

Development of Farmers Market Information System to Connect with Some Social Stakeholders

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1. Introduction

Large portion of Tanzanians are small scale farmers in rural areas who depend on crop farming as primary economic activity. They sell their crops to middle men in open markets at lower and exploited prices. These farmers do not get enough profits due to lack of information about crop markets.

Most of these farmers own and use low-end mobile phones for daily communication. They afford to buy these phones due to low prices.

In this paper, we develop Farmers Market Information System which is based on Web service and Short Message Service (SMS). The system will be developed using Waterfall software development model. The system will inform farmers on market prices of crops and connect them directly with crop buyers through SMS. As a result, farmers will be able to sell their crops at market prices and get better income.

The system will use Web service in order to make it centralized and be accessed by many users in different locations.

Methodology: Firstly survey was conducted to test truth about farmers poverty and market problems and collect user requirements. Then the system is developed.

2. Data Analysis

A sample of 70 farmers from four villages in Rungwe district, Tanzania was taken. The results are shown in Fig. 1 and Fig. 2.

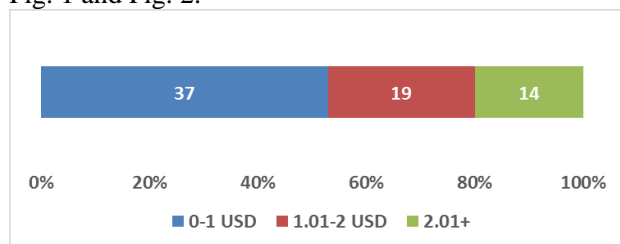


Fig 1. Daily income of farmers

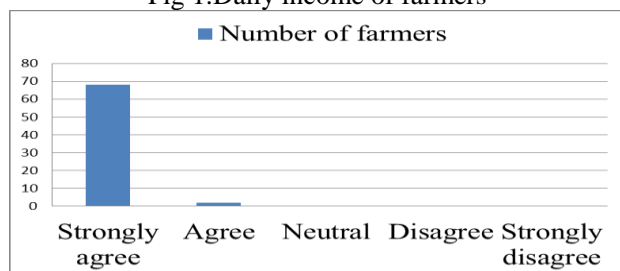


Fig 2. Lack of market access for crops

Majority of the farmers have daily income of 0-1 USD (53%) and 1.01-2 USD (27%) meaning that they are still poor according the international standards of living and 68 out of 70 farmers strongly agreed that lack of market access for crops is a serious problem affecting their economies.

3. Literature Review

Other researches such as [1] focuses on providing farming advice and crop diseases information using query analysis and annotation approach.

Another research [2] developed solution which enables GUI based mobile applications to be transferred over short number of concatenated SMSs.

This research is unique as it focuses on providing farmers with market prices of crops and crop buyers connection by developing Web system which responds to the farmers and mobile crop buyer SMS requests automatically and has unique system design.

4. Requirements Analysis and Specification

The following are user requirements collected during survey that was conducted.

4.1 Functional Requirements

- Farmers should be able to request information about crop prices, crop buyers details and post crops for sale through SMS. The system should send back the response to farmers through SMS.
- Crop buyers should be able to post information about crops they want to buy and request details about farmers' crops for sale through SMS or Web system. System should return response through SMS for mobile buyers and through Web pages for Web buyers.

4.2 Non Functional Requirements

- Availability
- Reliability
- Security
- Short response time

5. Design and Specification

5.1 System Architecture

The system will be centralized in order to be accessed by many users and will use the 3-Tier architecture (refer to Fig.3).

