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Wildlife Intrusion and Early Fire Detection using IoT

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Abstract: Interference of wildlife into habitat without prior knowledge is known to be destructive for both human beings and animals. Forest fire is an important hazard that occurs periodically due to the natural phenomena /human activities. The aim is to bring out this system based on IOT & wireless network with cloud updation. The motion of wild animals are captured by using sensors before entering into human range and alerted using cloud periodic notification. A network based wireless sensor is used to detect forest fire to achieve high verdict accuracy for the early detection without serious outcome. Alarming system is imposed to warn and notify nearby people.

Keywords: IOT(internet of things), sensors ,wireless network, cloud updation, alarming system

I. INTRODUCTION

Wildlife is greatly distressed due to deforestation which forces them to move into human habitats. It creates tremendous loss to properties and lives. In Times of India it has been reported that over 1300 people died due to wild animal attacks in India over the past three years. Humans face serious danger and the time to regain from the huge loss is imperceptible. Therefore there is a need for an intelligence supervision and perceptive system. Forest fire is an important hazard that occurs periodically due to the natural changes, human activities and other factors. The recent fire that erupted during February 21,2019 in Bandipur tiger reserve devastated 15,443 acres of pristine forest. Therefore, a network based wireless sensor is used for forest fire calamities to achieve high verdict accuracy for the early detection. The approach targets on detecting animals and sending cautionary messages using sensor and alarm. The main aim of our work is to alert the peoplein and around the forest borders and to protect their lives. In an uncontrolled field environments like desert, forest it is desirable to develop computer perception tools instead of performing physical field investigation.

II. LITERATURE SURVEY

"Image Detection System for Elephant Intrusion along the Forest Border Areas: (*the scientific world journal)"*during 2-jan 2014,S. J. Sugumar[1] and R. Jayaparvathy proposed that Image detection is challenging and cannot include all species. it is done only for elephants. In this work, the wavelet decomposition on the raw elephant image, by determining the scaling coefficient and largest wavelet coefficients, for every image is done. The 3-level decomposed query elephant image is obtained.These features are used during the process of the query and database image comparison of the elephants.[1] An Article "A global inventory of international wildlife law obligations" on 25-march 2016 in thisIt gives clear definition about prevention of Electric border fences. It says Fences, walls and other barriers are proliferating along international borders on a global scale. These border fences not only affect people, but can also have unintended but important consequences for wildlife, inter alia by curtailing migrations and other movements, by fragmenting populations and by causing direct mortality, for instance through entanglement. Large carnivores and large herbivores are especially vulnerable to these impacts.[2] "Active fire detection using LANDSAT-8/OLI DATA-Volume 185(Satellite system)." Nov 2016 by W Schroede proposed that aerial photography and commercial *satellite imagery* available gives issue about Earth-orbiting satellites and air-floating devices that detects fire only after outbreak. There is satellite data to map and monitor fire-affected areas. By considering the purpose of real time monitoring, the optimal solution would be to use the trigger threshold for the detection of new fires, and the fixed threshold in the following phases to continue to consider pixel as burning. It might be impossible to provide a full satellite coverage or even intermittent coverage. Satellites are located on orbits over 22,800 miles above the earth's surface. The optical and the infrared (heat) radiation emitted by flames in early stages, before its spread over a wide region, may be too feeble in intensity to be detected by a satellite.[3] "Animal Intrusion and premature Fire discovery Using IOT, Vol. 6" 2-feb 2018 by S.Irin Sherlyproposed that This study provides application on GSM (mobile positioning) 2G Technology based SMS notification system. The wildlife are captured by using a camera. A GSM notification along with the alarm is processed to the forest officials indicating that an animal has been detected in the forest borders and is fast approaching the human habitats.[4]

