

# International Journal of Innovative Research in Science, Engineering and Technology

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## Improving S-MPRP Algorithm for the Enhancing the Performance of MANET

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**ABSTRACT:** Current MANET and WSN are two different wireless techniques for the users communication. MANET is the mobile ad-hoc network where the nodes are moving in nature. The nodes can move with different speeds in the network area. In WSN the wireless sensor network the nodes are stationary and the nodes as sensors sense the parameter and send that to the remote machine for the collective data analysis. In MANET there are different routing protocols which are used for the path identification for the packet transmission. These protocols are standardized for the specific kind of activity. AODV is one of the protocols falls under the category of reactive protocols where the path is identified based on demand. Each route request for the path will be replied with the multiple paths at the source. Using different approaches the shortest path will be identified. Later on if one route will be failed alternative route will be selected. This way the packet delivery is ensured. For enhancing the performance of the existing S-MPRP the proposed approach has been specified. This proposed scheme is a strobe pulse. This will be sent onto all the expected paths. Whichever path will be having an early strobe ack. Will be considered the best path. This proposed scheme has better performance in terms of various parameters like energy dissipation, data delivered, end to end delay, throughput and packet delivery ratio.

### I. INTRODUCTION

MANET is the mobile ad-hoc network is having various mobile nodes move in the small area. It is having various wireless nodes inter communicate to each other wirelessly. These nodes are moving with varying speed from one position to other position. Each node sends the data from itself to some destination either directly or by considering some intermediate nodes. These intermediate nodes are mobile nodes. Which pick the message from one side and send to other side. Because of the nodes moving nature the path changes regularly. So for maintaining the path there requires reestablishment of the path. This path can be either same as the previous path or may be a new path. This makes a network a versatile network for the small area for the temporary period. While having communication there requires various levels of changes at the protocol level. So that message is sent from source to destination.

#### 1.1 Applications for the MANET

There are different applications for the MANET. These applications can be belonging to the diverse fields.

- a. Defence network: The MANET is used for the small area for the defense forces communication. MANET can be setup in the small area with very ease and even can be taken off with small duration of time. Anywhere there requires network for the communication of the defense personnel. This can be a strategically in favor of the forces which is using it.
- b. Small conferences: MANET can be set up for the small conference being taking place in the small area. Various organizers can set up this network for the inter communicate to each other.

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- c. Flood relief: MANET can be used for the small area where the flood relief is required. This type of condition is very critical when the all the communication which previously exists in the area has been destroyed or have been close down. So MANET may be the only way for the communication.
- d. School management: MANET can be used for the small area for the permanent basis. That means in regular way. Still MANET stands meaningful. Because using it the communication can be taken place.

## 1.2 Advantages

There are various advantages of the MANET. These advantages makes this network to be stand apart from the various wireless options.

- a. Cost effective: MANET is the cost effective type of network. Where various devices used for the communication to each other are very cheap devices. They can be purchased by the individual.
- b. Easy to Install: it is very easy to install the network in the area where it is required. Because the network with this type of utility can have very components that are to be set. Those can be set instantly.
- c. Maintaince free: MANET has devices which are rigid for any environment. So there is least maintaince on regular basis.
- d. Available: This type of network equipments are widely available in local markets. So they can be acquired from the local market.

## 1.3 Disadvantages

There are various disadvantages that are carrying with MANET. Which researchers are trying to cope up time to time.

- a. Battery operated: This network is battery operated. So there is limited life time for the node.
- b. No central controller: there is no central controller which can control the network users. Anybody can be the part of the network at any time.
- c. Crash: MANET can crash when there is congestion in the network. Either it has to restarts or users has to wait for the long time till whole traffic get cleared.
- d. Insecure: MANET is the network which has least amount of security considerations. This makes the network to be vulnerable from various types of attacks.

## 1.4 Protocols

There are different protocol which are there for the identifying the path from source to destination. These protocols can be categorized into three categories.

- a. Reactive.
- b. Proactive
- c. Hybrid

In reactive there is various protocols like AODV, DSR etc. These protocols are there to establish the path on demand. The previously used path is not considered.

In proactive table is used for the path identification. Before establishing the path first existing table will be looked into. If the latest path will be available then this path will be considered as the true path. Else new path will be established.

