

Deforestation Theft Monitoring System Using Load Sensor

M.Yuvaraj¹, K.Arunselvam², C.Dinesh³, T.Harish⁴

^{1,2,3,4}*Department of Electronics and Instrumentation Engineering M. Kumarasamy College of Engineering Karur, Tamilnadu-639113.*

Email: ¹yuvarajm.eee@mkce.ac.in

ABSTRACT: *The word deforestation means cutting down of trees in forests which results in loss of habitat for wild animals. In forests, cutting down trees are prohibited and it is regarded as an illegal activity. The third illegally imported logged timber in the world is India. Due to a shortage of manpower, our government finds it difficult to stop deforestation. The safest and sharpest method to prevent deforestation is done by using automation techniques. By using sensors, we can detect the abnormal activities in forests and the output is sent as an alert to the receiver. Thus, we can save our forests from intruders and we can stop deforestation activities using an automated detection system.*

KEYWORDS: *Arduino Uno, Load sensor, Global System Module*

1. INTRODUCTION

Exploration is done by the International Union of Forest Research Organizations the Hindustan Times says that the third position goes for India for wrongfully bringing in logged lumber 167 nations examined for the insurance of biodiversity of our in the social affair. According to the report of CBD, 2016, a large portion of a percent of the round wood and sawn wood exchanged everywhere in the world, which is collected without government information. Illicit chopping down of trees and bringing in is the significant explanation of deforestation on the planet. This activity harms the planet. In certain nations, the illicit exchange of wood prompts woodland wrongdoings. Unlawful wood exchange is a wellspring of accounts of wrongdoings. Because of the necessity of lumber, some created nations have placed an eye on the mind's wood exchange. So the wood exchange moves to Nations like India and China, because of the less severe Guide lines for lumber exchange in these nations. Deforestation and illegal logging additionally occur in a portion of the African, Asian nations, and Amazon backwoods. Progressing examinations concerning the level of unlawful logging check that illegal logging addresses practically 50%90% in tropical countries and around 15%30% around the world. In the meantime, the monetary assessment of overall unlawful logging, which incorporates taking care of, is assessed to 30–100 billion US Dollars, which is practically 100%. Fernando Beatriz Jordan Rojas Dallaqua introduced the Forest Eyes project intends to identify deforestation in tropical timberlands dependent on resident science (CS) and AI (ML) approaches. In this manner, these modules turn the Forest Eyes project a heartier framework in the deforestation discovery task, constructing high-certainty named assortments, expanding the observing inclusion, and diminishing volunteer reliance [1]. Nina Sofia Wyniawskyj and Milena Napiorkowska introduced the paper which

can recognize pixel-level changes in satellite pictures of forested regions consequently [2]. Daniel C. Zanotta¹, Letícia F. Sartorio introduced the robotized technique for the location of Amazon deforestation in Brazil. The framework is authoritatively embraced by the Brazilian government. Just in 2000, the framework began to give information on computerized designs, in light of a simple confirmation performed by visual understanding, which had the option to deliver itemized deforestation planning [3]. Shichao Gao introduced out-of-control fires and deforestation in the Amazon rainforests, which is a pattern of breakdown in the climate. Utilizing AI procedures, specifically Time Series and LSTM, we can foresee the future deforestation of Amazon woods. It is accepted that the help of high-level AI strategies will effectively hinder deforestation, consequently improving the climate within a reasonable time frame [4]. Abdul Rehman, Husnain Shahid introduced the paper about quick improvement in distant detecting satellites and RS strategies, gives a steady and progressive route for investigation of land cover and land planning. This examination mirrored a convincing slump in the woodland cover at the time of the study [5].

2. PROPOSED SYSTEM

Deforestation in India increases every day. India is placed in the third position for illegally cutting down of trees. By our system we can predict the vehicle which is used to transport the woods illegally. The working and cost of our system is simple and low but here the accuracy is high. This system measures the load of the vehicle which crosses that particular area[13][14][15]. This system consists of arduino used to process the data from the load cell and output of arduino is in two forms. When the load cell detects the weight of vehicle, then the system compares the detected load values with the data values which is already coded in arduino[18-21]. According to the output, this system sends the alert message to display on Liquid Crystal Display (LCD) and at the same time alert message is sent to the forest officer about illegal activities such as tree cutting using GSM module

