A Navigation Safety Application for Intelligent Transportation Systems

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Introduction

Intelligent transportation systems are advanced applications that make use of vehicular and infra-structured networks for services related to traffic and mobility management, and that interface with other models of transport [1].

Our goal was to build a navigation application for android devices that, along with displaying maps and location information, warn the user of important vehicles approaching, like ambulances and police cars, so that the driver may take decisions based on these informations.

Instead of beginning from the scratch, a popular open source navigation application has been used and modified so as to make it able to communicate, create a network and exchange messages. The name of the application is OsmAnd [2].

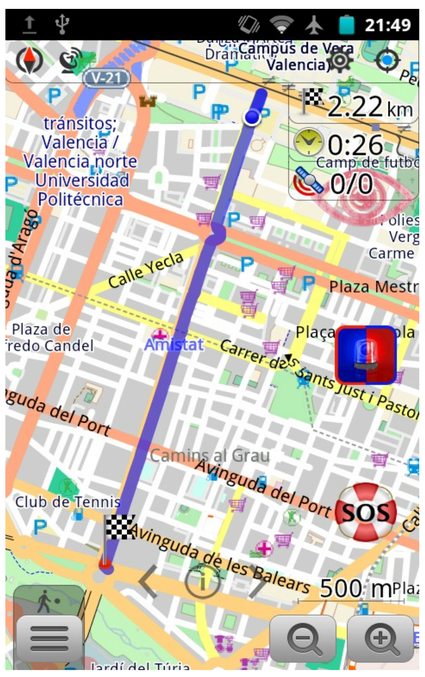
OsmAnd(OSM Automated Navigation Directions) is a map and navigation application with support for both online and offline use. It uses OpenStreetMap (OSM) [3] for map rendering and displaying, includes loads of features and may be used by cars, bicycles and pedestrians.

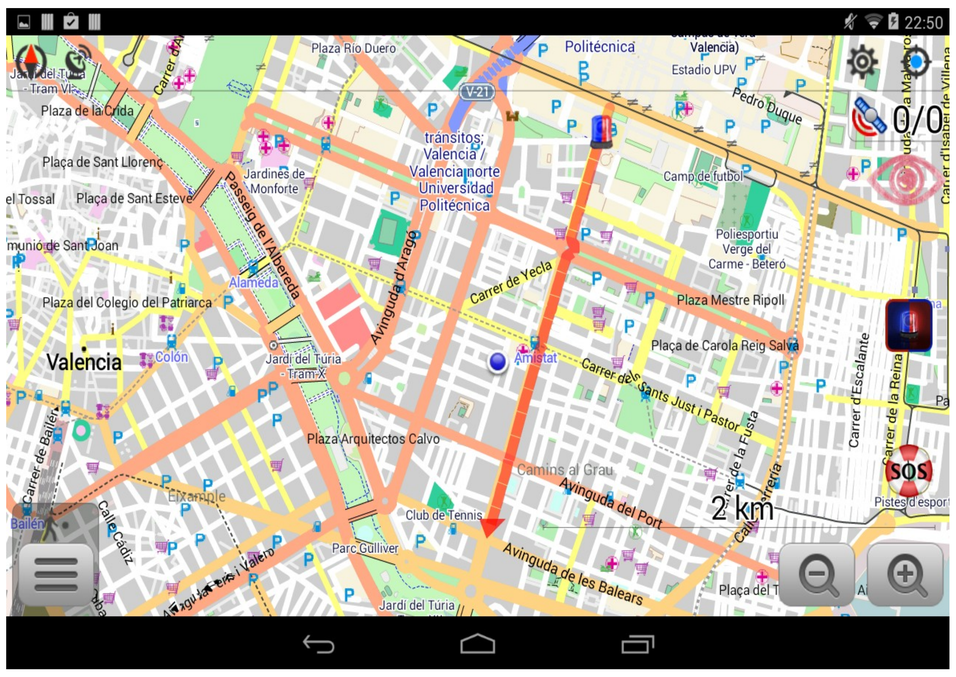
Description of the Results

Upon installation, our application allows the user to choose whether to become a part of this “drive safety” network or not. If the user wants to be a part of the network, the software allows the user to choose whether it is a civil or an administrative vehicle, like the police or an ambulance.

If chosen to participate in the network, by default the software works in the normal mode where the vehicles are assumed to be civil vehicles and only receives or forward data to and from its neighboring nodes. And, also it displays related information on-screen.

If the users choose that their vehicle is an administrative vehicle, an option only available to authorized users,and in this mode, the nodes send their current location and their future route to the nodes nearby, and the receiving nodes, in turn forward such information to their neighbors. Upon receiving this message, relevant information is displayed on the screen of these recipient nodes.





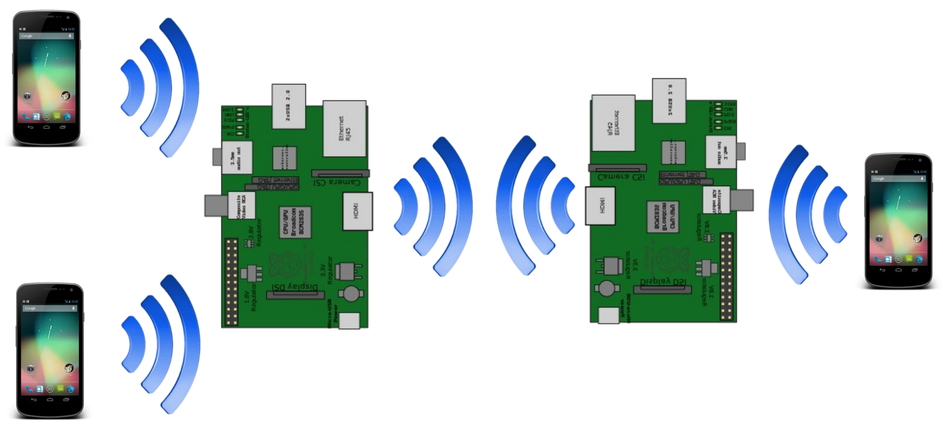
The software has also another mode in which a vehicle in distress can send an SOS beacon, which upon receipt by vehicles close to it, alerts the user by displaying a different icon on screen.

Conclusions

The ITS network may be both infrastructureless or infrastructured. Currently, our application only works with infrastructured networks and in the future, we will extend it to provide full support for infrastructureless networks.

While working to include this feature, we found that Android based devices do not yet support the ad-hoc mode. So, to solve this problem, we intend to use Raspberry Pi devices as routers in charge of ad-hoc communication.

This aforementioned feature, after successful development could help in developing and testing other ITS applications.



References

[1] The 2010 directives of the European Parliament and of the council on the framework for the development of ITS, *http://eur-lex.europa.eu/LexUriServ/LexUriServ .do?uri=OJ:L:2010:207:0001:0013:EN:PDF* accessed May 2014.
[2] OsmAnd software hompage, *http://osmand.net/* accessed October 2013.
[3] OSM homepage, *http://www.openstreetmap.org/* accessed November 2013.

Further Information

For more information related to this project, please visit the website of our group: http://www.grc.upv.es/
And you can also watch a video demonstrating the different functionalities of the application using the QR or at: http://www.youtube.com/watch?v=Wh4cwmdvecM

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