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Research paper

Modern agriculture aid

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Abstract

Farming is the primary occupation in India. People depend on it to survive but no support is provided for them when they struggle to support our living. One main issue in this industry is to manage the work done every day and to manage the post production products. There might be a scenario where the worker would have been abnormal which might lead them to leave the work incomplete. There needed a way for the farmer to easily find about the work done in his farm and about the workers. The proposed solution has two devices and an android application which focuses on monitoring the workers, knowing the work duration and recording the quantity of the product obtained as outcome of the process. It will make sure that the worker gets paid only if they work and will let the farmer to look after things from his/her home. The solution includes a way to authenticate the worker and record their time of entry, to verify the health condition of the worker, to track the duration of work done (Supports Salary Payment), to give basic crop characteristics for (novice) farmers, to allow the farmer to store expenditure details, to add-on the quantity of the outcome of the production into the database. It will be helpful for a novice in under-standing the farming process and will also assure a profit by aiding the farmers in understanding the requirements and expenditure and in calculation of payment for a worker based on their work.

Keywords: *Farming; Heart-Rate Sensor; Load Cell; GPRS; Android Application; Monitoring-Workers; Duration of Work.*

1. Introduction

Agriculture is the backbone of food production industry. It is not easy to reach out the land and look after production everyday and get paid less for it. It is necessary to aid this industry which exists as the root cause of humans to survive in this world. A farmer works in the field from the start of production over a period of three to six months. It is a difficult task for the landlord to manage the production and also the products produced. The recent implementations include eAgriculture which uses the electronic equipment and IT based applications to provide a major push to the ease the agriculture practices [1]. The scope of the proposed system spans to an extent to exploit the features of a smart phone and reach out to a wide range of people. The application will make it easy to know the farmers who are working for them. It will make it easy for the landlords to pay for the farmers. It also ensures user friendly and understandable support devices are built to monitor and manage agriculture. Thus, it helps in making it simple for the landlords and reduces the expenditure too.

2. Related work

a) Agriculture App[2]

An agriculture app aims to help Indian farmers to make informed decisions with the help of customized information related to their needs.

Drawbacks:

Supports farmers by providing all market and production related information but does not include any post production profit analysis or calculations nor used for monitoring farmer activities.

b) IOT based smart monitoring [3]

With various sensors in appliance the automatic on and off control of microcontroller and the usage of GPS module for making the farming easy to monitor.

Drawbacks:

It includes temperature, moisture and other sensing patterns but the main soil analysis is not available. The working area and the workers are also not monitored in this process.

3. Literature survey

The current pattern of farming includes more than one person working in the same row of crop plantation. There is no specific rule of one section per person to farm on. The present way of farming doesn't need any sensors to be embedded on the fields in the level of crops to monitor or maintain but instead it needs to reduce the effort of the landlord in monitoring both the farm and the farmers. The duration of work done by a farmer needs to be known in order to pay them according to their work and also there is a need to calculate the rate of profit from the expenditure and the income.

The need for the profit calculation is that it ensures that the need to mortgage the land for the purpose of their own survival and occupation will be reduced. The expenditure and the income for each production is not maintained by the landlords. Thus, each out going product and the income of the same must be documented for further usage.

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4. Proposed solution

The proposed system aims in developing an android application for the purpose of managing and maintaining the production records. The application will include a way for the farmer to authenticate himself and to maintain the details of his production and also to authenticate his farmers. The system also includes two devices, one that helps in authenticating the farmer and tracking that person's location for the duration of work done in the field and it also ensures that the farmer is normal according to the results of the testing of his/her heart rate. Another device stays helpful in weighing the quantity of the sack of crop produced and directly saving it into the database for future references.

Landlord: The process involved in a landlord's end is with the Mobile Application. The landlord must login and register himself. He can then check the crop characteristics and also the land area characteristics and choose the crop that he wishes to grow and enter the expenditure spent for that purpose. The details get saved in the database. The user will get updated of the person entering the field and also the person exiting the same with the help of the RFID and beacon module at the remote end. This data is stored in database and is viewed by the landlord in android application. He will also get the quantity of the product and thus will calculate the profit of his work.

