



Bharath

INSTITUTE OF HIGHER EDUCATION AND RESEARCH

(Declared as Deemed-to-be University under section 3 of UGC Act, 1956)

(Vide Notification No. F.9-5/2000 - U.3, Ministry of Human Resource Development, Govt. of India, dated 4th July 2002)



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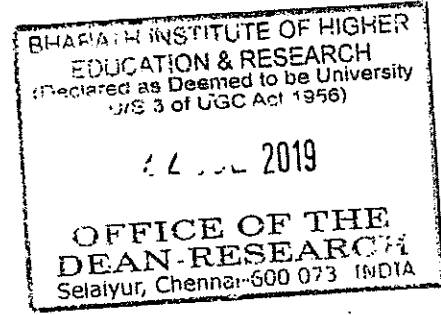
173, Agaram Road, Selaiyur, Tambaram,
Chennai - 600 073. Tamil Nadu.

Ref No.SMS-2018-O-19

Date: 22/07/2019

TO

Mrs. S. Philomina,
Asst. Professor/ECE,
BIHER.



Thro: Concern Head of the Department

Greetings!!!

We are happy to announce that the Research Advisory Committee has approved your proposal for Seed Money Scheme-2018 which was presented by you. You are requested to complete the proposal and send the progress report to the Dean Research in the prescribed time period.

Title of the Project: DYNAMIC DATA FLOW MANAGEMENT IN MOBILE ADHOC NETWORK

Seed Money Amount: Rs.1, 00,000/- (Rupees One Lakh Only)

Approved on: 17/07/2019

Payment details:

Cheque No.375321

Dated: 17/07/2019

Bank Name: Indian Bank, Selaiyur, Chennai.

With Regards

Dean-Research

PROPOSAL SUBMISSION

1. Details of Principal Investigator

Name : Dr. S. Philomina
Designation : Associate Professor
Highest Qualifications : Ph.D.
Department : Electronics and Communication Engineering
E-mail : philomina.ece@bharathuniv.ac.in
Contact no : 9080143665
Date of Joining : 05-09-2007

2. Details of Co - Principal Investigator

Name : Dr. M. Sangeetha
Designation : Professor
Highest Qualifications : Ph.D.
Department : Electronics and Communication Engineering
E-mail : sang_gok@yahoo.com
Contact no : 9884221512
Date of Joining : 27-11-2015

Technical details

1. Introduction

The Modern world is fully occupied by Wireless communication which leads to research in the field of Mobile Ad hoc network (MANET). Because of the high adaptability, low establishment and maintenance cost, MANET is preferred over other networks. MANET is a network created by a collection of mobile nodes communicating using wireless link via intermediate nodes which agree to route messaging with each other. MANET have issues like restricted bandwidth, constrained resources, varying topology, wireless link, inadequate resources and a decentralised approach. Data loss is a major issue faced by MANET.

Data loss occurs due to congestion, link failure, traffic, attacks like denial of service and coverage problem. Data loss adversely degrades the performance of the wireless network to a great extent. This entire work focuses on the causes of degradation of network performance due to data loss on a particular category of wireless network called adhoc wireless network. Major contributions of this research are the Transmission and Reception Rate based Ad hoc On-demand Distance Vector (TRR-AODV), cooperative communication and Secure routing Ad hoc On-demand Distance Vector (SRAODV) .

TRR-AODV avoids data loss due to congestion by selecting a routing path based on the transmission and receiving rate of the intermediate nodes. SRAODV solves data loss problem due to denial of service attacks. In SRAODV the average communication time between the source and destination to transmit a packet is calculated using heartbeat timer and a threshold value is fixed. The acknowledgment node id is checked if the communication time is greater or lower than the fixed allowable limit. In Cooperative communication, data loss due to coverage problem is focused. When a receiving node moves out of the coverage area, in order to maintain the continuity the remaining data packets are transmitted by considering the neighbour node as a carrier node. This avoids the disconnection of data transmitted and the request for new route to

resume the data transmission. The proposed system gives an improved routing performance such as Packet Delivery Ratio, end to end delay, and throughput.

2. Review of status of Research and Development in the subject

- **Ad-hoc On-demand Distance Vector (AODV) protocol**

T.G.Basavraju, S.K.Sarkar, C.Pattumadapa and M.A.Gautham 2014 introduced ECARP which is the most popular AODV protocol. This protocol considers the base algorithm in order to make the parameters to be utilized well. The advantages of ECARP are that it will use redundant routes that will increase the credibility to avoid congestion. This is needed during high data traffic. At the same time, it will dramatically reduce the congested routes and recover them. The initial setup will cause minimal overhead to the network.