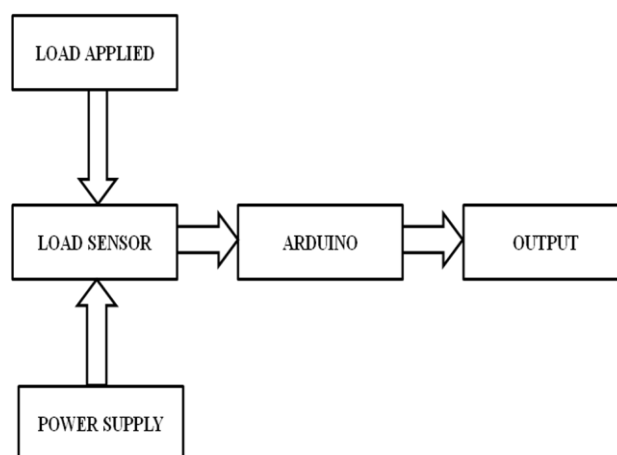


Figure 1. Block Diagram System design

2.1 LOAD SENSOR

Load applied is the load of the vehicle which is applied to the load sensor. A heap cell is a kind of transducer that changes over a mechanical power into a yield electrical heartbeat.

Even though there are numerous kinds of burden cells are accessible, strain-measure-based burden cells are the ordinarily utilized burden sensor. At the point when a heap or power follows up on the heap cell, the spring inside the heap cell is distorted except if it stays in a unique position or shape. Concerning the misshapen of spring, the strain check additionally changes the shape. The subsequent obstruction in the strain checks can be estimated as voltage. The adjustment in voltage is corresponding to the measure of power or burden that is applied to the cell, accordingly the measure of power that followed up on the heap cell can be determined from the yield.

2.2 ARDUINO UNO

Arduino Uno has a microcontroller board that upheld ATmega328P (datasheet). It's fourteen advanced info/yield pins (of that cardinal is utilized as PWM yield), cardinal simple information, sixteen rate quartz, USB connection, jack, ICSP header, and catch for reset. 'Uno' implies that one in Italian and was picked to check the release of Arduino code (IDE) one.0. The Uno Board and form one.0 of Arduino code (IDE) were the premier dependable renditions of Arduino. Arduino is an Associate in a Nursing open stockpile, segment and code organization, undertaking, and client local area that forms and fabricates microcontroller units to make advanced gadgets and intelligent gadgets that may see and the executive's objects inside the actual world.

2.3 GSM

GSM represents Global System for Mobile Communications. A GSM modem or GSM module is an equipment gadget that utilizes GSM cell phone innovation to give information connect to a distant organization. From the perspective of the cell phone organization, they are indistinguishable from a common cell phone, including the requirement for a SIM to distinguish them from the organization.

2.4 LCD

Liquid Crystal Display (LCDs) are used in the same systems where LEDs are used. These applications display the display of alphanumeric letters and numbers in the matrix dots and the component display.

2.5 HARDWARE DETAILS

Hardware connection is done with the load sensor, arduino uno, GSM and LCD. With the help of the transformer, the input power is stepped down to the desired power. From the transformer, bridge rectifier is used to convert the alternating current into direct current voltage. For reducing the noise in the rectifier output here using a capacitor for filtering purpose. Regulator is used to control the voltage fluctuations. Then, the load sensor, GSM and LCD [10-12] are made connections with the arduino. Load sensor is used to detect the load of the passing vehicle and an Arduino is used to processing the data and the output of Arduino is in two forms[16][17]. There is a program that is dumped into the Arduino for the detection of load of the vehicle which is normal or abnormal. When the load cell detects the load and that is below or equal to the set point then it displays NORMAL on the LCD (Liquid Crystal the registered mobile number. When the load of the vehicle is beyond the set point then, it will send a LOAD DETECTED message which is displayed on the LCD and also an alert message send to the registered mobile number. Thus, the officers can take immediate action to catch the intruders easily.

3. RESULT AND DISCUSSION

When the load detected by the load sensor is below and equal to set point ,then it will indicates “NORMAL” on the LCD display. When the load exceeds the set point, it will indicates “LOAD DETECTED” on the LCD display with the current location and also send an alert message to the registered mobile number with the help of GSM module.

