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A NOVEL AFRICAN BUFFALO BASED GREEDY ROUTING TECHNIQUE FOR INFRASTRUCTURE AND CLUSTER BASED COMMUNICATION IN VEHICULAR AD-HOC NETWORK

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ABSTRACT

In this modern era, the wire free replica is utilized Vehicular Ad hoc Networks (VANETs) to converse each other. Also, the VANET paradigm not required any specific fixed infrastructure. Furthermore, the vehicle in VANET framework is movable like as mobile nodes. Also, the wireless connectivity between the vehicular nodes is not stable in all cases, it often changes their structure. Research have recommended various responses to control these issues and furthermore to lessen blockage in VANET environment. Therefore, the infrastructure of a network changes frequently which results in communication overheads, energy consumption and lifetime of the nodes. Consequently, in this paper a novel African Buffalo based Greedy Routing (ABGR) technique is to improve the performance of infrastructure and cluster based communication of the node. Moreover, the routing overhead and infrastructure communication can be enhanced by this proposed protocol. Consequently, the energy consumption solution is enhanced based on the CH. Sequentially, the proposed routing protocol is compared with existing protocols in terms of end-to-end delay, throughput, Data transmission Ratio (DTR), and energy consumption and so on. Therefore, it shows that the energy utilization and lifetime of the nodes in the proposed network has been enhanced.

Keywords: *Vehicular Ad-Hoc Network (VANET), Energy Consumption, Data Transmission Ratio (DTR), End-to-End Delay, Throughput*

1. INTRODUCTION

In the past decade, the exacting case of wireless multihop network is VANET and it is the constraint of express topology varies according to the high hub mobility [1]. Moreover, raising the quantity of vehicles outfitted among the computing methodologies and remote communication strategies are follows inter vehicle communication is attractive a talented field of investigation, consistency, and improvement [2]. The application of VANETs is avoid the collisions, security, screen crossing, active direction scheduling, Observing the traffic condition with the real time examples etc[4]. Moreover, other significant application of VANETs is given the connectivity of Internet to the node of vehicular system [5]. The network is formed in an Ad-hoc mode in the VANET where the various moving vehicles and relating equipment's appear getting in touch with wireless path and shift practical data to one other [6]. The little network is formed at the single same time according to the equipment design and the vehicles of the node network [7]. Ad-hoc networks are formed among the one or more computers together exclusive of wireless router contact position [8]. The PCs are broadcasting directly with the other networks [9].

VANET has been growingly attracting the contemplations from both scholarly world and industry [10]. It is a vital constituent of the astute transportation framework that objective the improvement of driving security using vehicle correspondence or correspondence with side of the road infrastructure [11]. This VANET establishment reinforces the early availability of traffic episode information for end customers with the assistance of side of the road structure and web. VANET can be used as a checking and early location system for its to offer an exact initiating hint to alleviation components to start with time of a future traffic incident [12]. VANET is a unique classification of portable specially appointed organizations (MANETs) where have conduct distinctive in term of moving rate of hub and example, transmission capacity, scope of hub, transfer speed life time, unwavering quality and regular difference in systems administration geography[13]. VANET is shaped utilizing voyaging habitually geography evolving hub, who have independent and disseminated character used to control the clogged traffic, fuel burned-through and mishap on their way [14].

To satisfy the effective communication VANET, namely lifetime of the node, Data transmission Ratio (DTR), end-to-end delay[15] and energy utilization is the major challenges[16]. Moreover, energy consumption, and lifetime of the node is the main challenges in VANET [14]. In previously various techniques are used to improve the message exchange relation among the vehicles such as FCC [17] algorithm, DBDC algorithm [18], EDA algorithm[19].The work is mostly focused on effectually communicate the data traffic and maintains the node energy of a VANET network[20].
The rest of this article is categorized as follows: Part 2 demonstrated the related work. Part 3 describes the replica and the problem of the system. Part 4 explores the projected optimization approach and part 5 explains result and discussion of the work. At last in Section 6 concluded the paper.

2. RELATED WORKS

Some of the recent works of literature related to this research are elaborated below:

The problem of Clustering in VANET has been solved by different approaches. The performance of clustering is enhanced by a better excellence of examination. The VANET consume more energy due to communicate with their destination. To boost up the energy performance of the VANET, Khan et al [21] proposed a well-organized K-Medoid Clustering scheme (K-MCS) for the safety routing and efficient energy consumption. In this scheme the source node is recognized the low energy cluster head for the purpose of communication and also provide the information about the cluster node. Using this information the source node computes the high energy cluster node.