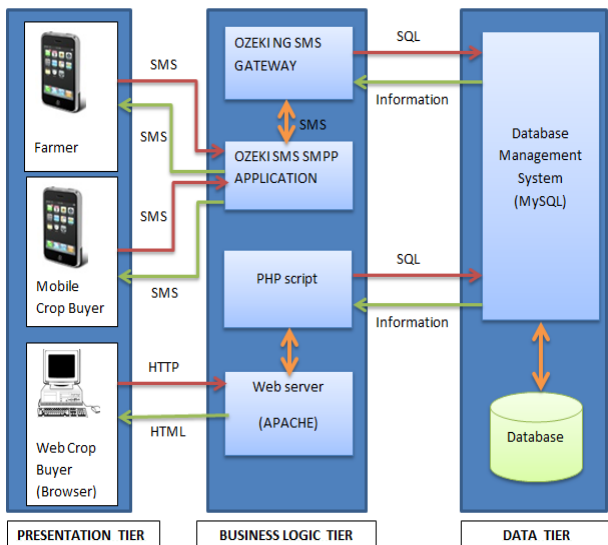


Fig 3. 3-Tier architecture

5.1.1 Presentation Tier

The presentation tier consists of user interfaces. Web user interfaces will be designed using HTML and CSS to provide easy to use graphical user interfaces (GUI). Mobile users can access the system through SMS while Web users will use Web browsers.

5.1.2 Business Logic Tier

This is the middle tier which consists of Apache web server which holds the computer programs written using PHP server side scripting language and OZEKI NG SMS Gateway [3] which facilitates sending and receiving SMS between users and the Web system and OZEKI SMS SMPP application which provides mobile service provider connection. SQL commands will be used to query information from the database and automatically reply to user requests.

5.1.3 Data Tier

Data tier consists of MySQL database management system which holds the database and facilitates management of data like retrieving, adding and updating data in the database. Entity relationship diagram (ERD) has been used in physical database design. Sensitive data like password will be encrypted while stored in the database.

6. Current Development

We have developed farmer module that automatically replies farmer SMS requests for market prices of crops.

Sequence of steps to access crop prices: Firstly crop prices are registered and updated in Web system by respective market officer (refer to Fig.4). Then farmer composes request SMS with the keyword PRICE followed by crop name and market name and send it to the system (refer to Fig.5).The system processes the request and returns the crop price to farmer through SMS within few seconds (refer to Fig.5).

Next step will be developing modules for mobile crop buyers and Web crop buyers to post crops for buying and access crops for sale.

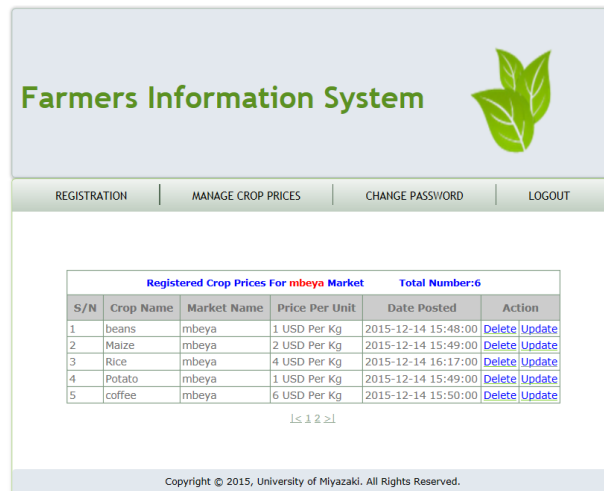


Fig 4. Market crop prices in the Web system

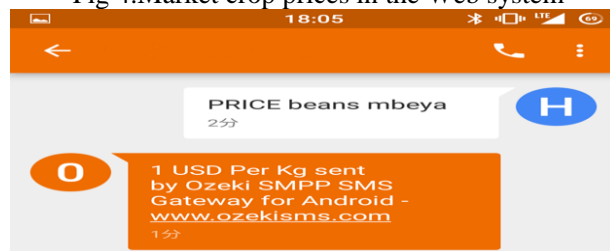


Fig 5. Farmer crop price request and response

7. Conclusion

In this paper, we have analyzed data collected from farmer survey and developed Farmers Market Information System using Waterfall model.

After completion, the system will be very effective to users. Feature like AUTOMATIC REPLY ensures the short response time and availability, authentication and data encryption ensure security of information, specifications of Processor and RAM and high bandwidth hosting network ensure system reliability. Farmers will access markets and sell crops at market prices and get better income. Crop buyers will also buy crops directly from farmers at market prices.

References

- [1] Mukda Suktarachan, Patthrawan Rattanamanee and Asanee Kawtrakul. The Development of a Question-Answering Services System for the Farmer through SMS: Query Analysis. KRAQ '09 Proceedings of the 2009 Workshop on Knowledge and Reasoning for Answering Questions:3-10, August 2009.
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