

Design of Automatic Deforestation Protection System

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Abstract--- *Illicit logging has been recognized as a significant issue in all over the world, which might be limited through successful observing of forest territories. This paper proposes and depicts the underlying strides to construct another three-level design for Forest Monitoring dependent on IoT and tree cutting noise identification by utilizing various sensors. The manual checking of the timberland to anticipate unapproved exercises is a very difficult job. The four significant tasks that are basic in analyzing the forest are developed in this work, in particular, tree cutting location, fire recognition, human discovery and tainted water identification utilizing vibration sensor, fire sensor, Passive Infrared Sensor (PIR) and PH sensor separately. A microcontroller is utilized along with GSM to convey to the focal server from a remote place. The detected information from sensors is gathered and sent to the approved individual by means of GSM. IoT has generally utilized innovation in forest analyzing the application. Moreover, this paper utilizes a Wi-Fi switch module through which forest administrators and employees can communicate with one another if the network is crippled.*

Index Terms— *Global system for mobile communication (GSM), deforestation, IoT, vibration sensor, passive infrared sensor (PIR), PH sensor, Wi-Fi router.*

I. INTRODUCTION

Forest is significant in life; absolutely rely upon the forest for endurance. The forest trees help us to inhale by siphon trip the oxygen and ingest carbon dioxide. The importance of the lush zone can be noticeable inside the most recent trade inside the climatic vacillation because of deforestation. [1] This paper's objective is to monitor timberland by avoiding tree cut, fire counteractive action, distinguishing debased water in the woods whether it is alright for the creatures are not and furthermore recognize the presence of a human in the woodland. Set up the vibrator sensor in the zone of backwoods in which valuable trees, for example, sandalwood trees present.[2] Assume obscure individuals or hoodlum attempting to cut the trees, vibrator sensor vibrate, promptly send tree slice message to microcontroller that will send this data to GSM module, and it sends an alarming message to the woodland officer with the goal that they can take essential activities and location tracking framework adeptness also provide to android application[3]–[5].

Also if a fire occurs by high temperature or by a human, a fire sensor will distinguish that fire occurred and send the sign to the microcontroller and microcontroller to GSM to send an alarming message of fire recognition to the backwoods officer. The PH sensor used to distinguish whether the water is debased or not and the PIR sensor is utilized to recognize developments of people in the woodland.[6]–[11] In addition, utilizing Wi-Fi switch office in the proposed framework in which guess certain exercises, for example, fire discovery, tree cutting recognition activities occur, if the representative of timberland officer can't send an alarming message to backwoods officer because of the system issue at

that circumstances employee can utilize this idea of Wi-Fi module.

In this paper set a router among sender and receiver so they can speak with one another by calling, sending an instant message, sending photographs and video gushing. Utilization of environmental information from constant timberland observing utilized the aggregate of 180 examples comprise of temperature, dampness and hydrogen gas took and examined. GPS used to distinguish the location of the framework inside woodland to screen ecological information.

Remote sensor arranges utilized for woodland fire observing and gave the proficient way to deal with sensor hub for kept checking of timberland. The security of backwoods trees, for example, the sandalwood tree utilized the microcontroller framework that employees the remote sensor network and ZigBee to communicate to the focal server from a remote spot. Woodland fire observing and flawed hubs distinguished utilizing remote sensors. The quantity of timberland trees has decreased from backwoods by people that make the unfortunate condition for creatures to survive in woodland utilized innovation.

The structure for woodland observing requires three sections, for example, the sensor arrangement scheme, network design, and intra-cluster correspondence convention. Woods fire observing framework utilizing remote sensor arrange utilized novel vitality effective directing convention that is augmented hazardous way (MUP) and utilized IPV6 over low power remote individual territory systems protocol. Backwoods fire checking controlled utilizing Wireless sensor network comprises of ZigBee utilized as correspondence convention. To avert illicit logging of woodland trees PIC controller, ZigBee transmitter and standard convention utilized which characterizes physical and MAC (media access control) layer.