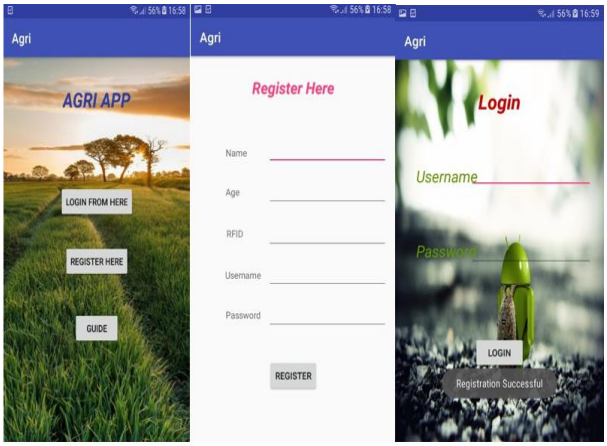


Fig. 1: Android App at the Landlord End.

Farmer: The farmer needs to authenticate himself when he enters the field and should also check the health with the help of RFID/Button and Heart Rate Sensors respectively. The user is given a slave beacon module and the device includes a master beacon module. This helps in tracking the location of the farmer. The device includes a button to authenticate the user even if the user forgets the RFID. There is no need for the farmer to authenticate when he/she leaves the farm.

5. System architecture

The system has the ARM7 microcontroller. This microcontroller has the TDMI-S processor. It is 32-bit microcontroller and also have the pipeline process. RFID receiver is interfaced to the microcontroller through the UART protocol.The function of RFID is to identify the objects [4].It is used to check whether the user is a valid person or not. If the user is a valid person it will check the heartbeat of that person. Heart beat sensor used to measure the heart rate and is interfaced to the microcontroller through the external interrupt. All the information is updated to the web server through GPRS modem. Beacon module checks the valid person is the present or not at that particular area.

The second device includes a load cell, HX711, Arduino Uno, Arduino Ethernet Shield to measure the quantity of the product and send it to the online server. The load cell varies in measurements like 1kg, 3kg, 10kg, 40kg, 100kg, etc. The Hx711 helps in connecting the load cell and Arduino. Arduino can be easily coded by using the Arduino IDE. Thus, it enables a way to obtain the result of the weighing load cell directly in the system.

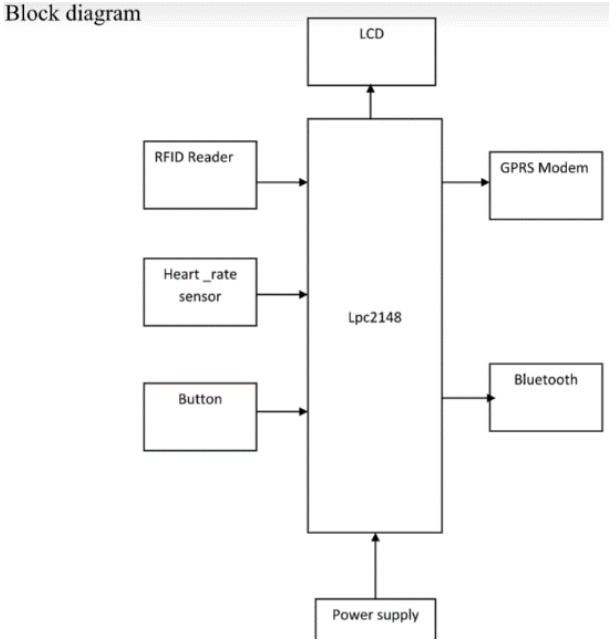


Fig. 2: Device to Authenticate.

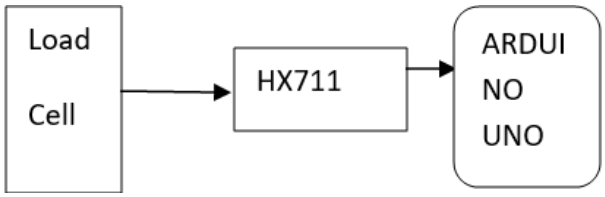


Fig. 3: Device to Measure Quantity.

6. Commercial viability

The above proposed type of application has not been tested in many farming areas. This will ensure that the worker gets paid only for the work that has been done by him. This will be of feasible cost of expenditure.

7. Conclusion

Technology is a light that does cuts through the darkness thus promoting lives on the earth. The aid for agriculture with the upcoming technologies helps in increasing the speed of work and thus ensures smart work in few hours of time. This approach is built with low cost and at best application that is user friendly and that actually assures profit in work. Technology is a light that cuts through darkness and promotes lives on earth. The need for establishing an aid for the landlords were among one such main problems faced in Agriculture industry. The difficulty in managing one certain crop's production is same for production of more than one crop. This approach is bundled with the low-cost devices and also an android application with a simple logic, but, it has a great potential. It will be helpful for a novice landlord in understanding and managing the farming process and will also assure a way to analyze a profit from the expenditure and income with a view of the requirements.

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