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Artificial Intelligence in Power Station

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Abstract: Looking at the present scenario, the liberalization of electric supply and shortage of Power supply has given a great global impact on environment. Therefore it is a matter of concern for environmentalist as well as socialactivist to look at the problem seriously. Therefore there is a requirement of a reliable power supply to fulfill the need worldwide. To ensure this need many developments are in progress. Artificial intelligence can play a vital role to help power system control.
They can extract more information and data which could be beneficial for proper management of the Power system. The Introduction of this artificial intelligence would be beneficial in long terms.
Keywords: Liberalisation, AI, Reliable, Beneficial

I. INTRODUCTION

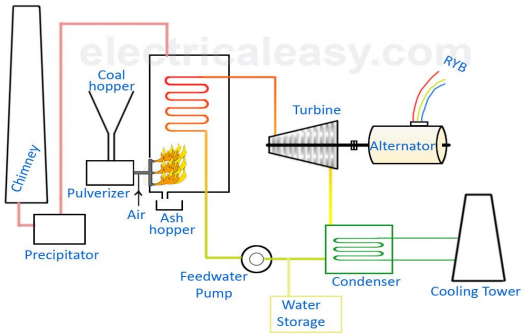
A. Power System

An electric power system is a network of electrical components which is used to supply, transfer and use electric power. The power systems are used in industry, Hospitals and homes. They consist of transmission System and distribution system. It rely upon three phase AC power across the modern world.
Power system which do not rely on 3 - Phase AC power are found in aircraft ocean liner automobiles.

B. Artificial Intelligence (AI)

Artificial intelligence is generally known as machine intelligence. Intelligence demonstrated by machines. For example Robots and Computer programs having developed software.
Artificial intelligence can be classified into three different types of systems : Analytical, Human Inspired and Humanized. It has an ability to deal with an outer environment and can also response according to the situation.
AI techniques play essential role in solving many challenging problems in Software Engineering and operations search.
There are three types of major Power plants known for the massive electricity generation.

1) *Thermal Power Plant:* In this Power Station heat energy is converted to electric power. In most of the places in the world turbine is Steam driven. Water is heated, turns into steam and spins a steam turbine which drives an electrical generator. The Rankine cycle is used to predict the performance of steam turbine systems. After it passes through the turbine, the steam is condensed in a condenser and recycled to where it was heated. These different heat sources like fossil fuel, nuclear heat energy, solar heat energy, bio fuels are used for variation in design of thermal Power Station.



2) *Nuclear Power Plant:* A nuclear Power Plant is thermal power plant in which heat source is a nuclear reactor. In its central part, the reactors core produces heat due to nuclear fission. The Heat produced is used to raise steam, which runs through turbines, which helps working in electric generators. Generator converts mechanical Power supplied through turbines into electrical Power. The Bhabha Atomic Research centre in Mumbai is India's premier nuclear research centre with a motto to sustain peaceful application of nuclear energy.

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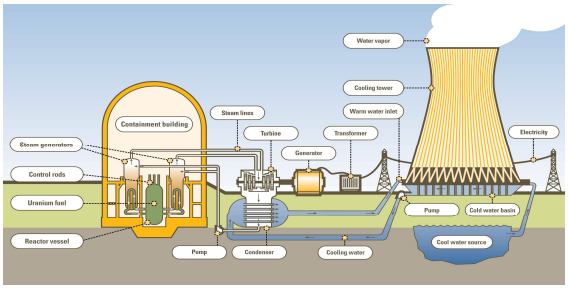
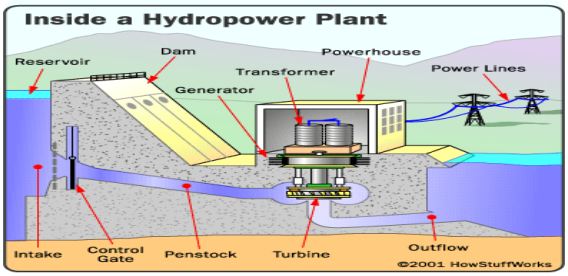


3) *Hydro Power Plant:* In Hydro Power Plant power is derived from energy of falling water. Which may be further used for useful purposes. Hydro Power produced from many kind of water mills is used for irrigation, it is a renewable source of energy. The force of water being released from the reservoir through the dam spins the blades of a giant turbine. The turbine is connected to the generator that makes electricity as it spins. After passing through the turbine the water flows back into the river on the other side of the dam.



