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A Survey on Location Management for Mobile Ad Hoc Networks

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***Abstract*— We propose and analyze a novel location management scheme for mobile ad hoc networks (MANETs) called VLMG (Virtual Location Magnitude Grid Protocol for Mobile Ad Hoc devices) to improve the quality of service over minimize the complexity of routing, highly support for fault analysis, clustering, speed of service, increased intelligence of tracking devices and speed recovery of fault over communication failures like link breakage and fast relocation and then we present a review of the proposed algorithms for each Location Management System, since the component Wireless networks are being increasingly used in the communication among devices of the most varied types and sizes. Personal computers, handhelds, smartphones, Wi-Fi appliances, sensors, and others are being used in several environments, such as residences, buildings, cities, forests and battle fields. Different wireless networks standards and technologies have appeared to easy deployment of the Mobile Ad-hoc applications. In the MANET environment location management is the major issue and fixation of location of a MANET device is highly complicated. In a signal week area of internet or satellite signal any MANET device can't keep the location track and location mark. On-behalf of this the existing MANET protocols are failing at many point like link breakage, speed of device relocation, etc… the proposed method is highly support for fault analysis, clustering, speed of service, increased intelligence of tracking devices and speed recovery of fault over communication failures like link breakage and fast relocation.**

Keywords*— location service, ad hoc networks, sensor networks, magnetometer.

I. INTRODUCTION (*HEADING 1*)

The invasion wireless communication technologies have revolutionized human lifestyles in providing the most convenience and flexibility over accessing Internet services and reliable services offered for privacy. Now days the car manufacturers and telecommunication companies have been gearing up to equip each car with technology that allows drivers and travellers to communicate with each other. Location service provides position of mobile destination to source node so that position-based routing can be applied. The overhead of each routing task, including location service, is $O(\sqrt{n})$,where n is the number of nodes in the network. An adaptive location magnitude grid protocol for ad hoc devices to improve the quality of service over minimize the complexity of routing, highly support for fault analysis, clustering, speed of service, increased intelligence of tracking devices and speed recovery of fault over communication failures like link breakage and fast relocation. Location-based routing problem is generally divided into two phases
That may be investigated separately as follows:
Step 1: Location service that comprises of location update and location retrieval.
Step 2: Routing data traffic from source to a destination whose location is known.

II. SMART PHONE VS MAGNETOMETER

A. Magnetic Compass

Compasses are typically mounted on an object that the user wants to monitor the direction of, most smartphones are equipped with a magnetometer that measures the local magnetic field in three dimensions, usually built out of two or three magnetic field sensors that provide data for a microprocessor. The correct heading relative to the compass is calculated using trigonometry. Often, the device is a discrete component which outputs either a digital or analog signal proportional to its orientation. This signal is interpreted by a controller or microprocessor and used either internally, or sent to a display unit. The sensor uses highly calibrated internal electronics to measure the response of the device to the Earth's magnetic field. A phone's orientation can be worked out by combining data from the magnetometer and its accelerometer,

which detects how the phone's orientation has moved relative to a baseline reference position. A magnetometer embedded smartphones that is used to determine direction relative to the surface of the earth. Compasses measure direction with respect to the 4 cardinal directions (North, East, South, West) with 0 degrees indicating straight North and 180 degrees indicating straight South.

B. *Electronic compasses work Electronic compasses working principle*

Electronic compasses work in exactly the same way as any other compass: They detect the Earth's magnetic field and respond to it. The difference is that an electronic compass uses a magnetometer to detect the field as opposed to a small magnet. This allows them to be much more accurate and allows them to respond more quickly to changes in direction than a traditional compass ever could. By using the magnetic field values we can able to trace the most common relative directions are left, right, forward(s), backward(s), up, and down. Using this direction the device movement and the routing can be done perfectly, a blind broadcast can be stopped, able to serve the nearby node based on the direction.

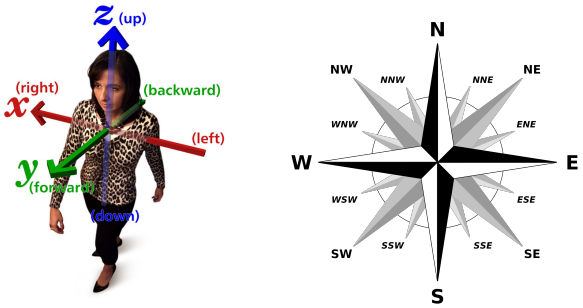

Fig 1: A magnetic compass - local magnetic field in three dimensions

C. *Magnetometer and Virtual Grid*

The Virtual grid is made for each device according to the communable strength. By using th emagnetometer field value we can able to get the direction *(magnitude say device X),* Then the logic of retrieval speed says the distance of the other-end communication device *(say Distance di)*. Then the virtual grid will make all near by devices to communicate effectively over the network.

