SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)
COIMBATORE-35
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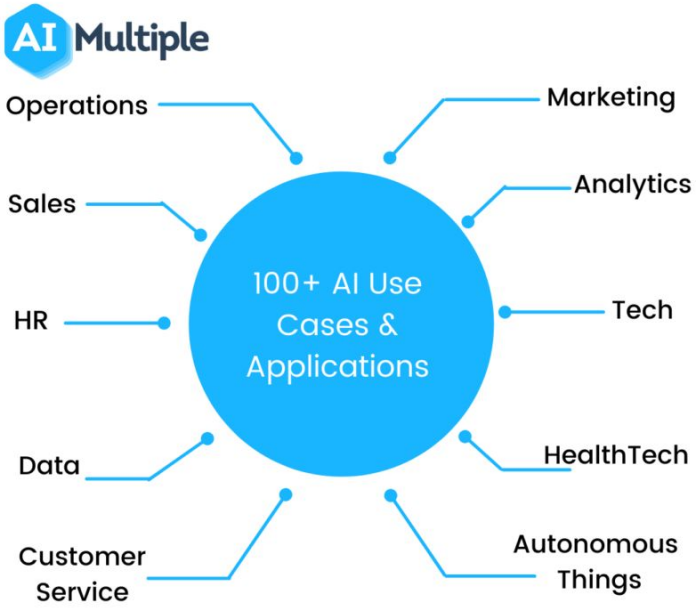
ARTIFICIAL INTELLIGENCE FOR ELECTRICAL ENGINEERING

TOPIC: LOAD FREQUENCY CONTROL BY USING AI TECHNIQUES

TOPIC OUTLINE

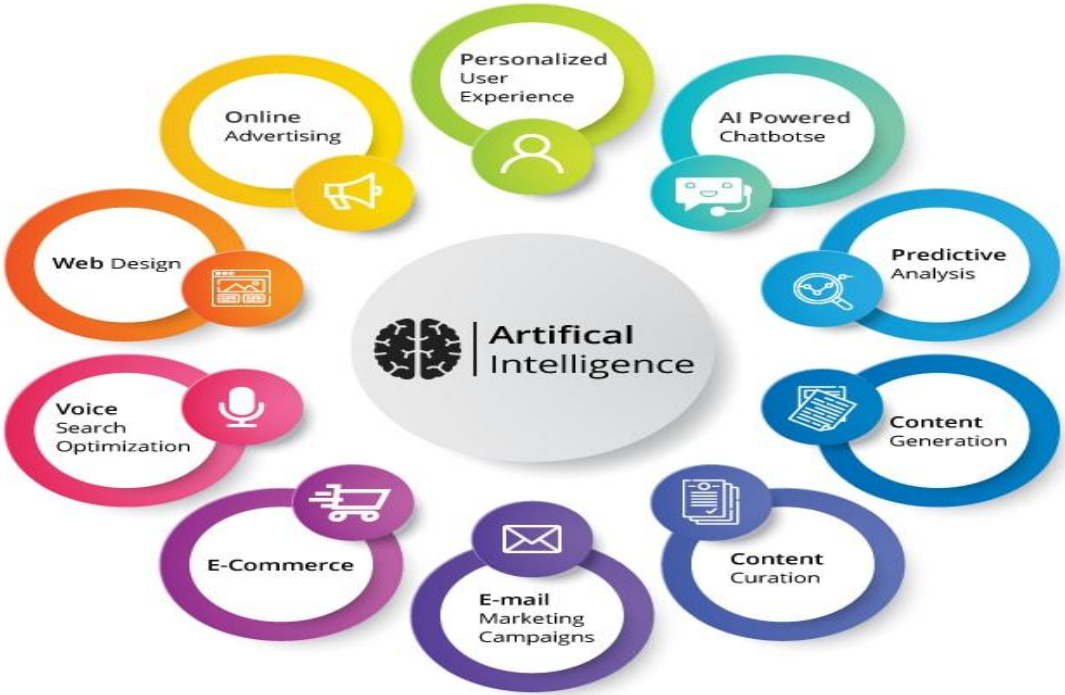


History of AI?