Automatic choice of trees continuously mode during the process of selective logging in which full robotization of administrator's capacities is made based on administrator's activity investigation and uncovering stages during which most extreme time is taken, greatest blunders are made because of human administrator's flaw. The fuzzy logic used to build up a technique for the choice of trees during the process of harvesting. The work revealed in the above overview depicts that a large portion of the issues is comprehended utilizing ZigBee transmitter and remote system innovation. In any case, the work announced in this paper is the utilization of Wi-Fi switch among sender and receiver that is the means by which two gadgets can communicate if the network is debilitated to warn about fire, tree cutting in the timberland. This idea is developed by utilizing IoT innovation. This application is useful for correspondence between backwoods officers and representatives of timberland. IoT is a framework wherein the system of physical gadgets installed with sensors, actuators, and availability that enables the items to interface and trade information. IoT assumes a significant job in monitoring woodland to send alarming signs

The use of acoustic gadgets for reconnaissance can be found in a few application territories. Many papers include a PC and an amplifier arranged in an average office environment, constantly examine the acoustic action at the site, isolate every fascinating occasion, and stores them in a database. In models for continuous acoustic grouping of vehicles into two sets (autos and trucks) are proposed. Various classifiers were tried in the spectral and cepstral space. Best results, on a specific database, could arrive at 97% with the use of the neural network. While there are a few papers for the acoustic grouping of vehicles found very little data in regards to the potential outcomes for cutting tool

recognition. The most important data was found where a remote sensor organize for cutting tool recognition is portrayed. The confinements of the equipment stage when structuring an autocorrelation based location instrument. Discovery depends on checking the essential recurrence, sound power, and the number of nearby maximums of the autocorrelation work. The best discovery efficiency was 80%, shockingly neither the definite order strategy nor the test arrangement or the test database is portrayed in subtleties. This inform can infer that while the territory of acoustic signal processing is enormous, the discovery of cutting apparatus, a significant occasion in timberland reconnaissance, isn't examined profoundly. Besides, most papers don't think about the constrained equipment assets and vitality supply accessible in WSNs. Contrary, in this paper report the calculations (and their exhibition) actualized in low utilization sensors including data combinations.

II. SYSTEM DESIGN

The design of this system comprises a micro-controller, fire sensor, vibrator sensor, PIR (passive infrared sensor) sensor, PH sensor, power supply, camera, speaker, smart phone, GPS (global positioning system), LCD (liquid crystal display), GSM (global system for mobile communication), Wi-Fi router.

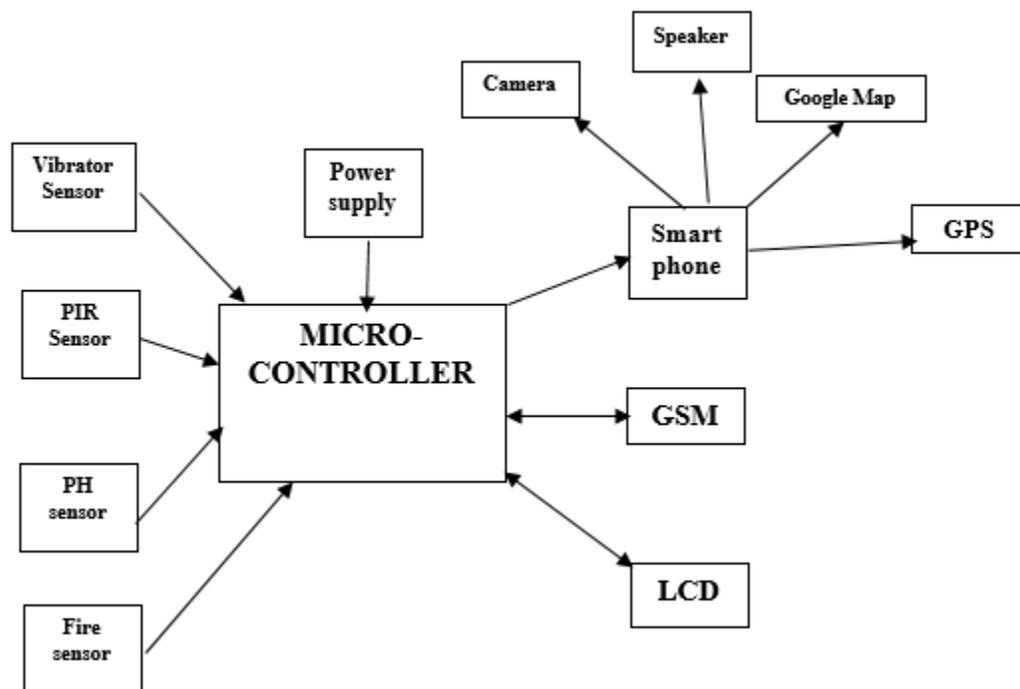


Figure 1: Block diagram of the system

It comprises of microcontroller used to process the information and yield of the microcontroller is in two structures, an alarm message is shown on Liquid Crystal Display (LCD) and simultaneously alert message is sent to the backwoods officer about logger operations such as logging, fire utilizing GSM module who is away from the woodland. GSM is utilized to move cautioning message to the woodland officer and Liquid Crystal Display (LCD) used to show the alarming messages. The microcontroller is furnished with GSM to send a cautioning message to

the enlisted telephone and the microcontroller can control all functions of sensor hubs. The following section manages the working of microcontroller, PIR sensor, vibrator sensor, fire sensor, PH sensor.

