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Implementation of Antiestablishment Wire Fault Sensing Using CC3200

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ABSTRACT

Underground cables are inclined to faults because of underground conditions. Detecting particular fault area in the underground cable is a tedious one for that the whole line is to be dug check and settle issues. The proposed method using IoT identifies the correct fault position that makes repairing work simple. The professional domain workers identify the fault area sometimes they also are not able to predict the fault location. Determining fault in the cable itself take lots of time, cash and endeavours and furthermore permit to service underground links speedier. An excellent Wi-Fi featured ARM Cortex-M4 microcontroller is utilised to implement the system. This device offers a total, ease, practical and easy to use method for continuous checking. The fault is acknowledged with the help of sensors placed over the cable. The cell phone application furnishes with a GUI to screen the information from a remote area. The cloud server act as the centre man between the hardware device and the cell phone application dealing with the data movement.

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1. INTRODUCTION

Mostly in the metropolitan territories, the electrical cable runs underground rather than overhead lines. The fault may occur due to change in the environmental condition. It 's hard to locate the correct area or defective area manually, sudden influences the effectiveness of the cable wire because of misfortunes happened. Till now numerous systems had as of now been actualised keeping in mind the end goal to distinguish fault in cable wire [1]. The major issue came up is the way to identify and recover the fault in a cable when it is undergrounded. The technique used before came up to some extent only. Keeping in mind the target, the proposed system is the idea to recover the distinguishes the correct area of the fault and through the methods of Wi-Fi modem its serially conveyed towards the server.

K. Hasan, et al. discussed that failure and degrading of wiring is a major concern when some fire or smoke is detected as a result of arcing. But the system in light of TDR is tedious [2]. Robert. d. Gross, an et al. says that an electrosurgical grounding pad is a hardware device detects the wrong area before it began producing burn, then again alert the administrator in a control room about the injury [3], [4].Through past looks, the method they used is time-consuming and inefficient. Fault Distance Locator for Underground Cable Circuits is explained in [5], [6]. We concluded that when underground cable fault issue rise means the information immediately will be sent to the authorities via email or message alert [7]. Cross-layer design approach for power control in mobile ad-hoc networks was presented. The Performance of a solar pond by using encapsulated PCM with nanoparticles were investigated in [8].

2. BLOCK DIAGRAM

The project aim is to outline and build up a cloud associated smart underground cable fault location stage, going about as a security device for identifying and to keep away from any conceivable mischances. Enzyme-mediated synthesis of silver nanoparticles using marine actinomycetes and their characterisation [9] described the nanoparticles characteristics for the marine systems. It is additionally fit for detecting fire breakout in the territory to give continuous checking and caution over the Internet. Modelling of Photovoltaic System with Converter Topology for Grid fed Operations [10] explained the converter technology for the photovoltaic system. In [11] a new approach has been represented to detect HIF based on harmonic analysis of current in distribution networks. In [12] presents a combined approach of Wavelet (DB4) and Artificial Neural Network to classify the single line and double line faults for protection of transmission line. The performance of the presented method is declared incorporating the effect of various parameters like fault type, fault location, fault resistance and variation in power flow angle. In [13], they consider the fault detection and diagnosis for the Lipschitz nonlinear system with the time-varying error based on adaptive fault observer. The adaptive law developed can not only guarantee the nonlinearity of system but also broaden the application scopes of a general adaptive observer. In [14] a prototype of an automatic system that continuously monitors the gas leakage status with the help of the sensors. This data is made available on the cloud through real-time feed over the internet.