The data transmission is performed directly via the strongest energy level of intermediate nodes. However, the cluster node has less life time so cannot communicate with the transportation system .In order to overcome this problem Elhoseny et al [22] proposed Firefly levy allocation algorithm that identify the cluster node with high lifetime of the. Furthermore, overloads in routing are reduced by the evaluation of this algorithm. Accordingly, the energy consumption of this cluster node is increased by minimizing routing overload. The outcomes are compared with other algorithms it shows poor efficiency.

In Guo et al [23] has presented affinity transmission based clustering model (ATBC) for VANET moreover, this ATBC algorithm is able to create the several steady cluster. For this scheme the vehicles are automatically replace the information through their neighbor transports to broadcast the accessibility and dependability. The performance of this affinity transmission clustering method is compared with other algorithm ATBC provides better accuracy and the energy consumption under the energetic VANET conditions.

VANET development is the intellectual transportation schemes are expanding extra attention for offering a lot of examination. Moreover, wireless mobility network includes large quantity of vehicles node that can move randomly. Clustering is one of the major proficient approaches in VANET. Ram et al [24] has proposed solidity associated cluster routing (SACR) procedure a location and density flexible clustering procedure. For this procedure is preserving the relativity among the two different metrics such as energy consumption and average velocity. The examined procedure displays the enhancement of the average velocity, energy and end-to-end delay compared with existing techniques.

Investigation and improvement on VANETs have enlarged rapidly in the last few decades. Moreover, VANETs includes a lot of challenges according to the better high hubs mobility and energetic technique that guide to frequency framework extrication. Clustering procedures are most proficient approaches to decrease the network extrication through the network hubs. Chen et al [25] proposed stable clustering approach for professional multihop vehicular communication (SCAPMVC) approach that receives the speed of the cluster node acceleration and location of the parameters. This proposed technique is to enhance the life time of the cluster by choosing the best possible cluster head node and also improving the calculation of the link connectivity. The outcomes are compared with other existing techniques the computation does not includes definite regular speed of the vehicles.

Table 1 Comparison the performance of VANET clustering techniques

Author name	Technique	Advantages	Disadvantages
Khan et al	K-Medoid Clustering scheme	Energy consumption high	Computation time high
Elhoseny et al	Firefly levy allocation algorithm	Better energy consumption	Poor Efficiency
Guo et al	affinity transmission based clustering model	Better accuracy and lifetime	Packet loss occur
Ram et al	density connected cluster routing (DCCR) procedure	Better cluster efficiency	Cluster selection process hard
Chen et al	stable clustering approach for professional multihop vehicular communication (SCAPMVC)	No packet loss	Poor computation

The Key contribution of this research is summarized below:

- Whenever the network is keep on changing in the cluster based infrastructure there will be an overhead on CH which required energy consumption, the system permits the sender to change its transferring rate. Therefore a novel African Buffalo based Greedy Routing (ABGR) technique is proposed in the network layer for energy management, lifetime of the node and infrastructure communication.
- Consequently, for enhancing the proposed protocol the knowledge-based algorithm is combined to investigate the energy capacity and strength of each node in the network.
- Moreover, the novel ABO algorithm is proposed to predict the node energy and select the best possible CH to communicate with each other.
- Furthermore, the greedy routing technique is proposed to enhance the message exchange ratio among the vehicles.
- Sequentially, the outcomes show that the proposed routing protocol outperforms is compared with various techniques.

3. SYSTEM MODEL

The structure of VANET is deformed because the network is formed by the interconnection of nodes[26]. Nevertheless, the nodes in VANET are adjustable, movable and self-organizing characteristics. The system model for energy efficient routing protocol in VANET is given in Fig. 1.

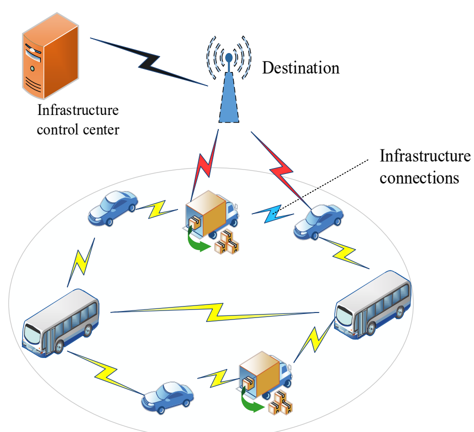

Fig 1 Architecture of VANET

Moreover, the VANET clustering procedure is represented as two types of messages such as accessibility and dependability message that are exchanged among the hubs and choose the suitable Cluster head (CH) [27]. Dependability x (i, j) of the CH is explained as eqn. (1),

