



## **Transformer Analyzer BOT**

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### **Abstract**

In an automation world everything gets connect to the internet using the cloud, IoT, and various techniques but it does not reach up to the mark. In a transformer, the efficiency can improve by various methods but the greatest challenge is still continuous which includes fault analysis and energy saving so there is an ideal solution to that greatest challenge using automation, cloud computing, and machine learning.

**Keywords:** Fault analyzer; Transformer fault detector; BOT for power saving

### **1. Introduction**

In general, automation changes the world with the great efficiency. It has been replacing humans in many fields. Assume that if a fault occurs at the transformer the respective department gets informed by the native people who live nearer to the transformer. In the modern era activities like these need to improve under any circumstance so that this project is meant to bring that kind of revolution with saves fault identification time and mainly it saves some energy, ofcourse, it is our primary duty to save the power (resources)for the next generation also this project can improve or may be add some extra features by some other authors.

### **2. Literature survey**

#### **2.1 cloud computing**

It is a virtual storing network that stores the data sent by the ESP. where it gives material for the machine to learn.

##### *A. Signal sensing*

The voltage and current measured from the sensor that data get fetch into the cloud through signal sensing.

##### *B. Embedded System*

Here the transformer connected to the cloud through some specialized ESP where the program gets fetched in to the ESP module to monitor the current and voltage continuously and fetch the data through the cloud and the data analysis by the graph form.

##### *C. Data Analytics*

It is one of the technologies used in TAB to analyze the data through machine learning techniques where the data monitored for a continuous- time and analyze the usage.

#### **2.2 Analyzer**

Here we use IoT, cloud computing, and signal sensing technology used to identify the fault that occurs in the system

also using machine and data analytics we can analyze the usage pattern of the load used by the consumer to find the power loss due to excessive supply and meet the demand without power losing there are many transformers may be under the control of certain departments were all the transformers get connected to one respective system which can be monitored and navigates to the transformer easily by developing a proper software.

**A. ESP**

A specialized ESP module which gets interacts with the independent cloud server where the user can access from any part of the world at any time, they need.



Figure 1: ESP module

**B. Voltage Sensor**

A voltage sensor used to measure the voltage produced by both primary and secondary sides of a transformer using the voltage divider rule which used to identify the fault that occurred by the voltage at what causes which may be due to over or under voltage.



Figure 2: Voltage Sensor

**C. Current Sensor**

A current sensor used to measure the current produced by both primary and secondary sides of a transformer using the current divider rule which used to identify the fault that occurred by the current at what cause.



Figure 3: Current Sensor

**D. Step down transformer**

The step down transformer used to step down the rated voltage of the transformer be in kilo volt which converted into volt that easily readable by the sensor for easy understanding we use 10:1 transformer

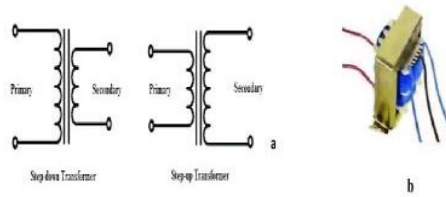


Figure 4: Step down transformer

E. LoRa

Here as we use the cloud and IoT we need a constant internet supply which can achieved by using a long ranger WIFI Module that gets connect to the ESP module as a long ranger can cover up to more than enough range where it must be installed in every transformer under the transmission department.

3. Proposed system

3.1 BASIC CONSTRUCTION

It has design to install in every transformer which includes the existing one and newly installed ones that the designing of TAB simplifies almost where the components stepped down transformer, current sensor, and voltage sensor, specialized ESP module with integrated cloud module

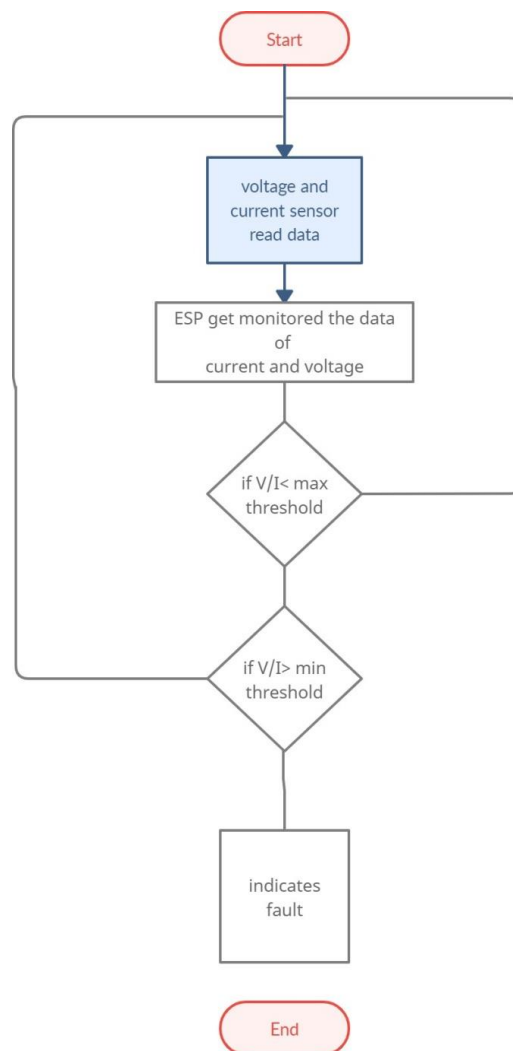


Figure 5: BASIC CONSTRUCTION

3.2 Working principle:

The construction, component, and connections were being same for both (Fault analyzer a power saver) with a slight

change in the software we can analyze fault or we can save the power.

