

IOT BASED TRANSFORMER HEALTH MONITORING SYSTEM ELECTRICAL DEPARTMENT SIT LOANAVALA

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ABSTRACT

Transformers are the main building block in a power system. Any damages in transformer Adversely affects the balance of a power system. The damages are mainly occurring due to Overloading and inefficient cooling The main objective of the real time monitoring of the Health conditions of the distribution transformer using IOT The parameter such as Temperature, voltage, current, and oil level of a transformer are monitored, processed and recorded in servers. For this purpose, we use sensors interfaced with Esp8266 Microcontroller. The recorded data can be send using Wi-Fi module and accessed from Anywhere around the world using IOT technology This helps in identifying human Dependency and solving a problem before a failure without human monitoring.

Keywords: Transformers, Health Conditions, IOT Technology.

INTRODUCTION

The Electricity plays an important role in our life. Every moment of our life depends upon electricity electrical has several components and equipment helping human to transfer and regulate the distribution according to usage. The most crucial equipment of transmission and Distribution of electric power is transformer. Operation of distribution transformer under rated Condition guarantees their long service life. However, their life is significantly reduced if they are subjected to overloading, heating low or high Voltage current resulting in unexpected failure and loss of supply to a large number of Customers thus is affecting system reliability. Overloading, oil temperature load current and Ineffective cooling of transformer are the major cause of failure in distribution transformer. large number of transformers are distributed over a wide area in present electric systems, it difficult to measure the condition manually of every single transformer. So, we need a Distribution transformer system to monitor all essential parameters operation, and send to the Monitoring system in time. It provides the necessary information about the health of transformer. This will help and guide the utilities to optimally use the transformer and keep this Equipment in operation for a

longer period. The main aim of the project is to acquire real-time data of transformer remotely over the Internet falling under the category of Internet of Things

PROBLEM DEFINITION/STATEMENT

Decreased in the event that they are exposed to overload, warming low or high Voltage current bringing about startling disappointment and loss of supply to a huge number of Clients consequently influencing system

OBJECTIVE

1. Real time monitoring
2. It Can Able to Detect the Faults Due to Over Current, Over Voltage, Increased Temperature at Real Time.
3. Monitoring Multiple Transformers Sitting in An Office is Possible
4. Pre fault Condition Is Easily Detected and Cleared at Same Time to Avoid System Failure. Fault Monitoring
5. Requires Less Time Also Use of WIFI Gives Most Accurate, Fast Respons

METHODOLOGY

This Proposed project presents plan and execution of IOT installed framework to Quantify load flows, over voltage, transformer oil level and temperature. This is carried out By utilizing on line estimating framework utilizing Web of Things with single chip Arduino Microcontroller and sensors. It is introduced at the circulation transformer site. The result upsides of setisors are handled and kept in the framework memory Framework modified with a Predefined directions to really look at strange circumstances. On the off chance that there is any anomaly on the framework. Subtleties are consequently refreshed in the web through sequential correspondence. This Web of Things (IOT) will assist the utilities with ideally using transformers and distinguish issue Before any disastrous disappointment happens. In this way, web based estimating framework is utilized to gather and Dissect temperature information after some time. Thus, Transformer Wellbeing Estimating will assist with distinguishing or perceive surprising circumstances before any serious disappointment which prompts a more noteworthy rehablity and massive expense investment funds. Transformer is one of the significant electrical gear that is Utilized in power framework Motoring transformer for the issue before they happen can forestall Deficiencies that are expensive to fix and bring about a deficiency of power