$$x(i.j) = y(i.j) - \max_{j \neq j_1} \{m(i, j_1) + n(i, j_1)\} \quad (1)$$

Accessibility of u (i, j) is sent reversely the node j and node i is sent to back and self-accessibility of u (i, j) is defined as the eqn. (2),

$$u(i,j)=\min\{0,x(i,j)+\sum_{i_1\neq i,j}\max\{0,x(i_1,j)\}\}$$
$$u(i,j)=\sum_{i_1\neq j}\max\{0,x(i_1,j)\}$$

(2)

Based upon the two types of messages the cluster head selection due to the cluster construction method for picking the Cluster head (CH) i is expressed as eqn. (3),

$$CH_i=\arg\max_j\{u(i,j)+s(i,j)\}$$

(3)

Where, CH_i is cluster head of i , j represented as neighboring node. Moreover, the velocity of scaling function is correlated at new neighbor node CH_k therefore, VSF_{i,CH_k} is determined by the eqn(4),

$$VSF_{i,CH_k}=\frac{1}{CCN_{CH_{k_1}}}(\sum_{U_j\in CH_{k_1}}(U_j-\overline{U_{CH_{k_1}}})^2$$

(4)

Where, $CCN_{CH_{K_1}}$ represented as cluster component node, $\overline{U_{CH_{k_1}}}$ is represented as medium velocity of CH_{k_1} and medium velocity can be estimated as following eqn. (5),

$$\overline{U_{CH_{k_1}}}=[\frac{1}{CCN_{CH_{k_1}}}\sum_{U_j\in CH_{k_1}}U_j]$$

(5)

Where, U_j denotes cluster sequence number.

3.1 Problem Statement

In VANET the each and every nodes in the network consumes some amount of energy but it is different for dislocation of nodes. In case the energy utilize via the node is diminished then the message drop will arise. VANET is created to trade message among vehicles in pragmatic situations. Moreover, it is important that the information packets needs to pass through by means of the organization among source and objective hubs. The clustering procedure is significant in the general working of VANET however, the information correspondence among the two nodes can be effortlessly done by the briefest way convention with the given organization geography. Then again, the correspondence cycle in VANET is started by the source hub which broadcast the information to numerous objective hubs, which is called as multicast steering and is isolated into incorporated and circulated calculations with deference to execution. Hereafter, the protocol sends the data to the destination through the energy efficient nodes. If the multiple numbers of messages sent through the same route then communication in the network will occur, nevertheless this will overcome by multipath routing techniques.

4. Proposed ABGR Methodology

To enhance the message exchange ratio between the vehicles, the clustering scheme is planned to implement. If the cluster head is fixed in between the vehicle then it avoids the neighbor hub selection. Thus, the communication broadcasting process is capable to execute within short duration. In this research African Buffalo based Greedy Routing (ABGR) technique is to improve the performance of infrastructure communication. Initially, African Buffalo fitness function is updated for finding the best CH. Henceforth, the greedy routing protocol is used to find the distance between sources to destination. Once the CH is computed the greedy routing technique is used to forward the messages towards the selected nodes. Moreover, each and every vehicle maintains the neighbor position, distance, and direction. The proposed technique checks the energy consumption of each and every node sequentially based on the fitness function, if the lifetime of node is less or defective then it sends the route request to its neighboring nodes and it receives the reply signals. The proposed ABGR technique in VANET is illustrated in fig .2.

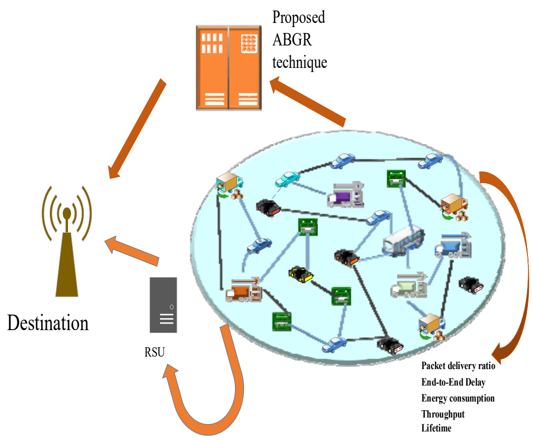

Fig.2 Proposed ABGR technique in VANET architecture

Here, the proposed model identity the best possible cluster head and avoid the low energy nodes based on the fitness function. Moreover, the fitness function of the African Buffalo is updated in the network layer of the proposed replica. Then, the developed AB technique is monitoring the each and every nodes present in the network area and also predicts the best node. Hereafter, the protocol sends the message to the destination through the energy efficient nodes as well as high lifetime of the node. If the multiple quantity of message sent through the same route then obstruction in the network will arise, although this can be overcome by novel ABGR routing technique.

