

# E-guard Medical System Using Dynamic Source Routing Technique from MANETs

**Dr. K Srinivas**

Professor, Department of Computer Science and Engineering, Koneru  
 Lakshmaiah Education Foundation, Hyderabad – 500075.  
 Email id: sreecw9@klh.edu.in

## Abstract

World is increasing with over population, people requires more health care according to health wise. Mobile ad hoc networks (MANET) provides very life expensive application for the users. Mobile ad hoc network are of two types infrastructure and infrastructureless network. Mobile ad hoc networks comes under infrastructureless wireless networks. This type of network is very less expensive and no need to go for infrastructure. Every user should have good internet connection. Application contains 2 sides, client and server sides. SARA - HUB is server side working software application which gives best performance in the worst time. [copyright information to be updated in production process]

*Keywords: MANET, Client-server, SARA – HUB, ad hoc networks, networks, RREQ, multi hop network, wireless network, wire network, e-guard medical system;*

## 1. INTRODUCTION

Wireless industry has seen exponential growth in the last few years. The advancements in growing availability of wireless networks and the emergence of wireless networks and handheld computers, personal digital assistance PDAs and cell phones is now playing a very important role in our daily routine. Two types of wireless networks: one is infrastructure networks and another one infrastructureless networks. Infrastructure and infrastructureless networks both are wireless networks. Infrastructure networks are of two types 1. Single-hop network and 2. Multi hop network, same way infrastructureless network is of two type 1. Single-hop network and 2. multi hop network. Hop network is nothing but network(s) and each network with nodes and where packets are to be passed from one network to another network. Single-hop means where a packet is sent from source to destination without the help of any other network. Multihop means packets are send from one network to another network from source to destination network as shown in below figure 1.

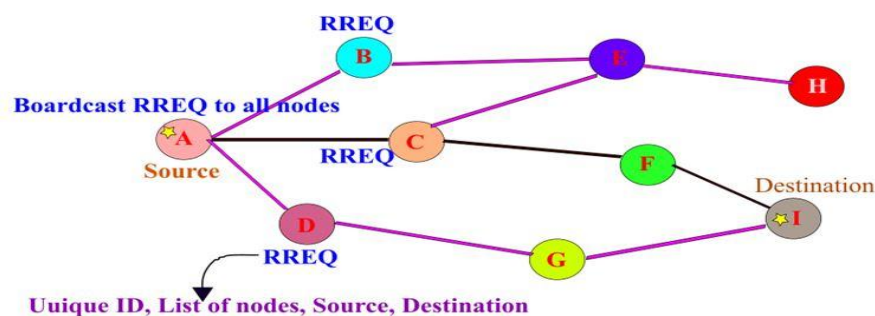


Fig 1 Example for Multi hop network.

A multiple path is established from source to destination with the help of other network(s), example source is A and want send information to destination I via node(s) C and F. Infrastructure network single-hop, example is your Wi-Fi wireless network at your home, you have a router and it is connected to various devices system/ PC, different mobile phones and other resources, this type of network is called infrastructure. Infrastructure network multi hop can have an example of GSM, Global system for mobile communication, where a message or data is sent to friend mobile, who is located Geographical, far distance from source and data is passed through different networks to destination. Infrastructureless network single-hop takes an example of Bluetooth where infrastructure is not required. Infrastructureless network multi hop take the example of ad hoc. Ad hoc carries from infrastructureless network under wireless network.

An ad hoc wireless network is collection of mobile nodes or PC or desktop, which transforms to a temporary network without the aid of centralized and administration or support device regularly available as conventional networks. Thus a node may forward packets between other nodes as well as run user application as shown in below figure 2. Mobile node can be a router or host, router will be sending packets between the nodes and it will receive the packets from

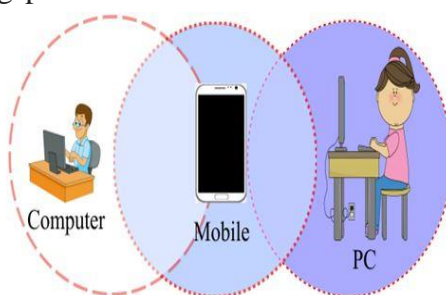


Fig 2 Ad hoc Wireless Network Communication

other nodes, best example for MAN is walkie talkie. By nature these types of network are suitable for situations. Ad hoc wireless network is found in many applications in various fields like defense, critical situations, and sensor network. Since the network nodes on mobile, an ad hoc network will typically have dynamic topology profound effects on network characteristics. In network, child machines which are loaded with battery, CPU limitations, memory consideration and bandwidth. Furthermore, wireless (radio) media will also affects the behavior of the network due to fluctuating link bandwidth resulting high error rates.