BLOCK DIAGRAM

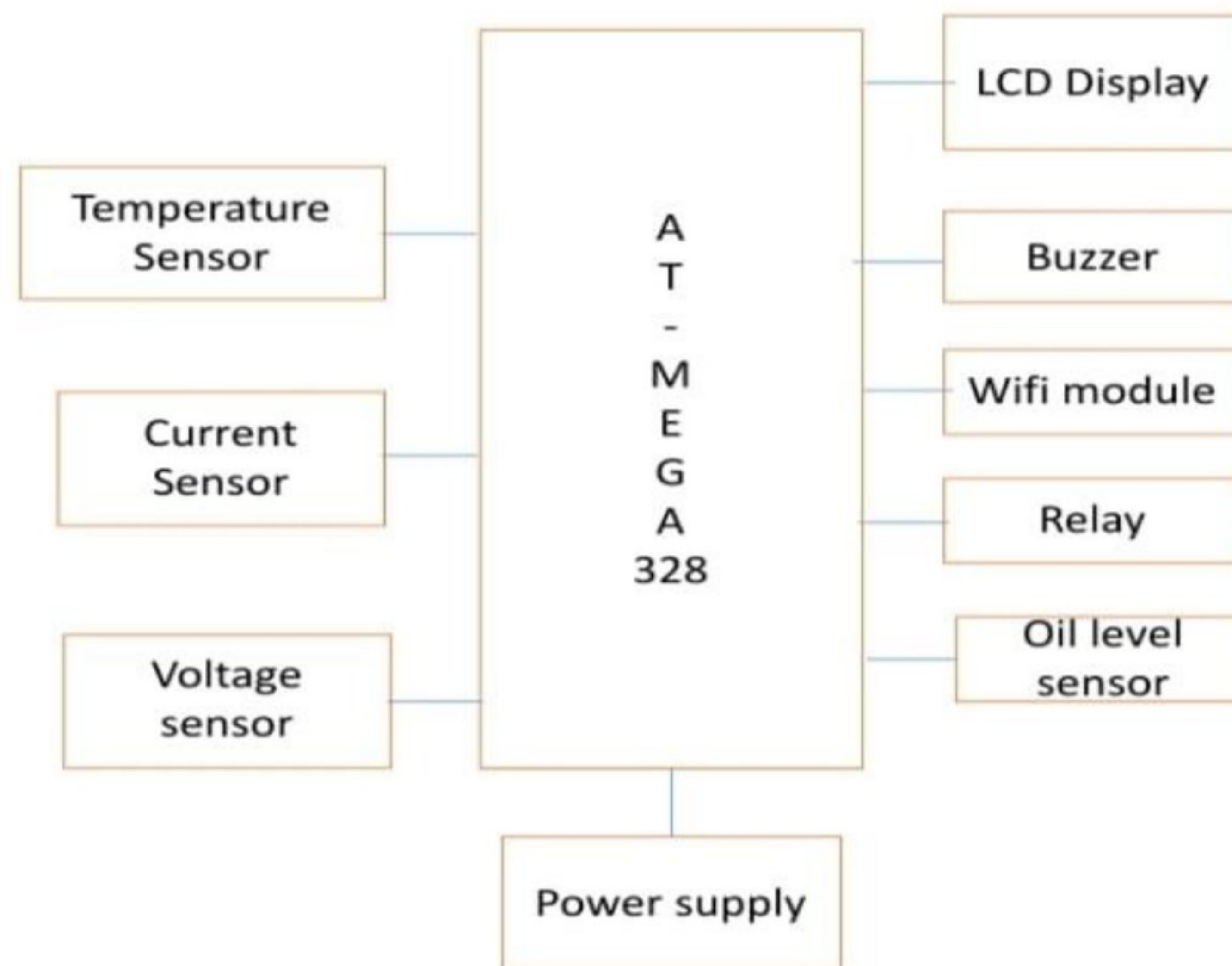


Fig 1: Block Diagram

COMPONENT DESCRIPTION

ARDUINO -UNO



Fig 2: Arduino-Uno

Arduino is open source hardware and software user Community that designs and manufactures single-board Microcontrollers and microcontroller kits for building digital Devices and interactive objects that can sense and control Both physically and digitally. Arduino microcontrollers are Pre-programmed with a boot loader that simplifies Uploading of program to the on-chip flash memory. A Program for Arduino hardware may be written in any Programming language with compiler that produces binary Machine code for the target processor. With help of this Device we can read the input values using sensors and Controls the measured parameters