- **Stable Energy efficient QoS based Congestion and Delay aware Routing (SEQDR)**

Mandeep Kaur Gulati, Krishan Kumar 2015, created Stable Energy efficient QoS based Congestion and Delay aware Routing (SEQDR) which considers different metrics like strength of signal, drain rate, end to end delay and length of queue. Queue length is used in load balancing and it will ignore the routes from being congested. This protocol will estimate the structural path which is efficient to pass the data to the destination. It is a Reactive based routing protocol. It is used to maintain the routing table for the proper projectile of the packets. The source node will check in its entry table whether there is a stable path to reach the destination.

- **End-point Congestion (EPC) Protocol**

Alonso, M. G., and Flich, J 2015, presented a protocol which can control the congestion by separating the normal traffic to the congested traffic. This routing protocol is called as End-point Congestion (EPC). Their role is to facilitate the path with maximum throughput. To implement this mechanism, they use the filters to be deployed in each and every router involved in the process. The router will check each and every packet with the hello tag with its own feature.

- **Improvement in AODV Protocol**

Mieso K. Denko. et al., 2006 describe the cluster based AODV algorithm in detail and the performance of the network is analysed. The cluster based AODV divides the network into clusters and a head is elected based on the mobility and lowest ID. Therefore, caution has to be taken in the selection of the head. The Cluster head is selected by keeping the node power under consideration. Once the node power goes down, new head with greater power is selected.

Xia, L.et al., 2009 anticipated an improvement to AODV, as Improved AODV-I. In general conventional AODV do not support the route repair mechanism. But in Improved AODV, the RREQ packet will not only prevent the packet from being congested but also make them to wait till the routes are busy. This is possible only by these components in which it improves the route repair mechanism along with nominal latency rates and throughput.

Charles E. Perkins, Elizabeth M. Royer 2013 explain the AODV algorithm in detail and its performance in the field of networks is studied. It drops data packets due to hidden terminal problem, because of the shortest path selection, which is the main disadvantage. From one access point only one node is visible, not the other, but it is connected to Access point. To understand, node A is connected to node B and C, but they (B&C) cannot converse with each other. If node B and C want to converse, congestion occurs in node A and packets are dropped. In this topic data packet loss and other problems are rectified by enhancing the algorithm.

Houda Moudni, et al., 2016 suggested a personalized AODV routing protocol. This modified protocol protects the network from the black hole attack. This removes single or multiple malicious nodes from the network. In this proposed method the intermediate node generates two reply packets. If the sequence number of the second RREP packet is greater than sequence number of the first RREP packet by 1, then the packet will be considered as a verified packet. The nodes after receiving the RREP packet, has its verify field checked, if it is 0 then the packet will be an unverifiable packet. The sequence number is then checked and if the condition is satisfied, then the verify field is

set to 1. The packet will be ignored if the sequence number does not satisfy the condition after checking the verify field in the RREP packet received by the node and found to be 0.

- **Inferences from the literature survey**

From the literature survey it is observed that the data loss is a major problem in MANET. There are many reasons for the occurrence of data loss in the network. First, congestion based data loss is discussed. Various congestion control techniques based on congestion aware and congestion adaptive routing protocol are discussed. Secondly, data loss due to malicious nodes and various solutions proposed to solve the security issues in MANET are discussed.

2.1 International Status: NIL

2.2 National Status: NIL

3. Progress/achievement so far,

- a) Reference papers were collected.
- b) Literature survey was studied.
- c) Proposal work has been started in the simulation of dynamic data flow management in mobile adhoc network.

