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## Solar based security and smart irrigation system for agriculture

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### ABSTRACT

Modern agriculture is the need which is required to enhance productivity and security of agriculture system. The security to the agriculture field has to be provided in order to protect the field from animals. The productivity of the agriculture system can be enhanced through the proper irrigation system, crop production/selection based on amount of water available and limited sprinkling of the pesticides' therefore decided to develop an application model which suits humankind with: 1) The security can be provided through laser fencing. Laser-based fencers can be used to protect the farm, farm-lands, forest bungalows etc. from animals. In a way, laser fencing help in performing the job of a farmer/forest guard present in the field. Laser fencer controls the animals/human by giving a siren indication that alerts them to stay away from the fence which will protect our field. Continuous monitoring of the field through a wireless camera which will be mounted in the field. 2) Create a robot that supplies pesticide in an agricultural environment with low wastage and reliability. The robot can be controlled by any wireless media of communication 3) Create a setup to provide water level indication in the water tank so that the proper crop can be selected which can easily grow in the available water. Thus this avoids the problem of scarcity of water 4) water irrigation system based on the moisture content in the field. Water will be supplied to the field if the moisture content in the field is low (minimum threshold) and supply will be stopped if moisture content is more (maximum threshold) in the field. Apart from these, we can even control the water supply through GSM.

**Keywords:** ARM controller, Arduino, GSM, a Moisture sensor, Motor, Bluetooth module.

### 1. INTRODUCTION

Modern agriculture is the need of the agriculture system which is required to enhance productivity and security of agriculture system. The main aim of our project is to provide Laser-based fences that can be used to protect the agricultural field. From animals. In a way, these simulate the job of a forest guard. Already popular in countries where manpower is expensive, Laser fencer is becoming popular in the whole worldwide. This controls the animals/human by giving siren that teaches them to stay away from the fence. Thus Laser fences are economical and practical solutions to maximize field production through via controlled grazing. Laser light is transmitted through laser/led and at the receiver the IR sensor is used to detect the light. This fencing to all four side of the field. If fencing breaks then a buzzer sounds and farmer is alerted by a message through Gsm. A farmer can see continuous monitoring of the field on his TV, mobile & laptop etc. Even after the first siren, the animal runs inside of the field then the farmer can make another siren by mobile.

A robot is an automatic mechanical-electronic device often resembles like a human or animal. Modern robots are controlled through an electrical/electronic circuit or computer programming. The aim is based on pesticide sprinkling robot. This robot has a controller, a tank to carry pesticide and Bluetooth device mounted on it and the movement of this robot can be controlled through Bluetooth application present in mobile.

Apart from these objectives our project also focuses on water level indication in field tank, because the amount of water available is necessary to determine which crop can be grown easily. Thus our project consists of three led connected to three iron rods which will place inside the water tank. Thereby the respective led glowing will tells us the water amount in the tank and select appropriate crop.

Even water supplying is also considered to an important factor in enhancing the productivity of the agriculture. By supplying water for a specific period and for a specific amount we can save water. This is done in our project by using moisture sensor which is connected to the motor through relays. It works as: when the moisture content in the field is less (lower threshold), the motor turns and vice versa. Therefore the motor functions automatically. In case of some crop if we want to supply water based on required and not on moisture then we can control the motor through Gsm.

This system is powered by a 12V of rechargeable battery which is connected through the solar panel. A solar panel is connected to the battery to charge on day time.

## 2. GUIDELINES FOR MAINSCRIPT PREPARATION

### A. Abbreviations and Acronyms

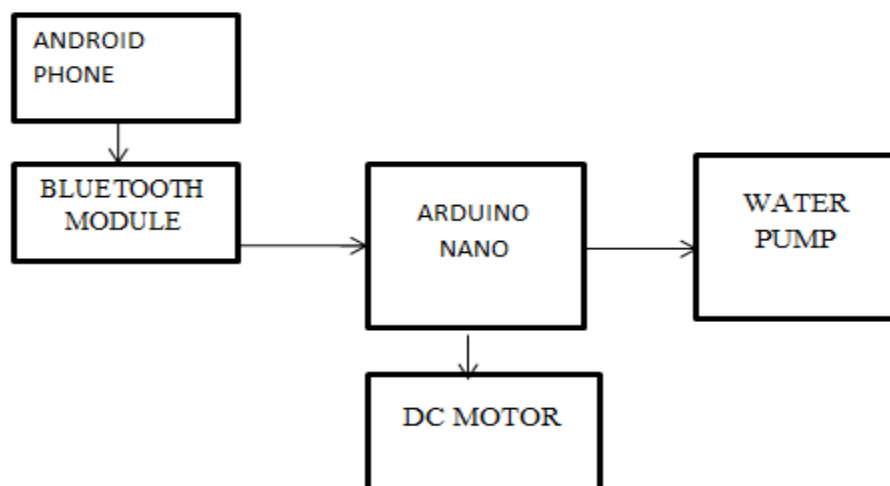
## Gsm-Global system for mobile communication