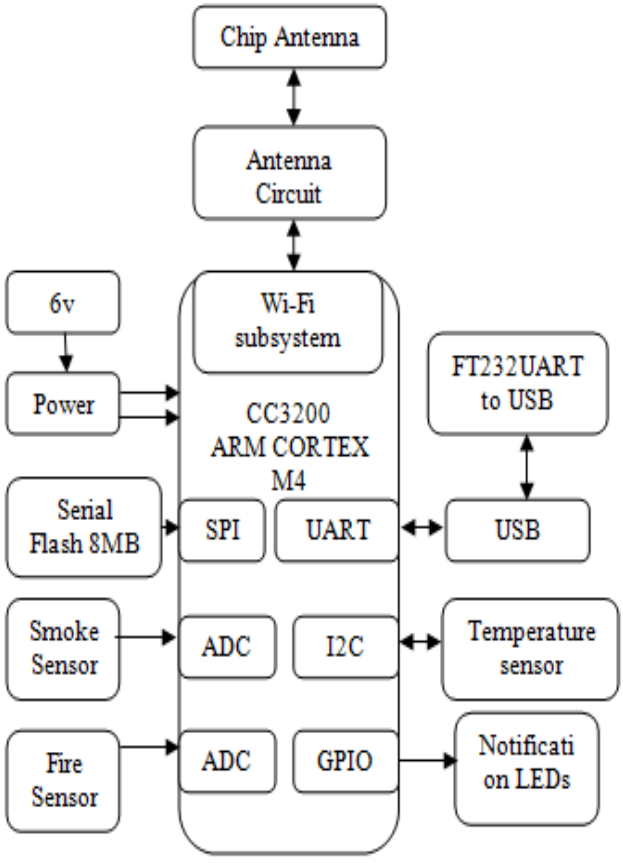

Figure 1. Block Diagram of Underground Cable Fault Detection

On the off chance that an irregular condition is distinguished, the device sends an alarm to the cell phone application of the client and furthermore produces an alert email to other authorities. An excellent Wi-Fi featured ARM Cortex-M4 microcontroller is utilised to implement the system. The device interfaces with the web using Wi-Fi. This device offers an entire, minimal effort, useful and easy to understand method for ongoing checking. The device consists of different sensors for detecting and preventing an abnormal situation. The cell phone application gives the end client a GUI to screen the information from a remote place through cloud server from a hardware device.

3. HARDWARE DESCRIPTION

3.1. CC3200 Microcontroller

The Wi-Fi CC3200 web on-a-chip MCU was intended to empower Internet of Things (IoT) applications.

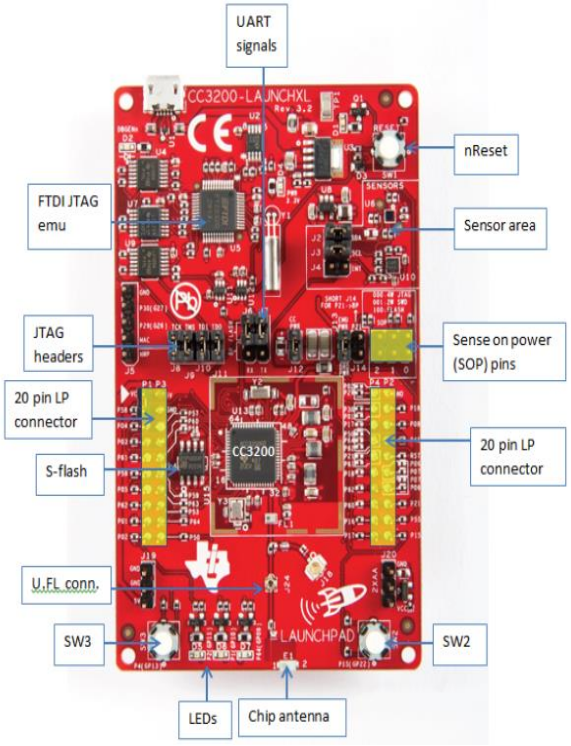

Figure 2. CC3200 Microcontroller

This embedded Wi-Fi collection is a remote Microcontroller that coordinates an elite Cortex-M4 Microcontroller and peripherals enabling clients to build up a whole application with a single IC. CC3200 incorporates an M4 Core running at 80MHz with RAM choices up to 256KB giving adaptability to coordinate your end use. Notification LED's are utilised to demonstrate Wi-Fi provisioning and cloud server association status.

3.2. IoT Cloud – Blynk App

Blynk is a smartphone app that can able to communicate with the hardware component. It's a digital dashboard where you can assemble a realistic interface for your venture by mostly relocating gadgets. The Blynk cloud server is speedy, responsive, and allowed to utilise. Associating with a Wi-Fi device is as simple as copying your created approval code into your CC3200 portray, and giving your Wi-Fi points of interest. The association with the web depends on Wi-Fi. The cloud is the server to hold the data and send the data to the correct user over a network.

3.3. Flame Sensor

Flame Sensor can be used to detect the presence of fire in the wavelength of 760 nm - 1100 nm. It will respond faster and more accurately detect depends on the mechanism. Because of its dark epoxy, the sensor is sensitive to infrared radiation.

4. RESULT

When the fault is detected with the help of fire sensor and temperature sensor over the cable, simultaneously the cell phone application furnishes the end client with a GUI to screen the information from a remote place through the cloud server without any delay. Not just this, a life of the cable will likewise get by expanding on the grounds.

5. CONCLUSION

Nowadays usage of underground cable is getting increased. The methods examined above were the most ultimate method for managing the underground cable fault issue. Keeping this in mind the proposed system is designed according to that scenario the device alarm about the defective area. A solution to such the problem is to set up a monitoring system which continues observing the fault location correctly. This paper presents a solution to overcome the problem faced by underground cable handlers. In addition to this, it sends an alert email or message to the authorities.

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