Introduction to artificial intelligence?

Advantages and Disadvantages of AI?

ARCHITECHTURE OF AI

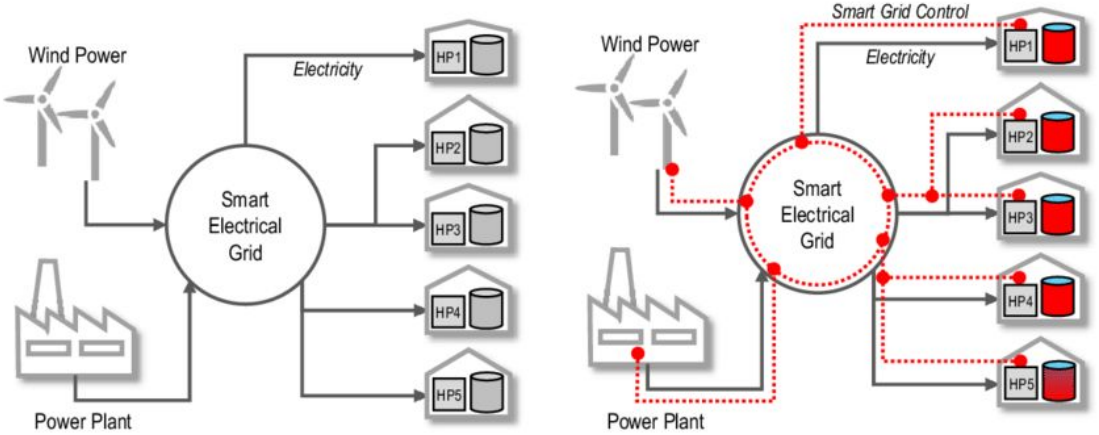


INTRODUCTION

- Load-frequency control is a very important issue in power system operation and control for supplying sufficient and reliable electric power with good quality.
- Therefore, fixed gain controllers based on classical control theories in literature are insufficient because of changing in operating points during a daily cycle.
- In recently years, modem control techniques, especially adaptive control configurations, are applied to load-frequency control.
- In the paper, artificial neural network (ANN) controller, which is an advance adaptive control configuration, is used because the controller provides faster control than the others.

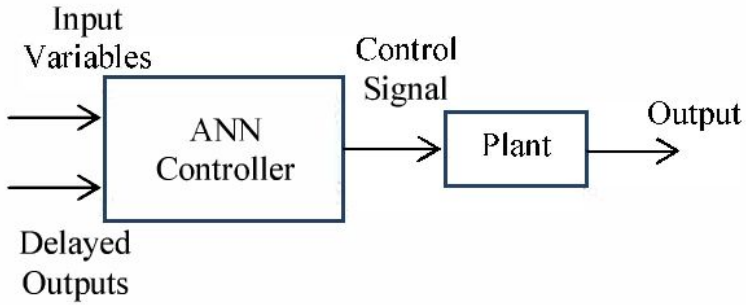
THE INVESTIGATED POWER SYSTEM

- Each area supplies its user pool, and tie-lines allow electric power to flow between areas.
- Therefore, each area affects others, that is, a load perturbation in one of areas affects the output frequencies of other areas as well as power flows on tie-lines.



THE ARTIFICIAL, NEURAL NETWORK CONTROLLER

- The neural network controller in each block is a perceptron with three layers and there are 20 neurons.
- in the first hidden layer, 10 neurons in the second hidden layer and three neurons in the output layer. The inputs of ANN are 15 state variables and three inputs, i.e. APD~ (i=l, ..., 3), and it has three outputs, which each one becomes the control inputs of each area in the power system.



