University of Victoria

CSC 579: Advanced Computer Networks: Overlay and Peer-to-Peer Networking

Topic: Ad-hoc Network android-based application for disaster management

PROJECT PROPOSAL

GROUP MEMBERS

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PROPOSAL

Abstract

In this research project, the various ad hoc network categories are explored as a way of coming up with a viable solution of alerting the community/rescue team in the occurrence of a disaster. The project involves clearly understanding ad hoc network functionality, then coming up with an android based application prototype. It will have a distributed network architecture for rescue officers. It will be based on some recent published paper on the same topic by focussing on improving what has been proposed.

In case of disaster, the reporting and rescue is one of the urgent action to be taken rapidly and carefully. The mobile android application is to locate where the disaster has taken place which is useful information for rescue officers. This project will implement a prototype that works towards reducing the number of people who suffer during disaster.

Background information

Wireless network is a way computers, phones and other telecommunication devices get connected for sharing data and communicate using wireless. Wireless ad-hoc network(WANET) is known as a wireless mesh network based on its topology. MANET is a type of WANET which is able to be routed, this behaviour allows MANET to move independently in any direction and to be able to change the links many times. It is noted to have many advantages for mobile users for example, it is self configured without requiring infrastructure based on its capability of delivering connection wirelessly [1].

In this paper, ad hoc network (infrastructure less network) is studied in depth with reference to the previous research work. In Infrastructure less network, the mobile devices dynamically create their network as they move, the nodes act as routers and they are not controlled by base stations. For infrastructure network on the other hand, the mobile nodes are fixed to base stations and as they move around they get into different base station ranges [2].

In the previous work done under this area, there are different disaster/emergency scenarios of which the researchers suggested solutions using the mobile ad-hoc network (MANET) [3]. According to [4], Ad hoc wireless network is divided into three branches; Wireless mesh network (WMN), Mobile ad-hoc network (MANET) and Wireless sensor network. Much research has been done on MANET unlike the other two. There's need to explore other options under Ad hoc network for instance using the wireless sensor mechanism or Wireless mesh network.

Problem statement

The problem to be solved is when there's emergency/disaster and the communication network is ruined/damaged. The infrastructure less network is important because it acts as a solution especially when there is a disaster like fire or air-bone disease outbreak and the existing network infrastructure is destroyed. It helps provide services like search and rescue and recovery from disasters. This can be useful particularly in rural areas and in informal settlements.

Proposed solution and approach

The study seeks to consider both sensor mechanism and mobile ad-hoc implementation. The Simulation Tools to be used are:

- Android app - use of android studio

The proposed mobile prototype application will be based on android platform.The goal is to provide needed disaster information to help rescue officers. In case of Emergency, This application can save the life of many. The problem can be raised about limited distance which is 50 m. All mobile devices which will be used in this project, will be considered as having equal priority (peer-to-peer networking).

Project schedule

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Date	**Tasks**
14th - 21st Feb	Environment setup and initial android configuration
22nd - 28th Feb	Introduction and Literature review writing
1st - 14th March	Implemetation of MANET function in Android
15th - 21st March	Testing and debuging
22nd -28th March	Documentation of methodology and obtained findings
29th - 31st March	Compilation of final project draft

References

[1] Mobile ad hoc network - wikipedia, 2018.

[2] Shaik Shabana Anjum, Rafidah Md Noor et Mohammad Hossein Anisi : Review on manet based communication for search and rescue operations. *Wireless Personal Communications*, 94(1):31–52, 2017.

[3] Vitri Tundjungsari et Ahmad Sabiq : Android-based application using mobile adhoc network for search and rescue operation during disaster. *In Electrical Engineering and Computer Science (ICECOS), 2017 International Conference on*, pages 16–21. IEEE, 2017.

[4] Chander Prabha, Surender Kumar et Ravinder Khanna : Wireless multi-hop ad-hoc networks: a review. *IOSR Journal of Computer Engineering*, 16(2):54–62, 2014.