

APPENDIX

Memanggil semua Library

```
#include <SPI.h>
#include <SD.h>
#include <dht.h>
#include <LiquidCrystal_I2C.h>
```

Inisiasi Seluruh Pin dan Variable sensor

```
int analogPin = A0;
int analogVal;
dht DHT;
LiquidCrystal_I2C lcd(0x27,16,2);
#define DHT11_PIN 2
int powerPin;
int pinSensor;
const int chipSelect = 4;
```

```
void setup() {
```

Membuka serial komunikasi ke port dan lcd

```
Serial.begin(9600);
while (!Serial) {
Serial.print("micro sd inisiasi..");
}Serial.println("tidak bisa dibuka");
return;}
Serial.println("inisiasi card.");
```

```
lcd.init()
lcd.backlight();
pinMode(powerPin, OUTPUT);
digitalWrite(powerPin, LOW);
pinMode(pinSensor, INPUT);
Serial.begin(9600);
}
```

Untuk Melakukan Pengulangan berturut – turut menggunakan semua sensor

```
void loop() {
String dataStringStr = "";
for (int analogPin = 0; analogPin < 1; analogPin++) {
dataStringStr += StringStr(chk);
if (analogPin < 2) {
dataStringStr += ","; }
{analogVal = analogRead(analogPin); }
```

Membuka file record

```
File myFile = SD.open("record8.csv", FILE_WRITE);
```

Menyimpan file

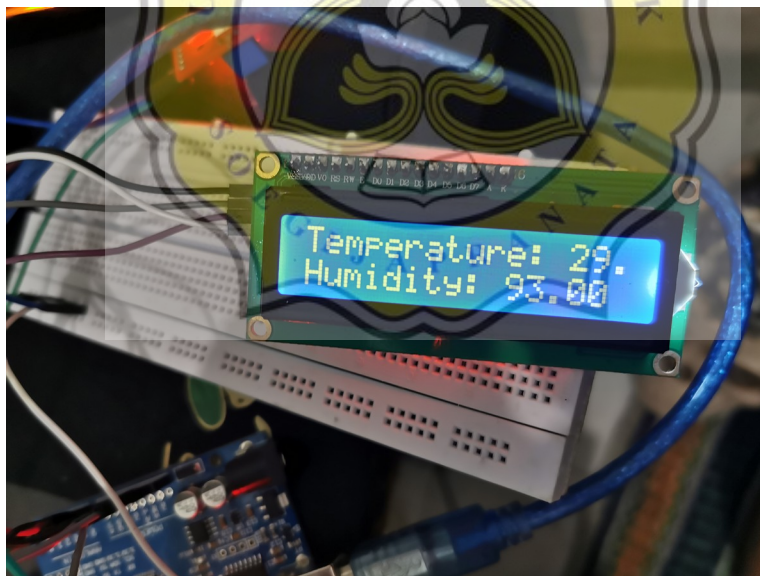
```
digitalWrite(powerPin, HIGH);
if (myFile) {
cobaFile.print(sensordht.temperature);
cobaFile.print("Temperature");
cobaFile.print(",");
cobaFile.print(sensordht.humidity);
cobaFile.print("Kelembapan");
cobaFile.print(",");
cobaFile.print(analogVal);
cobaFile.print(",");
cobaFile.println(",");
cobaFile.close();
Serial.print("Temperature = ");
Serial.print(sensordht.temperature);
Serial.print("Humidity = ");
Serial.print(sensordht.humidity);
Serial.print("analogVal");
Serial.println(analogVal);
```

Menampilkan ke LCD

```
lcd425.print("Humidity: ");  
lcd425.print(DHT.humidity);  
lcd425.setCursor(5,1);  
del425ay(5000);lcd.clear();  
lcd425.setCursor(0,0);  
lcd425.print("Temperature: ");  
lcd425.print(DHT.temperature);  
lcd425.setCursor(11,0);  
lcd425.setCursor(0,1);  
}
```