4. Work Plan:

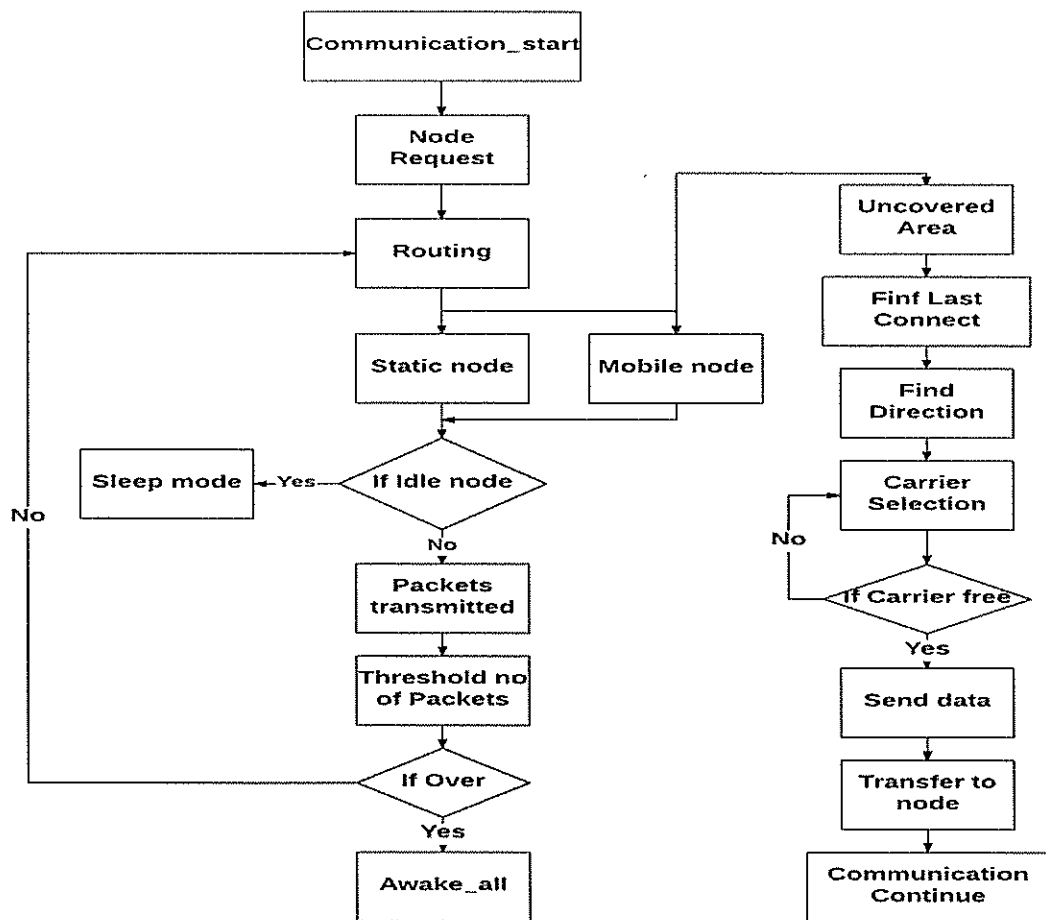
4.1 Methodology:

The main objectives of dynamic data flow management in mobile adhoc network approach are as follows,

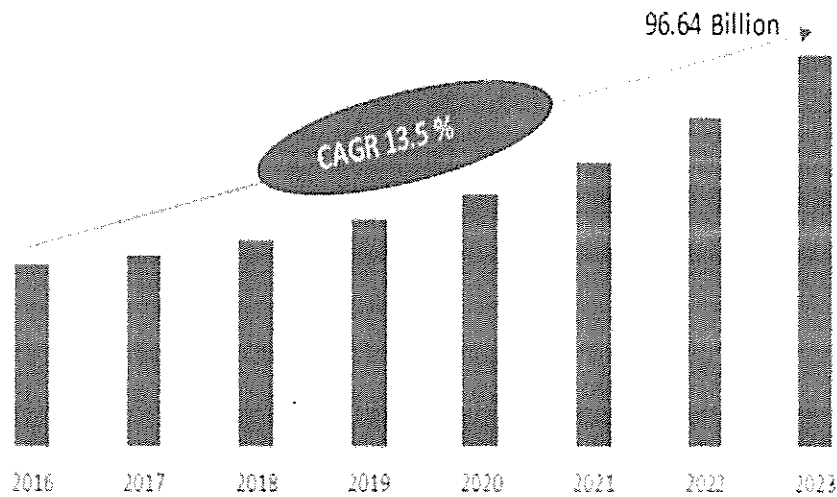
- To develop and analyze the performance of rigid sensing algorithm to reduce the data loss in order to enhance the performance in MANET. The routing path is selected based on the transmission and the reception rate of the node which is calculated before communication. This avoids data loss due to congestion.

- To develop a solution for data loss due to security issues in adhoc wireless network.
- To improve energy efficiency in adhoc wireless network.
- To develop a method to solve coverage problem incurred with data loss in MANET through Co-operative Communication.