## 2. Literature Survey

- [1] ChandrashekharGoswami et. al, author focuses on infrastructureless wireless networks (CBRT-LPUV) abbreviated as cross-layer and reliable opportunistic routing with location prediction update vector used to predict nodes location dynamically even at high node mobility situations. The model implemented in the NS2 and performance level is good but it is expensive. Using this model author calculated end-to-end delay time, packet delivery ratio and network lifetime metrics.
- [2] SanamNagendran et. al, author focuses on Mobile ad hoc networks rapidly growing communication system which is best Don node type of communication which is called as multi hop. Author projects the details on parametric estimation of ad hoc on-demand distance vector, dynamic source routing and destination sequence distance vector protocols and no focus on real time.

- [3] S J Sultanuddinet. al, focuses on STMR - secure token based multipath routing protocol using this protocol for hybrid clustering and path selection algorithm. Finally the STMR protocol is applied on AOMDV to verify and evaluate the performance but no focus on real time.
- [4] S J Sultanuddinet. al, author focuses on routing protocol mobilead hoc network. The proposed EQOTR protocol is used for efficient data gathering and link monitoring techniques of the nodes.
- [5] E Jayanthiet. al, author focuses on challenges in MANET, nodes are used under this Manet and are certified. Voting and non-voting based mechanism is used for certification purpose. If any node is not certified that means it is malicious node.
- [6] Arshad Ahmad Khan Mohammad, et. al, author focuses on MANET mobile notes that communicate with each other through Radio Communication channel, for secure network. The node pass packets to nearest node, this node can be secure not be secure, any hacking pirate change the IDs office note and get the valuable packets to the black hat node. The paper focuses on the security of the node which contains its ID and topology table.
- [7] ThatiBalamuralikrishnaet. al, author focuses on energy-aware design of the battery nodes that are in wireless communication. This paper focus on energy aware routing algorithms for energy optimising techniques in the ad hoc networks.
- [8] G T Chavanet. al, author focuses on dynamicity of nodes in Ad Hoc networks that are combined with location estimation algorithm to know the distance of each node or neighboring nodes of each node and their distance.

### 3. Existing System

Technology is growing day by day sophisticated are introduced to this world, Technology playing a key role everybody life. Technology is helping various ways like commercial systems, communication system, weather, entertainment and various fields. Technology is spreading its wings super giving better performance customers or users. Same here a key role in medical system. According to USA there are lot of deaths at emergency level. Last few minutes in everybody emergency plays a key role. Previously they used helicopter lift persons who are in emergency. Where it is very expensive and sometimes patient loose life.

### 4. Proposed System

It is a type of multi hop wireless networks and nodes in the network are mobile in general. The wireless host in such networks communicate with each other without their existing of fixed infrastructure and without a central control. Mobile ad hoc Network can be connected to other fixed networks or to the internet as shown in figure 2. Most of the adhocnetwork use the allocated frequency for the industrial scientific and medical (ISM) band. Adhoc Network can have more flexibility than other networks[21]. Adhoc networks are temporary and you can add nodes and remove nodes. It is better in mobility, it can be turn up and turn down in a very short time or period, it can be more economical considered a robust network non-hierarchical distributed control and management mechanisms. When we want to communication any two devices like mobile and your personal computer, then go to control panel and select network connections and add adhoc network to your Windows 10 operating system, then automatically your mobile and PC come to adhoc Network, you can add more devices or break the adhoc Network. There are lot of ad hoc network applications, group of people with laptops and they

want to exchange files and data without having an access point mobile hotspot is one of the example for this type. Adhoc network is most used in defense field (DoD), it is suitable for military communication where there is no network infrastructure. There are several challenges that ad hoc network faces limited wireless range, hidden terminal, packet losses, routes changes, devices heterogeneity and battery power constraints. Adhoc network will not have any infrastructure that means no base station, no back bone and no server. No network operators required so it is self-organization, self-configuration and self-healing. Multi hop wireless communication contains the nodes sometimes node is also called as mobile and this mobiles can communicate with each other in the same network or different networks. The other kind of environment an ad hoc network is emergency rescue operation[21]. The ad hoc form of communications is especially useful in public and research and rescue applications as shown in below figure 3.