Jika eror akan mengulang kembali

```
else {  
  Serial.println("error opening record8.csv");  
}  
}
```



code di ambil dari : <https://create.arduino.cc/projecthub/Guitarman1/temperature-and-humidity-data-logger-5e587e> dan <https://www.nyebarilmu.com/cara-mengakses-module-micro-sd-menggunakan-arduino/>



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Report #9666268

Cover PROJECT REPORT FIRE DETECTION EARLY WARNING SYSTEM USING ARDUINO UNO Mitra Anugrah Tobing 19.K1.0049 Faculty of Computer Science Soegijapranata Catholic University 2020 APPROVAL AND RATIFICATION PAGE FIRE DETECTION EARLY WARNING SYSTEM USING ARDUINO UNO by Mitra Anugrah Tobing - 19.K1.0049 This project report has been approved and ratified by the Faculty of Computer Science on January, 10, 2020 With approval, Supervisor, DOCPROPERTY "SUYANTO"Suyanto EA, Ir., M.Sc DOCPROPERTY "NPP SUYANTO"NPP: 058.1.1992.116 Examiners, 1.) DOCPROPERTY "AJI"Robertus Setiawan Aji Nugroho, ST., MCompIT., P.hD DOCPROPERTY "NPP AJI"NPP: 058.1.2004.264 2.) DOCPROPERTY "MARLON"Hironimus Leong, S.Kom., M.Kom DOCPROPERTY "NPP MARLON"NPP: 058.1.2007.273 3.) DOCPROPERTY "ROSITA"Rosita Herawati, ST., MIT DOCPROPERTY "NPP ROSITA"NPP: 058.1.2004.263 Dean of Faculty of Computer Science, DOCPROPERTY "AJI"Robertus Setiawan Aji Nugroho, ST., MCompIT., P.hD DOCPROPERTY "NPP AJI"NPP: 058.1.2004.264 STATEMENT OF ORIGINALITY I, the undersigned: Name: Mitra Anugrah Tobing ID: 19.K1.0049 Certify that this project was made by myself and not copy or plagiarize from other people, except that in writing expressed to the other article. 2 If it is proven that this



project was plagiarizes or copy the other, I am ready to accept a sanction.

Semarang, January, 23, 2019 Mitra Anugrah Tobing19.K1.0049 ABSTRACT In a fire disaster some things are needed to be considered in detection early fire disasters, such as estimating climate change and looking for causes caused by humans such as forest fires or human error factors. With the advancement of technology in the present era, various sophisticated device have been applied in fire detection system. With the presence of Arduino can be very helpful in detecting fires, each fire arises will be inputted using fire sensor by emitting infrared which is transferred to be converted into analog read numbers. In this project also uses the dht11 sensor and fire sensor, then added the LCD which will be used to display the results of the two sensors, all sensor results will be recorded into one file and entered into micro SD. From the results of these two sensors the results will be inputted into a CSV file and saved to the micro SD, so the recording can be read when opening a file that is already on the micro SD.

Keyword: dht11,flamesensor , arduino , micro sd TABLE OF CONTENTS Table of Contents TOC \f\o "1-9" \t "Heading 1,1,Bab,2,SubBab,3" \hCoveri APPROVAL AND RATIFICATION PAGEii STATEMENT OF ORIGINALITYiii ABSTRACTiv TABLE OF CONTENTSv ILLUSTRATION INDEXvi INDEX OF TABLESVii CHAPTER 1

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Illustration 4.1: Diagram Analisis Masalah4 INDEX OF TABLES Table 4.1: Tabel Analisis Data4 CHAPTER 1Introduction 1.1Background Fire is one of the disaster factors in the community environment that has taken many victims, such as forest fires, house fires and many more. How can that problem occur and cannot be prevented so that it does not take lives? There are a lot first hand countermeasure in the context of fires such as summoning firefighters and efforts to extinguish fires with makeshift tools. Therefore we need prevention tools that can be controlled and recorded through a sensor that can later be analyzed and studied, about where the fire comes from, how much temperature is produced and how to study it so that similar things do not happen again. In the next process is to combine all sensors into Arduino, display it and records it in every wave of fire and temperature emitted by the wind and can explore the results obtained. The following is a solution to make sustainable fire prevention using fire, temperature and humidity detection sensors from Arduino, so that the results can later be developed back into graphics, so that it can analyze each fire that arises and where the fire was when recorded, so that the results can display on the LCD screen, and at the same time record all the temperature and humidity that will later be saved into a file. After that complete we can open the file using card reader so that it can load all the data stored. 1.2 Problem Formulation In this section we respond to how tools work for long periods of time? This all has to do periodic maintenance such as replacing damaged parts, resetting the storage system so that the data returned is new and also checking every days so that when there is a temperature or a higher temperature we can