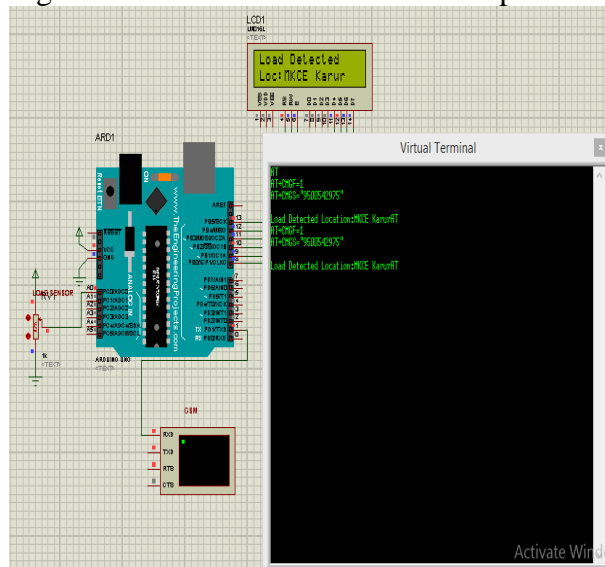


Figure 2.Simulation run

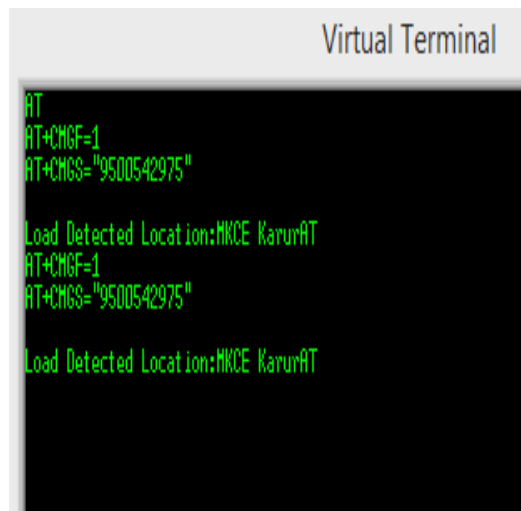


Figure 3.GSM output

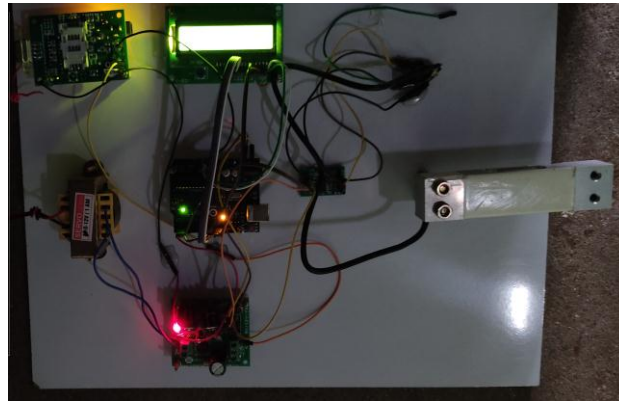


Figure 5. Hardware design



Figure 6. LCD output

Another alert message is send to the registered mobile number

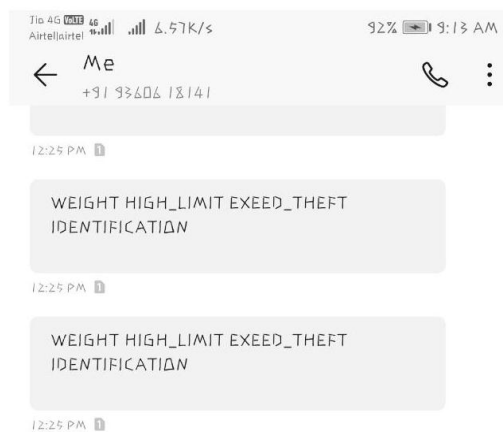


Figure 7. Alert message to the registered mobile number

4. CONCLUSION

In forests, cutting down trees are prohibited and it is regarded as an illegal activity. The third illegally importing logged timber in the world is India. Due to a shortage of manpower, our government finds it difficult to stop deforestation. The safest and sharpest method to prevent deforestation is done by using automation techniques. By using sensors, we can detect the abnormal activities in forests and the output is sent as an alert to the receiver. Thus, we can save our forests from intruders and we can stop deforestation activities using an automated detection system. This paper presented technological solution to monitor and catch tree cutting event through weight detection of vehicle. Arduino is used for better efficiency. GSM is used to send alert message to the receiver. We can also get live status on LCD. With this we can reduce the manpower and we can assure tight security to prevent trees from cutting down. Algorithms were tested and efficiency has been calculated.

