

METU, Department Of Computer Engineering  
Graduation Project  
Proposal Form

## Project Information

### Title

A Broadcasting System for Smart Cities

### Target

Public       Restricted

## Proposer Information

**Name(s)**                      Gulnaz Shaidolda  
   Ceyda Tosun  
   Gulsah Sabirsiz

**E-Mail(s)**                      [shaidoldagulnaz4@gmail.com](mailto:shaidoldagulnaz4@gmail.com)  
   [ceydatosun92@gmail.com](mailto:ceydatosun92@gmail.com)  
   [gulsah.sabirsiz@gmail.com](mailto:gulsah.sabirsiz@gmail.com)

## IP (Intellectual Property) Information

*Intellectual Property rights belong to FixIT group members.*

# Project Description and Background Information

## Description

In this project, our aim is to develop a Smart City Broadcasting System(SCBS) especially to use in emergency situations such as natural disaster or urgent announcements which interest all city members. The system will use wireless routers to communicate with other devices, but we are assuming that devices will not be connected th the Internet. To achieve this, devices will communicate in data link layer. We will call this communication as broadcasting from now on.

We can apply our project in many scenarios.

**The first scenario:** In emergency situation, one who has our android application on his/her mobile device will be able to broadcast some kind of “Help me!” , “ A+ Rh blood wanted”, “ A little boy is lost” message to the surrounding people without connecting to the network. System will use surrounding Wi-Fi routers to communicate with other android devices around which also sees the same router. The users who get the message can also broadcast it using the same method without sending same message to same devices.

**The second scenario:** Municipality will be able to broadcast urgent announcements to city members who also have the android application. In the past, there were small cities and making all people aware of some situations were easy. Now, cities are becoming crowded day by day and reaching all of the people at the same time becomes more difficult. For example, 5.150.072 people live in Ankara and if water cut occurs, notification of this case may not reach to every single people. There may be many people who does not have the Internet connection, and our application will be able to reach these people too.

Moreover, if an accident occurs in some place, a traffic police will broadcast an information message to the surrounding drivers (actually surrounding android devices). They may change their rotation according to this information. Also, the police may inform drivers about traffic intensity and he may direct them to other roads. As a result, traffic density problems of the city will be decreased.

**The third scenario:** In shopping centers, companies will broadcast sale messages to customers who are in the mall.

## Similar Products/Projects

### 1. Smart City Media

City-focused communication tool that incorporates the best of IoT, and broadcasts information and alerts to every citizen.

### 2. AFADIST

When disaster occurs, it sends your location to other people.

## Justification of the proposal

The main purpose of the project is communicating mobile devices in data link layer without connecting to the Internet. For example, in earthquake, communication is a very important issue and unfortunately GSM operators are not reachable. However, people need to reach nearest people to get help. We are targeting to develop communication infrastructure for this situations. Also this system will allow broadcasting without knowing IP addresses of other devices. So we will be able to reach surrounding people without IP information. We will use MAC addresses to communicate.

We are aiming to solve two basic problems. The first one is, making all citizens aware of city related issues by making broadcasts in big cities. The second problem to be solved is in an emergency situation sending messages to nearest people without Internet connection.

## Contributions, Innovation and Originality Aspects of the Project

The innovation of our project is communicating devices in data link layer without Internet connection. Moreover, applying it in useful scenarios.

We found an application called as Smart City Media System. They are also making smart city broadcast applications but their applications are not allow Peer-to-Peer communication. In addition, in our country, we do not have such a broadcast system. It is a very important requirement for our country. AFADIST is an android application which sends location in emergency conditions. But their application need the Internet connection.

The advantage of our product is providing communication between mobile devices in all situations. It gives the opportunity of communicating with the people in local area so that the help will reach more rapidly.

We hope that our application will be integrated into Smart City concept which is a big trend and market field. Then in international level, we will contribute to Smart City concept by adding a new view point. And we will solve a very big communication problem.

Communication in data link layer and broadcasting can be used in lots of different technological areas.

## Technical Aspects of the Project

We are going to use Android Studio as an android development environment. We are planning to utilize OpenWRT. For communication set up, we need to implement a protocol in data link layer. To avoid sending same message multiple times we will take advantages of Flooding algorithm.

## Targeted Output, Targeted User/Domain Profile

The end product will be an android application for mobile devices. The users can broadcast basic text messages to surrounding users who have installed the application.

In other scenarios, municipalities who have our application will broadcast messages to all citizens.

Tangible success measures and goals are broadcasting messages to other mobile devices in data link layer.

The users will be anyone who has an android mobile phone. Municipalities and shopping mall companies are also targeted users.

## **Project Development Environment**

As a hardware device we will use wireless router. We are going to use C++/Java/C programming languages.

We are planning to use flooding algorithm and Android Studio.

## **External Support**

We will use wireless router and android devices.  
We do not have sponsors.

## **References**

1. <http://smartmedia.city/#home>