*THESIS ABSTRACT*
**„LOCATION BASED SERVICES IN MOBILE COMMUNICATIONS NETWORKS"**
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The exponential development of systems and applications using location-based services has been enabled by the convergence of three technologies that are essential to today's society: mobile communications technology, Internet technology and geospatial information systems technology. The thesis aims to analyze the key elements of the operation and provision of location-based services in order to identify new techniques and methods that can contribute to the development of positioning methods, essential to the operation of location-based services.

As a novelty, the paper proposes to apply the radio fingerprinting technique to position mobile Wi-Fi devices in the urban environment. Complementary to the fingerprinting technique, crowdsensing is proposed as a method of collecting the radio measurements (fingerprints) required by the positioning system. Crowdsensing, in this particular case, involves calling for the voluntary contribution of positioning system users to measure Wi-Fi networks using their own mobile devices.

Chapter 1 presents the introductory elements of the thesis, the motivation behind the choice of the research theme, the proposed objectives, as well as the challenges that have to be overcome by applying the crowdsense technique.

In Chapter 2 are presented the fundamental theoretical elements specific to the location-based service technology in the current technological context. These include basic technologies, motivation and utility, applications, usage scenarios, personal data protection issues and the possibility of profiling, the importance of the context of mobile device positioning, the position-to-person link, and position information properties.

Chapters 3 and 4 deal with signal parameter measurements, position estimation algorithms, and the implementation of positioning methods in the LTE standard.

Chapter 5 presents the experimental contributions made by applying the crowdsense technique for the purpose of collecting measurements on Wi-Fi hotspots in the country. Wi-Fi technology is thoroughly analyzed to identify the mechanisms that can be used to design a fingerprinting positioning system as well as technical features such as the average access point radius, emission power, unique access point identification, scanning methods. The use of Wi-Fi technology for fingerprint positioning is argued by demonstrating the ubiquitous presence of access points in the urban environment.

Chapter 6 presents contributions to the application of estimation algorithms in fingerprint positioning methods, as well as contributions to software deployment of these methods. The particularities of the proposed positioning system are highlighted by establishing a mathematical model of fingerprinting positioning systems with data collected by crowdsense.

Chapter 7 contains the detailed analysis of the precision of the proposed positioning system. The results are compared with those reported in the literature as well as those of the GPS satellite positioning system, resulting in a precision of the proposed positioning system similar or better than that reported by the GPS system administrators in the particular case of a dense urban environment.

Chapter 8 presents the general conclusions of the results of experimental research. Future research directions conclude this chapter.