- **Microcontroller:** - It is an 8-bit microcontroller item manufactured with SST protected and exclusive outstanding blaze CMOS semiconductor manner generation. Figure 1 shows a depiction of microcontroller and it bolsters address range up to 64kbyte of program and information memory. It utilizes 8051 guidance set and it is perfect with standard 8051 microcontroller gadgets for the pin to pin arrangement. A microcontroller assumes a significant job to get the information from the sensor and send this data to the android application to alarm timberland officers about fire or criminal operations, for example, tree cutting in the woodland.
- **Passive Infrared Sensor (PIR Sensor):-** PIR Sensor An infrared sensor is an electronic sensor that estimates the infrared (IR) light emanating from objects. It is utilized to detect the developments of individuals or creatures or different articles in the timberland. At the point when an item, for example, human passes closer to this movement locator it will identify and send a sign to a microcontroller that will send to LCD (Liquid Crystal Display) at the same time send the message to Smartphone of timberland officer. Figure 1 shows the depiction of the PIR sensor.
- **Vibrator Sensor:** - Figure 1 shows a preview of the vibrator sensor and is helpful in various fields and it can distinguish vibration in the given territory. This is utilized to warn somebody to issue with a framework for instance if somebody is attempting to cut tree the vibrator will distinguish and send an alert message to a woodland officer.
- **Fire Sensor:-**The fire sensor is utilized to accumulate the entirety of the procedures and procedures that add to the early identification of a fire. In this framework, a fire sensor is utilized to identify the fire in the woods so as to limit the natural loss of condition and to spare wild lives in the woodland.
- **PH Sensor:** - The PH sensor is mostly used to quantify the water quality, amphibian living beings. This paper plans to screen the PH of a water body since it influences decides if the water is tainted or not. An adjustment in typical PH in water will be the sign of expanded contamination.

III. SYSTEM MODULE DESCRIPTION

The proposed framework is isolated into two modules.

III.I. **Timberland observing module:** The backwoods checking module predominantly comprises parts, for example, a microcontroller which goes about as principle controller and GSM, LCD, fire sensor, PIR sensor, and PH sensor are associated with it. The GSM assumes a significant job in the forest monitoring module by sending warning messages to the backwoods officer. Assume if a fire occurs in the woodland, a fire sensor recognizes that fire happened to send this information to the microcontroller. The microcontroller forms the information and transmits this information to GSM. Furthermore, it will send a warning message to timberland officers to make fundamental moves. The backwoods officer can likewise follow the area of fire by utilizing GPS.



Figure 2: Block diagram of Wi-Fi router communication

III.II. **Wi-Fi router module:** Wi-Fi is an innovation through which two gadgets can trade information if there should be an occurrence of the system is incapacitated in the scope of radio recurrence 3 GHz and 30 GHz. As appeared in Figure 2 Wi-Fi router module is used between two gadgets through the remote system access point.