HUMIDITY & TEMPERATURE SENSOR

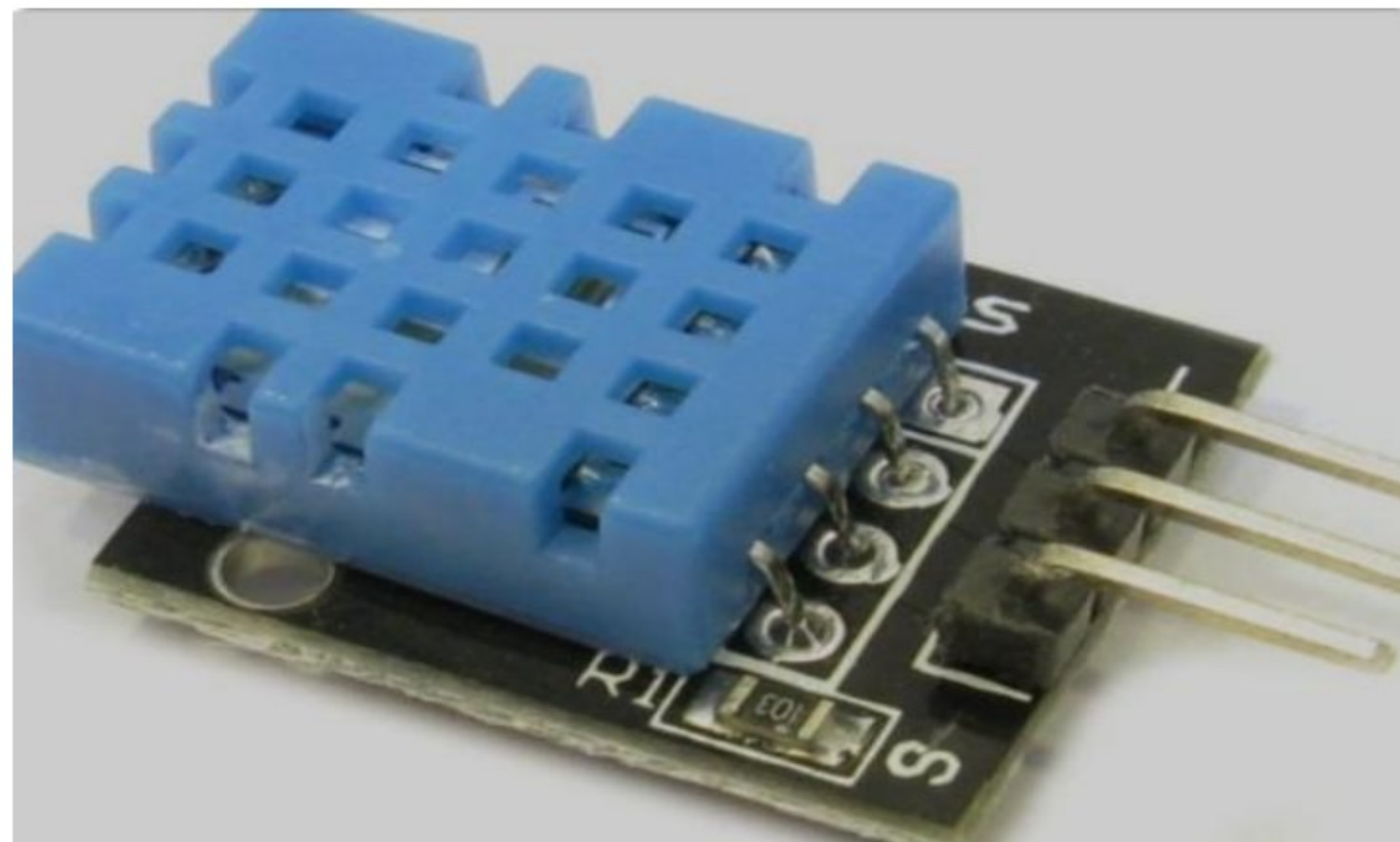


Fig 3: Temperature Sensor

Extreme burden current alone may not bring about harm to the transformer assuming the outright temperature of the windings and transformer oil stays inside indicated limits. Transformer evaluations depend on a 24-hour normal encompassing temperature of 45°C. Because of over voltage and over current, temperature of oil increments then temperature sensor identify the over temperature and move information to Arduino uno and LCD show, which stay away from the reasons for disappointment protection of transformer winding

