

# Supply Chain and Value Chain Management for Sugar Factory

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**Abstract**— This is an android and web based application for farmer and sugar factory. This application is to manage supply chain and value chain between the sugar factory and farmer. Supply Chain will be an information system, whereas Value chain provides valuable services for farmers. Existing system is very pathetic and hectic for farmers as they need to stand in a long queue for submitting the sugarcane to the factory and get the rewards. This application provides all the latest schemes and updated information given by government. Along with this it also notifies the weight and predicted cost. The predicted cost is calculated with the help of algorithm named HMM (Hidden Markov Model). This will benefit the farmer and thus, transparency is maintained. The application also includes handling emergency situation like crop burning. This system is authentic as it provides access to only registered farmers. Now-a-day's android application development is growing field. Android is free and open source, providing an easy-to-use development kit containing real time information update and facility to link websites. Due to this system is developed using android platform. The valuable benefit for the farmers will be the user interface which is provided in Marathi. Thus it manages the communication between the sugar factory and farmer in very smooth approach.

**Key words:** GPS (Global Positioning System), FCFS (First Come First Serve), HMM (Hidden Markov Model)

## I. INTRODUCTION

Now a day's agriculture industry is the most growing industry. This is an android and web based application for farmer and sugar factory. This application is to manage supply chain and value chain between the sugar factory and farmer. Supply Chain will be an information system, whereas Value chain provides valuable services for farmers. The system will be able to allocate labors, manage harvesting scheduling and rescheduling, cost prediction based on historic data, send notification to the farmers, transparency of sugar cane weight and cost is maintained detection of crop burning in farms using smoke sensor etc. We are working on all these problems now a days faced by sugar cane industry and farmers.

## II. RELATED WORK

In existing system, the farmers are provided with the android app which provides only with the information regarding how they can improve the productivity of the sugarcane. The farmer was provided with the entire information; also the existing system focuses on the providing government schemes to the system. But the existing system does not provide any services in order to automate entire manual process of the sugar factory.

## III. ARCHITECTURE

Project focuses on supply and value chain of the sugar factory unlike Agro Supply Chain. There are three main modules

present in system i.e. Server, Block Office and Farmer App. First of all farmer need to register to the factory via Android Application, once farmer get registered then farmer need to verify by reporting to the block office. After getting verified by the nearest block office farmer will receive notification regarding harvesting schedule. According to schedule farmer need to deliver sugarcane to the factory. Farmer will also receive different notifications like predicted cost, weight of sugarcane and share members will receive notifications regarding availability of seeds, fertilizers. There is another module crop burning which will deal with handling of emergency situations like crop burning.

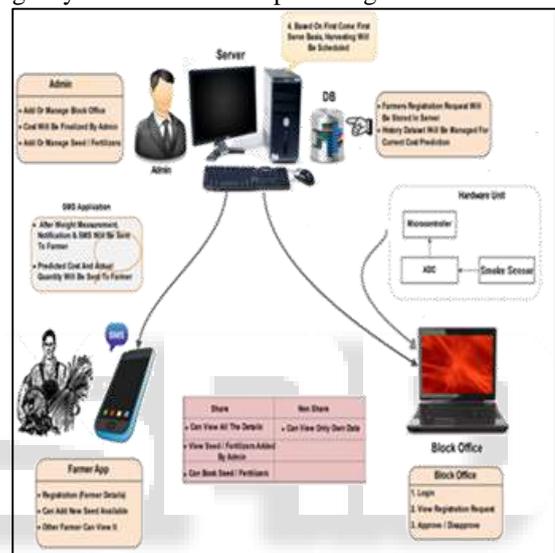


Fig. 1: System Architecture

## IV. ALGORITHM

### A. HMM (Hidden Markov Model):

We are using Hidden Markov model (HMM) in our project to predict the cost of sugarcane. It is a stochastic method which has been used in various application like speech processing, weather forecasting and character recognition. Hidden Markov Model is a statistical method that uses probability measures to model sequential data represented by sequence of observation vectors. In a hidden Markov model, the state is not directly visible, but output dependent on the state, is visible. The probability of each state depends only on what was the previous state. HMM are powerful statistical models for modeling sequential or time series data. In simple Markov models, the state is directly visible to the observer and therefore the state transition probabilities are the only parameters. In a hidden Markov model, the state is not directly visible, but output, dependent on the state, which is visible. Each state has a probability distribution over the possible output. Therefore the sequence of output generated by HMM gives some information about the sequence of states.

HMM Components are:

A set of states ( $x$ 's)

A set of possible output symbols ( $y$ 's)

A state transition matrix ( $a$ 's) probability of making transition from one state to the next.

Output emission matrix ( $b$ 's) probability of a emitting/observing a symbol at a particular state.

Baum-Welch is an iterative procedure for estimating  $\theta$  from only  $X$ . It works by maximizing a proxy to the log likelihood, and updating the current model to be closer to the optimal model. Each iteration of Baum-Welch is guaranteed to increase the log-likelihood of the data. But of course, convergence to the optimal solution is not guaranteed.

### V. IMPLEMENTATION

All modules and user interface was built in this step. Development will be done using Java Script language, Hyper Text Markup Language and Cascading style Sheets. Android application is developed by using JAVA language.

### VI. RESULTS



Fig. 4:



Fig. 2:

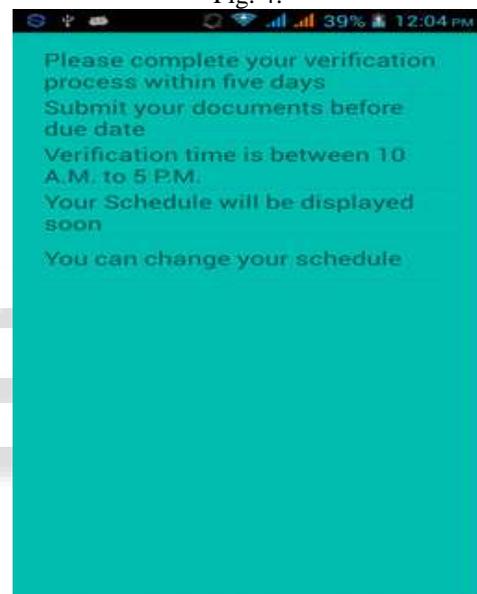


Fig. 5:



Fig. 3:



Fig. 6:

## VII. CONCLUSION

This android application is the complete package for farmers, which provides all the notifications about registration, harvesting schedule, total cost of sugarcane, rate of each type of sugarcane etc. and also handles the emergency situations like crop burning. So it is very useful for the farmers who want to do farming on sugar cane and obtain good production with proper management.

## REFERENCES

- [1] Agriculture Supply Chain Management Based Android Application, International Journal of Advanced Research in Computer and Communication Engineering Vol. 4, Issue 4, April 2015.
- [2] Time Quantum Based Improved Scheduling Algorithm, Lalit et al., International Journal of Advanced Research in Computer Science and Software Engineering 3(4), April - 2013, pp. 955-962.
- [3] Weather Prediction Using Hidden Markov Model, by SSRG International Journal of Electronics and Communication Engineering (SSRG-IJECE) volume 2 Issue 3 March 2015
- [4] <http://www.gisdevelopment.net/technology/lbs/techlbs003pf.htm>, Manish Prasad, GIS Development, Location based services, 2006.
- [5] Abbott and Powell: Land-Vehicle Navigation Using GPS, Proceedings of The IEEE, Vol. 87, No. 1, January 1999.

