacting the leaders in each group. Here $G_S$is the group magnitude, andD_V is the group standard deviation. Also, P Defines the probability of group at each interval, still, $P_C$is the number of packets shared on the network and is the number of vehicles travelling on the lanes, P_V is the vehicle count variations according to the context provides the density of the network.

$$N = P_C G_S, X = N G_S$$

$$Z = \frac{-2X}{2{D_V}^2}$$

$$P_V = \sum V_C$$

$$D_V = \sqrt{V_V}$$

$$P = \frac{1}{Z} e^Z$$

Similarly, the speed S change of each vehicle should be monitored. The vehicle will sometimes speed up S_P and then slow down S_D depending on the road environment. It is monitored as follows. Here S variations are measured between $S_1 = (0 \rightarrow M_S)$ for S_P ,and S_D is measured between $S_2 = (M_S \rightarrow 0)$. Here$M_S$ is the maximum speed and T is the time of speed measured, and iteratively repeat this process to get more accurate values.

$$S = \frac{D_{ist}}{T}$$

$$D_{ist} = \sqrt{|X_1 - X_2|^2 + |Y_1 - Y_2|^2}$$

Also, the moving angle $A_G$of the vehicle is calculated and thus the location of the vehicle varies.

$$X_D = (X_C - X_P), Y_D = (Y_C - Y_P)$$

$$tan_\theta = \frac{Y_D}{X_D}, A = atan2(X, Y)$$

$$A_G = \frac{A180}{л}$$

Here X_1 , X_2 and Y_1 , Y_2 are location points of the moving vehicles. Moreover, the changes in data transmission countsT_C in each group are calculated as follows.

$$T_C = \frac{P_C + 1}{t + 1}$$

Now, R is the random numbers and are the extreme E_T and smallest valuesS_M of the transmission counts of data packets $D_P$computed as follows:

$$D_P = \frac{R}{P_C(E_T - S_M)}$$

Total data counts transferred $D_T$between vehicle and $L$is computed as follows: Here is the size of the packet.

$$K = D_P(D - S_M)$$

$$D_T = K + P_S$$

Then the variation of the speedS_V of the vehicle is calculated and update new variation $N_V$as given below:

$$S_V = \frac{S - S_p}{t}$$

$$N_V = S_V + P$$

Here, $X_{Vt}$and $Y_{Vt}$are provide the location variations at time t.

$$X_{Vt} = N_{Vt} S_t + X_{it}$$

$$Y_{Vt} = N_{Vt} S_t + Y_{it}$$

The calculations below display high and low speed changes of the vehicle.

$$if\ (N_V > M_S + T_C) \rightarrow High\ Speed$$

$$if\ (N_V < M_S + T_C) \rightarrow reduced\ Speed$$

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In this case, the leader L selected during the packet transmission must not be too fast, and its speed must be monitored. Also need to find a vehicle that is going at destructive speed so that we can avoid choosing it as a leader. Every vehicle traveling on this network will focus on the lanes on those roads. The vehicle will travel alternately from one lane to another depending on the traffic environment on the road and the speed of the vehicle. So, the group set will change according to the atmosphere. At that time if the vehicleis transmitting data then its leader$L$ will elect according to that scenario, G_{MC} is the group member counts and mid of the group.

$$L = P_C D_{ist}(E_V \ G_{MC} \ P_C D_{ist} S)^{-1}$$

After selecting L, the noise level of vehicle to$L$are determined as N according to the transmission and receiving distance.Here, T_P is the transfer power and R_P is the power expended when receiving packets through a channel.

$$N = \frac{T_P}{D_{ist} R_P}$$

The error variation $E_V$is calculated depending on the quantity of this noise and the speed variation of the vehicle.

$$E_V = (N + D_{ist}) - S$$

All of these will be constantly updated during vehicle contact. As a result, the channel gain value is updated to its smallest and extreme values. Thus, the average usage of the channel $C_U$receives variations among different periods, which will be updated depending on the environment.

$$C_U = D_T G_S + B_E$$

With the number of group members G_{MC} , distance variationD_{ist}, packet countsP_C, uniform speed S, and smallest error variationE_V, the vehicle leader L in the middle of the group is chosen.