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III. PROPOSED SYSTEM

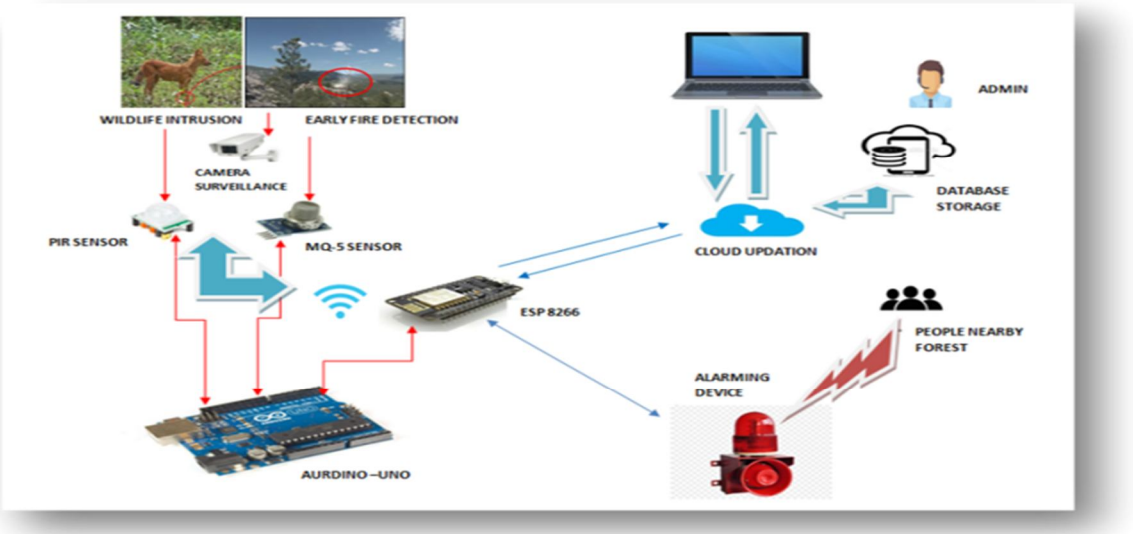

Fig.1 SYSTEM ARCHITECTURE

A. Description Of Proposed System

Proposed system consists of wildlife intrusion detection system for all the animals. animal crossing border is detected using IR sensor , and regular movement is checked using PIR sensor. Alert message is sent to both forest department cloud updation . In next case forest fires are sensed for abnormality, MQ-5 gas sensor is used to sense air composition. Notification is sent when air purity level is violated,(indicating the chance of fire).To alert people nearby forest through alarm buzzer sound and cloud updation to fire department .The WIFI ESP8266 serves for information exchange. Thus preservation of forest under the mentioned two categories are dealt firmly and helpful in early detection. the IOT enabled with cloud system is the substance of proposed model.

B. Features And Characteristics Of Components Used

1) *PIR Sensor:* Electronic motion sensor that measures infrared (IR) radiating levels from objects in its field of view. Sensor module is powered up after a minute, in this initialization time intervals during this module will output 0-3 times, a minute later enters the standby state. However, induction from right or left is more sensitivity than from up or down.

Fig 2 PIR Sensor

2) *IR Sensor:* An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. When the IR receiver does not receive a signal, the potential at the inverting input goes higher than that non-inverting input of the comparator IC(LM339) output goes low, hence the LED does not glow. When the IR receiver module receives signal, the potential at the inverting input goes low. the output of the comparator (LM 339) goes high and the LED starts glowing.

Fig3. IR Sensor

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3) MQ-5 Gas Sensor: It make detection by method of cycle high and low temperature, and detect CO at low temperature(heated by 1.5V).The sensor's conductivity gets higher along with the CO concentration rising 100ppm to 3,000ppm in the area.

Fig 4. MQ-5 GAS SENSOR

C. WIFI Module

1) ESP 8266: ESP8266EX can be applied to any microcontroller design as a Wi-Fi adaptor through SPI/SDIO or UART interfaces. Low-cost WiFi connecting microchip with full TCP/IP stack controller capability.

Fig 5. ESP8266

D. Aurdino Board

It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

Fig6. AURDINO –UNO board

E. Cloud

A network based cloud is implemented on centralized medium .the cloud system updates when sensor sends notification . it uses an IoT analytics platform service that allows to aggregate, visualize and analyze live data streams in the cloud. provides instant visualizations of data posted by your devices to cloud. online analysis and processing of the data as it comes in. This helps in Visualizing the sensor data in real-time. the wifi cabaple of sending data to nearby server when sensors send signals. thus the data's are displayed on cloud in period of time interval.