#### 4. Fault analyzer:

One of the primary objectives of this bot is to find the fault with the reason of it and the place of the fault occurs in the primitive method the people who live in the local area has to inform to the respective department where it takes a huge amount of the time to identify the area then analyze the fault get repair which not reaches the best level but this method could change this procedure where the transformer step down to 10:1 ratio so that the current and voltage monitored through the cloud when it reaches the threshold it intimates the fault causes, area of the fault happens which save the time to analyze and repair it the advantages of this method over traditional method is the time-efficient.

#### 5. Power saver:

Another main objective of TAB is to save the power which gets losses without using the set up for it with some extra algorithm these objectives can be achieved where the data of current and voltage which get continuously monitor analyzed by the mission and suggest the power saving method.

The data get graphed which easy to go through it from the below graph. we can make sure that the load demand varies concerning time. Where the algorithm analyzes it and suggests limiting/supplying the load. which used to identify the excessive power loss due to improper supply we knew that they were around hundreds of transformers get analyze by a single BOT so there may be confusion get occurs to sort out the problem whenever the usage pattern get occurs after the prohibition period then the BOT sends the complete report of the analyze which include average usage pattern graph of the prohibition period, suggested power supply for some time from the sample data, we found that

Table 1: The load demand varies concerning time

TIME	DEMAND	SUPPLY
00	200	800
04	400	800
08	700	800
12	760	800
16	500	800
20	410	800
24	200	800

In general, the supply for the distribution transformer is still being the constant value where the demand gets (static) which indicates that some power loss during the demand is lower than the supply. Assume that the data of the transformer were monitor for a prohibition period do certain time and analyze the usage pattern of an area distribution transformer after the prohibition period the machine will intimate where the power was being waste and where it needed. Whether the load can change manually concerning machine analysis /it can changed automatically.

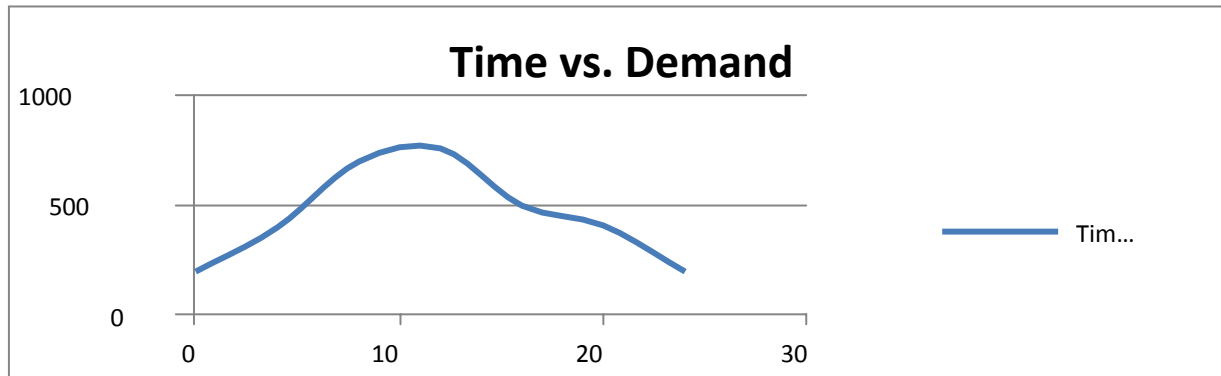
Table 2: The assumption from the graph

TIME	DEMAND	SUPPLY
00	200	250
04	400	500
08	700	800
12	760	800
16	500	600
20	410	600
24	200	250

Table - II (average supply=542.85) Comparing with table-I and table-II we get a clear idea about the power saving where the average supply of the traditional method is 800 and the average supply of TAB is 542.85 which saves up to 32.25% of the power.

The below graph plotted against time and demand of the load were using data analytics we found that nearly 32 percent of power get losses during the particular period of every day where the loss being unnoticed which leads to

run an efficient transmission system throughout a nation where during the period of 8 to 12 the load reaches its maximum values of 800 whereas during 24(00) am demand reaches the minimum value of almost 240 loads but the load supply for the transformer throughout the day were being constant it leads to power loss during the period when there is no much load needed.



Here the prohibition period was been awaiting or learning period for the BOT it generally about four weeks in a season which means the prohibition period may get occurs around three to four times a year during the prohibition period the usage pattern get analyze but the load supply for the transformer may be at a full phase in our case it around 800 units throughout a day the algorithm which inbuilt get learn the usage.

## 6. Conclusion

This proposed method is an ideate of creating a BOT to analyze the transformer where the BOT detect any abnormalities by using cloud also to analyze to losses that occurs due to improper supply of load as per Industry 4.0 the whole world moving towards automation where the IoT, AI, and machine learning plays a vital role in our daily life also still not reaches its benchmarks because many IoT, AI, and machine learning projects were being created for self-purpose which doesn't focus on society so we hope that this idea will create an eagerness for upcoming generations to add or may replace the project but up today we make sure that TAB is the advance method to sort out the two main problems in the transmission side.

## 7. Acknowledgment

The specialized ESP module mentioned here is nothing but BOLT IOT ESP 8266 module which has an independent cloud source to store and analyze the data.

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