This will make it easier for all members of the group to communicate in 1 – hop with their leaders. This ID, distance, noise level and speed are stored in a column of matrix. This matrix is constantly updated to keep the network running. The following formula is then computed to obtain linear filtration to eliminate noise, with which the data fusion is calculated and a new error N_E difference is found. Here C_D is the constant deviations.

$$N_E = (C_D - E_V)^{-1}$$

In a network, the movements of vehicles are monitored based on speed variation,A_G deviation and predictions of its next movements P_M. This allows to make predictions about future movements according to the current situation of the network. Based on this prediction, L will be able to properly handle the packets it receives from its member vehicles. Thus, optimizing the data transfer that member vehicles send to the leader.

$$P_M = (D_{ist} + E_V S_V) - S$$

Furthermore, the error variations of the current perceived correlation are calculated as multiple repetitions to obtain the correct accuracy. The following machine learning method is used to process the inputs: The unit difference with the product of input and matrix is resolute in the initial step of the input process. the first level's transposition value is then determined as second stage. The matrix product of filter and bits per second with the inverse filter is estimated at the third level. The product of the first level with the current error covariance is approximated with the product of second-stage values in the final stage.

Calculate the signal strength during data transfer between the vehicle and the leader as $S_S = (\ L_P \ P_F \ T_P)$. Here, S_S provides the level of transmission power of the channel. Here P_F is the deepening power fluctuations in the changes in the environment and L_P is the aspect of path loss. We then calculated the noise ratio signal as $N_{RS} = (\ S_S \ M_{LN} \ E_N)$.Here M_{LN} is the channel noise between the member and the leader, and E_N is the noise caused by the environment. From these, the channel gain $G_C$is calculated as follows:

$$G_C = T_P \ S_S N$$

Transmission error due to noise and signal weakness during network communications, this error will reduce the transmission between the L to the V, thus reducing the packet delivery to the target. Therefore, transfer variations V_A must be calculated to determine errors and losses

$$V_A = \frac{\sum T_P}{C_G}$$

After that, it is necessary to calculate the constant deviations $C_D = \sqrt{V_A}$, between the variations to know the relationship between the L and the members. It reveals the differences in the transaction between a member and a leader in a cluster.Smallest and extreme value boundary level errorB_E differences are calculated as follows from the lower V_L and upper V_M boundary of the exchanges, $T_H$is the threshold of the values.

$$B_E = \max(V_L, V_M)$$

$$V_L = T_H \to 0$$

$$V_M = 0 \to T_H$$

$$L_B = (V_L - C_D), U_B = (V_A + C_V)$$

Here, L_B and U_B are the lower and upper boundary limits. These values clarify the limit of data loss due to noise and signal weakness. In such a case we need to calculate the appropriation point $A_P$of the values as the signal values as follows.

$$A_P = \frac{\sqrt{V_L + V_M}}{2}$$

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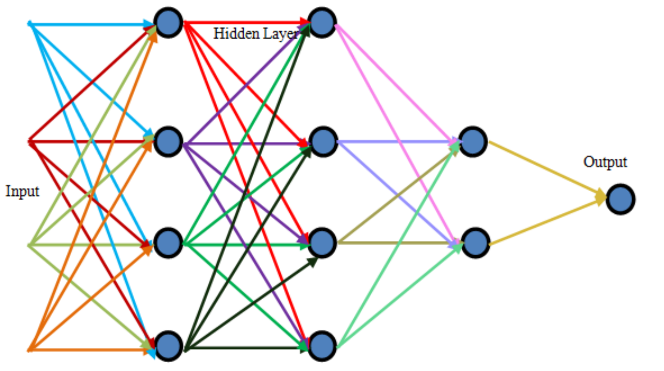

