ISSN: 1391-8796
Proceedings of
4th Ruhuna International Science & Technology Conference
University of Ruhuna, Matara, Sri Lanka
January 26, 2017

A Mobile-based Application for Making Timely Decisions using Participatory Sensing: A Case Study from Sri Lankan Agriculture

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In Sri Lanka, agriculture sector performs as a major economic force that making a significant contribution to the national economy and employment. However, the lack of strong information flow in the agriculture system makes complicated issues that lead to overflow or underflow of agriculture productivity. Current literature shows that a proper information flow can be created using mobile technologies. Last few years, the mobile technology penetration has shown significant improvement in farmer community that has verified through the several studies by holding successful field visits. Most of the mobile-based applications in agriculture make strong information environment for farmers as well as agriculture authorities. In these systems, most of agriculture officers and authorities are the responsible persons to maintain the agricultural information and they are not collecting sensory information regularly related to the farm. The sensory information is important to make correct decisions through the farming life cycle. The smartphone is a magic device that has facilities to capture the sensory information such as time, location, images, voices and that can be used to form a body of knowledge. We already developed a mobile-based application for Sri Lankan farmers to help their farming activities. The information provided by this application is based the ontological knowledge base in agriculture that we already created. This study analyzes how Participatory Sensing Concept can be applied to this mobile application to make further actionable information that will assist for farmers for successful decision making. Participatory Sensing concept was explored to gather the sensory information from the farmers. Emoticon of the mobile-based application is one of the ways to gather information from farmers with their feelings. Texts, images, voices, and videos can be gathered as a meta-information tag related for the moment/event. Those metadata can be shared and used to make further actionable information that will assist for farmers and agriculture authorities for successful decision making. In this paper, the architecture of the mobile system is proposed by analyzing the information flow with the Participatory Sensing concept. Since this is ongoing research, the implementation is only carried out for Disease Management Stage. Emoji icons are defined to identify the different levels of the expressions of the farmers and those are linked with other related information of farmers' queries.The information flow of the system is enhanced by plugging the existing knowledge base. By analyzing the farmers' inputs further actionable information can be predicted and thus can make decisions timely manner. Since farmer is the dominant party, this study identified the farmers' participation is important to make effective information flow in agriculture system and addressing these issues will help to maintain stable productivity and economy in agriculture system in Sri Lanka.

Keywords: *Actionable Information, Mobile-based Information System, Participatory Sensing*

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