Fig 3 e-guard Medical System

Medical teams require fast and effective communications when they rush to a disaster area to treat victims. They cannot afford the time to run cabling and install networking hardware. The medical can employee ad hoc networks (mobile nodes) such as laptops and PDAs and can communicate via wireless link with the hospital and the medical team on-site. For example a user on one side of the building can send a packet destined for another user on the far side of the facility, well beyond the point-to-point range of WLAN, by having the data routed from client device to client device until it gets to its destination. This can extend the range of the WLAN from hundreds of feet to miles the concentration of wireless users. Real-time communication is also important since the voice communication predominates data communication in such scenarios. Below figure 3 shows the adhoc Search-and-rescue application. Aggregate ad hoc networks is shown in figure 4.

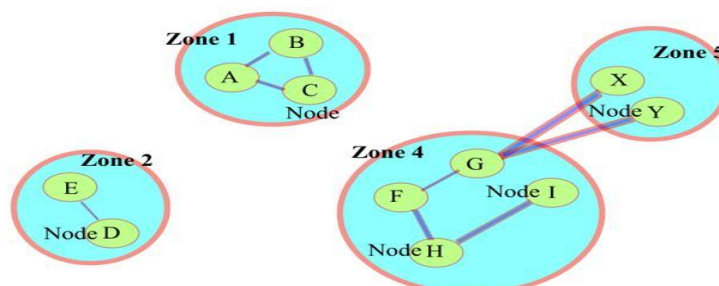


Fig 4 Aggregate ad hoc networks

Each node belongs two levels of topology: low level (node level) and high level (zone level) topology. Individual node may carry with two ID numbers node ID number and zone ID number. Normally, aggregate architectures are related to the notation of zone. In aggregate architectures, we find both intrazone and interzone architectures, hierarchical architectures. A further classification of ad hoc networks can be performed on the basis of the hardware configuration of the nodes. There are two types of node configurations: homogeneous networks and heterogeneous networks.

## 5. Implementation

On-demand ad hoc routing protocols - reactive protocols are also called on-demand routing protocols[21]. These protocols create the routes to a destination only when required. The route Discovery procedure is triggered whenever send data to find the destination node, and the route is maintained through the route maintenance procedure until the route is no longer required. In this manner communication overhead is reduced and battery power is conserved as compared to proactive routing protocols. As shown in below figure 5 there is a topology table in each node. When there is a request in node 1 to transmit data to node 4, the route discovery process starts by broadcasting to all nodes searching for node 4. When Node 4 receives this is this message, it responds to the request to build the route to node 1. The process is complete once a route is found for all possible route permutations have been examined. Once a route has been established it is route maintenance procedure.

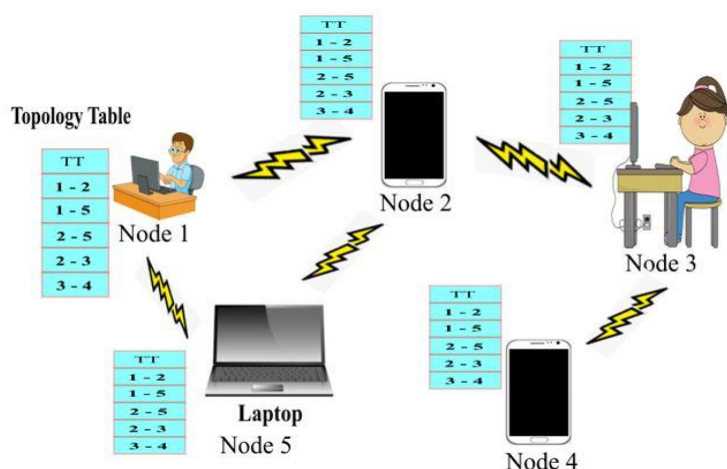


Fig 5 Proactive ad hoc protocol

The advantage of on-demand routing protocols lies in the fact that the wireless channel does not require to carry a large amount of routing overhead data for routes that are no longer used. This advantage may be reduced in certain scenarios where there is heavy traffic to a wide range of nodes. Thus, these scenarios have a strong impact on performance. In a scenario including large amounts of traffic to several nodes, the route setup traffic can rise higher than the constant background traffic to preserve the correct routing information at every node. Still, if sufficient capacity is available, the compact efficiency (increase overhead) may not influence other performance methods such as throughput or latency. On-demand/reactive routing protocols are