Hybrid is the mix of the proactive and reactive category of the protocols. Of the path exists into the table then the existing path will be used. If the path does not exists then new path will be established.

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## 1.6 S-MPRP(Secure Multi path routing protocol)

This is the technique lies in the improvement of the existing technique of AODV. It similar to the AODV establishes the multiple paths. Identifies the shortest route for the communication. That path will be picked which has least number of hop. All the packets are sent onto the identified route. If the path fails in between due to some reason the alternative route will be selected. This route will be from the route list which lies previously at the source. Rather than identifying the new route existing list next route will be selected for the delivery of the remaining packets.

## II. LITERATURE SURVEY

**M. Mohd Hilal (2018) et. al:** Author in this paper has studies the reactive category of the protocol where the path is established by sending the route request to the neighbours. Each neighbour receives the route request and will either forward the route request or will reply back for the path. At the source this way multiple paths will be collected. One path will be selected which is the shortest and the least busy path. But this way of multiple source adopts same path then there will be congestion on the path. The proposed scheme for the author is the improvement of the existing protocol where the path will be identified and shortest route will be taken and if this route get failed then immediately alternative route will be selected. Which will be based on following the path which is best for the total communication.

**Yao Zhao (2016) et al:** Author in this paper has proposed a scheme for the reduction of the overhead in the MANET. in reactive category of the routing the path will be established based on sending or we can say broadcasting the route request. This route will be followed for the destination on each neighbor. Carries the header for the whole network relay nodes numbers in the header. This way the path will be followed through and header size will grow more and more. This will increase the energy required for the packet to be transmitted. Author in this paper researched on multicasting path routing. This will reduces the header size.

**R. Manoharan (2010) et al:** Author in this paper has studied the relation between the mobility and the network link failure. As the mobile nodes moves from one position to other position with different speed the path lies in between from source to destination by using intermediate node will get failed. This means there is a impact of the mobility on the network failure. Using multicast the path identification is done so that the path failure can be minimized.

**Alex Hinds(2013) et al:** Author in this paper has proposed a technique for the path identification based on the different protocols. These protocols includes the old protocols and the new protocols. These protocol includes the reactive category of the protocol and the proactive category of the protocols. These protocols will helps in having path identification using advance protocols like MAODV. This means the path is identified such that the best path will be selected which is suitable for the current cause.

## III. ALGORITHM

Step1 Distribute the nodes in the small area nodes are  $(N_1, \dots, N_k)$

Step2 Position these nodes randomly in the network area.

Step3 Send the route request( $R_{request}$ ) to all the neighbor of the node.

Step4 Neighbour( $N_k$ ) receives the  $R_{request}$  will either reply back for destination or will forward the  $R_{request}$ .

Step5 Multiple  $R_{replies}$  will be collected at the source.

Step6 Sending the strobe to the all the routes.

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Step7 Whichever route will be having strobe reply first will be considered as the final route.

Step8 Send all the packets on the route.

Step9 end.

### IV. PROPOSED TECHNIQUE

The proposed technique is based on sending the strobe to all the routes identified against the route request. Whichever route will be having fastest strobe will be considered as the selected path. This means the strobe received means the path has been selected for sending the packets. This path will be authenticated, shortest, and least busiest path. This will enhance the performance of the network.

### V. FLOWCHART

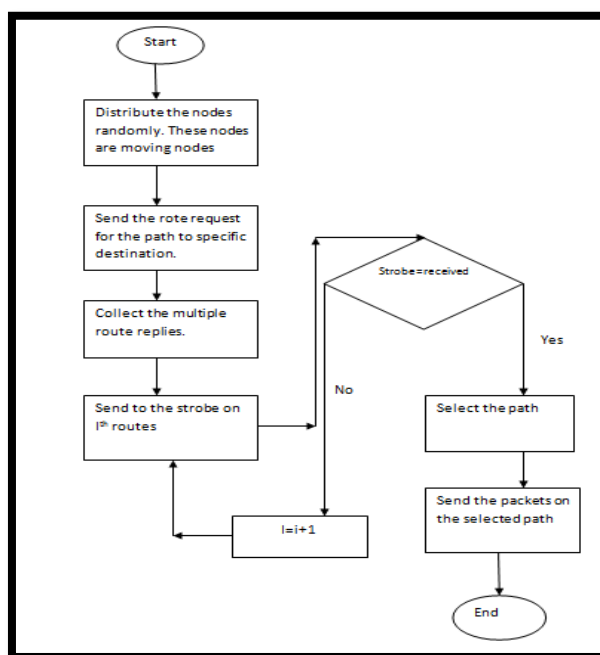


Fig. 1 Flowchart of proposed technique.