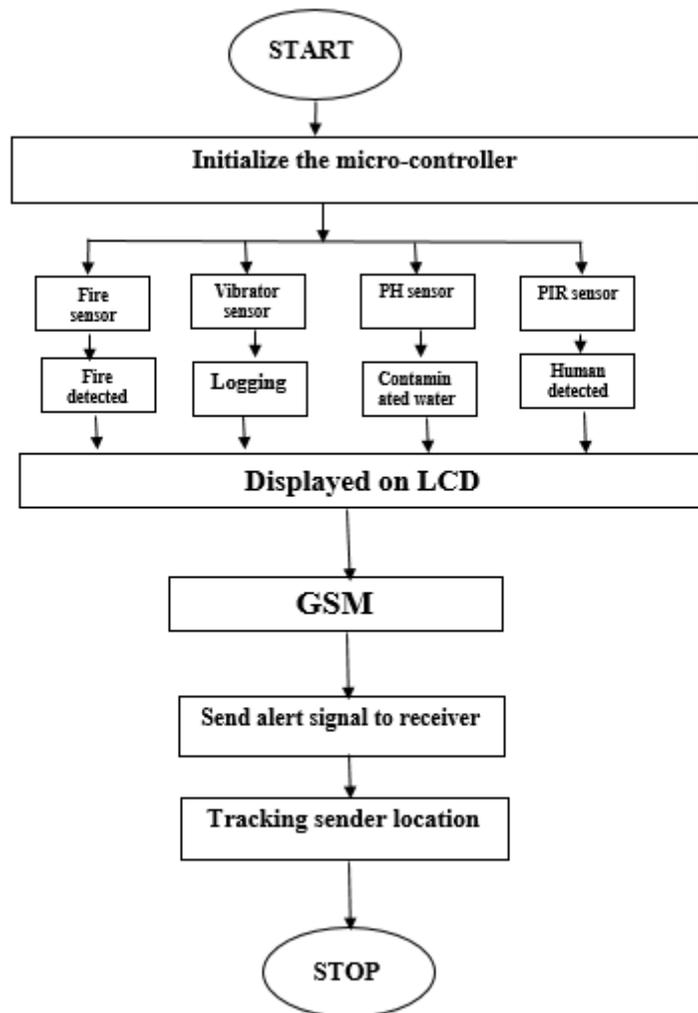


Figure 3: Flow diagram of the system

The proposed paper shows how the way timberland worker and the woodland officer can speak with one another through a switch if a system is debilitated, if some logger operations, for example, tree cutting and a fire occurs in

the backwoods. First sender (worker) needs to enroll the IP address of a router, presently representative (sender) can send photographs of the place, do video gushing, call and do the instant message to the backwoods officer (collector). Figure 3 shows the Information flow diagram. At first, when the power supply is given to the microcontroller it will reset and show the welcome message on the fluid gem show.

IV. CONCLUSION

Figure 2 shows the microcontroller interfaced with sensors and GSM in which that has been developed by researchers to distinguish the area of fire in the woodland, tree cutting and for of humans for illegal lumbering of backwoods assets. The forest zone is an exceptionally tremendous zone so it requires more sensors for forest land. This paper intends to put sensors specifically zone of backwoods and the expense relies upon sensor hubs utilized in the timberland observing the activity. The goal of the proposed framework is to control deforestation by endeavoring to recognize four illegal operations utilizing IOT innovation contrasted with past research and watched great outcomes for a wide range of recognition completed in this paper. The proposed framework displays another clever thought by presenting the Wi-Fi route among the sender and receiver. This Wi-Fi router establishes communication among employees and timberland officers when the network is crippled.

REFERENCES

- [1] "(PDF) AN AUTOMATIC SYSTEM FOR CONTROLLING DEFORESTATION USING IOT AND GSM." [Online]. Available: https://www.researchgate.net/publication/330351112_AN_AUTOMATIC_SYSTEM_FOR_CONTROLLING_DEFORESTATION_USING_IOT_AND_GSM. [Accessed: 09-Nov-2019].
- [2] L. Czúni and P. Zoltán Varga, Lightweight Acoustic Detection of Logging in Wireless Sensor Networks. .
- [3] C. G. Priya, M. Abishek Pandu, and B. Chandra, "Automatic plant monitoring and controlling system over GSM using sensors," in Proceedings - 2017 IEEE Technological Innovations in ICT for Agriculture and Rural Development, TIAR 2017, 2018, vol. 2018-January, pp. 173–176.
- [4] A. Hadi, "Automatic Controlling System of Drip Irrigation Based on GSM," Arch. Curr. Res. Int., vol. 7, no. 2, pp. 1–8, 2017.
- [5] S. kulkarni and R. Mulagund, "Automatic Irrigation System Using IOT," Bonfring Int. J. Softw. Eng. Soft Comput., vol. 6, no. Special Issue, pp. 78–81, 2016.
- [6] R. N. Win, S. Reiji, and T. Shinya, "Forest Cover Changes Under Selective Logging in the Kabaung Reserved Forest, Bago Mountains, Myanmar," Mt. Res. Dev., 2009.
- [7] P. H. S. Brancalion et al., "Fake legal logging in the brazilian amazon," Sci. Adv., 2018.
- [8] J. Papan, M. Jurecka, and J. Puchyova, "WSN for forest monitoring to prevent illegal logging," in 2012 Federated Conference on Computer Science and Information Systems, FedCSIS 2012, 2012.
- [9] J. Franke, P. Navratil, V. Keuck, K. Peterson, and F. Siegert, "Monitoring fire and selective logging activities in tropical peat swamp forests," IEEE J. Sel. Top. Appl. Earth Obs. Remote Sens., 2012.
- [10] P. H. S. Brancalion et al., "A P P L I E D E C O L O G Y Fake legal logging in the Brazilian Amazon," Sci. Adv, 2018.
- [11] M. Babiš, M. Ďuriček, V. Harvanová, and M. Vojtko, "Forest Guardian – Monitoring System for Detecting Logging Activities Based on Sound Recognition," Artif. Intell. Comput. Graph. Multimed., 2011.