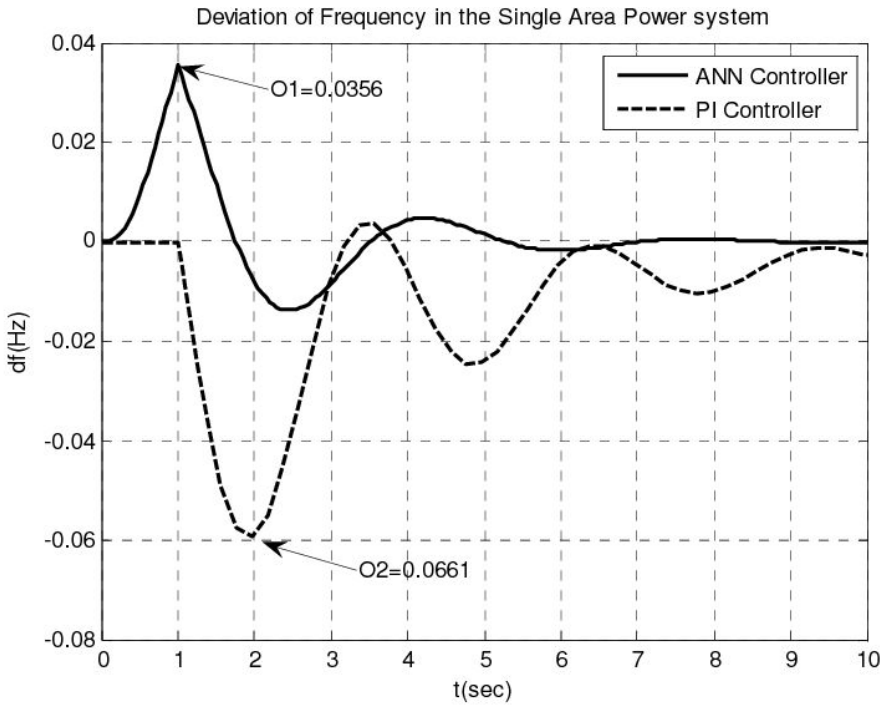
SIMULATION

- In this study, an application of ANN controller for load-frequency control in power systems is investigated.
- For the purpose, the interconnected power system having three areas including different type turb in units. In the system, first two area consist of steam turbines, which include reheater, and the last area consists of a hydro turbine.
- So, different properties and physical constraints of the areas mentioned above are considered in the simulation.
- The load-frequency control in the power system is simulated by using both ANN controller and conventional integral controller to compare the behaviours of the controllers.

CONCLUSION

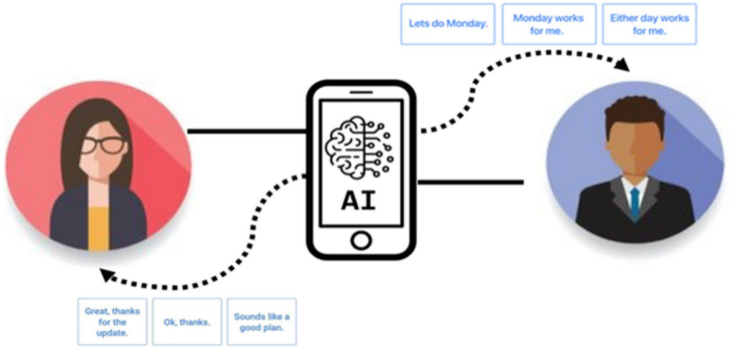
- The simulation results obtained show that the performance of ANN controller is better than conventional integral controller against to the load pertuxbation at any area in the considered power system.
- This study is an application of ANN to automatic generation control in the power system. In this work, transient behaviour of the frequency of each area and tie-line power deviations in the power system with three areas is considered under any load perturbation in any area.
- In practice, power systems generally have more than two areas and each area is different than others. Because of this, in the study, the power system with three areas that consist two thermal units and third area is considered as hydro unit.