4.1 Proposed ABGR Routing Technique

In this research ABGR routing technique is developed for energy management, congestion issues and also maintains the lifetime of the node. As because of each and every vehicles in the VANET are activated by the energy consumption of the node. Initially, the nodes are created in the random manner in the network that is employed to broadcast the messages. In this proposed ABGR technique is developed for infrastructure communication. The proposed ABGR is a very efficient and powerful technique since of its effortless execution and better results. The proposed ABGR technique is shown in fig.3

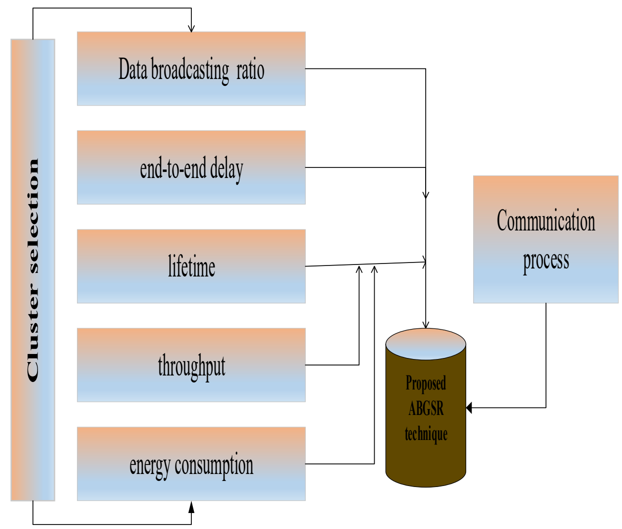

Fig.3 Proposed ABGR technique

Initially, the developed approach is computes the lifetime of the each and every node in the network area. Furthermore, the lifetimes of the nodes are evaluated based on the fitness function of the hybrid AB replica. Additionally, the proposed model is compute the end-to-end delay, throughput, energy consumption and DBR of the each and every node. Therefore, the fitness of the proposed technique is employed to identify the best possible CH in the network. Then, the greedy routing protocol is used to transmit the message from source to destination with short duration.

4.2 Mathematical Model

The aim of the ABGR methodology is to construct the constant cluster and evaluate the best possible CH to join the destination and communicate with short duration. The main purpose of this investigate is to improve the communication instance. The vehicles periodically share their information in a single transmission communication. This information is share based on the high energy utilization CH so the vehicles easily identify and share the information very fast.

4.2.1 Cluster Formation (CF)

The configuration of nodes starts when the vehicle density rises on the highway road consequently, there are no vehicles from the street vision area and the conditions are updated using ABGR algorithm. ABGR algorithm is to determine the cluster head with respect to high life time and high energy consumption of the node. The process cluster formation is based on the proposed ABGR method.

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4.2.2 Cluster Selection (CS)

Cluster selection is evaluated by computing the medium speed of the vehicles in cluster head.

The ABGR algorithm is used to determine the most appropriate CH in the cluster formation moreover, the five considerations are taken into the ABGR approach that is life time of the CH (L_t), end-to-end delay (D), DTR, throughput (T_p) and finally energy utilization(E) of CH.

The DTR able to acquired starting the absolute quantity of information packages showed up the objections partitioned by the complete information is packages are send from sources. PDR is the proportion of number of packets got at the objective to the quantity of packets sent from the source of the correspondent node. DTR is calculated in eqn.6

$$\text{DTR} = d_a / s_s \qquad (6)$$

Where, d_a represented as data arrived at destination and s_s denoted as data sent at source. The end-to-end delay (D) defined as total time taken by the data communicated from one end to other end that is measured by the eqn.7

$$D = \frac{\sum_{q=1}^{n} (M_r - M_s)}{n} \qquad (7)$$

Where, the transmitted message quantity is represented as n and q is the message finder, the receiving instants of message are assumed as M_r and sending instants is denoted as M_s.

$$T_p = P_a / I_t \qquad (8)$$

Where, P_a is represented as amount of packet achieved in the network and I_t is denoted as interruption. Moreover in this technique, the energy-efficient nodes can only include in the route discovery task which enhances the activation time of the nodes. Energy consumption of the node is determined by the eqn.9

$$E = \beta E_p \qquad (9)$$

Where, β is the parameter of the model, which must be in the range $0 < \beta < 1$ and is the energy factor.