SYSTEM FLOW CHART:



The Global Wireless Data Communication Market, 2018—2023

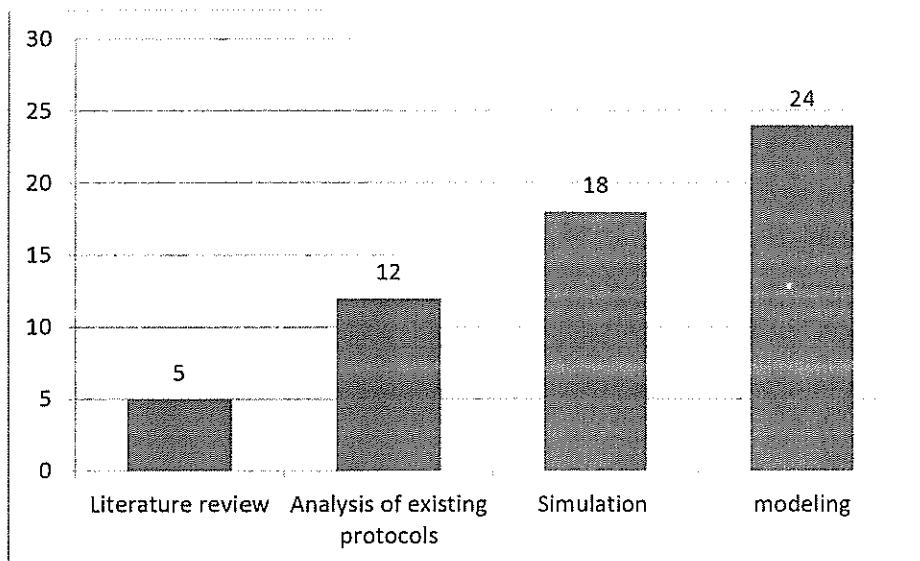


Survey source: <https://www.marketresearchfuture.com/>

4.2 Time Schedule of activities giving milestones through Pie diagram.

Work plan (including detailed methodology and time schedule)

Sl. No.	Activity / Milestone	1 st Year		2 nd Year	
1.	Literature review	1-5			
2.	Analysis of existing protocols		6-12		
3.	Simulation			13-18	
4.	modeling				19-24



Expected outcome within the time period of Seed Money Scheme

- a) Simulation model can be implemented within the time period of Seed Money Scheme.
- b) For a real time parameter based evaluation can be done within the time period of Seed Money Scheme.

5. Suggested Plan of action stating the name of funding agency where the project will be communicated for financial support within the time period of project.

Nil

6. Bibliography: Nil

7. List of Projects submitted/implemented by the Investigators (Separate for PI and Co-PI)

Nil

7.1 Details of Projects submitted to various funding agencies:

Sl. No.	Title	Cost in lakhs	Month of submission	Role as PI/ Co-PI	Agency	Status
	NA	NA	NA	NA	NA	NA

7.2 Details of Projects under implementation

Sl. No.	Title	Cost in lakhs	Duration	Role as PI/ Co-PI	Agency
	NA	NA	NA	NA	NA

7.3 Details of Projects completed during the last 5 years

Sl. No.	Title	Cost in lakhs	Duration	Role as PI/ Co-PI	Agency
	NA	NA	NA	NA	NA

8. List of publications published by the Investigators, if any:

a) Co - Principal Investigator

1. Sangeetha M., Manickam P., Rajapaul Perinbam J. and Kumaran M., 'A Dataflow extraction technique for Hardware/Software Partitioning of Software Binaries', published in World Scientific Engineering and Academic Society (WSEAS) Transactions on Electronics, Issue5, Vol. 3, May 2006, pp. 308-313.
2. Sangeetha M., Kumaran M, Rajapaul Perinbam J. and R.Mythili, 'Hardware-Assisted Simulation and Evaluation of IPCores', published in Asian journal of scientific research, Volume 7, No.1, 195-199,2009 .
3. Sangeetha M., Rajapaul Perinbam J and Kumaran M, 'A State Transformation based Partitioning Technique using Dataflow Extraction for Software Binaries', published in International Journal of Computer Science and Network Security, Volume 9, No. 2, Feb 2009. pp. 264-273.
4. Sangeetha M., Vani R. "Study of Evaluation Metrics in Block-Based Algorithms based on H.264 Video Codec", in European Journal of Scientific Research, Vol. 89 No 2 October, 2012, pp.249-256.

