

Research and Survey Practice for sugarcane farming using Internet of Things (IOT)

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Abstract— The lack of adopting new technology in agriculture directly impact on countries GDP, to enhance agro products need to adopt IOT based techniques to increase crop survey, crops status, managing water resources etc. Internet of Things has more potential and transfers the way we do traditional agriculture into smart agriculture. The increasing global population will cross 12 billion by 2050, so, in order to feed food to this huge population the agriculture need to be automating using smart system such as IoT based systems and components. The demand of food has to meet many challenges in future such as change in climate, weather conditions, environment changes impact result into intensive farming practices, smart agriculture farming through IoT based system helps to farmers to reduce human manpower resources and generated very less agriculture waste. And enhance the crops productivity. IoT Based smart farming is a hi-tech system of growing crops using tools and techniques and automated systems. It uses ICT base hardware tools, applications and advance techniques in agriculture. To incorporate IoT based farming need to use of sensors, automated vehicle, automated hardware systems, control units etc. are key components of this system.

Keywords—IoT,ICT,IT,GDP,Automated Hardware

I. INTRODUCTION

Agriculture sector is playing an important role in the process of development of many areas such as economy, productivity and prosperity of a country. It is already made a significant impact to many developed countries for their main source of income was agriculture. Now a day's irrigation system helps to grow commercial crops such as sugarcane, grapes, pomegranates etc. In an irrigation system we need to use controlled amounts of water to crops needed intervals, need to retain soil moisture, landscape and revegetate disturbed soil in dry areas and during periods of less than average rainfall in our country. Now a day's sugarcane forming is encountering many problems, such as red rot, wilt, grassy shoot, smut, leaf scald diseases, red stripped diseases, mosaic diseases, pokkahboeng, rust, yellow leaf diseases etc. In manual forming process farmers encountering many problems such as difficult to check individual crops leaves and it is more time consuming, cost effective and need lot of human resources. To overcome all these problems, need to adapt new technology such as IOT based techniques to do survey using drones, data information systems, web application and android applications are helps farmers to do survey and captures images of leaves of sugar canes using HD cameras, upload these images into data base system for image processing system to check the status of crop health,

information system will give details information about the crops. With the help of images we can easily identify types of diseases, soil moisture, crop height, crop width, crop health etc.

II. LITERATURE SURVEY

Precision agriculture defined as a group of tools and techniques to understand and manage inherent spatial variability within crops of various fields, which is also relies on various tools and techniques to collect, manage, analyse, process and synthesize huge volumetric amount of geo references data. The data which is collected is not able to show pH values of soil, correlation structure of soil, lime elements of soil, fertility of soil, organic elements matter and spatial distribution of sugarcane crops productions. Sugarcane crop is the bioenergy, commercial crop currently deploying in large scale. Sugarcane production system, however, differs substantially from major staple crops, affecting development and adoption of advanced IoT based tools and technologies, including those that enable for precision agriculture. [1].

Sugarcane production area is very important sector for the sugarcane refinery factories. It is important to strengthen its

crop management for enhancing the quality of crops and increasing productivity of quality sugar yielding. The main ways of building comprehensive, efficient and multi-dimensional farm management information system and services for farmers, government organizations and production of sugar factories. The web application information or services provided is integrated with the use of global positions system, geo information systems and web services, with the automated .systems information, easy to monitor the growth of sugarcane crops and estimate approximate yield of sugarcane, but security of data management and security of farm management information system and services will be still a challenging task [2].

The robotic technologies will help full to improve sugarcane productivity and enhance the quality of sugarcane by analysing sugarcane billets quality using computer vision systems and technologies. This technology increases the harvesting process of sugarcane and reduce damage control of billets. The computer vision system demonstrates the high performance at billets detection and alignment of billet orientations. Using these computer vision systems with a high computing and performance intelligence robotic system inspects, sorts and suggest good quality of billets for plantation in field, which is ultimately increases the productivity of quality sugarcane. The use of computer vision system improve the production and require lot of time to process the huge amount of data and storage to store this data requires high performance parallel computing devices[3]

The image retrieval from large database has an active area of a research. Content based image retrieval system extracts image's features from the raw images and computes an associative measuring between query image and database image. [4].