Initially, the vehicles density is consider as γ and the neighborhood density is termed as n moreover, each and every vehicles are under the communication region so the vehicles receive the message periodically based on the above message the direction of destination is calculated by the eqn.10

$$\gamma = (\gamma_1, \gamma_2, \ldots\ldots\ldots \gamma_{3)} \qquad (10)$$

Where, is the expected value of the neighborhood nodes next evaluating the closed transports of the road path. Consider the two vehicles m and n that is mutually closed to each other so the distance among the transmission range is low. Moreover, the closed path of m is calculated by the eqn.11

$$cd(m) = \{n \mid \forall A_{nr}(m,n) \le A) \qquad (11)$$

Where, A_{nr} is represented as transmission range, cd is the closed distance.

Algorithm 1 proposed ABGR algorithm

Start

Initialize the parameters Lt ,D, PDR ,E

// Lt ,D, PDR , E represented as life time, end-to-end delay, PDR, throughput (Tp) and consumption of energy (E).

Construct the node

Randomly select the CH

// Set the fitness value based upon African buffalo optimization (ABO)

// Estimate the life time of the node

If (Lt > high)

// cluster lifetime above 220s based on the African buffalo fitness function

Best possible CH

Else

Condition is not verified return estimation part

// Calculate the end-to-end delay using the eqn.(7)

If (D>110)

Best possible CH

else

Condition is not verified return estimation part

// Evaluate the Packet delivery ratio (DTR) using the eqn. (6)

DTR = d_a / s_s

// d_a *represented as data arrived at destination and denoted as data sent at source*

If (PDR>50)

Best possible CH

else

Condition is not verified return estimation part

// Compute the throughput using eqn. (8)
If(Tp>100)
Best possible CH
Else
Condition is not verified return evaluation part
// Evaluate the energy consumption using eqn. 9
If(E>50)
// initially find the direction of destination

$$\gamma = (\gamma_1, \gamma_2, \ldots\ldots\ldots \gamma_3)$$

// infrastructure communication is based on the greedy routing protocol
// position based protocol
//Estimate the closed path

$$cd(m) = \{n \mid \forall A_{nr}(m,n) \le A)$$

//Compute the cluster connectivity interval using the eqn. (12)
If (CCI<50)
// Cluster connectivity interval is should be less than 50 communication takes place
Else
Stop
Return to estimation
End if
Output: Best nodes are selected and communicate the message from source to destination.

Finally, gateway collection is used to communicate the each and every node and also transmit the information from source to destination. Moreover, cluster connectivity interval (CCI) is calculated by the eqn.12

$$CCI = \sqrt{(m^2+\gamma^2)A_{nr}^2 - \sqrt{(\alpha\phi-\beta\lambda)^2} - (\alpha\phi+\beta\lambda)/\alpha^2+\beta^2} \quad (12)$$

Where,

$\alpha = a_1 \cos\theta - a_j \cos\theta$, $\beta = u - v$,

$\lambda = a_i \sin\theta - a_j \sin\theta$, $\phi = u_1 - u_2$.For each cluster connectivity interval has two CH moreover, the calculation of CCI is optimized in the closed path of CH