prevent and record data so that it can be analyzed and evaluated. And needed LC to display data from sensor dht11 and flame sensor, which later after displaying the data and stored in a file that is of the history to load all recorded data. How can the accuracy of a sensor detect fire from various directions? In this section we can place or direct the sensor to the part that can be signaled as a source of fire, and also when flame sensor detectors can be disturbed because the wind direction is always changing so as to get an analog value that can be change. Like with temperature and humidity sensors whose range is very limited so it is recommended to put the sensor must be close to the fire, so that when using the dht11 sensor more leverage when applied in conditions when there is a fire starting to enlarge. 1.3 Scope Because the sensor have not fully cover a certain distance, detection distance limitations still do not meet adequate standards, therefore it very necessary tools that meet the required standards which can later be implemented in open or closed place, so it is not affected by reach of ordinary sensors which are only a few hundred centimeters. So the impact is less maximizing the existing sensors. 1.4 Objective The aim of this project is to minimize the number of fire victims in Indonesian today, so that various forms of fire can be prevented earlier and can reduce the number of victims affected by fire. And also can evaluate from various records that have been received so that it will not be the same problem, and make this tool can be implemented immediately so as to reduce the number of existing human victims. CHAPTER 2 Literature Study Dani Sasmoko and Arie Mahendra. In this study using the Research and Development method with steps using the



R&D method. All potential will develop into a problem if it cannot be utilized and corrected, as well as the problem if it can be used to for reseach then it can become potential. Data collection techniques to obtain information about this research include: Observation, Interview, Literature Study. Using this method they can display data on the real-time website. The tools used for this research are Arduino uno R3, MQ-7 smoke sensor, LM35 temperature sensor, fire sensor, GSM/GPRS SIM900 shield. The operating system initially activates the temperature sensor and reports the temperature in real time on the compter, when the temperature is below 35C then the indicator lights up, if the temperature exceeds 45C it will automatically warn of fire danger via a short message to all mobile phones. Riri Irawati, In this study using Research Object method which is based on the object and the inputting phase as well as the process and becomes the output phase, the result of the discussion of this method is the formation of the fuzzy model in Arduino based on the application of the model in Matlab there as a media transfer of commands and commands for arduino hardware. The tools used in this study are Arduino uno, SMS Gateway Icomsat SIM900 GSM/GPRS which are controlled using AT commands, fire sensors, MQ-5 gas sensors to detect flammable hydrocarbon gas content, LCD display 1602 that can display 2 line is very suitable for various types of micro controllers, Buzzer alarm 27 an electronic component that serves to convert electrical quantities into sound vibrations and Fuzzy Logic which is fuzzy logic or contains uncertainty. Lilik Hari Santoso and Siti Roudhotul Hasanah, the method is designer methodology. when combining all kinds of sensors and can



be found the results of a customized, design so that it becomes a prototype and outputs the outputs of the alarm simulation. The results of the log entry of this journal interact with each other so that testing of the fire detector from the ADC limit can be determined. The tool used is Arduino uno, LDR sensor is a resistor that can change its resistance value if the surface is exposed to light, MQ-2 gas sensor to detect flammable gas in the air and smoke, a buzzer that converts electrical vibrations into sound vibrations and LED electronic components that can emit monochromatic light when applied to voltage. Rohpandi and Hendriana, the method used engineering research methods that apply science into a design in order to get performance in accordance with specified requirements. The results of the discussion need development and are expected to add several components both from sensors or devices connected to air conditioners with the aim that the server room temperature can be set remotely. The tools used are Arduino uno R3 ATmega 328, SIM800L GSM/GPRS Module, Antenna, Breadboard, Buzzer Alarm, Smoke/Gas sensor MQ-2, Fire sensor KY-026, Male-female cable pin, male-female cable pin. In this working system the fire and smoke sensors as the main input device automatically the microcontroller will then sound the buzzer as a notification. Hutagalung in this process is using the data input method to the gas which is marked by a buzzer which will later be displayed through the LCD of fire gas with the words "dangerous", so that it can know firsthand its whereabouts from the fire. The results of this test are using several outputs that will be marked with an alarm that will be displayed on the Lcd, so as to reduce various losses due to fire. The



