

Prevention of Illegal logging of Trees using IOT

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Abstract: Smuggling of the trees such as sandal, Sagwan etc. is one of the major national issue. These trees are very expensive and less obtainable in the market. To avoid such type of smuggling and to save the forests around the globe some preventive systems need to be developed. In this paper we are proposing a system based on Internet of things which can be used to detect the illegal cutting of tree and restrict the tree smuggling. This system can be used by government to protect the trees.

Keywords: Tree Logging; IOT; Sensor; Data Processing; Sensor Network.

Introduction

Sometime before, when earth was framing its inward center and condition, it clearly had a decent arrangement of every zone, some portion of nature ought to fit in cycle together so it would act and work like a well-kept machine like today's installed frameworks are working persistently. Yet, from recent years we have been perusing in the daily papers about cutting and pirating of the trees like shoe, Teak and so forth. These trees are extremely costly and less possible in the market.

The sandalwood trees of India have turned out to be imperiled in recent years, and trying to spare it from outside sources, the Indian government is attempting to set a farthest point the exportation of sandalwood. It has been as of now government controlled however not legitimately kept up, and evacuation is not permitted whether on individual or open grounds until the tree is 30 years of age. This has not prevented numerous poachers from chopping trees down when experts are not viewing. Pirating of sandalwood has made financial and peace issues in regions circumscribing the condition of various states in India. To maintain a strategic distance from such kind of carrying and to spare the backwoods around the world some preventive frameworks should be created. We are framing a framework which can be utilized to confine this pirating.

In this paper we are proposing a system based on Internet of things that can be used to avoid the smuggling of the trees which would in turn stop the de-forestation and uphold the Environmental stability, which would help to solve one of the issues with the Global Warming. Each tree is having with one electronic division, which consists of Micro Controller, Flex Sensor, accelerometer sensor, TEMP sensor, and GSM module. Tree cutting will be detected by accelerometer sensor. Communication between the trees and server will be done by GSM modules.

Need For Study

Indonesian organization Korindo transporting timber in March 2004, and it was being foreign made to France, UK, Belgium and other piece of Indonesian nation however Greenpeace had made a move against it. Korindo was well known for unlawful cutting of timber from the rainforests of Indonesia. In May 2003, an Indonesian Government came to know from the examination that Korindo was doing pirating of timber with the assistance of infamous aristocrats. Tan Jung Putting National Park has protection territory more than 4,000 square km and this stop likewise has a worldwide significance. Joined Nation has announced it as a world biosphere save and it shapes a biggest secured territory of timberland in South East Asia.[2]

Carrying and Illegal logging makes tremendous harm backwoods, financial aspects of maker nations and nearby groups. It's an intense and far reaching issue. In spite of the financial significance of exchange timber and woodland items, the vast majority of the worldwide nations have no legitimate intend to stop or end such exercises on the grounds that in fact it's difficult to recognize wrongfully pirated timber and different trees. Subsequently some regularizing demonstrations against illicit exchanging of timber and different trees, is absent. Logical strategies to pinpoint the geographic starting point of timber are right now being worked on. Conceivable activities ought to meet with WTO control of non-separation to limit imports. They should be organized in two-sided agreements.[2]

Think about led by UK-Indonesian nations on unlawful signing in 1998 recommended that around 40-45% of timber exchanging was illicit. This had made more than \$365 million misfortune nations. In the event that we incorporate and contrast and lawful reaping in addition to trades recommend that close around 88% is unlawful somehow. From Indonesia the greater part of the illicit wood creation is being completed in Malaysia. This is key travel nation.

Though in Brazil, Amazon range holds 80% illicit exchanging this abuses government controls. At the center of illicit logging is across the board defilement regularly called as 'Green Gold'. In Brazilian condition of Para this issue is profoundly established. This examination was completed by Greenpeace. As like timber, for mahogany there is no dependable lawful route exists till date and key players in its exchange are still initiate in those regions.[2]

200 teak trees cut, timber snuck LUCKNOW [3]. Imperiled red sandalwood seized from runners in Berhampur [4]. The town of Suifenhe in China is home to a timber manufacturing plant that procedures more than 5 billion pounds of wood for every year, the majority of which originates from Russia By pirating [5]. Punjab News line Network on Saturday, 18 December 2010. The circumstance has gone very more awful as timber, worth lakhs and lakhs of rupees is in effect unlawfully sold directly under the nose of the concerned office. The Times of India, Ahmedabad. Plan to check between state pirating of backwoods woods.