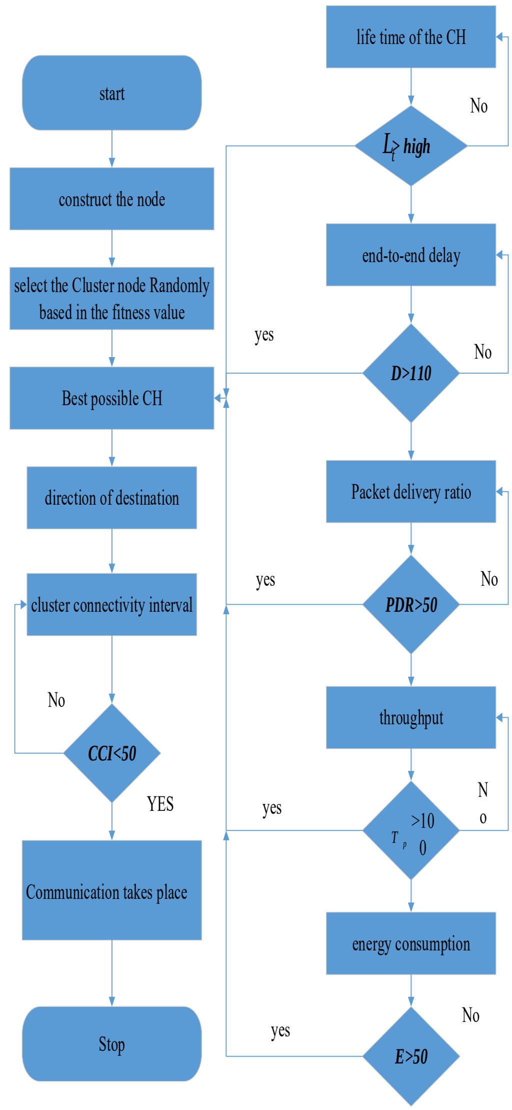

Fig.4 Flow chart of ABGR

Finally, the best CH is selected with the help of AB optimization and infrastructure communication is done at greedy routing protocol. At last the message is transmit from source to destination within a short duration by the proposed technique.

5. Result and Discussion

The proposed novel ABGR algorithm for VANET is implemented in NS-2 platform. The developed technique is to compute the energy and lifetime of the CH and also evaluate the infrastructure to infrastructure communication. Finally, the comparison is performed among the proposed techniques with some of the recent existing works of literature and NS-2 implementation provides better results.

5.1 Case study

Consider the n of nodes in VANET for this case moreover, let us consider there are 3000 data packets arrived at the destination and 30 nodes are sent at the source substitute this values in eqn (7)

DTR =3000/30

Packet delivery ratio is 100 ,consequently, the fitness value of PDR is taken as above 50, then calculate the total time taken by the end-to-end delay sending instants 200 sec and receiving time 50 sec number of nodes taken as 2 apply this values in eqn (8)

D= (200-50)/2

End-to-end delay of the node is 75, energy consumption is calculated by using eqn(9) V value taken as 0 to 1 and energy efficient factor is assumed as 56j apply this values in eqn (9)

E=1*56

Energy consumption of CH is 56 and also fitness value is 50. Then calculate the direction of destination consider neighborhood density is taken as 0 to 500 nodes apply this values in eqn (10)

$\gamma = 455$

Then find the closed path of two vehicles the transmission rate is consider as low and shortest distance consider as 25m apply this values in eqn (11)

A_{nr} =25m

The transmission range is 25m.Furthermore, cluster connectivity interval (CCI) is calculated by the eqn.(12) let us consider direction of angles taken as 30 and 50 deg, velocity of the transports taken as 3.2ms substitute this values in eqn (12)

CCI=25

Consequently, if the CCI node is not met, then all the nodes form into a cluster shape. Based upon these function, the path of the node is estimated by the distance and energy evaluation. Therefore, the infrastructure communication is takes place in the best possible CH.

5.2 Performance Evaluation

The effectiveness of proposed method is examined with existing methods like FCC [17], DCCR [25], GAPCA [24] and KMCR [21]. Therefore, to calculate the efficiency of the proposed model some of important metrics should be validated such as cluster lifetime, end-to-end delay, DTR, throughput (T_p) and also energy utilization. Moreover, the proposed ABGR approach valuable performance is compared with the conventional clustering techniques namely FCC, DCCR, GAPCA and KMCR algorithm. Based upon these performances best possible CH is selected and directly forward the messages to the CH towards the direction of the destination with help of developed routing protocol.

5.2.1 Cluster lifetime (L_t)

Cluster lifetime is calculated with various velocities of clustering nodes and also the results of the projected ABGR approach are compared with the existing approach such as FCC, DCCR, GAPCA and KMCR algorithm. The performance of cluster lifetime is shown in fig. 5, and values are enclosed in table. 2,

Table2 Comparison of cluster lifetime

Density of vehicles	Life time				
	FCC	DCCR	GAPCA	KMCR	Proposed ABGR
0	0	0	0	0	0
40	10	15	5	5	15
60	25	30	15	30	30
80	55	75	75	80	90
100	85	80	95	90	105
120	145	145	130	115	170
140	175	185	155	135	210
180	180	200	165	140	225
200	200	225	175	150	250