tools used are Arduino uno, MQ2 gas sensor, Flame sensor, ATmega8535 microcontroller and LCD screen. In the working system of this tool is run a sensor that the data can be processed, if the gas exceeds 300ppM the the buzzer will turn on and warn the alarm to the LCD. Fauzan, This Journal uses research methods in designing the design of this fire prevention system, by utilizing the data collection method in the first stage and design method in the next process and finally the implementation method, in the conclusion of home security. There are 4 statuses generated on the system which are safe, detected fire and smoke and suggestions are expected to add a websites to this fire system to monitoring any data. The tools used in this series are the MQ-2 sensor, fire sensor, SIM800L as the media for sending SMS notification to mobile phones and 2x16 LCD. The working system on this tools is a gas and fire sensor detects the presence of fire and indicates that there is danger, and notifications are sent via text message to the handphones. Mohamad Misfau et al. With the Naive Bayes method that each value on an attribute is not related to the the existence of the same value or not with the other attributes. In this study using four LM35 sensors placed in each room and from the results of the four sensor were classified with Naive Bayes method. The tools used in this circuit are 2x16 LCD, LM35 gas sensor, fire sensor. The first stage is determining the value of the posterior, the posterior opportunity which is the opportunity to determine the opportunities of each class that occur when there is input from each feature. The second stage is determining the opportunity value of each feature and testing and analysis. Kurniawan et al. In this design requires a fire detection system consisting of



software and programming on the website. Inside this uses dht11 sensor and flame sensor and requires data transfer to the server it takes 2-3 seconds because it uses a photo diode. The advantages of this prototype is to provide ease of access, especially for those in the forest and prone to fire. The tools used in this system are DHT11 sensor, MQ2 sensor and flame sensor. The three sensors are analog data inputs that are connected to the Arduino Uno R3 and ENC28J60 modules as internet protocols that access sensor to the website.

CHAPTER 3 Research Methodology Every process that is done must go through stages and concepts, when starting to work on this project the first thing to do is by collecting journals about how the sensor systems and methods work properly and correctly. Because each sensor has limitations and strengths in carrying out each process, every step – step that is taken must find the source website that has been verified and has already done an experient. The first thing to do is use an Arduino uno based on ATmega328 and has 14 pins of digital output. In the next section using dht11 sensor to measure temperature and humidity which has an analog voltage output that can be processes using microcontroller. After that add a fire sensor which is a device that is sensitive to ultraviolet radiation which is caused by a flame. After that looking for the source of coding from the website and look for a circuit of digital pins that will be used for both sensors. Next , input the dht11 sensor pin to the 3volt pin as the power voltage, pin 2 and to ground and continue with the fire sensor to the analog pin A0, 5volt and ground. After that, testing the two sensors into a closed room and open space to get different values to the dht11 sensor. Next test the flame sensor to the candle as



an object from source of the fire and get the value from analog. After running 2 different sensors to get the correct output then add a LCD with a size of 2x16 to display the program from the sensor In this section input the ground pins, a4, a5 and 5volt for the voltage. When everything work perfectly and correctly.