II. METHODOLOGY

There are mainly three techniques

A. *Expert System*

An expert system is a computer System that has an ability of decision making and can solve complex problems by reasoning through different bodies of knowledge.

1) Disadvantages of Expert System

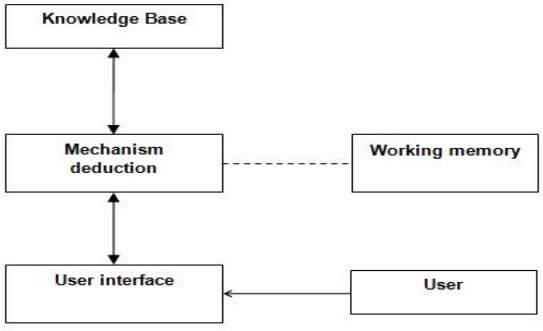
a) No Explanation of the logic is used behind a decision.

b) No common sense, no emotions are used in making decision

2) Advantages of Expert System

a) They provide accurate and quick decisions.

b) It performs high quality tasks as experts do.



B. *Fuzzy Logic System*

It is a method of reasoning that resembles human reasoning. It has the ability of decision making like human beings. Fuzzy logic is the way the human brain works, and we can use this technology in machines so that they can work some what like humans. It sometimes may not give accurate results but acceptable results are given. It is useful both for commercial and practical purposes.

1) Application of Fuzzy Logic

a) Environment control

b) Automotive systems

c) Domestic goods

2) Advantages of FLSS

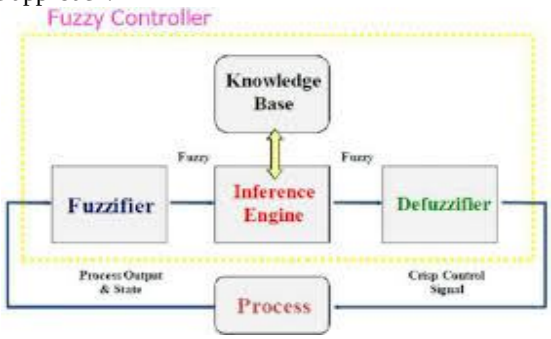
a) It can be modified easily by changing some rules due to flexibility of fuzzy logic.

b) It is like a key which gives solution to all complex problems in every field as it has the ability of decision making like humans.

3) Disadvantages of FLSS

a) They can not sort complex problems and those problem which require high accuracy.

b) The system is not designed with a systematic approach.



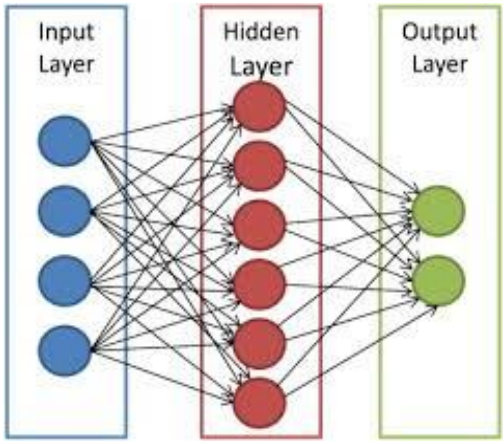
C. Artificial Neural Network

ANN is based on collection of connected units or nodes called artificial neurons. An ANN is an information processing model that is inspired by the working of brain. They are mainly used for classification. They are classified by their architecture number of layers and topology : Connectivity pattern, feed forward or recurrent.

1) Disadvantages of ANN

a) Results are always generated even if input data is unreasonable.

b) Unexplained behaviour of network.



2) Current Applications of AI in Power System

1) Control of network like location, sizing and control of Facts devices.

2) Used in network security, restoration, management.

3) Control of Power system like voltage, stability, power flow.

4) Human workers are saved from working in dangerous conditions like live maintenance of high voltage transmission lines.

5) Used for increasing efficiency of components used in power system.

6) Used for control of Power Plants like thermal Power plant, Hydro electric Power plant.

7) Results are consistent and can be easily transferred.

