AI BASED ENERGY CONSERVATION USING IOT

Sachin Shetty[1] & Riyaz Mohammed[2]

Abstract-This research is based on the concept and applications of Artificial Intelligence & IOT. The primary focus of this research is 'Conservation of Energy' by leveraging modern IT technology and stretching the scope beyond its conventional purpose. So far technology's advances have only led to greater things that were not possible a decade ago, but no one really had a second look at the efficiency of these technologies. And by revisiting some of these areas to combine two or more areas of technology will lead to an innovative solution for the existing problems, ahead of its time. The simple idea of recognizing electrical usage pattern to reduce loss of power at the step-down transformer's end, will not only reduce energy consumption but also prevent unnecessary flow of electricity. It could also be used to divert its path to less privileged areas. The IOT tools will collect data and transmit it to the AI main frame which will act as a brain of this power grid. An automated main frame computer will later manage the flow of electricity to different parts of a small city.
Keywords: Energy Conservation, IOT, Smart Lights, AI based Power Grids etc.

1. INTRODUCTION

1.1 What is Artificial Intelligence?

As per the father of Artificial Intelligence, John McCarthy, it is "The science and designing of making wise machines, particularly clever PC programs".

Counterfeit consciousness is a method for making a PC, a PC controlled robot, or a product think shrewdly, in the comparable way the smart people think.

AI is the concept of studying how human mind considers, and how people learn, choose, and work while endeavoring to take care of an issue, and afterward utilizing the results of this examination as a premise of creating wise programming and frameworks.

1.2 What is Internet of Things?

The Internet of Things (IoT) is an arrangement of interrelated processing gadgets, mechanical and advanced machines, articles, creatures or individuals that are furnished with one of a kind identifier and the capacity to exchange information over a system without expecting human-to-human or human-to-PC connection.

2. PROPOSED THEORY

Energy conservation is the means to reduce the quantity of energy that is used for different purposes. The practice may result in increase of financial capital, environmental value, national and personal security, and human comfort.

All that comes to the mind when we speak about Energy Conservation is that we need to rely on renewable re-source via reducing the consumption of non-renewable ones. This might just maintain the balance but doesn't solve the long terms goal of heavy power consumption.

We might find new source that powers the population without affecting the nature to certain extent but if we do not spend it efficiently we will soon be spending a lot on setting up such a power source and switch back to fossils.

An ideal transformer never expends any power itself; it essentially exchanges control from its contribution to its yield. In the event that you leave an ideal transformer associated with a power source with nothing associated with its yield, it will draw no power from the source.

But there is no such thing as an ideal transformer yet - Real transformers are not quite ideal, though some of them are very close. A real transformer connected to a power source, with nothing connected to its output, will draw a small amount of power on its own and might warm up a little. Similarly, a small percentage of the power transferred from input to output by any real transformer will be lost (converted to heat).

The proposed theory here is – Recognizing usage patterns and reducing disbursal at the source end.

IOT sensors can be integrated with electric board of a house, a small township or a section of power grid. The IOT devices will study the usage and send information to the mainframe devices which can be automated using AI configuration. Also, these IOT devices can be integrated with tall poles which will study the weather and transmit it to the incoming weather reports to the power house to avoid power outage and switching to back-up systems.

AI algorithms will study the patterns of electric usage and decide the units to be allotted for a certain area. Instead of power drains at the transformers ends, it is always better to study the actual utilization. The algorithms will also be responsible to act

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[1] Department of Computer Science & Bio Informatics, AIMIT, Mangalore, Karnataka, India
[2] Assistant Professor,Department of Computer Science & Bio Informatics, AIMIT, Mangalore, Karnataka, India

on the received information from the IOT devices which transmits weather forecasts information and to avoid electric shortage of circuits during torrential rains and other natural calamities.