dynamic source routing protocol (DSR), ad hoc on demand distance vector routing protocol (AODV), location aided routing (LAR), associativity-based routing (ABR) and signal stability-based adaptive routing protocol (SSA). These protocols find paths to destination only when needed (on-demand) to transmit a packet. Our concern is related to dynamic source routing (DSR) protocol, this is a source based routing protocol, on-demand protocol periodically exchange the so-called beacon (hello) packets, hello packets are used to inform neighbours about the existence of the node and DSR does not use hello packets. The basic approach of this protocol is as follows: during root construction DSR floods a route request packets in the network. Intermediate nodes forward route request if it is not redundant. Destination node replies with route reply, route reply packet contains the path traversed by route request packet and the receiver responds only if this is a first route request and not a duplicate. The DSR protocol uses the sequence numbers, route request packet carries the path traversed and sequence number and the sequence numbers are used to prevent loop information and nodes check it. The DSR also uses route cache in each node, if node has a route in the cache, this route is used.

Proactive routing protocols enable each node to keep up-to-date routing information in the routing table. This routing table is exchanged periodically with all other nodes, as well as when network topology changes. Thus, when a node needs to send a packet, the route is readily available. However, most of the routing information that is exchanged is and undesired. Proactive routing protocols are also called table-driven routing protocols. Below figure illustrates the concept of proactive protocols. For example, if node 1 wanted to send some data to node 4 on the previously prepared topology table, which is stored in Note 1. Table parsing is faster and requires less power than searching the entire network for a destination. If the network nodes do not have frequent mobility, then the topology table will not consume too much power. DSR is another on-demand protocol designed to restrict the bandwidth consumed by control packets in ad hoc networks by eliminating the periodic table-update message required in the table driven approach. The sender knows the complete hop-by-hop route to the destination, and those routes are stored in a route cache. The data packet carries the source route in the packet header. There are two major phases in this protocol. The first is root discovery, which is achieved by flooding the network with RREQ packets. The destination node upon receiving an RREQ, responds by sending an RREP packet back to the source along the same route traversed by the incoming RREQ packet. Any node can update its cache when it receives are forward a packet containing source route information. The route cache can be used to reduce the number of packets flooding the network. The second phase is root maintenance. Based on DSR protocol a novel model called e-guard Medical system is shown in figure 6.

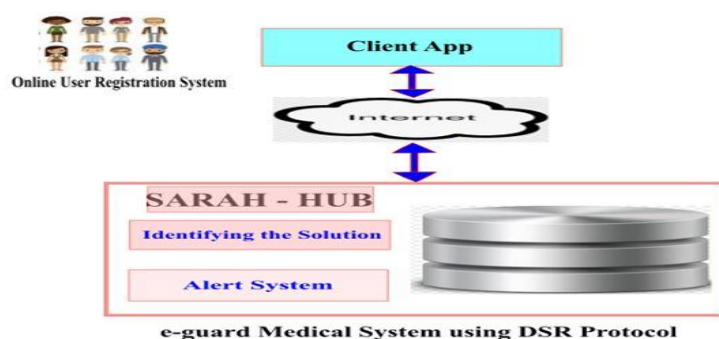


Fig 6 e-guard Medical system using DSR Protocol



## Algorithm

Step 1: Public who want e-guard Medical System should login or register.

Step 2: User should follow guidelines or minimum requirements for sensors, mobile and internet.

Step 3: Users report is monitored by electronic gadgets and information is passed to server-end

Step 4: Client-side information is received by SARAH – HUB. Search-and-reach-application-help – HUB.

Step 5: Server has information about the nodes like hospital, emergency, ambulance and police.

Step 6: Based on requirements solution is identified and information is stored in the repository for future use.

Step 7: Based on Dynamic Source Routing Protocol nearest node is identified and processed.

Flow chart as shown in figure 7.