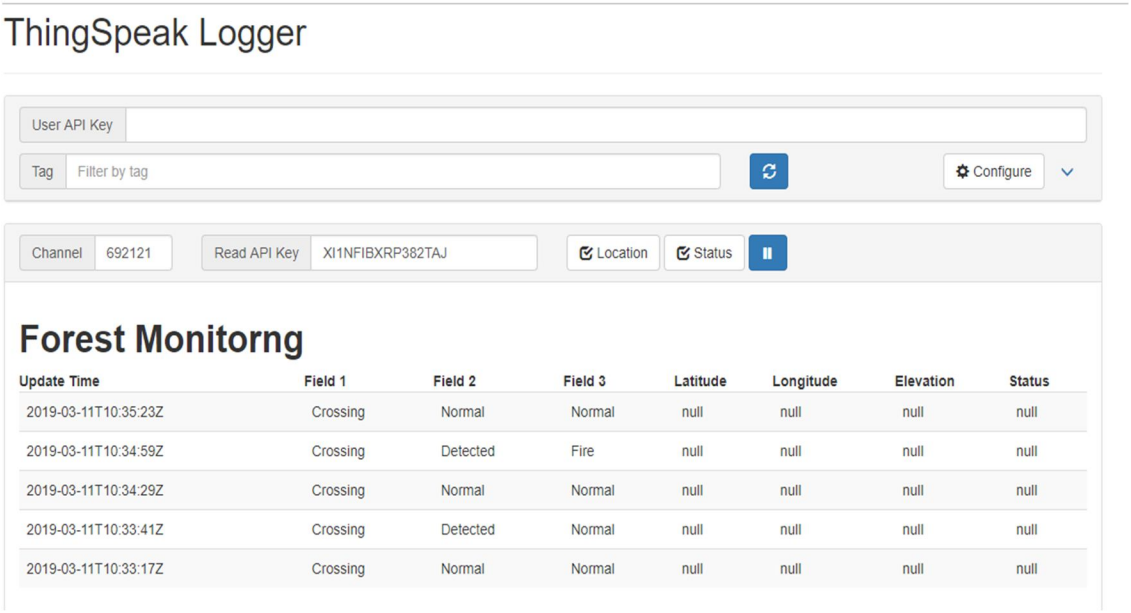

Fig.7 cloud notification

IV. GRAPHS

Fig.8 Fire Detection

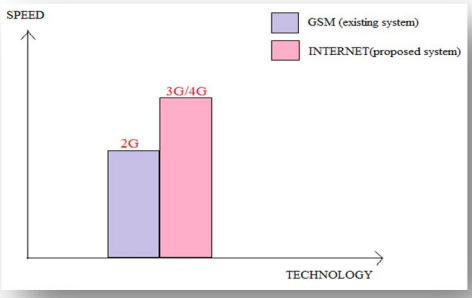

Fig.9 Network Speed

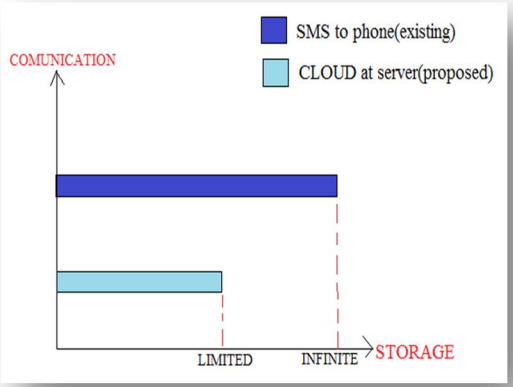

Fig.10 Storage

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V. CONCLUSION

The proposed system contribute to conservation of wildlife issues and solutions to human animal conflict it also provides insight to safeguard the forest from fire eruptions. Overcoming the drawbacks of the existing system it also consists of animal detection at highway boarders. Location detection along with fire and animal detection is done by sensors. This system can be deployed at forest borders, tea estates, food plantation, water holes, migration routes etc. Human-animal collision can be reduced to a greater extent. Air composiion level can also be monitored and notified by sensors. Cloud updation system is employed, which is more effective than SMS alerting systems. Traditional observation can be less effective. Therefore, automated systems are being used. The real time automated approach minimizes manual work and is more efficient and reliable when compared to all existing systems. Thus possibly simpler and cost reducing factors are accomplished in Internet of Things (IoT) and let sensors take up the world.