Figure.2 Neural Network Processing

Then normalize the values N_V to find the optimal border values.

$$N_V = (1 - C_A(1 - G_C D_T + A_P))$$

The matrix is filled with different values according to the calculations and operations of the vehicles. Random weight values are then given for entries from 0 to 1.The variance between both positive and negative values is measured between the mean perceived value and the currently perceived values. In this neural network computations are handled in three layers, the first being the input layer for receiving inputs, here, A_P, N_V , V_P, N_{RS} and are given as inputs to select the leaders, followed by the second layer being the hidden layer, where a non-linear boot loader is used for processing, and the final layer gives its outputs. With this processing the leader selection for each group in the network will be accurate. This turns off the network and processes the parameters and then the leader is selected. Members burn to send and receive data through this leader.

IV. RESULTS AND DISCUSSION

100 vehicles are placed in this network, in addition, road side units, base station, internet servers are also positioned by 3000 x 1000 square meter topography area and their operation is tested by PMLC protocol. Their performance is illustrated in graph form below. The parameters used in this network are Table below. Given in Table 1.

Table 1. Simulation parameters

Simulation parameter	Value
Nodes	100
Topology size	3000 sqm X 1000 sqm
RSU	4
Mobility	Random way point
Transmission range	250meters
Bandwidth	2 Mbps
Gateway	2
Internet Servers	2

Several metrics and quality measurements were used to assess the network's performance. The four measurements are depicted visually here. These packet delivery ratios and throughput performance are critical indicators of data transfer rate and bit count. When there are fewer disconnections and less noise in the network, group members can send more packets to the leader. This boosts the ratio and efficiency of packet dispersion. Similarly, similar computations and optimization approaches significantly reduce the latency. The end to end delay is referred to as the network delay. This, together with the propagation delay, transmission delay, and buffering delay factors, will be computed. If the network is stable, delays are always minimized. If all of these metrics are automatically upgraded, the network's packet drop will be reduced as shown in Figure.1, Figure.2, Figure.3, and Figure.4.