III. METHODOLOGY

The proposed system helps to identifies various sugarcane diseases by using drone, HD cameras and sensors, we can do survey by collecting various images of sugarcane leaves and send these information to our Internet of Things (IOT) based system and do image analysis and predict proper solution, such has what types of diseases, health status of crops, water moisture level, soil moisture, height of sugarcane in various location etc. With this system helps us to identify soil moisture based on the moisture automatically turn on and off water motor.

Algorithms:

Step1: Using drone system do survey and collect various data such images of sugarcane leaves of different geographical locations.

Step1: These images are sent to central processing system through wireless controllers of Internet of Things (IOT) based system.

Step3: Analysis of collected images using tag based image retrieval using pseudo relevance feedback mechanism

Step4:process and Predict proper solution to these health status of sugarcane .

Step5: Identify weather conditions, soil moisture, coil correlation using various sensors, store information in cloud based internet of Things and uses these data for accurate and systematic prediction for crops status.



Fig: 1 Internet of Things in Sugar cane Farming

The precision farming makes the farming procedure more systematic, automated, accurate and reliable. This types of farming enhances quality and quantity of crops yielding. Precision farming adopts new and advance tools and technologies which makes new revolutions in agriculture industries. These technologies are fully automated from start to end of farming. The use of IoT bases system is a part of precision farming. The arduino Internet of things contains many components such as hardware board, sensors, software, small display board, controller, Wi-Fi module, actuators, and more. Manual farming takes consumes lot of time , require huge man power and more cost effective. To overcome all these issues automated farming came into picture which require less man power, less time and cost is also very less. These automated system collect data and process the data and analyse data and give accurate and predict the results.

IV. RESULTS AND DISCUSSION

The products and many services are offered by Internet of Things systems include correlation of soil, weather status, colour identifications, soil moisture probes, VRI optimization techniques, virtual optimizer PRO techniques.

Agriculture aerial survey drones

For precision farming aerial drone are used in order to increase survey of huge agriculture lands in very less period of time, crops measurements, measurement of height of crops, health status of plants and leaves, weather condition, soil information etc. These drones are remote based controlled system through Internet of Things (IoT). Controlled parameters are set in Arduino IoT board and software for farming. [8].

Many benefits that the usage of these aerial survey drones with cloud brings to the table include, ease of use, time-saving, crop health image capturing, integrated GIS mapping, aerial survey and the ability to increase crop yields. The use of drones tools and technologies will give a high-tech changeover to the agriculture sector by making use of previous results, strategy and planning based on real-time data collection systems and processing these data, generate accurate and prediction of quality yielding. [7].

The farmers can put required information in their android application of smart phones, information is related to their field information such as field survey number, total area covered, ground resolutions, ground clearance, altitude, longitude area of the field. Based on the information, the Internet of Things based system send controlled message to drones, these drones do survey according to the controlled message received from controller. These drone click images of leaves of plants with HD cameras and to central system through wireless devices and Internet of Things based system for processing and health predications of yield prediction of crops, These drones also collect information related to height of plants measurements, plants counting, health indices multi-dimensional images of plants during the flight and lands at any location of filed. [6].



Fig:3 Drone based Survey System

Devices and Arduino Internet of Things (IoT)

The main components used in arduino internet of things are hardware board with built in Wi-Fi, NB-IoT, LTE Cat-M, Ethernet facilities. The hardware devices which runs the software, reads different sensors, control the actuators, display the graphs in small display board and communicate with arduino devices and store results in cloud for further analysis and predictions. These arduino Internet of Things device control drones remotely and helps full for collecting, processing and analysing different data.



Fig : 4 Arduino IoT components

V. CONCLUSION AND FUTURE SCOPE

The sugarcane farming can be increased by using automated systems, automated hardware system, tools, techniques, application and android applications. In this paper proposed precision farming (PA) using advance tools and techniques in sugarcane farming. Adopting Internet of Things based system is best way to achieve precision farming in sugarcane farming and is also very less cost effective and easy to handle. Internet of things system greatly reduce the human resources, do easy survey work and enhance quality and productivity sugarcane farming.

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Dr. P. Bhaskar Reddy has received his Doctorate in Computer Science and Engineering from Sri Venkateswara University, Tirupati. His Doctoral thesis titled “A Novel Approach for Design and Implementation of Efficient Algorithms for Content Based Image Retrieval Using Local Patterns Based Feature Descriptors”. He has 10 years of experience in teaching and 4 years of Research experience. He has published and presented several papers in peer-reviewed International Journals and Conferences. His research interests include Image Processing, Data Mining, Content Based Image Retrieval.Experience.