IOT Based Forest Conservation System

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Abstract: In recent years smuggling at forest is a big problem. Robbers try to theft expensive trees like sandalwood, Teak wood etc. This incurrs a huge loss to government and it is difficult to monitor by forest officers. So that the proposed system with wireless sensor network to find the trees smuggling by using vibration and sound sensor. Each trees will be attached with a sensor which turns on alarm if someone is trying to cut the trees. In recent years forest destroyed due to natural fire, Example Amazon forest fire accident. The loss is in million and also the pollution is huge. Hence, The proposed a sensor based fire detection and automatic extinguisher (automatic water spraying unit)is designed to prevent the fire occurrence at the forest.

Keywords: IoT, GSM, LCD, Arduino.

I. INTRODUCTION

For many days we are reading in the newspapers about smuggling of the tress. These trees are very costly. These are mostly useful in the medical sciences as well as cosmetics. Because of huge amount of money involved in selling of such tree woods and lots of incidents are happening of cutting of tree and their smuggling. This problem isn't related to India only, in China, Australia and African countries are also struggling with same issues. Putting cost in mind, Indian sandalwood costs 12000to 13000 INR per kg whereas in international market Red Sanders command a high price of INR 10core per ton. The Indian sandalwood tree has become endangered in recent years, and in an attempt to curb its possible extinction the Indian government is trying to limit the exportation of sandalwood. For an individual, maximum permissible purchase limit is not to exceed 3.8kg as per Govt. The tree is already government controlled, and removal is prohibited whether on private or temple grounds until the tree is thirty years old. But even though some corner of newspaper shows us the same title. The problem what observed is there is no system or any medium to detect illegal logging and cutting of trees. A mean by which, at your workplace, you will know what's happening with my trees should be installed. Such system will help you to detect and will alert you so that you can take actions. Putting this problem in mind, a system is designed which help us to achieve our goal i.e. TO PROTECTNATURE.

II. METHODOLOGY

In this figure, there are various units are used. These are Arduino UNO, lcd Display, vibration sensors, Sound sensors, fire sensors, laser sensor,Alarm, GSM, Fire Extinguisher,RFID.

- Arduino is heart our project, which take input from different sensors and control the actuators

- We have vibration and sound sensors which are attached to the expensive trees in the forest.

- If someone try to cut those trees, then either sound sensor or vibration sensor get activated and will send signal to Arduino. Arduino will turn on the alarm and also it will send SMS with help of GSM.

- We have fire sensor to detect the fire in forest due to natural heat. if fire is sensed immediately fire extinguisher get on and prevent fire accident

- We have Laser sensor which is installed surrounding the area of the trees to detect someone enters the zone illegaly.

- We have RFID technology to access the grant to authorized persons to enter the zone. When authorized person swipe the RFID card to RFID receiver the laser fence will automatically disabled further they can enter the zone.
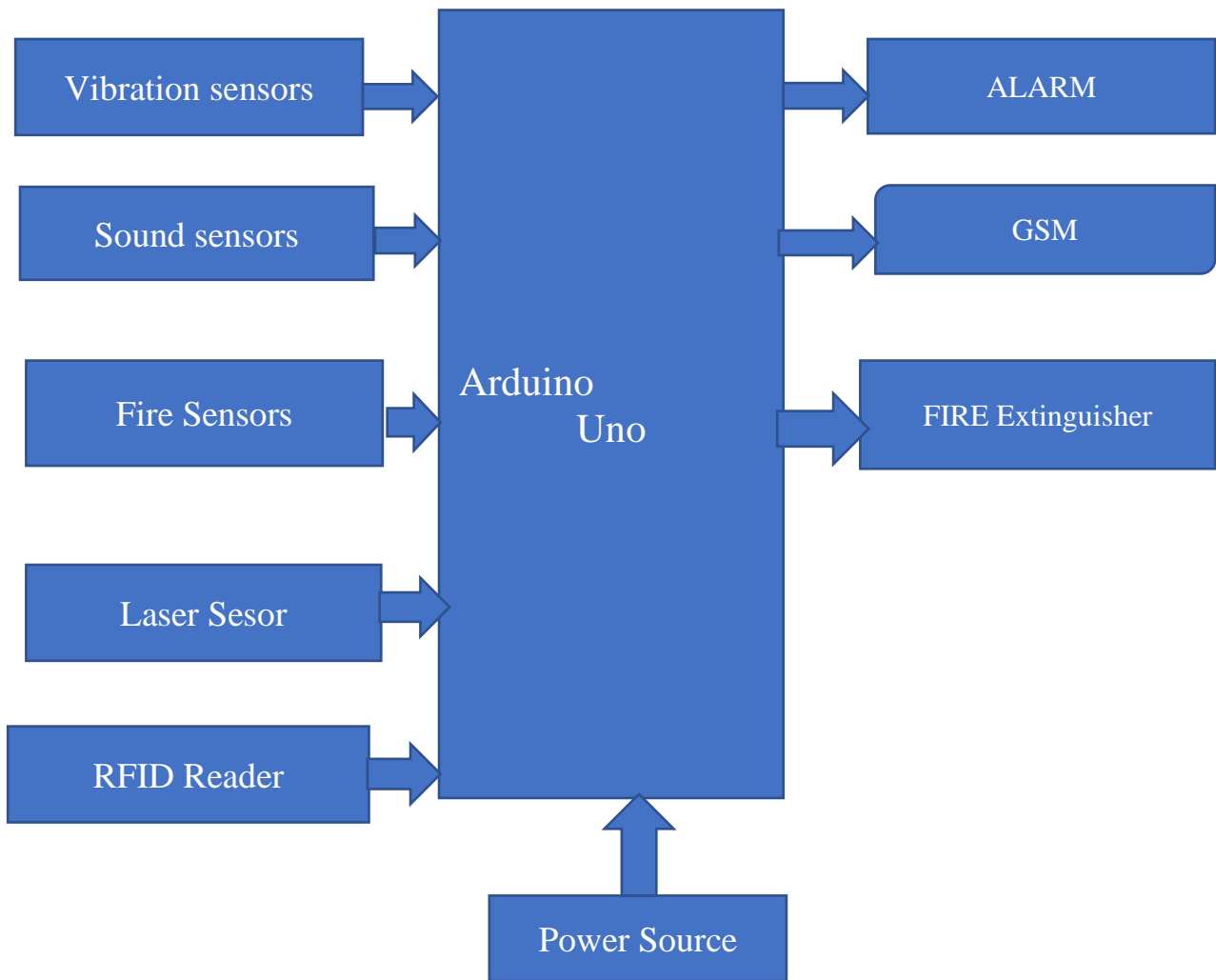
FIG: Block Diagram of the IoT Based Forest Conservation System.