CURRENT SENSOR

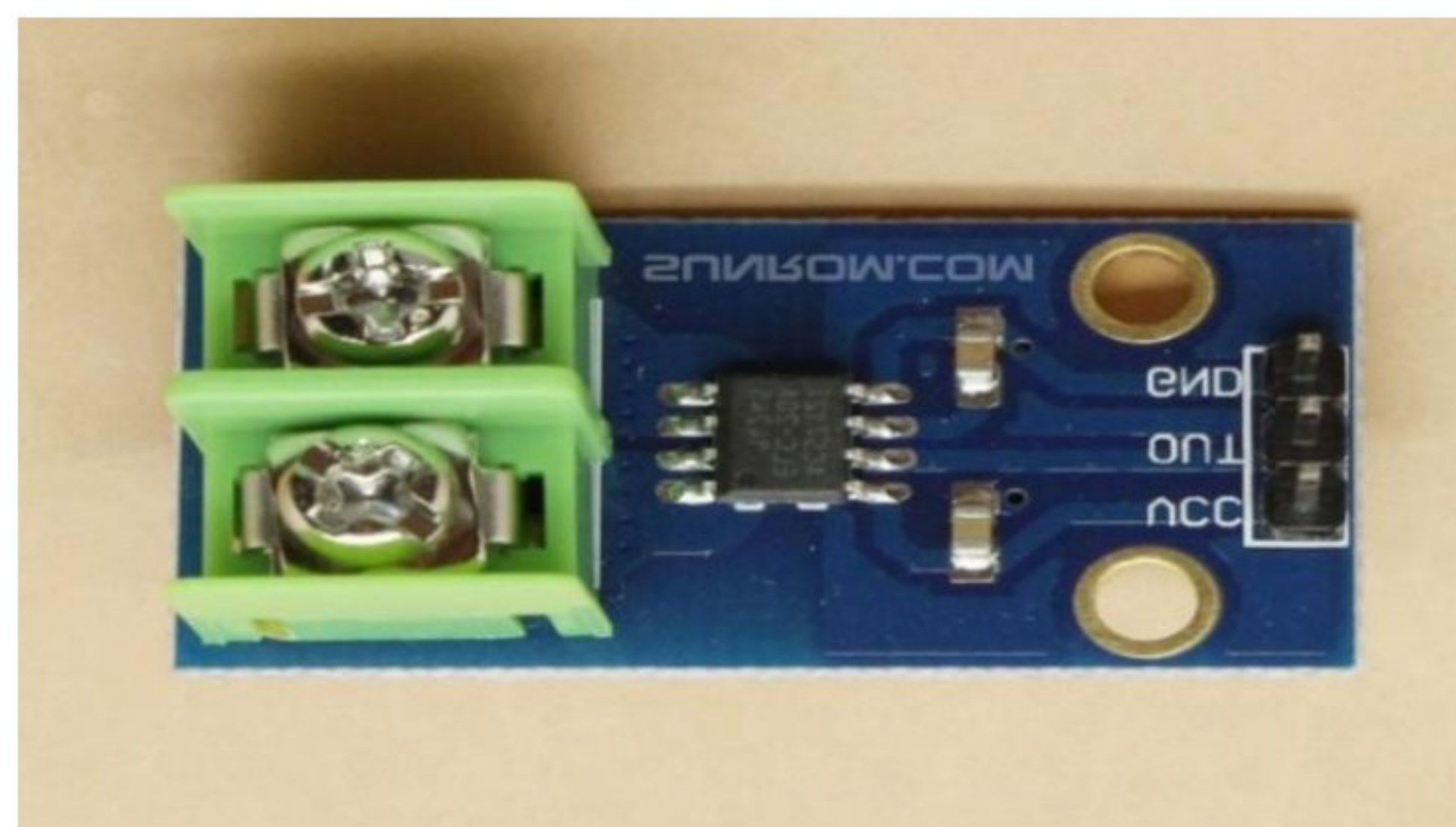


Fig 4 : Current Sensor

Like the voltage sensor, this actions the ongoing moving through the transformer. It very well may be founded on Corridor impact sensors or current transformers. Like the voltage sensor, it sends current information to the microcontroller. As the ongoing reach is consider from 0.5 to 5 Amp, when over 5 Amp of current reach, current sensor identifies the higher current condition and move the information to the Arduino uno and which displayed on LCD show

LEVEL SENSOR



Fig 5 : Level Sensor

Oil primarily utilized in transformer for two purposes one is for cooling of transformer and another utilization is for protection reason. At the point when temperature of transformer goes high, oil level in transformer tank diminishes to warming impact. For typical activity of transformer oil level ought to keep up with at required level. In the event that oil level declines past required level, it influence cooling and protection of the transformer. Because of over the top high power utilization the deficiencies in the inner fringe of the transformer tank increments and afterward oil level differs regarded to warming impact. What's more, in this way, every one of the information moves to the Arduino uno and drove show