The proposed flowchart in fig. 4.2 shows that the first whole network will be established. Source node send the route request to all its neighbors. On receiving the route request will either reply back or will forward the route request. Source node will receive multiple route replies. Select the shortest route and send the strobe on the route. If the route will be having reply of the strobe then the path will be considered shortest, free, and authenticated.

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## VI. RESULTS AND DISCUSSION

The current research is based on selecting the authenticated, free and the shortest route for enhancing the network performance. At any time the MANET is the network is having various mobile nodes which are moving at random speed. Establishing the path on the selected route will be a challenge. But using strobe and the S-MPRP will identified the best path. This selected path will be having least drop ratio. And the performance is the terms of energy dissipation, data delivered etc. has higher rate compared to the existing approach.

### 6.1 Parameters

Table 1 Configuration for network

| Parameter           | Value          |
|---------------------|----------------|
| Size of the network | 1000m by 1000m |
| No. of nodes        | 50             |
| Protocol            | AODV           |
| MAC                 | CBR            |
| Delay               | 5 Sec.         |

Table 1 shows different configuration of the parameters. They are also called as experimental setup. Different nodes are positioned in the network area of 1000m by 1000 m. this means the network area will be small. All the nodes positioned in the network area will requires some protocol for the path establishment and that protocol is AODV. There will be 50 nodes in the network.

### 6.2 Parameters

#### 6.2.1 Residual Energy

This represents that how much energy has been consumed for overheads. Whatever energy will be lost for the communication will leave some remaining energy.

#### 6.2.2 Data transmitted

This is the amount of the packet sent from the source to destination. It measure much packets has been delivered from source to destination.

#### 6.2.3 Throughput

It measure the amount of data sent per unit interval of time.

#### 6.2.4 End to End Delay

It is the amount of delay that is there for packet to arrive at destination once it is transmitted.

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## 6.2.5 Packet Delivery Ratio

It is the number of packets sent versus total packets received.

## 6.3 Residual energy

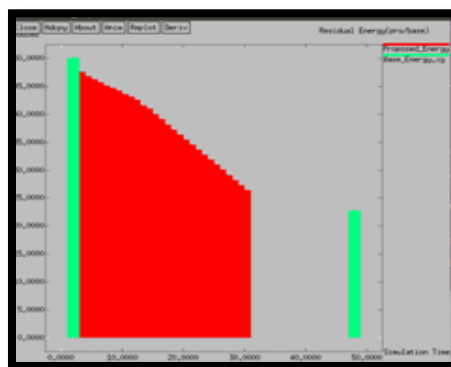


Fig. 2 Residual energy comparison

Fig. 6.3 show shows the comparison of the existing and proposed technique. The green color is showing for the existing . Two vertical lines of the green shows two different levels of the energy. One is the initial energy and the second is the final energy. Red shows the energy for the proposed technique. the proposed technique has also two levels one if the initial energy and other is the final energy. The initial energy in both the cases is equals. But the final energy has difference. The final energy for the proposed technique is better compared to the base technique.

## 6.4 Data Transmitted

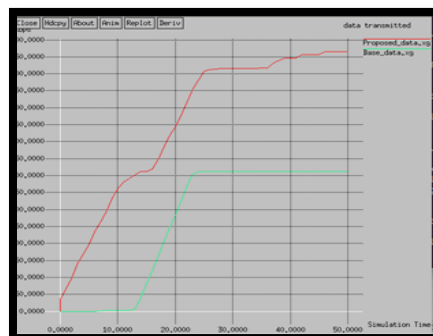


Fig. 3 Data transmission comparison

Fig. 3 shows the comparison for the data transmitted for the base and the proposed technique. the red line shows for the proposed technique and the green line shows for the base technique. figure shows that the proposed technique performance is far better than the base technique more data is transmitted using proposed technique. it represents that the proposed technique will identify the path which is better in terms of availability, freeness and the authenticity. But on the other hand in the existing system only shortest path will be selected. Which will be that path which has least hops. But the freeness of the selected path is not known. So some time the selected path will be having higher traffic.

