Chapter 23

Early Warning System of Fire Land People based on Android Applications

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Abstract

The peat-land forest in Indonesia to date has resulted in a reduction in the amount of carbon deposits in peat soil and air pollution, thus damaging the ozone layer and disrupting the health of the people. This is because there are still many areas of mysteriously burned peat-lands. Peat-land fires can be predicted with land surface temperature parameters. Peat-land that will experience a fire will be characterized by rising ground surface temperatures significantly around the peat-land area. The high surface temperatures of this land are the foundation in the handling of peat-land forest fire disasters. Extensive peat fires have been caused by the relevant officers not getting the information quickly in the event of a fire. This problem is caused by the slow information coming as a result of incoming information is not directly obtained through an application owned by the officer. The rapid development of mobile phones has given rise to an Android service that can be used to access any information quickly. Minimization of peat fires is urgently needed, therefore information is needed which can be known to the public directly, through the forest fire early warning system in the Android Application. The end result of this research is an early warning system that can be run on mobile phone devices, and contains the parameters of surface temperature of land for mitigation pre disaster of Fire of Peat Land. Periodic measurements of land surface temperatures through this application can increase the preparedness of the Indonesian Forest Service in monitoring peat forests during the dry season, researchers in research on peat-lands, and communities in anticipation of faster peat fires.

Keywords: *Android apps, Early Warning Systems,* Peat-land

Introduction

The tropical peat-lands of the world cover an area of 40 million ha and 50% of them are found in Indonesia (mainly in Sumatra, Kalimantan and Papua) and are huge carbon stocks that must be preserved. Riau Province's peat-land potential in 2002 of 4.03 million ha. The carbon content (C) in peat soil in Riau Province in 1990 amounted to 16,833.45 million ton C (75.62% of Sumatera total), whereas in 2002: it changed to 14,592.14 million tons. For 12 years (1990-2002) decreased carbon content of 2.241 million tons (13.31%) or 1.11% per year. Peat-lands function like sponges absorb and store large amounts of water, otherwise peat-land disturbance can store water as much as 0.8-0.9 m3 / m3 peat.

Inside are organic materials that decompose slowly. Under normal conditions, peat is very difficult to burn. But Kanalization has transformed peat-lands into flammable and loss of function as a water

supply. Like a fire in the chaff, fire lasts for days or even months. Incomplete combustion, resulting in high carbon emissions.

This is exacerbated by the difficulty of putting out fires that burn peat-lands. The difficult access to the point of fire may be overcome by extinguishing by air, but the main problem is not access, the location of what is the main problem. We need to know that at the time of burning, it is not only vegetation that grows on burning peat-lands, but the peat-lands are also burned. A fire that burns not only on the surface but also beneath the surface. This is what complicates the blackout process, so that peat-land fires can last up to a matter of months.

Peat-land fires seem to have become a routine event every dry season, so that achievers as the largest exporter of smoke. The prevention of burned peat-lands can only be done by restoring the original peat function. Channel-the existing canal must be closed to elevate the groundwater face on the peat so that the water content is present even though drought.

The gradual recording of land surface temperatures in peat-land areas can be a reference in the prediction of peat-land fires. However, there is no measuring tool for increasing the surface temperature of the land for prediction of peat land fires. Android application is the fastest access in the present and has been owned almost all the world community. Therefore, an android app is required in accessing a surface level temperature measuring apparatus around the slopes of the volcano to minimize losses due to peat forest fires in Indonesia.

Content

The system block consists of five parts outline that is input, process, output, power supply and IOT system. In the input consists of a variety of inputs are the input level of soil moisture and temperature sensors and input time data sourced from RTC. Process blocks function as input and output processors. The processor used is Arduino Nano type in which there is ADC feature to process input from sensor, I / O to process input and output, Input / Output (I / O) to communicate with output and the last one is serial (Rx, Tx) to transfer data using ESP8266 and GSM SIM900 and also to communicate with IOT system. Output serves to provide an indication of the conditions of LCD and LED. The virtual media in use here are two ESP 8266 and GSM SIM 900 modem to further communicate with the output. Block IoT system serves to connect the transmission media to the internet until it can be a display of android information and can be controlled from android. The necessary tools are Smartphone, Web Hosting, Cloud Server and Internet. The power supply block serves to provide power throughout the system in order to work properly.