LCD DISPLAY

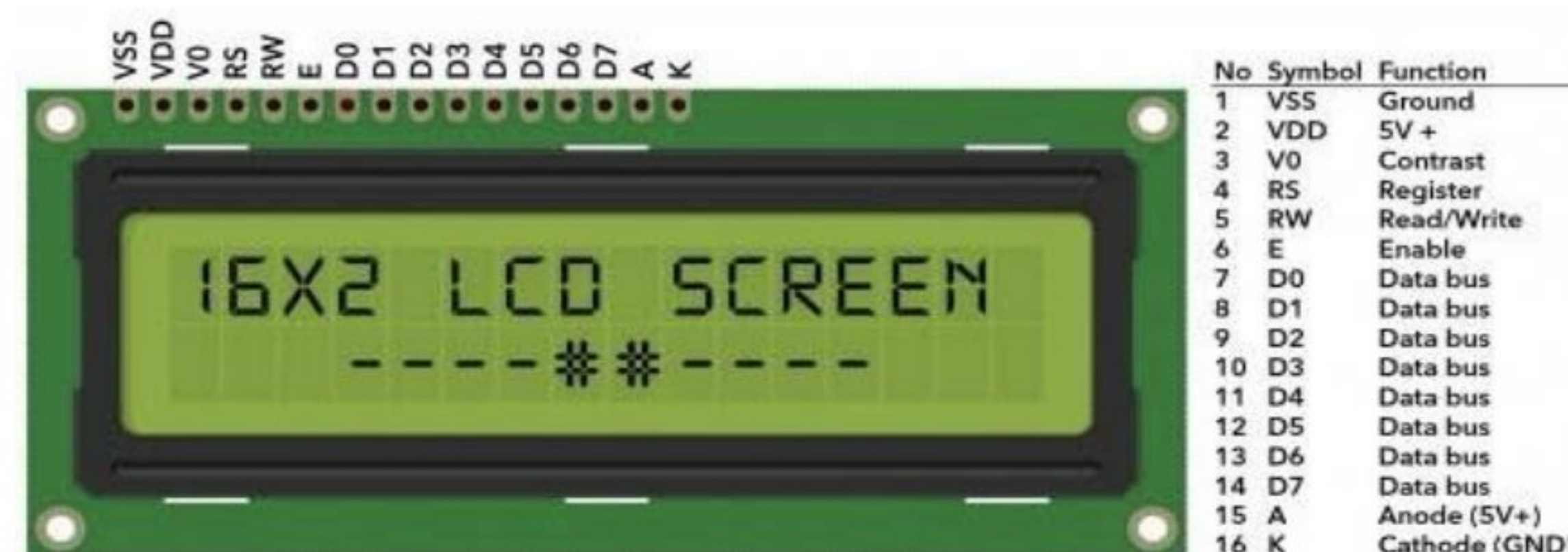


Fig 6: LCD Display

An LCD is made with either a passive matrix or an Active-matrix display grid. The active-matrix LCD is also known as a thin film transistor display. The passive Matrix LCD has a grid of conductors with pixels located at each intersection in the grid. A current is sent across two conductors on the grid to control the light for any pixel. An Active matrix has a transistor located at each pixel intersection, requiring less current to control the luminance of a pixel. For this reason, the current in an active-matrix Display can be switched ON and OFF more frequently Improving the screen refresh time.

