The importance of Intelligent Control Systems

Kavitha

University of Mysore Karnataka, India

---***---

Abstract - *Intelligent control system combines the mathematical theory of control and artificial intelligence that is AI technology. In this paper we will discuss in detail how intelligent control system works and why it is use for. Also we will cover its crucial importance in the field of technology along with its pros and cons. As Artificial Intelligence is the need of the digital world to ease out work and copy the human brain. Intelligent control system take support of artificial intelligent to work for and why it is so important in the technological world. Its together with artificial intelligence called schemer which is to support such a paradigm. Schemer is worked to solve the difficult problem and work like a problem solving agent which react, interact and dynamically change the condition of difficult task situation to carry out problem solving activities.*

*Key Words***:** Intelligent control system, Artificial intelligence, schemer, problem solving.

1.INTRODUCTION

Artificial intelligence is now becoming very important for field of computer science and research. It has high demand in the market with major applications in the field of computing and information science. Artificial Intelligence have reached its hike in the few years and is making stability in the field of computer science. As the market is getting dependent on computer Artificial intelligence has made its space very well and its practicing is also going on to run the market as it is very efficient in processing and data security. It has high implementation on logic gates and other technology which ar4e totally dependent on computer systems. Intellectual control system is a combination of hardware and software combined by general information process or machine learning mode. In recent time human machine interaction is known to control "intelligent control system ". Today, we all are practicing the Artificial intelligence and its methods to control the complex task and machine. To make the complex thing easy AI is used in for complex task which can't be solved manually. Artificial intelligence is the second part of advanced of AI. It involves perception, vision, and geographical processing. It imitates the mind of a human being's mind and analyses the unstructured form of data. Manuscript, pictures, auditory data comes in the category of unstructured data. The immediate application domains of advance Artificial intelligence are speech recognition, medical diagnosis, transportation, urban planning, logistics,

security, and safety. When you check as an Outsider of China means in other counties. No one use more than compare to the Chinese population. In China, Yitu technology is the best example of AI. The price of this method is for one dollar billion only. Face recognition is the primary usage of AI for everybody. It was found in year 2012 that. Some additional submissions of advanced artificial intelligence are Gather vision and NIO. Deduce vision uses for providing major medical diagnosis solutions in over 280 hospitals. NIO develops an autonomous vehicle solution in the transportation and automotive industry.

Independent Artificial Intelligence is the 3rdpart of Artificial Intelligence. It refers to an ability to become self-aware during the interaction with human beings. Most of us learn its own feature raise by a human being when staying at home. It comprises many other places like outside the home and in a professional environment [1-7].

Intelligent control system basically uses artificial intelligence technique and its different approaches to solve the problem which includes fuzzy system, neutral network and others.

Intelligent Control Techniques
Here we going to discuss all type of intelligent control technique which are used to solve the problem related to research and computer science

FUZZY CONTROL
fuzzy control is a human thing which have human knowledge to control the system. This system is basically divided in four parts for solving a problem. Those parts are as follows
- Rule base- it set the rule for the system regarding the control of the system.
- Fuzzification – this is a process in which the numeric inputs changed into the form which is suitable for inference mechanism.
- Inference mechanism- it plans that how the system will use the input given by fuzzification for further process to get the desired result.
- Defuzzification- it is process where the results formed by inference mechanism is transformed to numeric input.

NEURAL NETWORKS ARTIFICIAL

It is a circuit or computer algorithm or mathematical representation that are joined by number of neurons which get a biological neural network structure. This technology is known for pattern recognition, signal processing, estimation, and control problems.so for all these types of works intelligent control system uses neural network

GENETIC ALGORITHMS

It is a computer program that pretends the characteristics of evolution, natural selection and genetics. It is a technique that optimize parallel to performs and stochastic that directed to search the evolve of most fit population. Many time it is used as the multiple candidate when it gets stuck at local optimum and try to concurrently finds the other parts of the search space will allow to jump out of the local optimum and find one global or local one to resolve the problem. Genetic Algorithms does not use analytical gradient information but it can modify if information is available [8,9].

INTELLIGENT AND AUTONOMOUS CONTROL

This system is capable to perform the complex task alone without the help of other system. this system is high in demand by the government as well as by the individuals which are tending the engineers to make function that can be performed by the machine that was previously done by humans [10].

Application of Intelligent Control System

The application of intelligent system is used more in industrial application and have the main characteristics as follows-

- **Heuristic Construction of Nonlinear Controllers-** It is the first area in which intelligent control system are uses and have impact in industry in this construction of nonlinear controllers. Two areas in intelligent control system are in the area of fuzzy control and expert systems of control system and the reason this is uses that they normally not depend on the development and use of mathematical model of the process which need to be controlled.
- **Data based nonlinear estimation-** The most important area where intelligent control system is used to use as of neural networks to construct mappings from the data and it is found that neural network methods are found useful for pattern recognition and estimation [11].