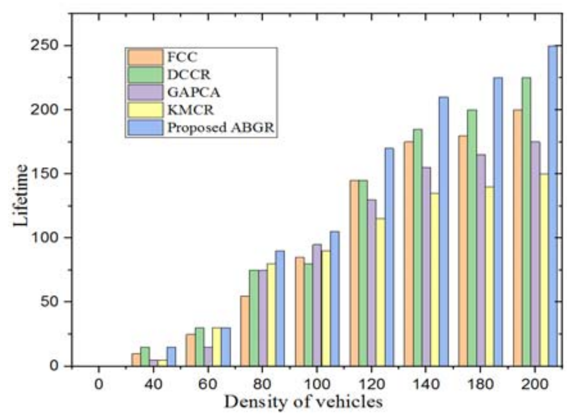

Fig 5 Cluster lifetime

5.2.2 End-to-End Delay (D):

The considerable instants among the formation of a package CH and broadcasting of a packet destination node is calculated. Furthermore, the calculated each and every feasible interruption that arise in the source and all interior nodes that are collected in packet broadcasting, allocation and queue instance. The comparison between the FCC, DCCR, GAPCA and KMCR algorithms are illustrated in fig 6

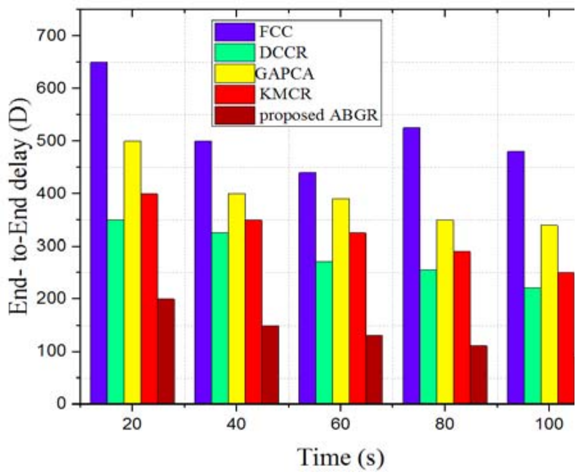

Fig 6 Time (s) Versus End- to-End delay

The planned ABGR is obtained 30% of low end-to-end delay compared with the FCC, DCCR, GAPCA and KMCR algorithm. Moreover, time versus end-to-end delay is shown in table.3

Table 3 Time (s) Versus End- to-End delay (D)

Time (s)	End- to-End delay				
	FCC	DCCR	GAPCA	KMCR	Proposed ABGR
20	650	350	500	400	200
40	500	325	400	350	150
60	440	270	390	325	130
80	525	255	350	290	110
100	480	220	340	250	90

5.1.3 Data Transmission ratio (DTR)

Data transmission ratio (DTR) realizes that percentage between the absolute of the vehicles tolerating information parcels to the complete number of the vehicles sent in the district.Moreover, the stability of the CH resolve highly concerned compared with FCC, DCCR, GAPCA and KMCR algorithm. Sequently, the DTR has major development more than the FCC, DCCR, GAPCA and KMCR algorithm as the speed of the vehicle increment.Comparision of PDR is shown in fig.7

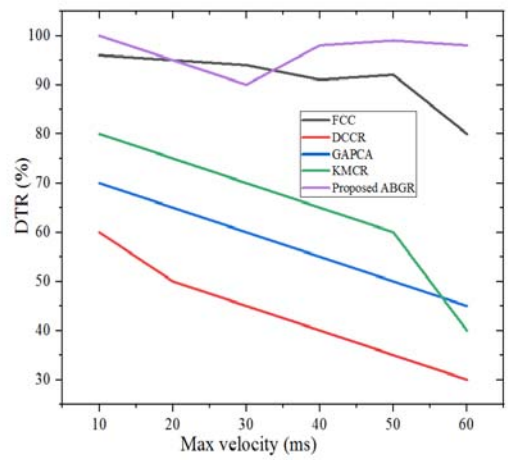

Fig 7 Data Transmission ratio

The proposed ABGR approach compared with the existing FCC, DCCR, GAPCA and KMCR protocol. Therefore, the proposed ABGR approach provides better clustering stability. Moreover the comparison is described in table.4

Table 4 Data Transmission ratio (DTR) (%) vs. Max velocity

Max velocity (ms)	DTR (%)				
	FCC	DCCR	GAPCA	KMCR	Proposed ABGR
10	96	60	70	80	100
20	95	50	65	75	95
30	94	45	60	70	90
40	91	40	55	65	98
50	92	35	50	60	99
60	80	30	45	40	98