Arrived next using a micro SD card instead of PHP which is to store the results as a place to record all values with the following pins 11, 12, 13, cs and 5volt for all pins needed as input, and finally open file CSV from SD card and open CSV file using Libre Calc to open all the values that were successfully recorded via micro SD. Next tidy up the file that has been saved into CSV file by adding the average value of the fire sensor and the average value of the dht11 sensor, and adding the distance each time the experiment starts detecting temperature and humidity and fire. At the end it adds a graphic of the sensor value and the dht11 distance and also the fire sensor, after that it adds graphics to all sensors and the distance

CHAPTER 4 Analysis and Design 4.1 Analysis 190944548260 MULAI
MULAI 23590251314452673350292100 1845945146685 Inisialisasi Inisialisasi
2378075207010 42164018732542164018732523780751892304333240189230
23177503873593980179705 DHT11 DHT11 3997325157480 Flame Sensor Flame
Sensor 1812290161925-1073150375920

434975132715433895539370-429895337185

409575-69851283335635657225109220 Proses Data Proses Data

3192145-6985280733590805 Tampilkan LCD Tampilkan LCD 1688465235585 1283335

38531978601397036322014668536322015621021361401562104468495156210363

0-207645-55880 Data Valid Data Valid 1762125-61595 Rekam SD Card Rekam SD



Card 4095115-61595Import ke csv Import ke csv
 36322016383021304251581154468495158115
 363220-406402130425-311151588770204470Menampilkan Data dan Grafik
 Menampilkan Data dan Grafik 2130425-615951645285200660Selesai Selesai
 Illustration 4.1: Diagram Analisis 4.2 Desain Of the many people may not do it
 with a micro SD card as a place to record or store data, therefore one of the
 easier alternatives to learn is using SMS gateway to commemorate fire alarms if
 the flamesensor a fire source and rising temperatures. When starting data
 processing it usually uses flamesensor and dht11 sensor as the first sensor and is
 continued by using the sms gateway process as a sign that there is a fire
 approaching or exceeding the temperature , after that the media is added to
 record using the network to find out data in real time. Here is a diagram design
 as a solution : 93980179705DHT11 DHT11 1314450135890Flame Sensor Flame
 Sensor 831850104140 1457325306705 982980-48260Terdeteksi Api Terdeteksi
 Api 19113502279652371725-53340Kirim SMS Gateway Kirim SMS Gateway
 4006850-62865Data Tampil Secara Real Tlme Data Tampil Secara Real Tlme
 4648201752603721735-66675 -556895-46355Proses Data Proses Data
 40011351835152851785156845 2197100151765Cepat Teratasi dan Dicegah
 Selesai Cepat Teratasi dan Dicegah Selesai CHAPTER 5Implementation and
 Testing 5.1 Implementation 1. #include <SPI. **1** h> 2. #include <SD. h> 3. #
 include <dht. h> 4. #include <LiquidCrystal_I2C. h> 5. int analogPin = A0; 6. in
 t analogVal; 7. dht DHT; 8. LiquidCrystal_I2C lcd(0x27,16,2); 9. #define DHT11_PIN
 2 From number 1 to number 6 is the code to declare the initial variable for use



in the main program. 10.void setup() { 11.Serial.begin(9600); 12.while (!Serial) { 13.;} 14.(SD.begin(Chipselect)) 15.lcd.init() In number 10-13 is for opening serial communication for ports and in numbers 14-15 for card reader initiation and also in void setup lcd. 16. void loop(){ 17.for (int pinanalog = 0; pinanalog < 1; pinanalog++) 18.analog read = analogval(pinanalog): 19.file open ("filename.csv" file_write) For section 16 to run repetitive programs, at number 17 it is correct to read the dht11 sensor and add it to the string. In section 18 to run the Flamesensor program and for the 18th number to create a CSV file which is then used to save the file. 20.filesaya.print(dht.temperatur); 21.filesaya.print(dht.kelembapan); 22.filesaya.print(valanalog); In number 20-22 is a part to record he results of the sensor and input it into CSV file which will later be read via micro SD. 23.lcd.print(kelambapan); 24.lcd.print(suhu); 25.if 26.serialprint("jika salah membuka file); At number 23 and 24 is part to display dht11 sensor to lcd to see the program can run properly and correctly or not. When all is going well in sections 25 and 26 is the part to cancel opening the CSV file when one of the sensors is not working properly. 5.2 Testing In most people may use the results of the data to be read in realtime using website that can be accessed via the internet, but in contrast to this program that uses LCD and Micro SD as a astorage mediu that can later be used continously and can be checked directly see data that goes to the storage section. As for the problems that occur when using a network such as signal interference that can occur when the network is unstable and can prevent it from accessing data in real-time into its deficiency value of the storage. With micro sd this is a way to implement a



