

Social Life Network for Disease and Pest Control

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As a developing country agriculture has traditionally dominated the Sri Lankan economy and there are various issues such as overproduction, under supply, pest and disease outbreaks which has affected the farming community. Controlling diseases and pests related to cultivation is one of the major issues that farmers face during their farming activities. The current process of detecting and controlling pests and diseases is very time consuming in terms of collecting, analysing, processing pest and disease related data and notifying outbreaks to the relevant parties. This limits the timely and proactive actions that could have been taken to control those pests and diseases.

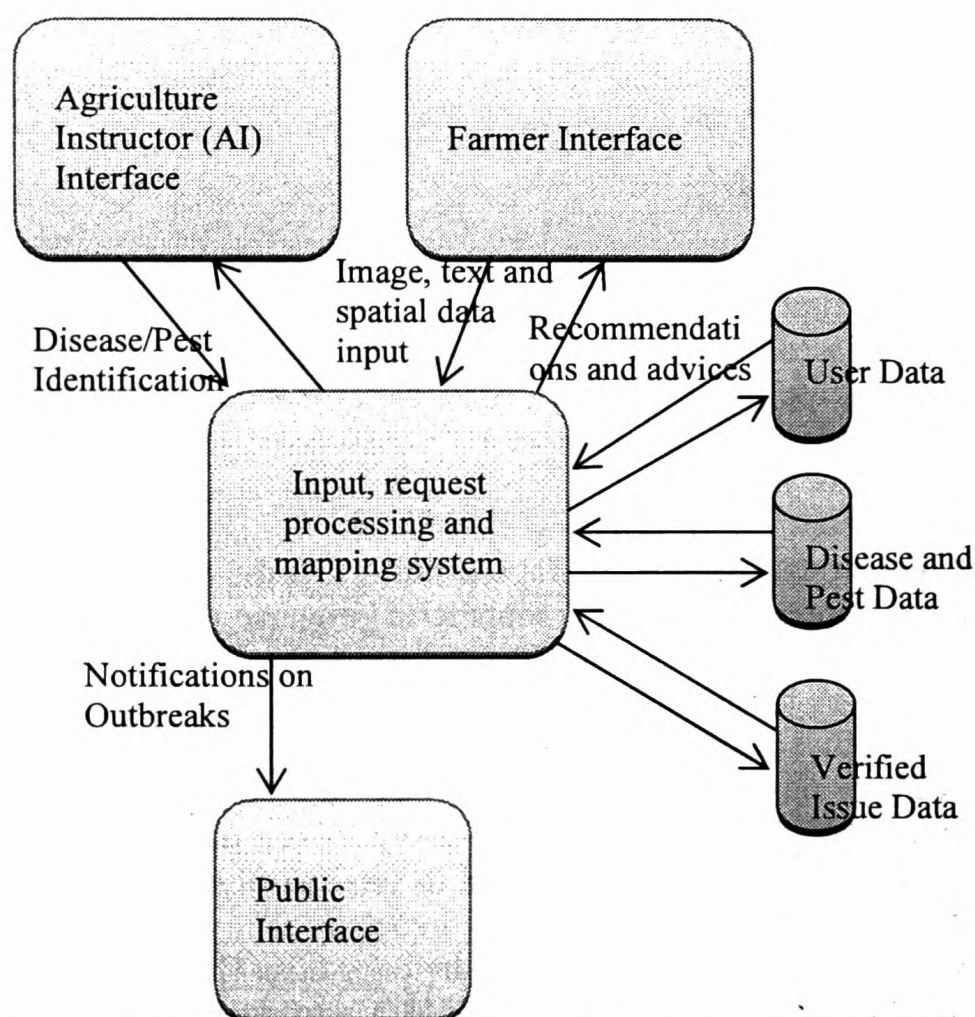
To address the drawbacks and limitations in the current process, our proposed solution has built a Social Life Network to help control the spread of diseases and pests. Building a Social Life Network provides a good mechanism to link all the stakeholders of the agriculture sector. It also facilitates the integration of information, knowledge and resources which are scattered in different places and provide instant access to real time, dynamic information through the Social Life Network. Thereby improving the information visibility to its stakeholders and providing the ability to make accurate and timely decisions. With this system, details of crop pests or diseases (images with GIS data, spatial data) are obtained from farmers together with the spatiotemporal data with minimum delay would be available for analysis by the relevant officers to detect possible disease or pest. The spread of verified diseases or pests is alerted via a map showing the locations as hotspots. After collection of such data a model would be formulated to predict the spread of diseases or pests.

As shown in Fig.1, the main system processes input from the farmers and sends it to AIs (Agriculture Instructors) for manual verification. After the issue is verified from an AI, the data is updated in the system and it would be sent to the analysts via the main system. The farmer interface and AI interface are for the farmers and AIs respectively to interact with the system while the public interface represents interfaces for all the other stakeholders including the pesticide/insecticide suppliers, labour/machinery supplier to view information on outbreaks.

The Design Science Research Methodology is adopted for the research. A prototype was developed using client-server

architecture. It is a web based mobile application that allows users to access through Smartphones and tablets. Implementation was done using PHP, JavaScript, jQuery, AJAX, HTML5 within the jQuery Mobile Framework.

Fig. 1 High level Architecture of the Proposed Solution



The proposed solution is built up on the assumption that the quality of the images obtained through farmers are sufficient to accurately detect the pest/disease. Also the system has some limitations such as device limitations, browser limitations and the dependency on AIs.

Evaluation of the prototype was done with the main stakeholders including 13 farmers, 12 AIs from the Kalutara District and 2 pesticides suppliers (one from a large scale organization and another from a small and medium scale organization). All of them provided positive feedback towards the system. Further enhancements captured from the feedback and usability improvements of the user interfaces need to be done as the future work.