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Vol. 9, Issue 1, January 2020

## 6.5 Throughput

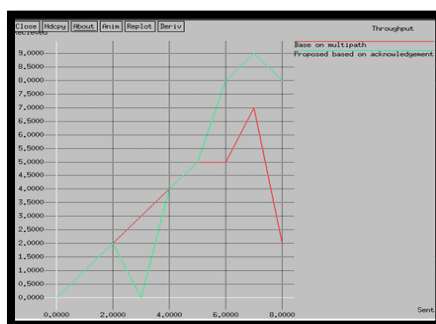


Fig. 4 Throughput

Fig. 4 shows the throughput for the existing and the proposed technique. The proposed technique is represented using green and the proposed is represented using the red line. The proposed technique has better performance in terms of packet delivered per unit interval of time. The proposed technique in the initial drops the throughput. But later on whole network status will be known the packets will starts delivers at faster rate. The graph shows overall the throughput for the proposed technique is better compared to the base technique.

## 6.6 End to End Delay

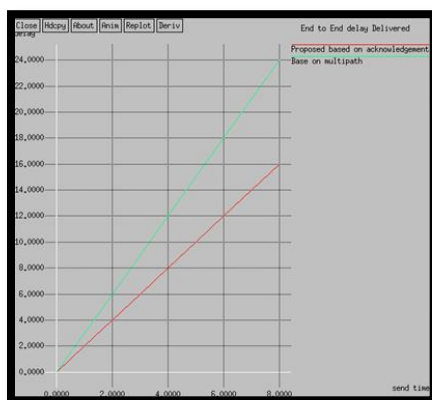


Fig. 5 end to end delay comparison

Fig. 5 shows the comparison for the end to end delay for the existing and the proposed technique. the proposed technique is represented using red line and the existing technique is represented using the green line. The proposed technique has better end to end delay. That means the selected path will be having least traffic. Will deliver the packets at the higher rate compared to the base technique. The proposed technique has better performance compared to the based technique in terms of the path selection and the message sending on the selected path.

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## 6.7 Packet Delivery Ratio

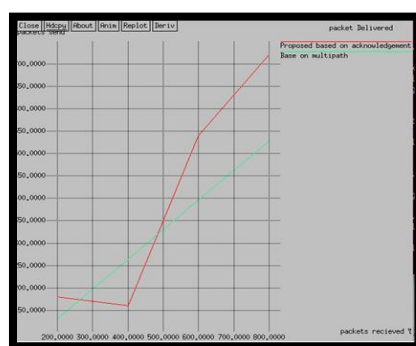


Fig. 6 Packet Delivery Ratio comparison

Fig. 6 shows the packet delivery ratio for the proposed technique in comparison to the base technique is shown the graph. The proposed technique is shown with the red color and the existing technique is shown using green color. The proposed technique has better performance compared to the base technique. More packets are being delivered from source to destination compared to the base technique. in the initial the packet delivery ratio is low. But at the later stage more packets will be delivered from the source to destination.

## VII. CONCLUSION

MANET is the mobile ad-hoc network. Where various mobile nodes intercommunicate to each other to share the messages with each other. It is cost effective network. Where the network is layout in small area easily for temporary period. Later on this structure can be moved to some other place without having much of the cost. This makes it a feature full system for various types of applications like strategic and the non strategic field applications. MANET has various performance issues. Different levels of research is being held by different researchers to enhance the performance. In same line in current research is focused on the issue of improving the performance of the network without increasing the hardware. This means the system requires up gradation in the protocol settings. In current research strobe pulse is sent to the identified path to check the path strength. Whichever path will be having higher strength will having faster delivery of the messages. The proposed approach has shown the performance on different parameters like throughput, end to end delay, packet delivery ratio, Packet sent, Energy dissipation etc. On all the parameters the performance is optimized compared to the existing approach of S-MPRP.

## VIII. FUTURE WORK

Currently different researchers are giving emphasis on different aspects for the performance enhancement. The existing and the proposed techniques can be enhanced with application identification into the proactive protocols. And further research can be done on the security improvement of the MANET.

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**Vol. 9, Issue 1, January 2020**

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