5. Sangeetha M., Leelavathi, Udhayasuriyan Kalaiselvi, Kavitha., "Scheduling and Allocation Algorithm for an Elliptic Filter", International Journal of Advanced Information Technology (IJAIT) , Vol 2.,No 2, pp.93-101.
6. R.Vani , M.Sangeetha , P.Davis , "CHDS: A Fast Search Algorithm For Motion Estimation in Video Coding Standards", Journal of Theoretical and Applied Information Technology Print ISSN 19928645 ,E-ISSN 18173195 , 31st July 2014. Vol. 65 No.3 ,pp.606- 615, Pakistan Little Lion Scientific, 2014.
7. P Davis, Sangeetha Marikkannan, "Implementation of motion estimation algorithm for h. 265/HEVC", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol 3 No 3, 2014, pp. 122-126.
8. Vani Rajamanickam, Sangeetha Marikkannan , "Efficient Block-based Motion Estimation Architecture using Particle Swarm optimization", International ARAB Journal of Information Technology ,Print ISSN 1683-3198 Jordan Zarka Private Univ.(ANNEXURE I, ACCEPTED FOR PUBLICATION IN VOLUME 14, NO.5, SEPTEMBER 2017).
9. R.Vani , P.Davis , M.Sangeetha , "Modified Cross Hexagon Diamond Search Algorithm for Fast Block Matching Motion Estimation", International Journal of Engineering and Technology, ISSN : 0975-4024, Vol 6 No 4, Aug-Sep 2014 , pp . 1737- 1757, India, Engg Journals Publications.
10. M.Vinoth kumar, J.Gobinath, M.Sangeetha, "Realtime distributed wireless sensor network for monitoring smart Agricultural environment", International journal of Applied Mechanics and Materials Vol. 573 (2014) pp 388-393.
11. Vani Rajamanickam, Sangeetha Marikkannan, T. Rajavelu," An Hybrid Motion Estimation Algorithm For Video Coding Standards", International Journal of Applied Engineering Research, ISSN 0973-4562 Volume 10, Number 2 (2015) pp. 4885-4894(ANNEXURE II)
12. Vani Rajamanickam, Sangeetha Marikkannan and Sharmila Ganesan, "An Improved Motion Estimation Search Algorithm for H.264/AVC Standard", VOL. 10, NO. 6, APRIL 2015 ISSN 1819-6608 , ARPN Journal of Engineering and Applied Sciences , pp. 1-6. (ANNEXURE II) .
13. Vani Rajamanickam and Sangeetha Marikkannan, "An efficient Motion Estimation Algorithm for Search point reduction in Video Coding", International Journal of Applied Engineering Research, ISSN 0973-4562 Vol. 10 No.33 (2015) (ANNEXURE II)
14. Vani Rajamanickam and Sangeetha Marikkannan, "A New hybrid search algorithm with novel Cross-Diagonal-Hexagon Search Video Coding Algorithm for Block Motion Estimation", Wireless Personal Communications, Springer (ANNEXURE I)

15. Dr M. Sangeetha, "Control construct estimation for Partitioned Binaries in Codesign System", International Journal of Advanced Research in Innovative Discoveries in Engineering and Applications, Vol. 1 No 1, October 2016, pp.22-27.
16. R. Vani, N. Ushabhanu, M. Sangeetha, 'Fast Motion Estimation Algorithm using Hybrid Search Patterns for Video Streaming Application' International Journal Of Computers Communications & Control, ISSN 1841-9836,, 12(5), October 2017, pp.715-727.

b) Principal Investigator

1. Philomina.s, Dr.Ramesh, "TRR-AODV Based Performance Enhancement in Mobile Ad Hoc Network", Journal of Advanced Research in Dynamical and Control Systems, 9(1),35-40,1943-023X,2017.
2. Philomina, S., Sundararajan, M. , "GSM based vehicle ignition system", Journal of Chemical and Pharmaceutical Sciences,9(3),107-110,0974-2115,2016.
3. Philomina, S., Sundararajan, M., "Accomplished locomotives in wireless sensor Proprietary wireless protocols", Journal of Chemical and Pharmaceutical Sciences,9(3),111-115,0974-2115,2016.
4. Philomina, S., Sundararajan, M. ,"Wireless multipoint message transfer system", Journal of Chemical and Pharmaceutical Sciences,9(3),116-120,0974-2115,2016.
5. Philomina S., Karthik B.,"Wi-Fi energy meter implementation using embedded linux in ARM 9",Middle - East Journal of Scientific Research,20(12),2434-2438,1990-9233,2014.
6. Philomina S., "Remote control system using embedded linux and ARM 9", Middle - East Journal of Scientific Research,20(12),2491-2496,1990-9233,2014.
7. Philomina S., "Sophisticated home appliance control system using embedded linux", Middle - East Journal of Scientific Research,20(12),1873-1878,1990-9233,2014.
8. Philomina S.," General purpose embedded systems using linux and wireless protocols", Middle - East Journal of Scientific Research,20 (5),646-649,1990-9233, 2014.
9. Philomina S.,"An electronic system for evaluating CO2 emission using embedded systems", Middle - East Journal of Scientific Research,19(9),1156-1161,1990-9233, 2014.
10. Philomina S.,"An optimal analysis for design of Viterbi decoder", Middle - East Journal of Scientific Research,16(12),1846-1853,1990-9233,2014.

