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Research Article

SMART AGRO INDICATION SECURITY SYSTEM

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ABSTRACT

Agriculture is the primary job in our country for ages. But now a days due to migration of people from rural to urban area there is Barrier in agriculture. So to overcome this problem we go for smart agriculture techniques. By using the recent electronics technology we can try to put forth remedies on situation. We developed a microcontroller based system, along with various sensors. This includes PIR, temperature, moisture and water flow sensor and some auto control drivers such as solenoid valve, and relays. Here for communication impetus we used GSM module. Hence system becomes better decision making and more efficient exploitation operations and management.

All the operations are carried out from remote location by user (farmer) with the help of mobile SMS. Also all the activities carried out by system are inform to user (farmer) via SMS alert. System also provide theft detection techniques to water pump. Thus a complete system gives a indication as well as security alert to user.

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INTRODUCTION

India is mainly an agricultural country. Agriculture is the most important occupation for most of the Indian families. In India, agriculture contributes about sixteen percent (16%) of total GDP and ten percent (10%) of total exports. From diagram 1, we say that agriculture plays a vital role in India's economy. Over 58 per cent of the rural households depend on agriculture as their principal means of livelihood. As per the 2nd advised estimates by the Central Statistics Office (CSO), the share of agriculture and allied sectors is estimated to be 17.3 per cent of the Gross Value Added (GVA) during 2016-17 at 2011-12 prices.

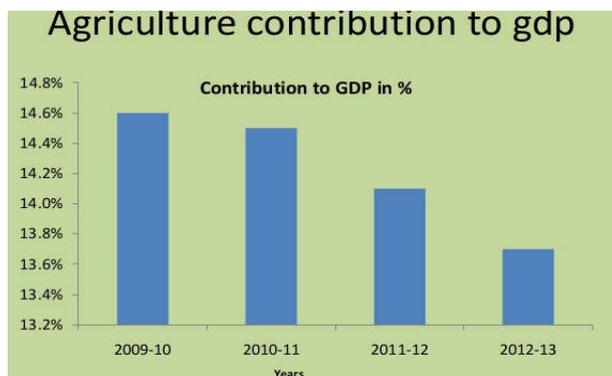


Diagram 1 Agriculture contribution to GDP

Agriculture has come a long way in the past century. We produce more food than ever before-but our current model is unsustainable, and as the world's population rapidly approaches the 8 billion marks, modern food production methods will need a radical transformation if they're going to keep up. But luckily, there's a range of new technologies that might make it possible.

As far as modernization of farming is concern, from the farmer's point of view Smart Farming should provide the following circumstances

- **Management Information Systems:** Planned systems for collecting, processing, storing, and disseminating data in the form needed to carry out a farm's operations and functions.
- **Precision Agriculture:** Management of spatial and temporal variability to improve economic returns following the use of inputs and reduce environmental impact. It includes Decision Support Systems (DSS) for whole farm management with the goal of optimizing returns on inputs while preserving resources. enabled by the widespread use of GPS, GNSS, aerial images by drones and the latest generation of hyper spectral images provided by Sentinel satellites, allowing the creation of maps of the spatial variability of as many variables as can be measured

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- Agricultural automation and robotics:** The process of applying robotics, automatic control and artificial intelligence techniques at all levels of agricultural production, including farmbots and farmdrones.

LITERATURE SURVEY

KapilBhusari gives the “Smart Agro System” which Implementation of precision agriculture sector using WSN. Different sensor nodes sense various environment characteristics and sensed data stored in database for further process. Base station consists of arduino Uno with integrated GSM module to take the actions and give the actions to various sensor nodes. Also to pass the sensed data to base station ZigBee sensors are mostly used[1]

Dr.N.Sumamention idea in his smart agriculture techniques using IoT, have various features like Global positioning system based remote controlled monitoring, moisture & temperature sensing, intruders scaring, security, leaf wetness and irrigation facilities[2]

VidadalaSrija project probes into the implementation of agricultural automatic system using GSM and WEB technologies. This Embedded project is to design and develop a low cost system which is depend on embedded platform for agricultural automation. Minimum usage of water is first purpose of this system[4]

Chandankumarsahu the objectives of this paper is to control the water motor automatically and choose the direction of the flow of water in pipe with the help of soil moisture sensor. Finally send the data (operation of the motor and direction of water) of the farm field to the mobile SMS and g-mail account of the user.[5]

S.S.Katariya [6] this paper describes the four major task in agriculture field which is done by a robot without applying any human support. They do the agriculture work like spraying of pesticides, pesticide water supplying, dropping of seed, plugging, accurately and automatically & the solar plant provides the supply source to whole robot which makes it echo-friendly.

Need of Project

Today’s agriculture system mostly prefers manual work, which requires more effort. For every minor work in farm, user needs to do a multiple task at the same time. This causes delay in work and hence losses of resources like water, electricity. Here we need to design a system which can overcome all of these problems. Hence a microcontroller based smart agro indication system is a key solution on it, which causes effective and precise agriculture.

METHODOLOGY

Figure shows a block diagram of smart agro indication security system. It consists of various sensors at a input section. These sensors include PIR, Temperature, and moisture and water flow sensor

PIR sensor (HC-SR 501): A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. It is use to detect the motion present in farm. There may be chances that any

obstruction can be occurring in farm viz. animals which causes ruin the farm. As soon as motion is detected in farm it will automatically send the SMS to the user. Here HC-SR 501 is able to sense angle less than 120 degree and 7 meter.