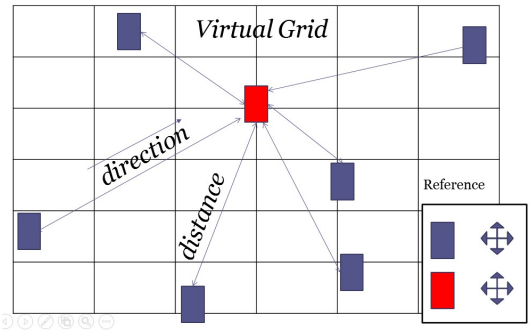

Fig 2: Virtual Grid

III. Mobile Ad-Hoc Location Management Survey

This section briefly describe position-based (location) routing schemes that are used in various papers. Because of frequent mobility, the location of a destination should be identified before efficient data transmission could be accomplished. We can see various papers with different methodologis of location management schemes.

A. *A Cooperative Location Management Scheme*

This papers says the mobile ad-hoc is a self-configuring network of mobile routers connected by wireless links. Since MANETs do not have a fixed infrastructure, it is a chal-lenge to design a location management scheme that is both scalable and cost-efficient. In this paper, we propose a cooperative location management scheme, called CooLMS, for MANETs. CooLMS combines the strength of grid based location management and pointer forwarding strategy to achieve high scalability and low signaling cost. An indepth formal analysis of the location management cost of CooLMS is presented. In particular, the total location management cost of mobile nodes moving at variable velocity is estimated using the Gauss_Markov mobility model for the correlation of mobility velocities. Simulation results show CooLMS performs better than other schemes under certain circumstances [1].

B. *Integrated location management and location-aided routing system*

This paper present's an integrated location management and location-aided routing system for mobile ad hoc network (MANET) which organizes the MANET into a two-level routing hierarchy with the help of Voronoi diagrams. The location information of mobile nodes in a Voronoi zone is summarized using bloom filters and distributed among the location servers in the zones. In the integrated system, the destination's location is learned during routing in the overlay network of the hierarchy. Theoretical analysis and simulation results show that the proposed system reduces the routing time by about 25\% over traditional location-aided routing techniques for transaction-type traffic while incurring only small management overhead and low storage requirement [2].

C. *A Novel Dynamic Location Management Solution for Internet-Based Infrastructure*

This paper discuss about the Wireless mesh networks (WMNs). There is an increasing demand for supporting a large number of mobile users in WMNs. As one of the key components in mobility management support, location management serves the purpose of tracking mobile users and locating them prior to establishing new communications. Previous dynamic location management schemes proposed for cellular and wireless local area networks (WLANs) cannot be directly applied to WMNs due to the existence of multi-hop wireless links in WMNs. Moreover, new design challenges arise when applying location management for silently roaming mobile users in the mesh backbone. Considering the number of wireless hops, an important factor affecting the performance of WMNs, we propose a DoMaIN framework that can help mobile users to decide whether an intra- or inter gateway location update (LU) is needed to ensure the best location management performance (i.e., packet delivery) among dynamic location management solutions. In addition,

by dynamically guiding mobile users to perform LU to a desirable location entity, the proposed DoMaIN framework can minimize the location management protocol overhead in terms of LU overhead in the mesh backbone. Furthermore, DoMaIN brings extra benefits for supporting a dynamic hop-based LU triggering method that is different from previous dynamic LU triggering schemes proposed for cellular networks and WLANs. We evaluate the performance of DoMaIN in different case studies using OPNET simulations. Comprehensive simulation results demonstrate that DoMaIN outperforms other location management schemes and is a satisfactory location management solution for a large number of mobile users silently and arbitrarily roaming under the wireless mesh backbone [4].

D. Geographical Routing With Location Service in Intermittently Connected MANETs

This paper says how to combine the mobile platforms such as manned or unmanned vehicles and peer-assisted wireless communication is an enabler for a vast number of applications. A key enabler for the applications is the routing protocol that directs the packets in the network. Routing packets in fully connected mobile adhoc networks (MANETs) has been studied to a great extent, but the assumption on full connectivity is generally not valid in a real system. This case means that a practical routing protocol must handle intermittent connectivity and the absence of end-to-end connections. In this paper, we propose a geographical routing algorithm called location-aware routing for delay-tolerant networks (LAROD), enhanced with a location service, location dissemination service (LoDiS), which together are shown to suit an intermittently connected MANET (IC-MANET). Because location dissemination takes time in IC-MANETs, LAROD is designed to route packets with only partial knowledge of geographic position. To achieve low overhead, LAROD uses a beaconless strategy combined with a position-based resolution of bids when forwarding packets. LoDiS maintains a local database of node locations, which is updated using broadcast gossip combined with routing overhearing. The algorithms are evaluated under a realistic application, i.e., unmanned aerial vehicles deployed in a reconnaissance scenario, using the low-level packet simulator ns-2. The novelty of this paper is the illustration of sound design choices in a realistic application, with holistic choices in routing, location management, and the mobility model. This holistic approach justifies that the choice of maintaining a local database of node locations is both essential and feasible. The LAROD-LoDiS scheme is compared with a leading delay-tolerant routing algorithm (spray and wait) and is shown to have a competitive edge, both in terms of delivery ratio and overhead. For spray and wait, this case involved a new packet-level implementation in ns-2 a- - s opposed to the original connection-level custom simulator [3].

