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Development of a Surveillance System - Location and Route Mapping.

Giovana La Luna.

Abstract
Analyzing the history of violence in Brazil, and considering such episodes within the universities, as well as within the Unicamp (State University of Campinas), an effective security system is needed, capable of promoting the protection of those who transit on campus. However, in order to help the victims of the occurrences, it is imperative that there is a security team closer to the place which can be present immediately after the call. With this in mind, there are a number of softwares that can calculate the ideal route to the nearest safety and emergency location, such as ArcGIS, which provides what is needed for mapping, spatial data compilation , analysis and management in a database. In this way, by using this software, and knowing the positioning of the call, it is possible to identify the nearest security vehicle and, through the projection of an ideal route, the security can optimize the time of arrival to the emergency place, guaranteeing successfully the safety of the individuals who circulate in the vicinity of the University.

Key words:
Surveillance System, Security, Location.

Introduction

Considering the historical data of violence that have occurred inside the Universities, to help the victims of such emergencies, who demand rapid protection, it is necessary to send the guards that are closer to the place of the occurrence. For this porpuse, the use of ArcGIS software becomes essential. This software consists of a Geographic Information System (GIS) that assimilates reference data in an environment of response to setbacks; it provides what is needed for map creation, spatial data compilation, analysis, and management in a database. In this way, this project plans to act in the aspects related to the location of vehicles and the route design, allowing the displacement of these vehicles that are destined for safety within Unicamp, through a system of low cost sensors. The specific objectives of the work are: 1. To develop on the prototyping platform (Arduino) a system capable of obtaining geographical coordinates and transmitting them to a server; 2. Develop a precision mapping, containing extensive information about the University's road system, as well as a database georeferenced with the institutes and colleges of Unicamp; 3. Integrate the information received from a server (location of vehicles) with the mapping of the University (network file), in order to establish ideal routes between the event to be verified (occurrence of violence) and the nearest security vehicle.

Results and Discussion

Initially, the vehicle localization system will be developed, consisting of a prototyping platform (Arduino), in which a GNSS receiver capable of identifying the position of the security vehicles inside the campus will be integrated. To realize the recognition of an ideal route, it is necessary to know the geometric characteristics of the road system of Unicamp. Using aerial campus images (already available), it is possible to generate a campus road map connected to a network file that, through graph analysis, allows the establishment of routes that fulfill a certain function. Finally, knowing the geometric and logical structure of the campus road system, it is possible, in case of request, to identify the location of the security vehicles and to verify which one is closest to the place of occurrence and, thus, determine the optimized path to meet the demand. This procedure can be performed using a map object library implemented in a Geographic Information System (GIS) - such as ArcGIS.

Conclusions

After the development of a system capable of obtaining geographic coordinates, it is expected to obtain such geographical coordinates in real time from a moving vehicle and transmit them to an online server via GSM, with an accuracy of approximately 1 meter. With the elaboration of the mapping, it is desired to obtain a precise cartographic base of the campus, which will be composed by a network file, which allows the insertion of information regarding the route that is to be traced. Finally, it is expected, through the integration of the information received from the server with the mapping of the university, to install the devices in the vehicles so that the server connects with them and obtain the request location and, thus, the algorithm identifies which vehicle is closest to the occurrence and draws an optimal route that leads the driver to the user. After system validation, the campus living secretariat is expected to replicate such strategy on all security vehicles.

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