Abstract No: SE-09   **Systems Engineering**

Applicability of crowdsourcing for traffic-less travelling in Sri Lankan context

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Abstract
Traffic is one of the most significant problem in Sri Lanka. Valuable time can be saved if there is a proper way to predict the traffic and recommend the best route considering the time factor and the people's satisfaction on various transportation methods. Therefore, in this research using crowdsourcing together with data mining techniques, data related to user mobility were collected and studied and based on the observations, an algorithm has been developed to overcome the problem. By using developed techniques, the best transportation method can be predicted. Therefore, people can choose what will be the best time slots & transportation methods when planning journeys. The algorithm correctly predict the best traffic-less traveling method for the studied area of each given day & the given time. Throughout this research it has been proven that to determine the best transportation method in Sri Lankan context, data mining concepts together with crowdsourcing can be applied. Based on a thorough analysis by extending the data set of the collection stage, it was shown that this research can be extended to predict the best transportation method with consideration of existing traffic in all the areas.

Keywords: Big data, Crowdsourcing, Data mining, GPS

Introduction
With the enhancements of technological arena such as Internet, Wireless Communication, Big Data Analytics, Sensors Data, Machine Learning; a new paradigm is enabled for processing large amount of data which are collected from various sources. Crowdsourcing, which is a relatively recent concept that encompasses many practices. This diversity contributes to the fact that its limits are blurred, and it is usually identified with any type of Internet-based collaborative activity, such as co-creation or user-innovation (Enrique & Fernando, 2011), is one of the greatest mechanism that can be used to get a huge amount of data. Modelling big data is a current trend and combining that with the Internet of Things and crowdsourcing is an interesting area for a research work. In recent years, smart phones become prevalent in people's daily lives. With such devices it has become easy than ever of tracing people's outdoor mobility using location-based applications. In actuality, GPS receivers have no problem receiving signal as long as the receiver has at least 4 partial view of the sky. The GPS satellite constellation consists of 24 satellites (plus some spares) orbiting in six different planes. Each of these planes are inclined 55∘ from the Earth's equatorial plane. The satellites are positioned in their respective planes in such a manner that from almost any place on Earth, at least four satellites are above the horizon at any time (Ashby, 2003). With this configuration, every receiver is nearly always guaranteed to be in view of the minimum number of four satellites needed to get an accurate fix (assuming there are no obstructions). If enough satellites are in view, an accuracy within two meters can be achieved (5-10 meters is a realistic expectation (Wolf, 2006). This spatial accuracy coupled with GPS satellites' extremely accurate clocks allows for great representation of a user's mobility. According to Kardashyan (2011), due to the