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Taking Location-Based Alerts to the Next Level with Geofencing 2.0

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Abstract- *Location-based services (LBS), also known as geofencing, recently took a proactive turn by sending out intelligent notifications whenever a user enters or leaves a specific geographic area. Therefore, it is impossible to connect several geofences over time. In order to define complex geofencing scenarios as state- and transition-based geofence models, we thus provide a novel method. Such a model considers the temporal links between geofences as well as the time limits for being inside a geofence or moving between geofences. These two elements are essential for handling complex scenarios in which notifications should only be issued when a user passes a certain number of geofences in a specific order or leaves a geofence after a certain period of time.*

Keywords- Ubiquitous Computing; Location-based Services,Geofencing; Location-based Notifications

I. INTRODUCTION

This article guides a stepwise walkthrough by experts for writing a successful journal or research paper, starting from inception of ideas till their publication. Research papers are highly recognized in the scholarly community and form a core part of the PhD curriculum. Research scholars publish their research work in leading journals to complete their grades. In addition, the published research work also provides a big weight-age to get admissions in reputed universities. Now, here we enlist the proven steps to publish the research paper in a journal.

However, the majority of the time, a mobile device can only function as a reactive intelligent system. A mobile device must be able to start the dialogue in order to actively support the user. Only a small number of services are currently permitted to interrupt the user under any conditions or according to their own specific rules.

The next iteration of location-based services (LBS) is called proactive LBS, and it takes into account an extra context element. This results in a mobile device starting a conversation with the user whenever the mobile device enters or exits a geofenced area. Consider a geo-notification that asks travelers arriving at a specific airport to complete a location-specific survey. If the structure of the survey is to take into account the passenger's personal history, such as the airport from which the passenger first departed, the trigger conditions of the location-specific survey must temporally relate at least two different geofences: the airport of departure and the airport of arrival. Otherwise, regardless of their past locations, all travelers arriving at the targeted airport would be asked the same questions because they could not be discriminated against based on their departure airport.

To the best of our knowledge, there isn't a modern server-based geo-notification system that can be parametrized with trigger conditions made up of geofences with time-related relationships.

As a proof-of-concept, we developed an appropriate visual editor for the design and modification of arbitrary use cases and the associated proactive LBS that can handle temporally connected geofences.

II. RELATED WORK

Notifications should not be sent to mobile devices outside of the bounds of the area. The solutions that are currently commercially available on the market can be distinguished depending on how they incorporate the geofencing capability into the mobile operating system, a 3rd Party SDK, or a number of domain-specific apps, to name a few [1, 2, 3].

Geofencing is mostly known in the research community for two problems: its effect on mobile device energy consumption [4] and its effect on wireless access network traffic load [5].The privacy of a mobile phone user is also seriously jeopardized by geofencing in the event that their position is continuously determined by the network operator's infrastructure or sent to a third-party service [6]. The purpose of this study does not address these issues, despite the fact that they are significant and may even be essential for the deployment of future proactive LBS. Geofencing has become a ready-to-use technology for developers of third-party applications in the areas of regional warning systems, location-based gaming, caretaker services, electronic tourist guides, location-based recommender systems, and so on, with the emergence of geo-notification functionalities built into common mobile operating systems.

The concept of a single and independent geofence, as argued in [7], is sometimes insufficient for the delivery of appropriate location-based notifications. All of the aforementioned solutions, however, only associate a notification with the event of entering or leaving a single dedicated geofence. As a result, temporal dependencies between geofences are completely ignored. It is not possible to define temporally related geofences using one of the existing graphical editors, and neither are existing geo-notification systems capable of detecting mobile devices passing through different geofences in a predefined order or within fixed time slots.Only the Cascadia [9] system and the Topiary [8] tool allow for the modeling of sequences of contextual states based on RFID tags or arbitrary location representations.

Cascadia, unfortunately, does not support the modeling of conditional scene transitions or looping scenes. Furthermore, neither of these approaches has been properly formalized.

III. CONCLUSION

In this study, we present a potent strategy for modeling the next generation of spatiotemporal geofences. By utilizing a state and transition-based behavior model, our approach enables flexible design of complex geo-notification scenarios. In addition to having an immediate and direct effect on current LBS applications, Geofencing 2.0 can pave the way for more complex geo-notification scenarios, particularly when it comes to industrial applications like fleet management or process automation. Yet even mobile phone users will benefit from Geofencing 2.0 because they can easily and intuitively construct their own use cases using our Geofence Designer.

IV. REFERENCES

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