GRAPH

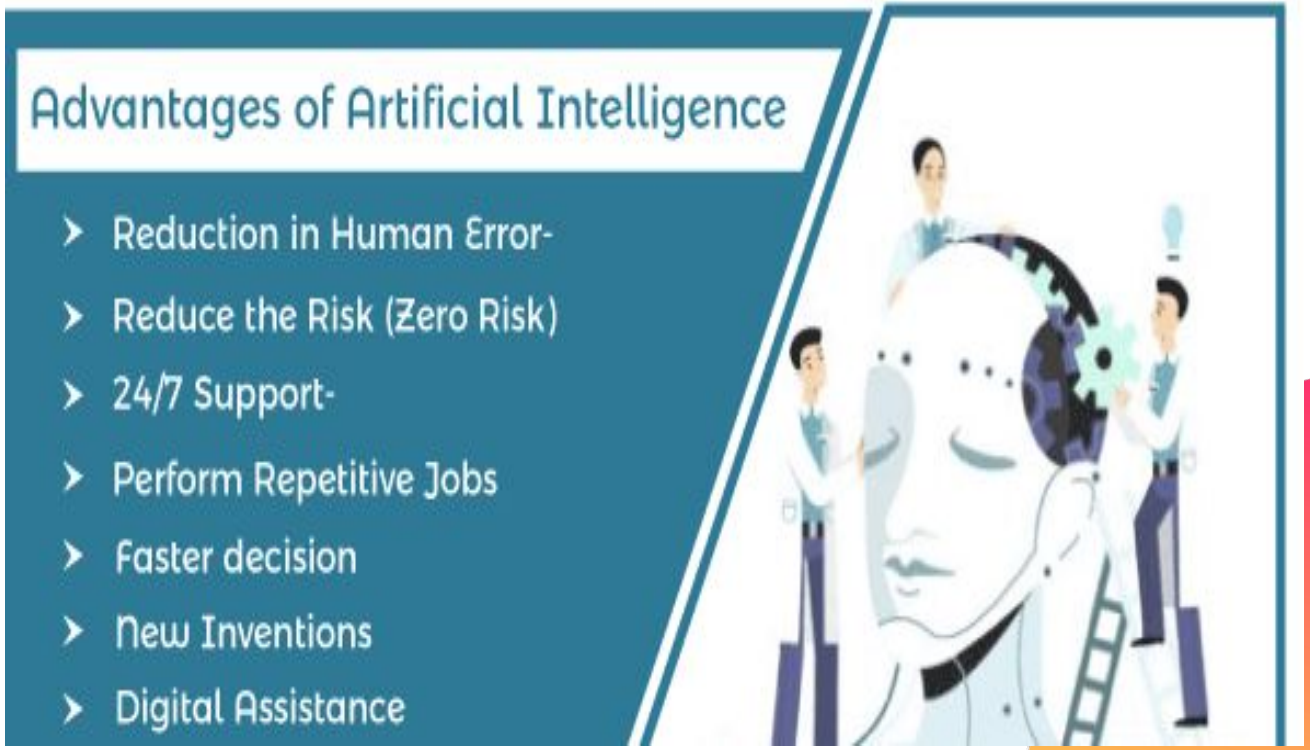

Deviation of Frequency in the Single Area Power system
ANN Controller
PI Controller
O1=0.0356
O2=0.0661
df(Hz)
t(sec)
0.04
0.02
0
-0.02
-0.04
-0.06
-0.08
0
1
2
3
4
5
6
7
8
9
10

ARTIFICIAL INTELLIGENCE IN COMMUNICATION

- Artificial intelligence is not ready to communicate with us at the same level yet. Nor is it prepared to replace translators and interpreters.
- It's hard to predict if it ever will be. However, AI can assist us with natural language processing (NLP) systems



ADVANTAGES OF AI



DISADVANTAGES OF AI

Disadvantages of Artificial Intelligence

- High production cost
- Risk of Unemployment
- Increasing human's laziness
- Emotionless
- Lack of creativity

Alternating Current

thank
For Your Purchase !
you!