

MapUme: Smartphone Localisation as a Service

a cloud based architecture for providing indoor localisation services

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ABSTRACT

Accurately determining the user's position is considered the key enabling technology for the provision of location based services on smartphone devices. The most promising approaches to date for achieving accurate indoor coverage are based on WiFi fingerprinting in combination with complex estimation and filtering algorithms. In order to meet these computational requirements for a large number of devices a localisation system must be inherently distributed to provide real time responsiveness to all users at all times. Furthermore, to make such a system commercially feasible those computational resources sometimes cannot be maintained by the localisation service provider itself but have to be dynamically allocated in the cloud always based on current and not on peak demand, which depending on the application can vary significantly and thereby render static systems commercially infeasible in these cases.

In this paper we will propose such a cloud based architecture enabling the immediate demand driven provision of computational resources to connected devices. The presented indoor localisation system allows the simultaneous accurate localisation of large numbers of users without relying on heavy client side processing, which would use up the limited smartphone's computational and energy resources. We will demonstrate the systems real-time performance under varying peak demand scenarios and show how commercially feasible smartphone indoor localisation services can be provided utilising the elastic infrastructure of the cloud. In particular we will report on our experience in the trade show application space and the challenges it poses by requiring the system to provide localisation services to thousands of exhibitors and visitors over a very short period of time in a highly dynamic environment.

KEYWORDS: Smartphone localization, Indoor localization, Integration platform, Cloud computing.