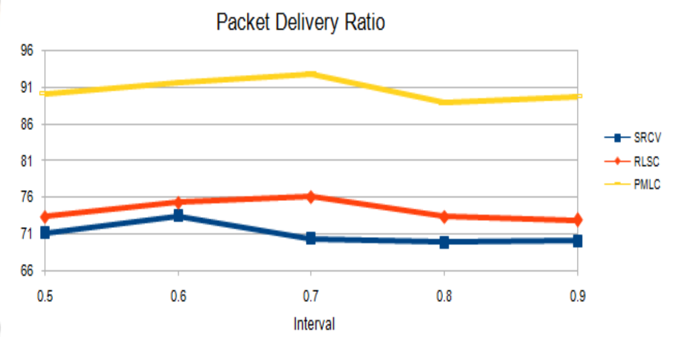

Figure.3. Interval Vs Packet Delivery Ratio

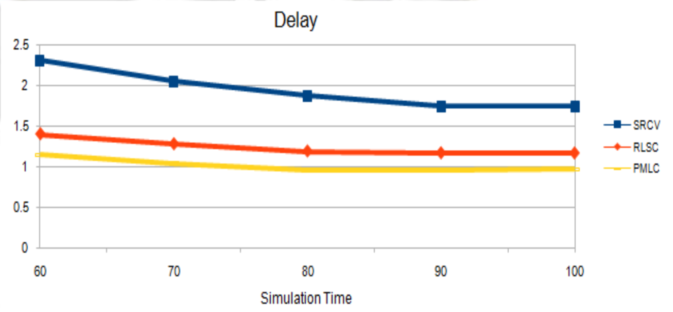

Figure.4. Simulation Time Vs Delay

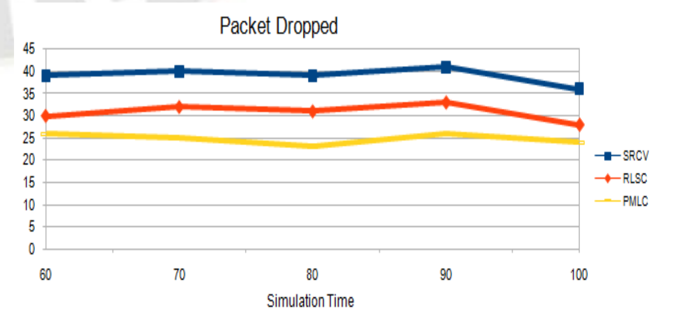

Figure.5. Simulation Time Vs Packet Dropped

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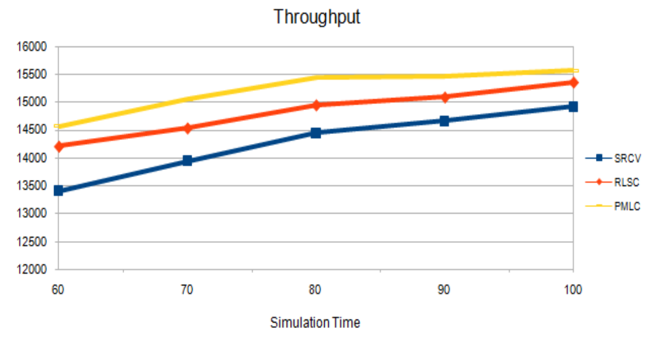

Figure.6. Simulation Time Vs Throughput

V. CONCLUSION

This PMLC is included into the VANET's routing clustering mechanism. Within a coverage range, each lane or integrated lane of the landscape will have one group, such a way entire network contains multiple connected groups. and each group will have one leader in the center of the group region. This leader is chosen based on its operating angle, speed fluctuation, channel gain, and signal intensity. Each leader should also calculate the noise in the channel and the errors generated by it. Then, train and test data, movements, and their new versions using a neural network-based machine learning system. The neural network's processing values aid in obtaining the most accurate projected values to finalize the leader and exchanges. We can upgrade the network in the futurewith secure communication method.

REFERENCES

[1] Sachin P. Godse, Parikshit N. Mahalle, Sanjeev J. Wagh, “Rising Issues in VANET Communication and Security: A State of Art Survey”, International Journal of Advanced Computer Science and Applications(IJACSA), Vol. 8, No. 9, 2017.

[2] TASSOULT Nadia, AMAD Mourad, MOUMEN Hamouma, KALLA Hamoudi, “A Survey on Vehicular Ad-Hoc Networks Routing Protocols: Classification and Challenges”, Journal of Digital Information Management, Volume 17 Number 4, August 2019.

[3] M.beheshtifar, “Discussion And Review In Vanet”, International Journal of Information, Security and Systems Management(IJISSM), Vol.7,No.1, 2018.

[4] Ram Shringar Raw, Manish Kumar, Nanhay Singh, “Security Challenges, Issues and Their Solutions for VANET”, International Journal of Network Security & Its Applications (IJNSA), Vol.5, No.5, September 2013.

[5] Gyawali, M. Y. P. ., Angurala, D. M. ., & Bala, D. M. . (2020). Cloud Blockchain Based Data Sharing by Secure Key Cryptographic Techniques with Internet of Things. Research Journal of Computer Systems and Engineering, 1(2), 07:12. Retrieved from https://technicaljournals.org/RJCSE/index.php/journal/article/view/5.

[6] P.A.Sumayya, P.S.Shefeena, “VANET Based Vehicle Tracking Module for Safe and Efficient Road Transportation System”, International Conference on Information and Communication Technologies (ICICT), 2015.