5. REFERENCE

- [1] Building Data Sets for Rainforest Deforestation Detection through a Citizen Science Project. Fernanda Beatriz Jordan Rojas Dallaqua 2020.
- [2] Forest Monitoring in Guatemala Using Satellite Imagery and Deep Learning. Nina Sofia Wyniawskij, Milena Napiorkowska, 2019.
- [3] Automatic Methodology for Mass Detection of Past Deforestation in Brazilian Amazon, Daniel C. Zanotta¹, Letícia F. Sartorio, 2019.
- [4] Deforestation Prediction Using Time Series and LST, Shichao Gao, 2020.
- [5] Deforestation Analysis of Northern Areas (Pakistan) using Image Processing and Maximum Likelihood Supervised Classification. Abdul Rehman; Husnain Shahid, 2019
- [6] Hot Spots Occurrence in the Dynamics of Deforestation in the Amazon Rainforest. Claudia Arantes Silva, Giancarlo Santilli, 2019.
- [7] Near Real time Multi sensor Algorithm for Deforestation Alert over the Dry Chaco Forest. E. Roitberg; V. Barraza, 2018.
- [8] Deforestation Monitoring in Different Brazilian Biomes: Challenges. C. A. Almeida; D. M. Valeriano, 2020
- [9] Evaluation of the Impact of Deforestation on the Radio Wave Propagation near the Large Antenna System in the Calculation of Sanitary Protection Zones. M. S. Mikhailov, E. S. Malevich, 2018.
- [10] PL.Somasundaram and AL.Chokalingam, "Framework For Contingency Ranking at Various Uncertainty Conditions Under Deregulated Environment", Journal of chemical and pharmaceutical sciences (2017), Pages, 265-269.
- [11] P Sakthi and P Yuvarani, Detection and Removal of Weed between Crops in Agricultural Field using Image Processing, International Journal of Pure and Applied Mathematics(2018), Vol,118(8),Pages:201-2016.
- [12] P. Yuvarani, P.Sakthi and S.Kiruthika, "Accident Prevention Using Insomnia Glass", Biosc.Biotech.Res.Comm. Special Issue Vol 13 No (5) 2020 Pp-01-03
- [13] K. Yasoda, R. Ponmagal, K. Bhuvaneshwari, and K. Venkatachalam, "Automatic detection and classification of EEG artifacts using fuzzy kernel SVM and wavelet ICA (WICA)," *Soft Computing*, vol. 24, no. 21, pp. 16011-16019, 2020.
- [14] C. Viji, N. Rajkumar, S. Suganthi, K. Venkatachalam, and S. Pandiyan, "An improved approach for automatic spine canal segmentation using probabilistic boosting tree

- (PBT) with fuzzy support vector machine," *Journal of Ambient Intelligence and Humanized Computing*, pp. 1-10, 2020.
- [15] K. Venkatachalam, A. Devipriya, J. Maniraj, M. Sivaram, A. Ambikapathy, and S. A. Iraj, "A novel method of motor imagery classification using eeg signal," *Artificial intelligence in medicine*, vol. 103, p. 101787, 2020.
- [16] S. K. Vasudevan, K. Venkatachalam, H. Shree, R. B. Keerthana, and G. Priyadarshini, "An intelligent and interactive AR-based location identifier for indoor navigation," *International Journal of Advanced Intelligence Paradigms*, vol. 15, no. 1, pp. 32-50, 2020.
- [17] S. Subramaniyan, R. Regan, T. Perumal, and K. Venkatachalam, "Semi-Supervised Machine Learning Algorithm for Predicting Diabetes Using Big Data Analytics," in *Business Intelligence for Enterprise Internet of Things*: Springer, 2020, pp. 139-149.
- [18] Punithavathani, D. Shalini, K. Sujatha, and J. Mark Jain. "Surveillance of anomaly and misuse in critical networks to counter insider threats using computational intelligence." *Cluster Computing* 18.1 (2015): 435-451.
- [19] Sujatha, K., and D. Shalini Punithavathani. "Optimized ensemble decision-based multi-focus imagefusion using binary genetic Grey-Wolf optimizer in camera sensor networks." *Multimedia Tools and Applications* 77.2 (2018): 1735-1759.
- [20] Chang, Jinping, Seifedine Nimer Kadry, and Sujatha Krishnamoorthy. "Review and synthesis of Big Data analytics and computing for smart sustainable cities." *IET Intelligent Transport Systems* (2020).
- [21] Song, Hesheng, and Carlos Enrique Montenegro-Marin. "Secure prediction and assessment of sports injuries using deep learning based convolutional neural network." *Journal of Ambient Intelligence and Humanized Computing* 12.3 (2021): 3399-3410.