E. Design of a Fast Location-Based Handoff Scheme for IEEE 802.11 Vehicular Networks

This paper discussed based on the IEEE 802.11, it is an economical and efficient standard that has been applied to vehicular networks. However, the long handoff latency of the standard handoff scheme for IEEE 802.11 has become an important issue for seamless roaming in vehicular environments, because more handoffs may be triggered due to the higher mobility of vehicles. This paper presents a new and fast location-based handoff scheme particularly designed for vehicular environments. With the position and movement direction of a vehicle and the location information of the surrounding access points (APs), our protocol is able to accurately predict several APs that the vehicle may possibly visit in the future and to assign these APs different priority levels. APs on higher priority levels will be scanned first. A blacklist scheme is also used to exclude those APs that showed no response to the scanning during previous handoffs. Thus, time spent on scanning APs is supposed to be significantly reduced. The simulation results show that the proposed scheme attains not only a lower prediction error rate but also lower link layer handoff latency and that it has a smaller influence on jitter and throughput. Moreover, these results show that the proposed scheme has a smaller total number of handoffs than other handoff schemes [5].

F. Reducing the Positional Error of Connectivity-Based Positioning Algorithms Through Cooperation Between Neighbors

This paper discusses about the positioning algorithms in the radio range of sensor devices and the position estimates of neighbors and neighbors of neighbors. This information creates special graph theoretic structures which impose new constraints on the positions of sensor devices. The new constraints sometimes lead to a feasible set of positions with disconnected regions. These properties can be used to reduce the set of feasible positions for a node. In this paper, a new fully distributed positioning algorithm, called Orbit, which exploits these properties is presented for mobile sensor networks. The algorithm uses additional constraints and trims disconnected regions. These new constraints are generated through cooperation between neighbors. The performance of Orbit is examined for many communication and mobility models, including a probabilistic communication model generated from radio experiments. Computer simulation experiments demonstrate that Orbit outperforms a recently proposed positioning algorithm in terms of positional accuracy under different models with a wide range of parameter values. Orbit is implemented on resource limited sensor devices. This implementation demonstrates the feasibility of the algorithm for sensor devices. The algorithm is tested on deployments of the sensor devices in a field and the results are comparable to those from the simulation experiments [6].

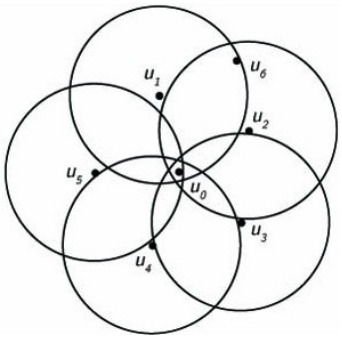

Fig 3: Positioning Algorithms Through Cooperation Between Neighbors

G. Ad hoc wireless Sensor Network Architecture for Disaster Survivor Detection

This paper discusses about the wireless Ad hoc sensor nodes, the sensors are playing a vital role in wireless data transmission infrastructure. Due to its compact size and energy efficient structure these nodes can be successfully deployed in wireless Ad hoc infrastructure where these nodes can be efficiently transmit the disaster related sensed data to Sink nodes via Ad hoc relay stations. In this Research study we are going to propose a Model for the Disaster survivor detection based on extremely critical Disaster situation where this energy efficient Architecture can successfully trace and locate thousands of people in critical circumstances. The emphasis of the research focuses on earth quake based disasters. Our proposed Model can also be successfully integrated with Telemedicine based infrastructure for emergency response authorities to take necessary measures in a limited span of time [7].

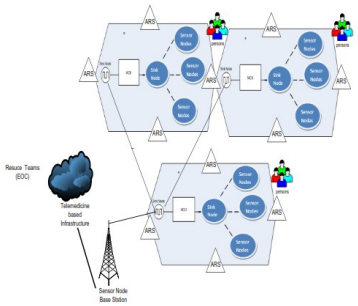

Fig 4: MCU Control System Architecture for Disaster Survivor Detection

CONCLUSION

The outcomes of the research study focuses on location management among the mobile ad-hoc network revels the successive results of routing and broadcast. Most of the methods are adopted with various sensors deployed on the locations, position identifying happens among those areas and use less for general purpose among the mobile ad-hoc devices. The proposed methodology along with the magnetometer hops a successive model among the emerging mobile ad-hoc network location management effectively. The advantages of this methodology will improve the quality of services, minimize the complexity of routing, highly support for fault analysis, clustering, speed of service, increased intelligence of tracking devices, speed recovery of fault over communication failures like link breakage and fast relocation.

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