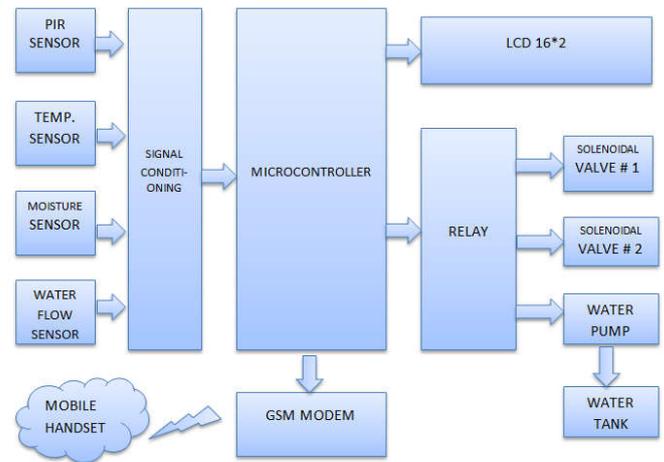


Figure 2 Block diagram of Smart agro indication system

Temperature sensor (LM 35): Here as per the crop requirement a heat is provided. Some crop need more heat viz. maize, paddy. While some required cool environment viz. wheat. So a temperature sensor will help to maintain the required condition of crop.

Moisture sensor (VH400): Soil moisture sensors measure the volumetric water content in soil. Moisture sensor will detect the water content in soil and accordingly temperature sensor will maintain heat. Here moisture sensor is also determine whether water is required to crop or not. If soil is dry, the corresponding message is send to user. Accordingly user will run the motor if necessary.

Water flow sensor (YF-S201): Here the number of solenoid valve is present in farm. Here farmer will ON or OFF the vale as per requirement. Here water flow sensor will sense the water flow and SMS is send to user accordingly.

Signal conditioning: All the outputs of sensors are given to Signal conditioning. Here the manipulation of a signal in a way that it prepares it for the next stage of processing. The function of signal conditioning is to make the output of sensors acceptable to microcontroller.

Microcontroller (89c52): A microcontroller is considered a self-contained system with a processor, memory and peripherals and can be used as an embedded system. Here the controlling relay, water pump and GSM module and 16*2 LCD display is run by microcontroller. Microcontroller is heart of system.

Relay: Relays are electromechanical switch that open and close circuits electromagnetically. Relays control solenoid valve which is further control the fertilizing and sprinkling. Here switching of relay is controlled by microcontroller.

GSM modem: A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. Here microcontroller gives commands to GSM modem and accordingly a text message is send to user.

Hardware Details

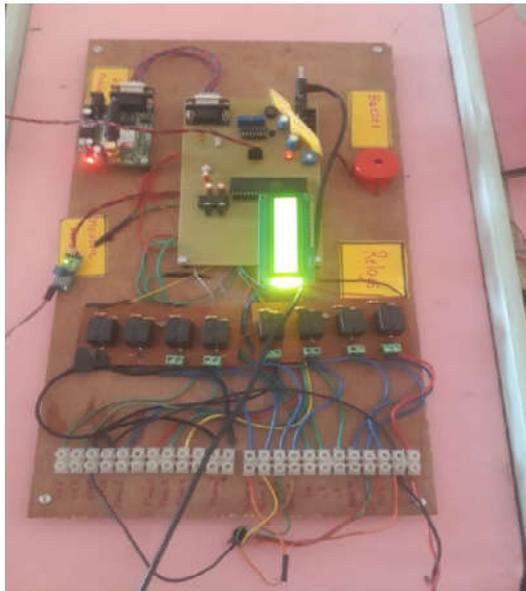


Fig 3 Hardware of smart agro indication security system.

Sensors

- PIR : HC-SR501
- Temperature :LM 35
- Humidity : VH400
- Water flow sensor : YF-S201

Microcontroller: AT 89C52RD2

GSM Modem: Dual band GSM/GPRS 900/1800MHz.

Relay: 12v ,5A(JS1-12V-F)

Solenoid Valve: Two way 12V - 3/4" (ROB-10456)

Alphanumeric display: LDC 16*2

Model



Fig 4 Demo Model of smart agro indication security system

A hardware set up is mounted on 5*3 plyboard with necessary compartment. Here a solenoid valve is fitted for each compartment. Once set up is powered, the demo model works accordingly.

Here a three container is fitted on rack for the fertilizing purpose. A water tank is fitted on tower for water storage purpose.

RESULT AND DISCUSSION

Table 1 Valve control status

Message display	Water valve 1status	Fertiliser valve 2status
Valve 01 ON	√	×
Valve 02 ON	×	√
Valve 01 OFF	×	×
Valve 2 OFF	×	×

*VALVE will closed automatically after water tank storage sensing the soil sensor output.

Table 2 Status of tank storage and motor

Status of tank	voltage level	Motor
Empty	Low/ 0 level	ON
Full	High/ 1 level	OFF

Table 3 Status of soil sensor

Status of soil sensor	Voltage Level	Status of water ,fertilizer Valve
DRY	High	ON
WET	Low	OFF

CONCLUSION

From this project we conclude that, we can implement smart agro indication system, which can operate from remote location. Hence ultimately reduce the human efforts. As there is less human interference, system becomes more accurate. Here the designed Water supply system is useful for both sprinkler and fertilizer. Also storage tank is useful when there is shortage of water resources. Automation system involves a feedback SMS which gives idea about present status of system.

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