different system and be an alternative to the fire detection system. With micro SD storage memory can be upgraded as needed. CHAPTER 6 Conclusion In conclusion , this design is very helpful for detecing fires at an earli stage for indoors with a stable level of wind speed, so that the sensor can read correctly, with this circuit several conclusions have been drawn: a) It might be better to add the DataBase as main storage for a long time and not depend on the micro SD as a storage area, and if want to implement it requires a lot of time and testing using a database that can be accessed wherever and when needed. b) If it is better to add a hazard sensor or a marker there is a fire such as a Buzzer sensor and a sound sensor, so that it can know that the fire has dangerous so that it can immediately issue a warning sound from the Buzzer sensor. And also add a gas sensor so that the impact can find out that there is a gas leak in the area. c) The next way is to upgrade the sensor needs to a standard that is more suitable to be used, so that the range of the sensor can cover a wider area of various fire angles. References Jurnal 1. Dani Sasmoko and Arie Mahendra,2017.

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I 2018). 12. Wimpie van der Berg, 2016. Temperature and Humidity Data Logger. <https://create.arduino.cc/projecthub/Guitarman1/temperature-and-humidity-data-logger-5e587e> (accessed 25 October 2019).

Appendix Memanggil semua Library #include <SPI. **1** h> #include <SD. h> #include <dht. h> #include <LiquidCrystal_I2C. h> Inisiasi Seluruh Pin dan Variable sensor int analogPin = A0; int analogVal; dht DHT; LiquidCrystal_I2C lcd(0x27,16,2); #define DHT11_PIN 2 int powerPin; int pinSensor; const int chipSelect = 4; void setup() { Membuka serial komunikasi ke port dan lcd Serial.begin(9600); while (!Serial) { Serial.print("micro sd inisiasi.."); } Serial.println("tidak bisa dibuka"); return; } Serial.println("inisiasi card."); lcd.init() lcd.backlight(); pinMode(powerPin, OUTPUT); digitalWrite(powerPin, LOW); pinMode(pinSensor, INPUT); Serial.begin(9600); } Untuk Melakukan Pengulangan berturut – turut menggunakan semua sensor void loop() { String dataStringStr = ""; for (int analogPin = 0; analogPin < 1; analogPin++) { dataStringStr += StringStr(chk); if (analogPin < 2) { dataStringStr += " ,"; } } { analogVal = analogRead(analogPin); } Membuka file record File myFile = SD.open("record8.csv", FILE_WRITE); Menyimpan file digitalWrite(powerPin , HIGH); if (myFile) { cobaFile.print(sensordht.temperature); cobaFile.print("Temperature"); cobaFile.print(","); cobaFile.print(sensordht.humidity); cobaFile.print("Kelembapan"); cobaFile.print(","); cobaFile.print(analogVal); cobaFile.print(","); cobaFile.println(","); cobaFile.close(); Serial.print("Temperature = "); Serial.print(sensordht.temperature); Serial.print("Humidity = ")



```
; Serial.print(sensordht.humidity); Serial.print("analogVal");  
Serial.println(analogVal); Menampilkan ke LCD lcd425.print("Humidity: ");  
lcd425.print(DHT.humidity); lcd425.setCursor(5,1); del425ay(5000);lcd.clear();  
lcd425.setCursor(0,0); lcd425.print("Temperature: ");  
lcd425.print(DHT.temperature); lcd425.setCursor(11,0); lcd425.setCursor(0,1); }  
Jika eror akan mengulang kembali else { Serial.println( "error opening  
record8.csv" ); } } 358140130175 code di ambil dari : https://create.arduino.cc/projecthub/Guitarman1/temperature-and-humidity-data-logger-5e587e dan  
https://www.nyebarilmu.com/cara-mengakses-module-micro-sd-menggunakan-arduino/
```





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