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III. CONCLUSION

Looking at present scenario the role of AI has added more advantages and it has proved to be a need of an age. All the global development has become more accessible. A lot of research is yet to be performed to perceive full advantages of this upcoming technology for improving the efficiency of power system. Power system is particularly a renewable energy resources for operation. The advancement of technology would enhance the more proper functioning of power system which could lead the country a world wide progress and the country would reach the zenith of glory. The life of every person would become easy and there would be more resources which they could make use of for their growth and development.

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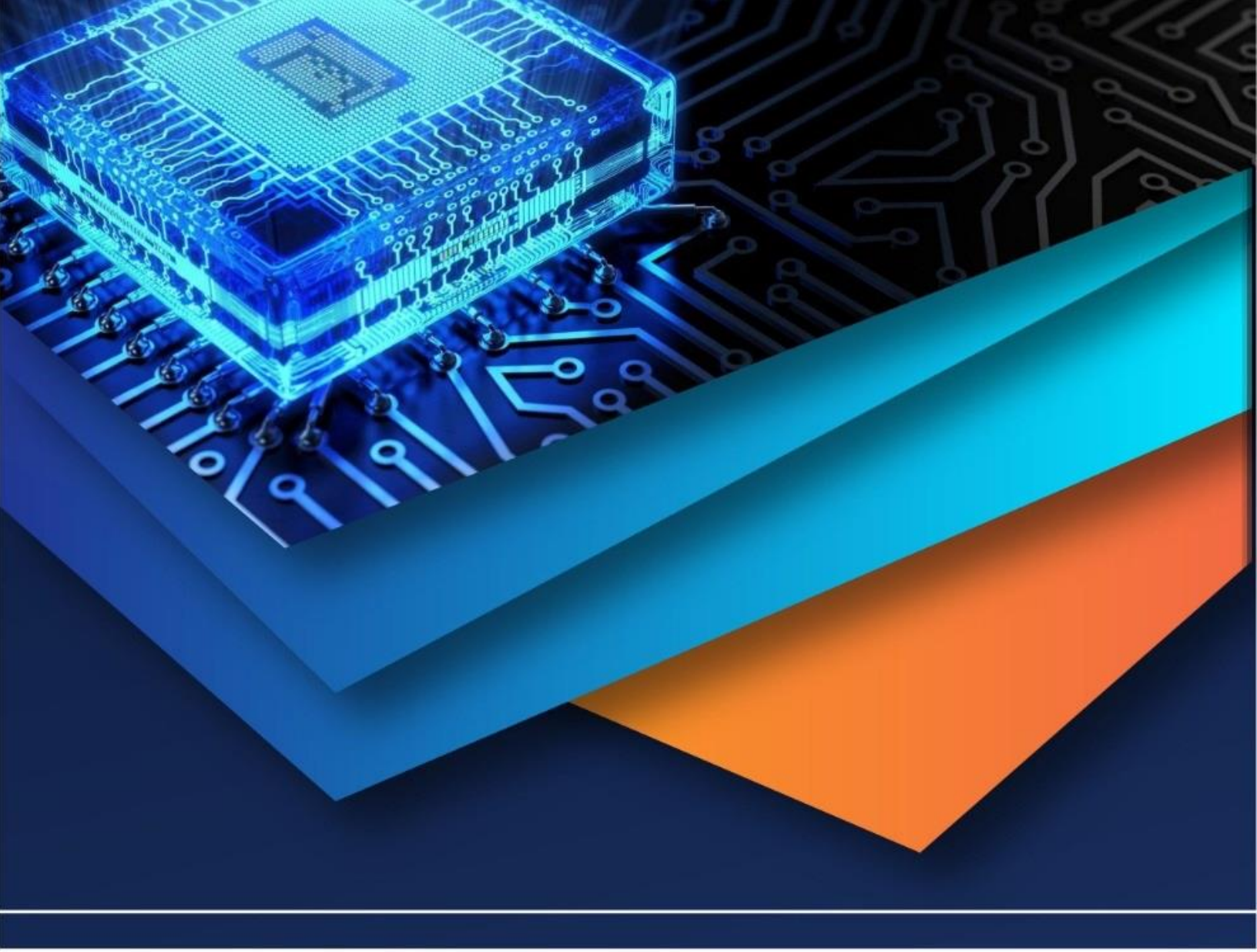

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