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Title : **Privacy Issues of Location Based Services in
Mobile Communication Systems**

Abstract

The popularity and wide spread use of mobile phones, portable laptops, tablets and similar handheld devices with GPS enabled communication systems are quite location aware. These new systems of location awareness giving rise to Location Based Services/ Applications have their own pros and cons. Local information is always vital because you save money and time many times if you have sufficient information about the locality in which you are moving or stay. It also gives a new dimension to *m-commerce* (mobile-commerce) because such services will invite local advertising and offers from shops, restaurants, companies etc. But this new dimension is not getting a smooth run into the communication systems because of the possible privacy breach users perceive with its advent. The work presented here undertakes this problem of privacy protection in the domain of Location Based Services for mobile communication systems.

Our thesis is an effort towards robustness of privacy enhancing technologies which are primarily meant for Location Based Services. The motivation behind this work was the fading popularity of these communication services due to the privacy breach

users associate with them. We delved hard to find out almost all privacy techniques for the location privacy, location trajectory privacy and the online and offline domains of the same. We had analyzed the mechanisms available and then reached to the effective possibility of anonymisation using Mix-zones. We further tried to ensure the robustness of the privacy that will be achieved through these real-time Mix-zones. We made them dynamic by activating and deactivating them in accordance with the flow analysis of the traffic. We also provided cryptographic techniques for all the possible communications in the vicinity of these Mix-zones.

The proposed Secure Transient Mix-zones fairly achieve a good success over their available counterparts. Although several attempts and efforts comprise our work presented here but as the well said proverb says: *“There is always a room of improvement. This is the biggest room.”* Location Based Services and the main issues (privacy) associated with them, are full of new and upcoming paradigms. As the services are not wide spread their applicability can't be adjudged appropriately just by assumptions and calculations. Our work itself leaves behind trailers and scope which can hopefully find new paradigms to achieve great successes in this field.

The data taken by us is not applied on any actual Location Based Server. Its applicability as a real-time privacy enhancer has still to be tested. The simulation however is giving excellent results and hence if the real conditions are being applied with the proposed mechanism they could get benefitted in a well pronounced manner. But this has to be checked. The work described here however, can work really well in off-line domain as the real-time threats to the privacy are far better pronounced and unknown than the real-time threat mechanisms.