For many in the North American timber industry, the problem of illegal logging and illegal activities in the forestry sector was brought to our attention during the Forest Leadership Forum Conference held in April 2002 in Atlanta, or else by the revised Sustainable Forestry Initiative (SFI) certification standard that now requires companies to develop a procurement policy that contributes to the elimination of illegal logging. The topic has now been discussed at many high-level policy for, including the UNFF, MCPFE and COFO, and is the subject of a high-level proposal by the EU Commission.[22]

However, the first true public and official statement on the subject was the one made during the G8 summit in Birmingham in 1998 and subsequently at the 2000 G8 summit in Okinawa (EU, 2002). It is worth mentioning that, in 1998, the G8 adopted an action plan (G8 Action Program on Forests) that acknowledged the need for more information on the extent of the problem prior to proposing countermeasures. An Asian ministerial conference (FLEG – Forest Law Enforcement Governance) was also organized by the World Bank in Bali, in September, 2001. This initiative brought Asian wood producers and wood importers countries together to lay the foundations for concerted efforts in combating illegal activities in the forestry sector. The meeting was also significant in that Ministers agreed to a very clearly worded declaration calling for clear action, arguably elevating illegal logging to the highest political levels. This new kind of cooperation has led to similar regional FLEG conferences being organized in Europe and Africa during 2002 and 2003 and contributes to raising awareness of the issue at the international level. In addition, bilateral cooperation agreements to curtail illegal logging and trade have been signed. Moreover, the FAO, the World Resource Institute (WRI) and the Royal Institute of International Affairs (RIIA) have also organized panels and stakeholder meetings on the subject in 2002 and 2003. Furthermore, the implementation plan of the World Summit on Sustainable Development held in 2002 in Johannesburg contains a commitment to “take immediate action on domestic forest law enforcement and illegal international trade in forest products, including in forest biological resources, with the support of the international community, and provide human and institutional capacity building related to the enforcement of national legislation in those areas” (WSSD, 2002).

Illegal logging and illicit trade in timber are subjects that are now being dealt with more openly by governments (Doherty, 2002). This is also the case for corruption that has been brought to the forefront in international discussions surrounding forests. This is entirely in line with the general concern about problems of governance as regards development, in all sectors. Problems in the areas of governance and law enforcement contribute to the phenomenon of illegal logging which, in turn, contributes to unsustainable forest management. This has prompted several governments, non-governmental organizations (NGOs), private companies and international organizations to focus on the issue (FAO, 2002).[22]

There exist few methods based on RFID to detect the movement of trees [18]. There is a need for detecting at the time of cutting tree and taking necessary action at that time only.

Proposed Work

The Proposed system architecture is shown in figure 1.

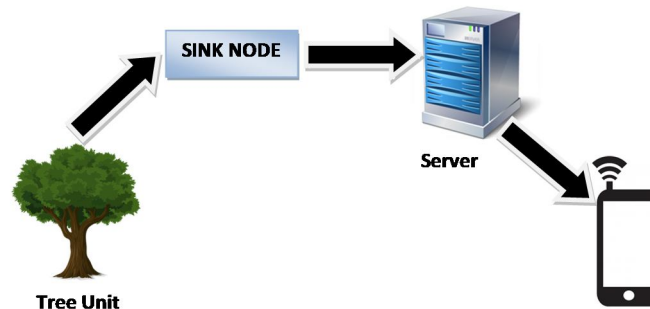


Figure 1: Proposed Architecture

The system consisting of 3 units:

1. Tree unit
2. Sink Node unit
3. Server unit

Tree Unit

The Tree unit would be the essential unit for the execution of the framework. This unit would comprise of three sensors to give the data of getting Cut Down the trees, Damage with flame, and so forth. The tree unit would be the essential unit for the execution of the framework. Figure 2 shows the tree unit. The tree unit comprises of three sensors:

1. Accelerometer Sensor
2. Flex Sensor
3. Temperature Sensor.

In the tree unit Renesas microcontroller is the heart of the venture, situated at the inside and controls operations of the framework. A LCD is utilized to show every operations going ahead inside the microcontroller. Tree cutting will be detected by accelerometer sensor, bending of tree will be detected by flex sensor and in case of fire it will be detected by temperature sensor.

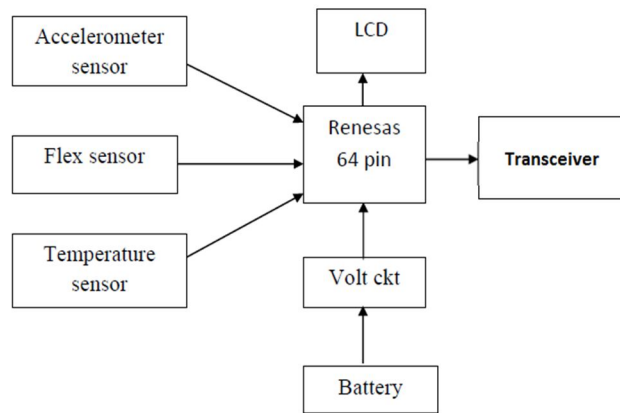


Figure 2: Tree Unit

Tree unit is attached to all the major trees in the application area. The information sensed by the tree unit is transmitted to sink node through the transceiver.