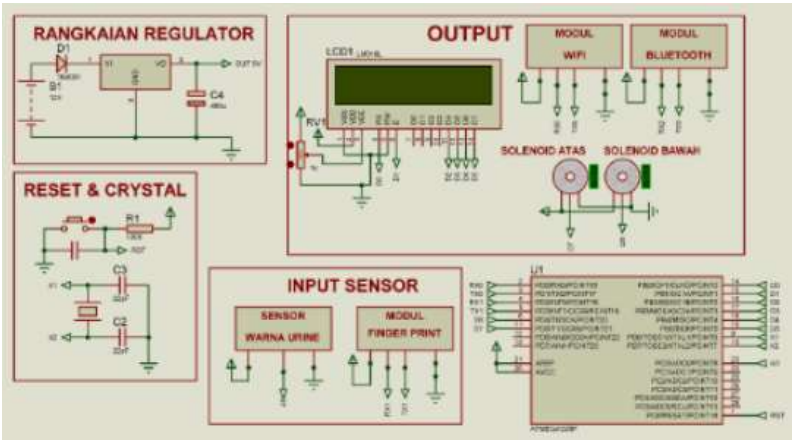

Fig 1. Schematic circuit of Electronic and Transmission System

The schematic design above is a plan drawing of the electronic circuit of the air temperature meter and the surface temperature of the land to be realized. In the picture above as a whole there are five parts of the regulator circuit, sensor input, output, reset and crystal and a series of processors.
The purpose of the Surface Sensor temperature sensor test is to calibrate the measured value using the sensor so that the output value matches the desired result, in this case a percentage indicating the surface temperature of the land. Based on the Lm 35 sensor datasheet, the following is the expected range of values:

Status	Level	Keterangan	Informasi
Normal	1	Land Surface Temperature below 40^0 C	Safe Peat Forest
Alert 1	2	40^0 C – 45^0 C	Fire-prone Forest, Forest Service is on standby
Alert2	3	45^0 C – 50^0 C	Very Prone Fire Forest Fire, Fire Car Start Prepared the point of the sensor
Watch Out	4	➢ 50^0 C	Fire trucks are deployed to the sensor point in the associated Peat Forest

Table 1. Relationship of Land Surface Temperature to the Status of Fire Hazard of Peat-land (Modified Data Field)

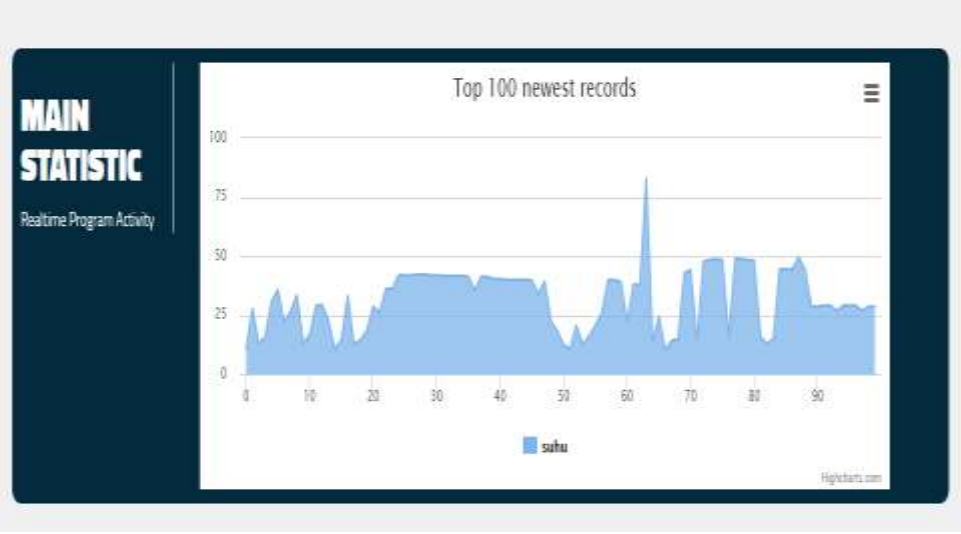

Fig 2. Graphical User Interface date

Lm 35 sensor test results can be concluded that the design and implementation of Lm 35 sensor can be said feasible and successful because the range of values obtained in accordance with the datasheet sensor Lm 35.

Conclusion

1. The design and implementation of the Early Warning System of Peat Land Fires has fulfilled all the test criteria and has a valid value.
2. Surface Temperature Testing The soil can be said good and successful because the range of values obtained in accordance with the increase in Surfaces Temperature.
3. The results of data and data performance data acquisition results on smart-phones can run well and correctly.

4. Geomorphology analysis of Peat-land areas is the main basis in the installation of sensors, power supplies and transmissions in the Peat-land Territory.

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