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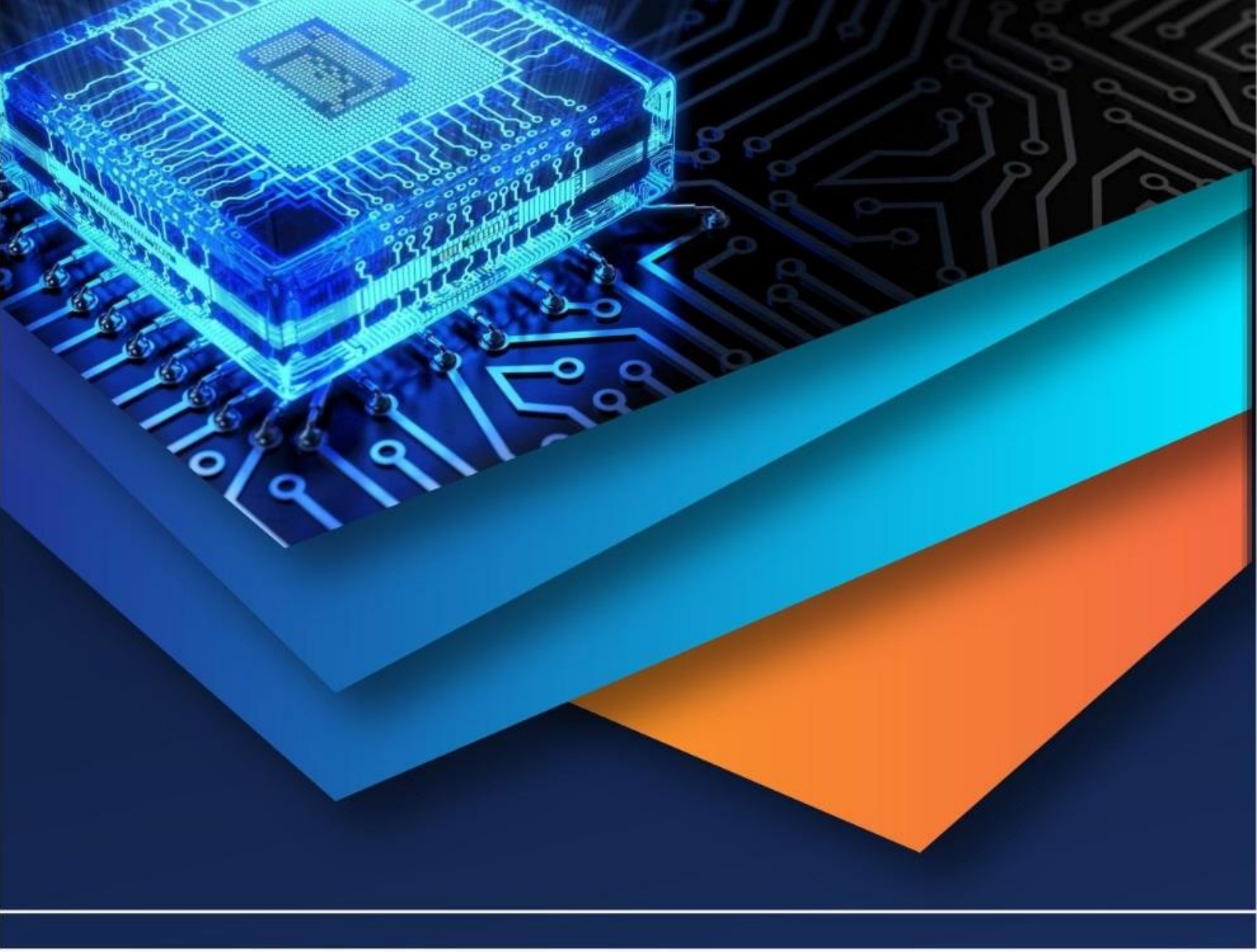

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