In this project we are mainly concentrating on four different applications. First application is avoiding smuggling by using vibration sensors. All expensive trees are placed with vibration sensor. It will give signal to control unit the control unit gives alarm along with GSM to base station so that they can take immediate action. Along with for supporting we are adding sound sensors, if the sound level is more than threshold level automatically it will give signal to controller unit. For fire detection system, we are using fire sensor if there is any fire catches IR LED will detects the fire and give signal to base control unit. Control unit will turn on the alarm, along with the alarm it will turn on the water pump so we are using natural water resources.

We are using Arduino Uno as a controller which will collect all information from different sensor and based on that it take a decision. At the same time we are using GSM sim800c module will help to send command or SMS to concern team or using wireless. We are using 16*2LCD to display all the parameters.
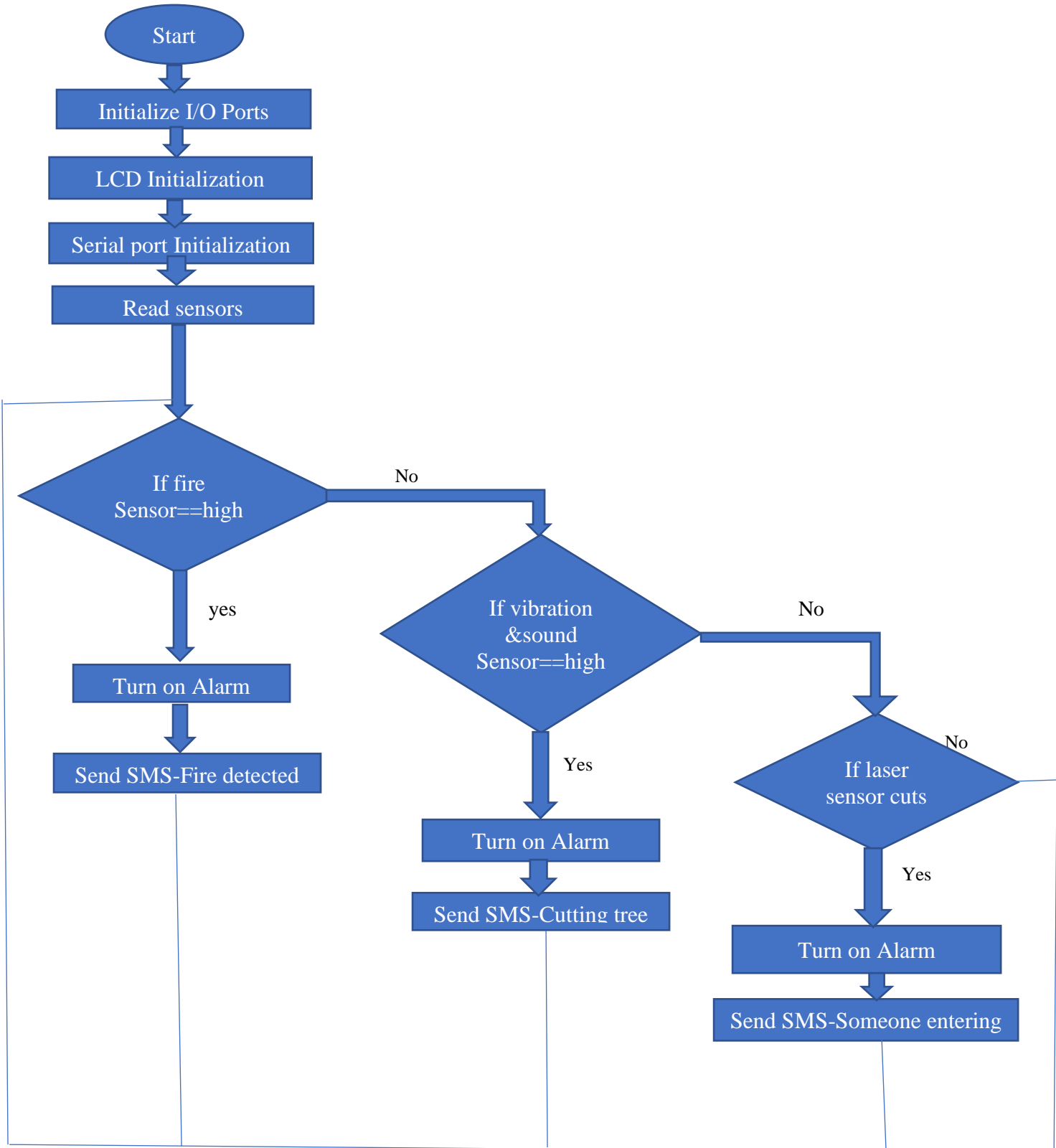
Flow Chart:

