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Automatization of Thermal Power plant by Artificial Intelligence

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Abstract: Artificial intelligence (AI) makes it possible for machines to learn from experience, adjust to new inputs and perform human-like tasks.There is a huge demand of power supply in the last few decades. According to the size and complexity of the power system like generator, transmission lines, power transformers, increases the risk of inviting faults. Acquisition and the processing of those data which is used by the operator, control over the remote devices is the elementary unit of modern utility control system. Manual calculations, technical analysis and conclusions start to work on the power system design, operation and control.As power system grew it become more complex because of its technical advancements and variety and dynamicrequirements.

Keywords: Artificial intelligence, Expert system, artificial neural network, Fuzzy logic, Thermal Power station, Hydal Power Station, Neculear Power Station.

1. INTRODUCTION

There are three types of power plants which is mainly known for electric generation:

1) Thermal power plants,
2) Hydal power plants,
3) Nuclear power plants

It may expect that the mobile sensing will play an important role in the monitoring of power system. Artificial intelligence is mostly known to be the intelligence exhibited by machines and software, example: robots and computer programs. An expert system obtains the knowledge of a human expert in a narrow specified domain into a machine implementable form.Expert system are not be able to understand the problem of circumstances. Expert systems are also known as knowledge based systems or rule based systems. Expert systems are computer programs which are capable to understand a particular field. Artificial neural networks are interconnected group of nodes inspired by simplification of neuron which convert a set of inputs into a set of outputs by a network of neurons, where each neuron produces one output as a function of inputs. These are classified by their architecture such as number of layers and

topology: connectivity pattern, feed forward or recurrent.

Advantages:

- Its speed of processing is fast.
- No need of any knowledge of model system.
- It can easily handle any problem related to data e.g. incomplete data and information, corrupted data etc.
- It is risk tolerant.

Disadvantages:

- More data required.
- Hardware dependence
- It will always generate the result if the input data is reasonable or not reasonable.

Fuzzy logic or fuzzy systems are logical systems for standardization and formalization of approximate reasoning. It is similar to human decision making with an ability to produce exact and accurate solutions from certain or even approximate information and data. Fuzzy logic is the way like which human brain works, and we can use this technology in machines so that they can perform somewhat likehumans.

2. METHODOLOGY

Techniques used in artificial intelligence are:

i) Expert system techniques,

ii) Artificial neural networks,

iii) Fuzzy logic systems.

- Expert system is a computer system, the process of writing codes is easier than actually calculating and estimating value of parameters which is used in generation, transmission anddistribution.
- Modification can be easily done after the finalization because it is a computer program.
- As artificial neural networks operate on biological institutes and perform biological evaluation of real world problems, the problems in generation, transmission and distribution of electricity can be fed to the artificial neural networks so that a suitable solution can beobtained.
- As the limitation of practical transmission and distribution system, the exact value of the parameter will be determined.
- Values which can be determined e.g. value of inductance, resistance and capacitance in a transmission can be numerically calculated by artificial neural networks.

- Fuzzy logic can also be used to design the physical component of the power system.

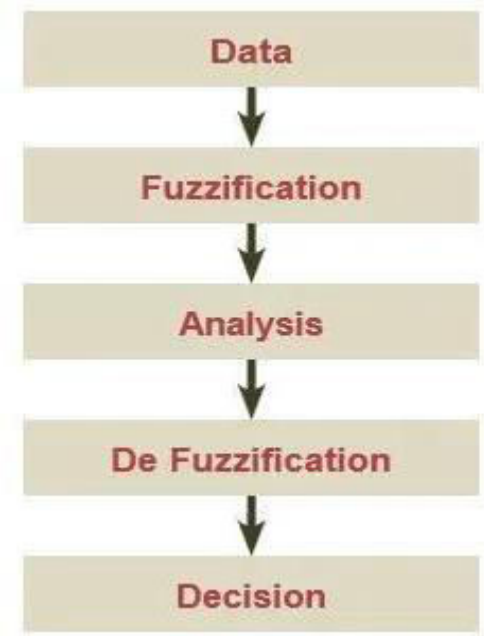

Fig 1. FUZZIFICATION

3. RESULT

- It is replacing the risky work of human workers e.g.Live maintenance of high voltage transmission lines etc.
- Operation perform in risky environments e.g. such as radioactive locations in nuclear plants, access to tight spaces etc.
- An expert system is a computer system that emulates the decision-making ability of a human expert**.**
- It gives permanent result.
- Documentation is easy.
- Results can be easily transferred andreproduced.
- The working of neuron and the pattern which is used for the interconnection is also used to construct computer for solving the real world problems of pattern recognition.
- It provide high level power, giant generalization and improve the power of model complex at minimum cost.
- Substantiality analysis and improvement.
- Power systemcontrol.
- Fault detection.
- Load forecasting used by power or energy-providing companies to predict the power/energy needed to meet the demand and supply equilibrium.
- Responding power planning.
- Operation performed by power system unit commitment, hydro-thermal coordination, economic dispatch, congestion management, maintenance scheduling etc.
- Planning of power system like generation expansion planning, power system reliability etc.
- Power system like voltage control, power flow, stability control, load frequencycontrol through it.
- It also Control the power plants like fuel cells power plant control, thermal power plantcontrol.
- Electronic communication of power

system like fault detection, network security etc.

- It can be used in small circuits.
- It is also used to increase the effectiveness of the components which is used in power system.
- Mostly data used in power system analysis are around the values, Fuzzy logic can be used to obtain the fix output.

4 .CONCLUSION

Continuous supply of electrical energy is also the one of essential part for the advanced society. Supply of Electricity is one of the most important thing for the growth and determines the value of the society. So, implementation of artificial intelligence is very important in powersystem.

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