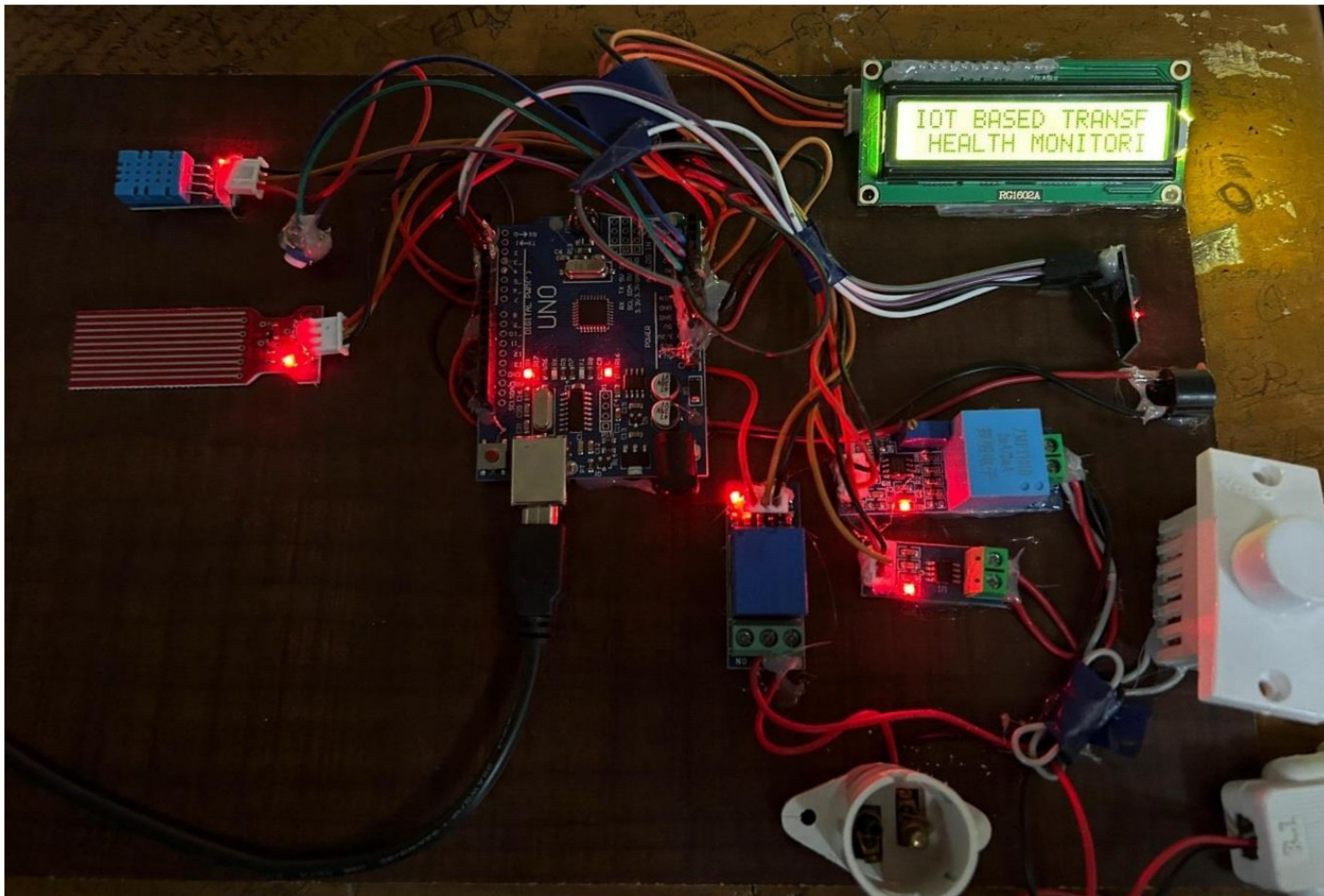
IOT MODULE



Fig 7 : IOT Module

The ESP8266 Wi-Fi module is a self-contained SOC with Integrated TCP/IP protocol stack that can give any Microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application Processor. Each ESP8266 module comes pre-programmed With an AT command set firmware, meaning, you can simply Hook this up to your Arduino uno device and get about as much Wi-Fi ability as Wi-Fi offers. The ESP8266 module is an extremely cost effective board with a huge and ever growing community.

RESULTS AND DISCUSSIO



The proposed strategy with results has shown that the assurance conspire works appropriately with Exactness, responsiveness of this plan extremely high for the strange and flawed conditions. Transformer Wellbeing Monitoring will assist with distinguishing or perceive startling stations before Any serious disappointment, which prompts more noteworthy rehablity and tremendous expense investment funds. Assuming that transformer Is in unusual condition, we can be aware from anyplace. No human power needs to screen the Tra Framework tnsformer. Insights

CONCLUSION

This framework would dispose of the necessity of human power and consequently giving Productivity and exactness The IOT based checking of appropriation transformer is very valuable When contrasted with manual observing and furthermore it is dependable as it is absurd to motor consistently The surrounding temperature increase load current physically. Subsequent to getting of message of any Anomaly we can make a move promptly to forestall any catastrophic disappointments of circulation Transformers

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