5.1.4 Energy consumption (E)

For the communication process the each and every nodes have some amount of energy through the network. Moreover, the number of nodes increases due to the simulation time and also enhanced the energy consumption of the CH. The proposed approach is compared with FCC, DCCR, GAPCA and KMCR techniques. Comparison of energy utilization against amount of hubs are exposed in fig 8

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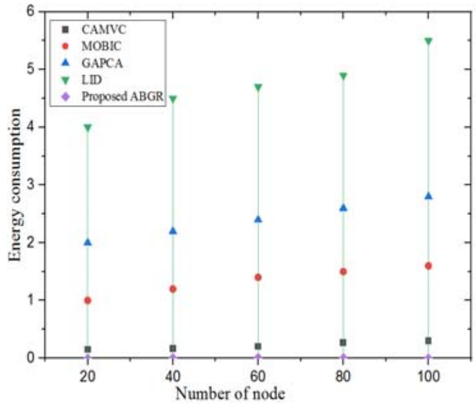

Fig 8 Comparison of energy utilization versus amount of nodes

Less amount of energy utilization is providing better results. Because Less amount of energy consumed nodes engages a enormous quantity of lasting energy. The node with a enormous quantity of energy in the route is selected as the optimal route. Comparison of power utilization versus amount of nodes enclosed in table 5

Table 5 Comparison of energy utilization versus amount of nodes

Number of node	**Energy utilization (E)**				
	FCC	**DCCR**	**GAPCA**	**KMCR**	**Proposed** ABGR
20	0.15	1	2	4	0.001
40	0.17	1.2	2.2	4.5	0.006
60	0.2	1.4	2.4	4.7	0.008
80	0.27	1.5	2.6	4.9	0.009
100	0.3	1.6	2.8	5.5	0.001

5.1.5 Throughput (T_p)

Throughput (T_p) is Known as the amount of information established at the intention side to the delay of packet transmission in the process.

T_p =amount of packet achieved/interruption

Throughput versus time of proposed ABGR approach is compare with existing techniques such as FCC, DCCR, GAPCA and KMCR is illustrated in fig.9 and table.6. The throughput of FCC is 60%, DCCR is 78%, GAPCA is 50% and KMCR is 66% while compare with the proposed techniques both existing techniques attained less throughput value because the throughput value of the proposed ABGR is 99%. Therefore, the proposed approach achieved better throughput than the existing approaches.

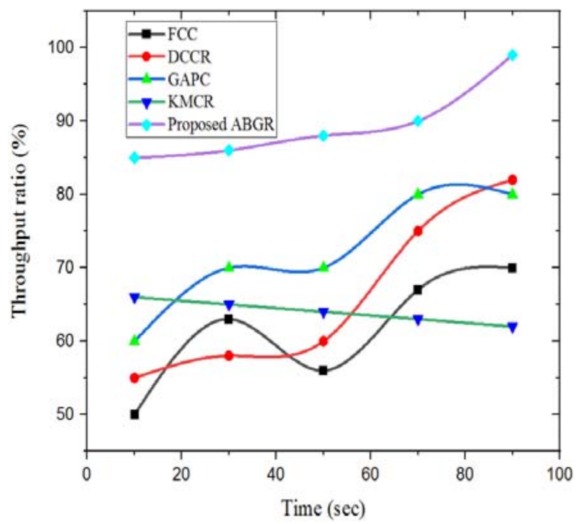

Fig 9 Throughput (%) vs. time(s)

Table 6 Throughput (%) vs. time(s)

Performance	Method	Pause time(s)				
		10	30	50	70	90
Throughput (%) vs. time(s)	**FCC**	50	63	56	67	70
	DCCR	55	58	60	75	82
	GAPCA	60	70	70	80	80
	KMCR	66	65	64	63	62
	Proposed ABGR	85	86	88	90	99

6. CONCLUSION

The major idea of this investigation is to improve the communication in VANET without any other issues; therefore, a new ABGR technique was developed. First, select the best possible CH based upon the fitness function of the AB technique by means of energy consumption and high lifetime. Hereafter, the GR technique is used to forward the messages within short duration. Moreover, the proposed outcomes are compared with other existing techniques it shows better performance.

Consequently, comparison proved that the proposed technique improved the delay by multipath disjoint protocols and reduced the energy consumption of nodes in the VANET. Therefore, the proposed ABGR approach is to

enhance the infrastructure to infrastructure and cluster based communication and also high energy consumption and life time of the CH is selected. In Future, this work can also be extended for high density of vehicles having un uniform speed.

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