## Lcd-liquid crystal display

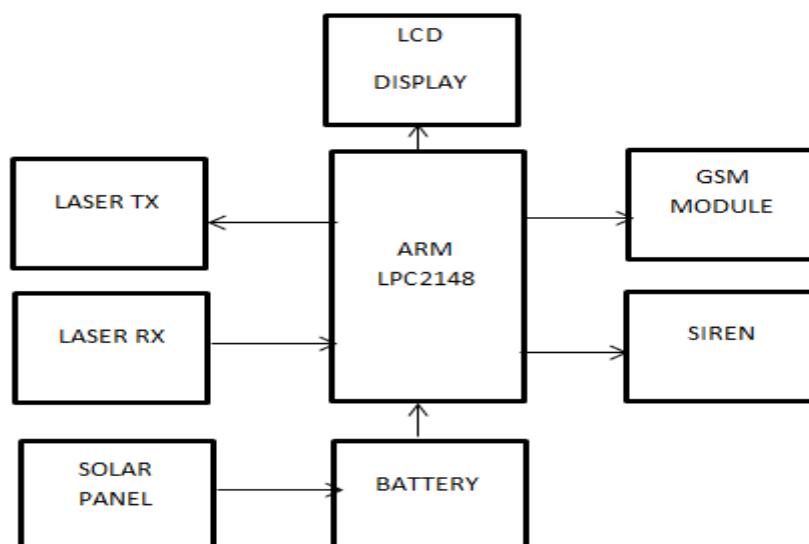
IR sensor-infrared sensor

### 3. BLOCK DIAGRAM

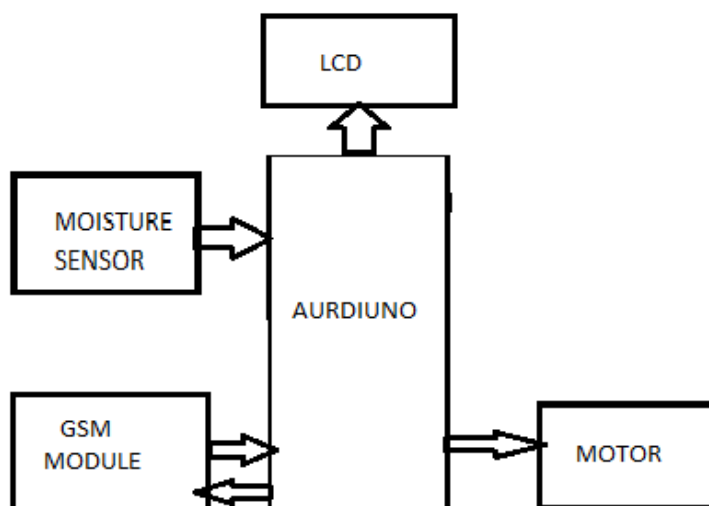
### A. Pesticide Sprinkling Robot:



### B. Security System through Laser Fencing



### C. Smart Irrigation System



### 4. ADVANTAGES

- Are relatively simple to design and install
- This is very useful to all climatic conditions any it is economic friendly
- This makes an increase in productivity and reduces water consumption
- Here we are using ARM controllers so there is error free
- Reduce soil erosion and nutrient leaching.
- Reduce the chance of plant disease by keeping foliage dry.
- May be concealed to maintain the beauty of the landscape, and to reduce vandalism and liability when installed in public areas.
- Require smaller water sources, for example, less than half of the water needed for a sprinkler system.

### 5. CONCLUSION

The ARM-based security system proves to be a real-time feedback control system which monitors and controls all the activities in field system efficiently. The use this model enables the agriculture system to enhance its functioning by providing required amount water and pesticides. The present proposal is a model to modernize the agriculture industries at a mass scale with optimum expenditure. Using this system, one can save manpower, water to improve production and ultimately profit.

### 6. FUTURE SCOPE

A set or group of laser-light can be used to cover a large area. Securing the field from all animal can be done by using the laser at three to four different heights. High & precious moisture sensing sensors can be in future placed in the field in order to get exact moisture sensing so that exact amount of water can be allowed to pass and saving the wastage of water. Use of IR sensor can be made on the robot to provide plant-plant pesticide sprinkling. We can Increase the range of controlling of the robot by substituting Bluetooth with Wi-Fi or Gsm module.

### 7. REFERENCES

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- [2] IEEE SPONSORED 2ND INTERNATIONAL CONFERENCE ON ELECA | Low-Cost Smart Irrigation Control System | Chandan Kumar sahu | Dept. of Electronics and communication engineering, Sambalpur University Institute of Information Technology Sambalpur(768019), INDIA
- [3] International Journal of Engineering Trends and Technology (IJETT) – Volume 32 Number 5- February 2016 Arduino Based Bluetooth Controlled Robot | Subankar Roy #1, Tashi Rapden Wangchuk#2, Rajesh Bhatt#3 | #1Diploma Student in Dept. of Electronics & Communication Engineering, CCCT Polytechnic #2Sr. Lecturer in Dept. of Electrical and Electronics Engineering, CCCT Polytechnic #3Diploma Student in Dept. of Electronics & Communication Engineering, CCCT Polytechnic Chisopani, P.O. Nandugaon, South Sikkim, India
- [4] International Journal of Engineering Trends and Technology (IJETT) - Volume4 Issue6- June 2013 ISSN: 2231-5381 <http://www.ijettjournal.org> Page 2513 Solar Energy: The Future Sai Manoj Rompicherla#1 (Department Of Electrical And Electronics Engineering), K.L.University Vaddeswaram, Vijayawada, Pin: 520001, Andhra Pradesh.