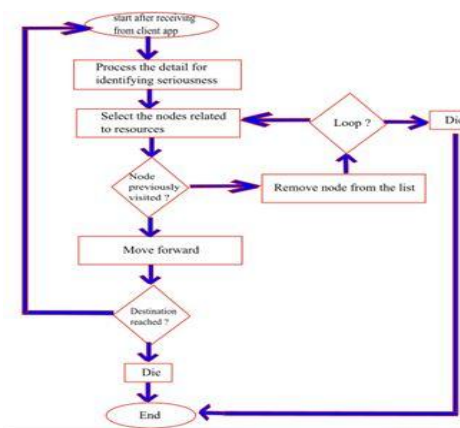


Fig 7 DSR nodes routing

## 6. Testing

e-guard Medical System using DSR protocol, this protocol is used efficiently under manet domain. With low infrastructure/ infrastructureless wireless network we can save human life. There is a wrist watch or medical sensor can be attached to human body via app provided by e-guard Medical System. Public can register through online application of website provided by the e-guard Medical System. e-guard Medical System has two parts client application and server application. Client application will be available in user mobile or any other electronic gadget like tab or personal computer. Server version will be available at SARAH - HUB office. Server application will be monitoring client application based on the emergency. Client application will get the details of the patient or user regularly from the sensors. Based on sensors reading server application will be search-and-reach-help-hub (SARAH - HUB), based on the of the patient sensors server application will identify the solution. Solution means identifying the nearest nodes, nodes on nothing but resources like hospital, emergency, ambulance and police. An alert message is send to resources based on the problem of the patient or user. Healthy user can also register for the website, any person at anytime using minimum requirements or guidelines can become a user. Every user should have good internet services. By using so we can human life in the emergency conditions.

Annual deaths in USA is shown in below figure 8.

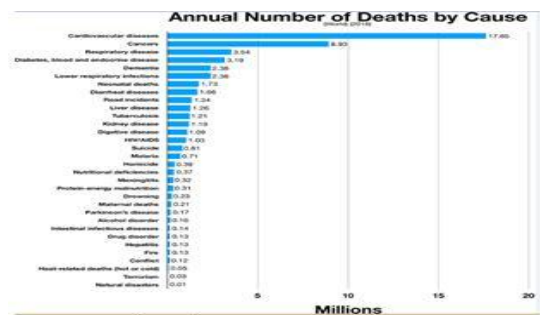


Fig 8 Annual Deaths in USA

Reduced death rates due to e-guard Medical System as shown in below figure 9.

The medical diagnosis CSV file, named Medical\_Diagnosis.csv, contains the diagnostic data related to a medical invoice. Each row of the CSV file relates to one row in the Medical\_Invoices.csv file by the INVOICE\_ID field. There can be multiple diagnosis rows relating to one invoice. Each field in the following table must be included in the CSV file in the order listed, but the fields can be empty. The fields can be empty except for INVOICE\_ID and DIAGNOSIS\_ID.

Table 1 Medical diagnosis CSV required fields.

Field	Description
DIAGNOSIS_CODE	A string value that identifies the type of diagnosis
DIAGNOSIS_ID	A string that serves as the primary key by uniquely
INVOICE_ID	A string that serves as a foreign key, this field is required to join to medical_invoices.csv

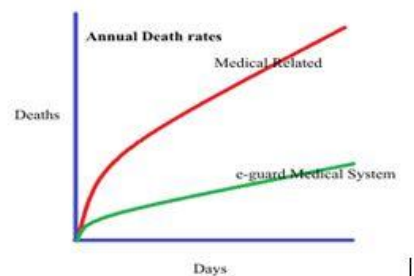


Fig 9 Decrease of death rates

7. Conclusion

As population is increasing day by day the medical requirements are also taking its shape every day. Based on medical requirements this paper is designed. Computer networks plays a key role



in today's world. More research is going on networks and security domains. Computers are very user-friendly medical solutions. In this scenario SARAH - HUB is designed. Infrastructureless wireless network with dynamic source routing protocol are used to identify patient or user or human body with sensors giving data to the client version application. Based on emergency mobile app send the data to the server. Based on emergency server will respond to the client app. Client can install the app in mobile or any other electronic gadget and see that their good communication with server. With less expensive we can have a good health security.