11. Philomina S., "Secured ATM transaction using GSM", Middle - East Journal of Scientific Research,16(12), 1838-1841,1990-9233,2014.
12. Philomina S., "Controlling of automation systems using wired protocols", Middle - East Journal of Scientific Research,18(12),1745-1750,1990-9233,2014.
13. Philomina S., "Design portal of a wireless linked naval substation for international boundary scanning and surveillance system", Middle - East Journal of Scientific Research,16(12),1842-1845,1990-9233, 2014.
14. Philomina S., "Wireless embedded device based on Zigbee technology for monitoring physiological parameter", Middle - East Journal of Scientific Research,16(12),1853-1858,1990-9233,2013.
15. Philomina.s, Dr.Ramesh, "Maximum Demand Control Using Ad-Hoc Network To avoid grid failure", IJAER 10(1),1439-1448,0973-4562,2015.
16. Dolphin Kiruba D., S. Philomina An Efficient Energy Saving Energy Distribution Management System,IJAER, 9(22),6257-6263, 0973-9769,2014.

9. Budget

Sl. No.	Equipment	Quantity	Amount in INR
1	Wireless Tri-Band Gigabit Router	2	70000
2	Consumables (Like, testing tools etc.)	As per requirement	15,000
3	Travel support for the purpose of research work.	---	5,000
4	Contingency	---	5000
5	Others	---	5000
	Total		1,00,000

10. Name of at least two subject experts from the Institute and one from the outside Institute with their contact details:


- a) Dr. B. karthik –Professor, Dept of ECE, BIHER, Chennai-600073.
- b) Dr. R. Ramesh – Professor, Dept of ECE, Saveetha Engineering College, Chennai.

CERTIFICATE FROM THE INVESTIGATOR

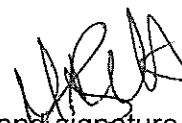
Project Title: DYNAMIC DATA FLOW MANAGEMENT IN MOBILE ADHOC NETWORK

It is certified that

1. I do hereby agree to submit a complete proposal for financial support to the external funding agency within the time period of SMS-2018
2. I undertake that spare time on equipment procured in the project will be made available to other users.
3. I agree to submit a certificate from Institutional Biosafety Committee, if the project involves the utilization of genetically engineered organisms. I also declare that while conducting experiments, the Biosafety Guidelines of Department of Biotechnology, Department of Health Research, GOI would be followed in to.
4. I agree to submit ethical clearance certificate from the concerned ethical committee, if the project involves field trails/experiments/exchange of specimens, human & animal materials etc.
5. I agree to abide by the terms and conditions of SMS-2018, BIHER, and Chennai.



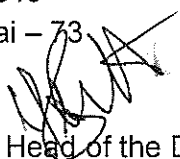
Name and signature of
Principal Investigator



Name and signature of
Co-Principal Investigator

Date: 17/06/2019

Place: Chennai – 73



Forwarded by Head of the Department



Signature of the Head

PROJECT EVALUATION FORMAT

Recommendation Sheet

Name of the Principal Investigator	Dr. S.Philomina
Name of the Co-Investigator	Dr. M. Sangeetha
Name of the Department	ECE
Title of project	DYNAMIC DATA FLOW MANAGEMENT IN MOBILE ADHOC NETWORK
Recommendation of the evaluation committee	Yes.
Financial allocation recommended	Rs. 1,00,000 -

Sl. No.	Equipment	Quantity	Amount in INR
1	Wireless Tri-Band Gigabit Router	2	70000
2	Consumables (Like, testing tools etc.)	As per requirement	15,000
3	Travel support for the purpose of research work.	---	5,000
4	Contingency	---	5000
5	Others	---	5000
	Total		1,00,000

Name and Signature of the Research Advisory Committee members with date

Recommended
[Signature]
Dr. P. Narayana Chandra