FIG: Flow Chart of the Proposed System
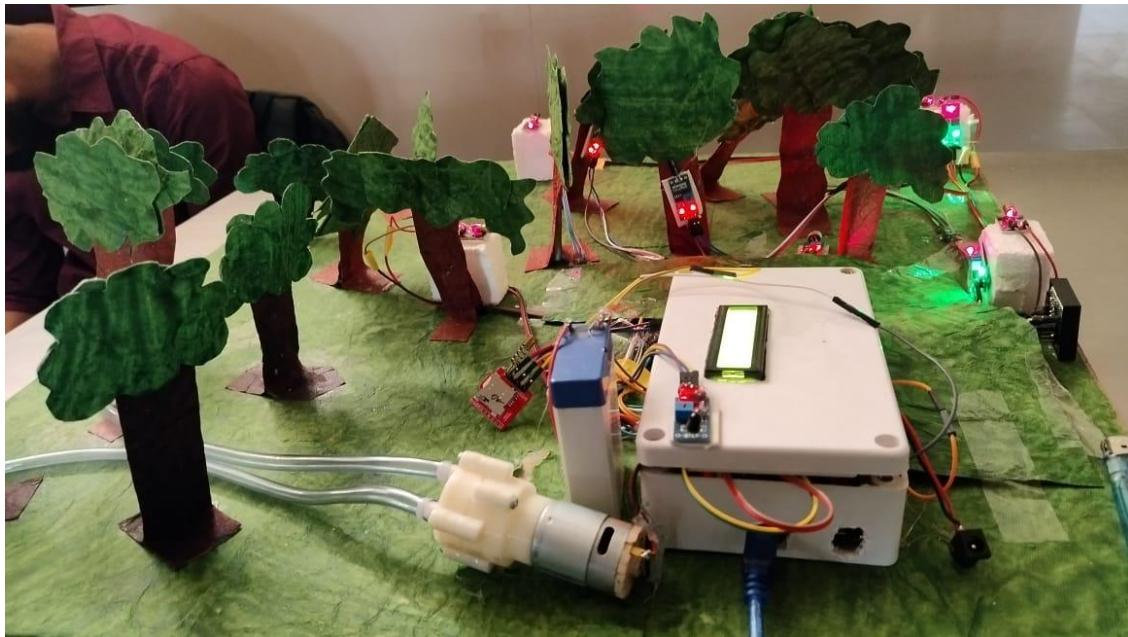
III. RESULT ANALYSIS

Fig: Working model of the proposed system

Case(i):If someone tries to cut tree

Case(ii):If unathorized person enters the forest

Case(iii):If Fire Detected

Three distinct units are placed in proper places for performing experimental test. Fully setup of system is established. Stroke has been given and it is being detected by tree unit. Further processing of signal is done by GSM unit. For understanding purpose LCD display we have attached. At control station where main unit is fixed, detected signal is successfully received by GSM module. For displaying purpose GUI is maintained which will display a message or alarm indicating that particular tree is undergoing non-bearable pressure. We also tested a laser system to detect unknown person entering. It was working perfectly and gives alarm to alert sms received to phone. Fire alarm system is also tested successfully and along with the alarm it has prevent the fire by spraying water.

IV. CONCLUSION

In this project, an IoT based forest protection system was implemented using Arduino. This system consists of three different units Tree Unit, GSM Unit, and Main Unit along with vibration sensor. The Flex Sensor detects the smuggling activity at the tree unit, and then this signal is passing to the sub server unit. The sub-server unit is located for particular area of forest, as it receives the event detected signal from tree unit and passes it towards the main unit which is located at forest office, this data received at main unit is use by the forest officers to take preventive action and this whole process is done within one minute. This system will also help to monitor and protect the trees and animals from natural fire.

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