## 8. References

- [1] ChandrashekharGoswani, Parveen Sultana H, May'2019, IJRTE, "Cross-layer and Reliable Opportunistic Routing with Location Prediction Update Vector (CBRT-LPUV) in Mobile Ad hoc Networks MANET)".
- [2] SanamNagendran, K Ramchand H Rao, May'2019, IJITEE, "Parametric Estimation of various Protocols for Routing In Manets".
- [3] S J Sultanuddin, Mohammed Ali Hussain, April'2019, IJITEE,"STMR-Secure Token Based Multipath Routing Protocol for MANETs Using Hybrid Clustering and Path Selection Algorithm".
- [4] S J Sultanuddin, Mohammed Ali Hussain, March'2019, IJRTE, "Routing Protocol for MANET: Token Based Energy Efficient QoS Aware Routing Using Hybrid Optimization Algorithms".
- [5] E Jayanthi, Mohammed Ali Hussain, Dec'2019, IJVICS, "Reliable White List Manaement Technique for Warned Nodes in MANET".
- [6] Arshad Ahmad Khan Mohammed, Ali Mira Mohammed, SrikanthVemuru, 2019, Springer Singapore, "Providing Security Towards the MANETs Based on Choatic Maps and its Performance".
- [7] ThatiBalamurali Krishna, Mohammed Ali Hussain, Jan'2019, Springer, Singapore, "A Framework for Evaluating Performance of MADA-AODV Protocol by Considering Multi-dimensional Parameters on MANET".
- [8] G. T. Chavan, VemuruSrikanth, June'2018, ARPN Journal of Engineering and Applied Sciences, "Zone Based Routing Protocol with Improved Location Estimation for MANET".
- [9] AyushreeArora, Sandeep Kumar, Dec'2017, Journal of Engineering, Science and Technology, "COMPARATIVE ANALYSIS OF AODV AND DSDV USING MACHINE LEARNING APPROACH IN MANET".
- [10] Sundeep Kumar, Suresh Kumar, July' 2015, researchgate website, "Study of MANET: Characteristics, Challenges, Application, Routing Protocol and Security Attacks".
- [11] A Seenu, M R Narasingarao, U S SPadmajyothi, International Journal of Advance Research in Computer Science, 2014, "A System for Personal Information Management Using an Efficient Multidimesional Fuzzy Search".
- [12] GaikwadKiran P, Dr. C M Sheela Rani, International Journal of Scientific & Technology Research, 2020, "Regression Model with Modified Linear Discriminant Analysis Features for Bimodel Emotion Recognition".
- [13] Mr.PrashantMininathMane, Dr. C M Sheela Rani, IJPAM, 2018, "Triple Data Encryption Algorithm based Multiple Authority Access Control in Cloud System Using Optional Threshold".
- [14] D V Manasa, M R NarasingaRao, A S Lalitha, International Journal of Applied Engineering and Research, 2014, "Analyzing the Services and Privacy Conflict Resolutions of Shared Data in

OSNs”.

- [15] SwathiKarkarlapudi, M R NarasingaRao, International Journal of Science and Advanced Technology, 2011, “A Novel Facial Recognition Model Using an Artificial Neural Networks”
- [16] SunandaNalajala, KanekarAkhil, VenkatSai, DivyenduShekhar, Praveen Tumuluru, 2019, “Light Weight Secure Data Sharing Scheme for Mobile Cloud Computing”.
- [17]Senthil Kumar AvinashiMalleswaran, BhaskarakraoKasireddi, Dec, 2019, IJSTR, “An efficient Task Scheduling Method in Cloud Computing Envirnoment Using Fire Fly Crow Search Algorithm (FF-CSA)”.
- [18] Dr V Krishna Reddy, G NarasimhaRaju, K Lakshmi, N Vamsi, 2019, IJAST, “An Advanced Keyword Attacks over Encrypted Data in Cloud”.
- [19] B Tirapathi Reddy, ChBhuvaneshChava, T Susanth Kumar, V GopiKalayan, Nov, 2019, IJAST, “Security Key Provided for Group data Sharing in Cloud Computing”
- [20] P Raja Sekhar Reddy, K Ravindranadh, 2019, IJITEE, “An Exploration on Privacy Concerned Secured Data Sharing Techniques in Cloud”
- [21] P. R. Kshirsagar, H. Manoharan, F. Al-Turjman and K. Kumar, "DESIGN AND TESTING OF AUTOMATED SMOKE MONITORING SENSORS IN VEHICLES," in *IEEE Sensors Journal*, doi: 10.1109/JSEN.2020.3044604.