The scope of the proposed theory is limitless and can be incorporated in each and every corner of the world

3. PRACTICAL CONCEPTS
3.1 Architecture –
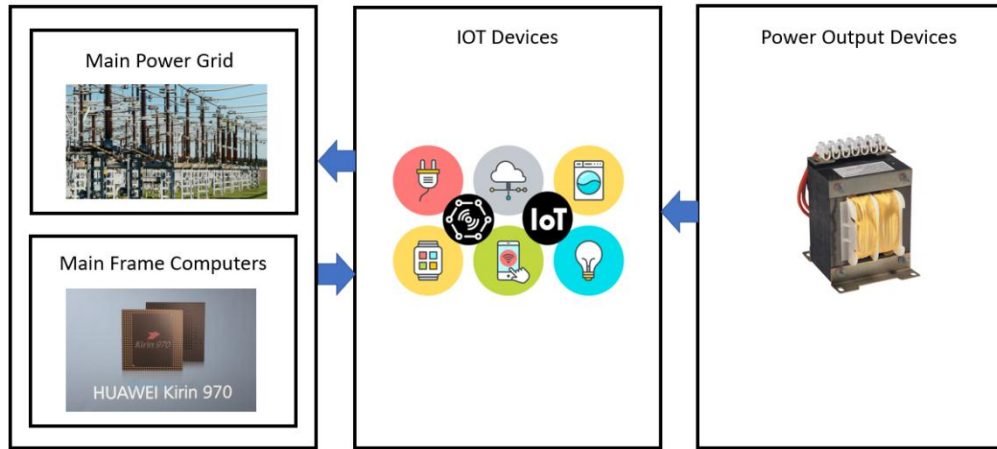
3.2 Prototype implementation –

The below figures will give you a vision about how two or more technology can be combined together and the result will solve the existing problem with an innovative solution.

For a simple prototype of this concept requires the following devices.

IOT Devices with temperature sensors, Electric circuit board, Power supply with 12V output current, couple of LEDs and DC motors, Huawei Kirin 970 chipset etc.

Rig up a circuit board with LEDs and motors that uses a power source of 12V and intakes maximum of 2.58A of current.

Now program the chip set to distribute current required only to switch on 2/ 3 motors with a fan, when temperature is at 35deg C – assuming the case that it is a hot summer period and 1 motor when the temperature drops to 20deg C.

The IOT devices will collect data of how much ampere of current is utilized on a particular day and time. This data will be transmitted to the Main Frame Computers which automates the flow of current from the Main Power Grid to individual houses or to the transformers.

Over the period of time, the AI will learn patterns based on the climate and season change and disburse only the required amount of current. This avoid unnecessary drawing of current at the transformer's end.
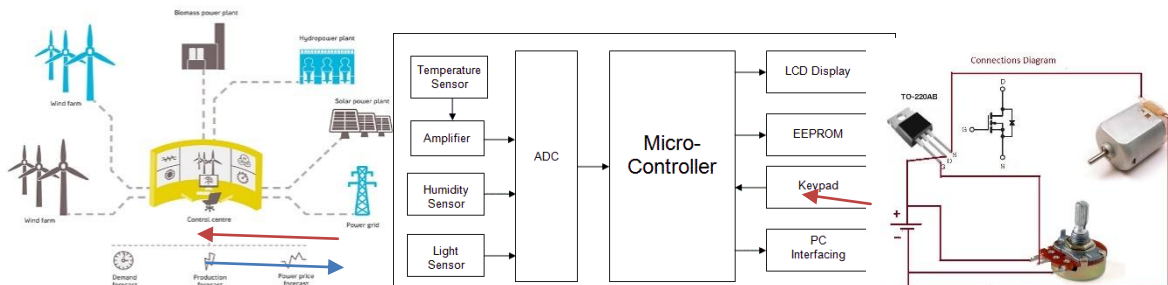
4. SECURITY RISKS

AI always poses a security threat to mankind. One way to limit this is having a proper security infrastructure.

The transmitted data and the analyzed information needs an historical archive for the AI to be self-sufficient on the longer run and will grow over time. This growing data needs a highly guarded cloud storage. If the power usage statistic gets on the wrong hands, it will initiate a monopoly over the power industry.

Hackers are continuously trying to breach such an information domain, where they could control the city grids and alter data that might completely defeat the purpose of reducing energy usage.

5. CONCLUSION

By overcoming the security threats and properly organizing the work-flow we can certainly achieve the concept of Energy Conservation using AI & IOT. The proposed research work will allow Energy utilization more efficient which eventually will

lean towards Energy conservation in terms of power consumption.Also, the AI will be capable of understanding the consumers' needs and divert its flow to the less privileged sections of the globe.

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