Sink Node Unit

The Sink node acts as a interface between forest tree network and the internet. It gather the information from various tree units and forward the information to server using GSM module. Sink node unit is shown in figure 3.

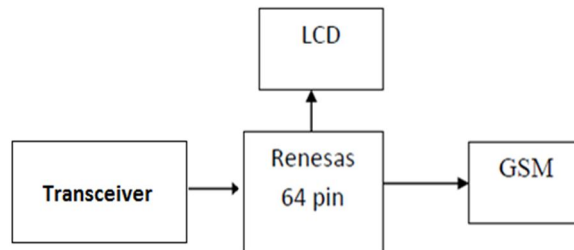


Figure 3: Sink Node

Server Unit

The server receives the data from sink node through internet. It stores the data in the cloud based database. Server processes the data and detects the suspicious activity based on the threshold values of various sensors. If there is any suspicious activity regarding the tree cutting, the server will send the alert message to the concerned authority mobile phones. Server will be having GSM module. All the information is sent through GSM to mobile application. With the help of GSM modem

whenever any tree will get cut down or bent or fire then authorized person will get the SMS on our registered mobile phone which contains information regarding temperature of the tree and movement of the trees by accelerometer sensor and even a voice alert over an android application. By this information we are able to alert and control the illegal logging of trees.

Experiment Result

The test bed is created using Renesas 64 pin microcontroller, Accelerometer sensor, Flex sensor and temperature sensor. All these modules are assembled. We considered a tree model and fixed the tree unit to it. We considered a Renesas Flash Programmer software package to program the on-chip flash memory of Renesas microcontrollers. We used MySQL at the server and Maria DB database servers. Android application is created using eclipse. Figure 4 shows the data gathered by the server.

Id	status	date1	time1
1	Tree Fell	12/4/2017	18:08:44
2	Tree Fell	12/4/2017	18:08:58
3	Tree Fell	12/4/2017	18:09:17
4	Tree Fell	12/4/2017	18:09:49
5	Tree Fell	12/4/2017	18:10:01
6	Tree Fell	13/4/2017	12:09:04
7	Tree Fell	13/4/2017	12:09:06
8	Tree Fell	13/4/2017	12:09:22
9	Tree Fell	13/4/2017	12:09:32
10	Tree Fell	13/4/2017	12:09:50
11	Tree Fell	13/4/2017	12:10:02
12	Tree Fell	13/4/2017	12:10:16
13	Tree Fell	13/4/2017	12:10:26
14	Tree Fell	13/4/2017	12:13:53
15	High Temperatur	13/4/2017	12:16:55
16	High Temperatur	13/4/2017	12:17:32
17	High Temperatur	13/4/2017	12:17:34
18	High Temperatur	13/4/2017	12:17:46
19	High Temperatur	13/4/2017	12:17:51

Figure 4: Data in the data base

We tried different cases like tree may fall due to natural events like rain or through fire. If someone is trying to cut the tree using weapons, someone may try to fire the tree base. Figure 5 and figure 6 shows the alert though various medium.

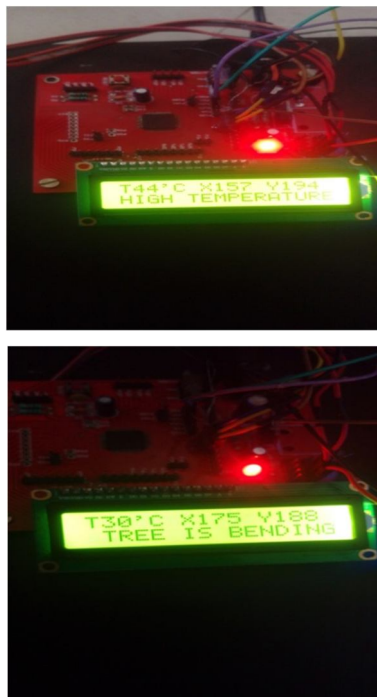


Figure 5: Various alert message displayed on LCD

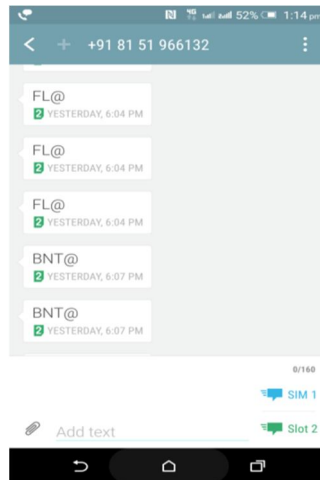


Figure 6: Alert Received on mobile phone through SMS

Conclusion

Through the proposed system we can prevent the tree cutting in forest and control the smuggling of trees in forest where the human being not capable to provide security. This is also helping the government or the authorized person concern where the smuggling is happening and who owns that the forestry or tree and how it is happening like cutting of tree, fire or because of the high temperature around the surroundings of the forest. As a future scope we can enhance this model to detect the illegal plucking of coconut and various fruits.

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