[7] Paul Garcia, Ian Martin, .Diego Rodríguez, Alejandro Perez, Juan Martinez. Optimizing Adaptive Learning Environments using Machine Learning. Kuwait Journal of Machine Learning, 2(2). Retrieved from http://kuwaitjournals.com/index.php/kjml/article/view/178.

[8] Shridevi Jeevan Kamble, Manjunath R Kounte, “Routing and Scheduling Issues in Vehicular Ad-hoc Networks”, International Journal of Recent Technology and Engineering (IJRTE), Volume-8 Issue-3, September 2019.

[9] Hiroshi Yamamoto, An Ensemble Learning Approach for Credit Risk Assessment in Banking , Machine Learning Applications Conference Proceedings, Vol 1 2021.

[10] Josiane Nzouonta, Neeraj Rajgure, Guiling Wang, and Cristian Borcea, “VANET Routing on City Roads using Real-Time Vehicular Traffic Information”, IEEE, 2008.

[11] Ahammad, D. S. K. H. (2022). Microarray Cancer Classification with Stacked Classifier in Machine Learning Integrated Grid L1-Regulated Feature Selection. Machine Learning Applications in Engineering Education and Management, 2(1), 01–10. Retrieved from http://yashikajournals.com/index.php/mlaeem/article/view/18.

[12] Sang-woo Chang and Sang-sun Lee, “Distance-Based Stable Routing Decision Scheme in Urban Vehicular Ad Hoc Networks”, Hindawi Publishing Corporation International Journal of Distributed Sensor Networks Volume, 2015.

[13] S.Gayathri, S.Nithya, G.Shanthini, R.Janani, R.Ramachandiran, M.Shanmugam, T.Kalaipriyan, RS. Raghav, G. Siva Nageswara Rao, “ACO-ECDSA Based Secure Routing in VANET: A Bio-Inspired Approach”, International Journal of Pure and Applied Mathematics, Volume 119 No. 14, 2018.

[14] bin Saion, M. P. . (2021). Simulating Leakage Impact on Steel Industrial System Functionality. International Journal of New Practices in Management and Engineering, 10(03), 12–15. https://doi.org/10.17762/ijnpme.v10i03.129.

[15] Dr. R. Dhaya, Dr. R. Kanthavel, “Bus-Based VANET using ACO Multipath Routing Algorithm”, Journal of trends in Computer Science and Smart technology (TCSST), Vol.03, No. 01, 2021.

[16] Pratik Gujar, Dr.P R Bajaj, “Bio-Inspired Routing Protocol for Vehicular Adhoc Networks”, International Journal of Advancements in Research & Technology, Volume 3, Issue 4, April-2014.

[17] Josiane Nzouonta, Neeraj Rajgure, Guiling (Grace) Wang, and Cristian Borcea, “VANET Routing on City Roads Using Real-Time Vehicular Traffic Information”, IEEE Transactions on Vehicular Technology, Vol. 58, No. 7, September 2009.

[18] Prerana Deshmukh, Prof. Shrikant Sonekar, “Improving Energy and Efficiency in cluster based VANETs through AODV Protocol”, International Journal of Computer Science and Information Technologies(IJCSIT), Vol. 5 (3) , 2014.

[19] Asim, A. ., & Cada, M. . (2023). Enhancement of Physical Layer Security in Flying Ad-hoc Networks by Intelligent Reflecting Metasurfaces. International Journal of Intelligent Systems and

Applications in Engineering, 11(1s), 46–50. Retrieved from https://ijisae.org/index.php/IJISAE/article/view/2475.

[20] AbduladhimAshtaiwi, AbdusadikSaoud and Ibrahim Almerhag, “Performance Evaluation of Vanets Routing Protocols”, 2014.

[21] S.Vinothini, Mr. J. John Raybin Jose, “A Review on Routing Protocols in VANET”, International Journal of Advanced Research in Computer and Communication Engineering(IJARCCE), Vol. 4, Issue 7, July 2015.