Intelligent control system must ensure methods and technologies to evaluate system for optimal, functional, and operation reliability are necessary for following conditions:

- There must be sufficient prior information available to control object and external environment for functional and also include opposition conditions.
- Huge number of unstationarity issues which are difficult to take into account and their subjective character.
- Mortification and necessity of targeted reconfiguration which are revitalizing to control the development.

Control system becomes complicated with the expansion of functional loading and the system which appears as advanced control and complexity factors of modern as follows-

- It can control on multilevel with heterogeneity of subsystem by the use of quantitative and qualitative models and are different from processes of scale in time and space which have multimodality and multilink, and nature ramified and structural complexity of model control system and the object to be controlled.
- Existence of uninhibited coordinate parametrical structural and regular singularimpacts which include active counteraction in a conflict environment.
- It uses the descriptive methods for uncertainties of information by the use of deterministic and probabilistic model for the vector and parameters of the system and to get properties of errors to measure and for the environment.
- There are factors like non linearity and distributes parameters are there to delay control and object dynamics for impulsive impacts for high dimension of models and many other.

ADVANTAGES OF INTELLIGENT CONTROL SYSTEMS

- Many performance results from the benchmarking showed that intelligent control system has better performance overall compared to the classical control methods.
- The intelligent control system with neural network and fuzzy controller had high accuracy and better temperature modification.
- It has a mean indoor temperature which is closer to optimal temperature thus make small standard deviation which point for lower temperature fluctuation and maximum and minimum temperature are closer to optimal one to utilize the total energy usage for the classical methods.
- One of the benefit through use of neural network that has ability to solve the real life problems by learning non-linear model and complex relationships to identify the gaps. It also predicts data of any unseen information by concluding variable available to them and make the generalize data by the inputs it received to give desired outputs. ANN does not execute on constraint on any input variable. It has ability to learn hidden data of both high volatility and non-constant change. It is important for forecasting in financial time series like stock prices. It can store information of the entire network such as traditional programming not on a database. ANN has ability to work

with incomplete information to provide the data and the performance is depending on the missing information. ANN is train in such a way to provide best data. It can provide data on incomplete information too.

DISADVANTAGES OF INTELLIGENT CONTROL SYSTEMS

• It is not easier than classical methods for implementation as it has to depend on models. Intelligent control methods have much work for implementation and training but it can have applied for many kind of problems.

• For intelligent control systems neural network required training before to recall the phase in order to satisfactory production of results. It require prior training for that it required sufficient amount of training data which need to be available on training process. When there is no training available neural network will not work. Intelligent system requires neural network to be trained and neural networks is much depended on hardware as it requires parallel processor to process the problem through neural network. The understanding of the equipment is thus required.

• For field knowledge and to develop fuzzy logic controller which work as high accuracy with small temperature variance, it required proper knowledge and more about to control the variable and system required to decide necessary inputs and outputs. This required intensive knowledge and study of data with accurate calculation based on physical relations of inputs for attain fuzzy rules that work towards right control decision.

Intelligent control is originated from artificial intelligence and computer controlled system; both were the main components of this field. As it uses all system of artificial intelligence it was easily able to solve the complex task within few seconds of the entering the input values. It is very useful for computing and performing task that are extensively complex. It is totally dependent on the artificial intelligence to solve all the problem. It is based one neural network who has given insights to solutions of many problems and helps to work like the human brain and process the environment simulation in same way. As human brain learn same way artificial neural networks learn from many examples sets on the different networks to give the solution of almost every problem. It has given new insights to technological world which can be used by almost every sector for instance solution and giving information on time. Its uses authenticated and given many instant solutions which obviously ease the work for the people rather than traditional approach of working in earlier days. There is further more technology like fuzzy system on which it is based for solving the complex problem by their method of solving issues which take same time but different way to solve the problem some take numerical input turning directly into the result and some take few interface process for solving same problem [9-11]

CONCLUSIONS

Intelligent control is developing in the market and creating a good space in the market. It has huge demand in the market by the individual and government as it has great practical importance. There are very few research paper on intelligent control system but this paper consists all the information regarding intelligent control which are useful for the future development.

REFERENCES

1. Mcfarlane, D., Sarma, S.E., Chirn, J.L., Wong, C.Y., & Ashton, K.J. (2003). Auto ID systems and intelligent manufacturing control. Engineering Applications of Artificial Intelligence, 16, 365-376.
2. Padgham, L., & Winikoff, M. (2004). Developing intelligent agent systems - a practical guide. Wiley series in agent technology.
3. Zilberstein, S. (1996). Using Anytime Algorithms in Intelligent Systems. AI Magazine, 17, 73-83.
4. Valera, M.T., & Velastin, S.A. (2005). Intelligent distributed surveillance systems: a review.
5. Zhang, J., Wang, F., Wang, K., Lin, W., Xu, X., & Chen, C. (2011). Data-Driven Intelligent Transportation Systems: A Survey. IEEE Transactions on Intelligent Transportation Systems, 12, 1624-1639.
6. Wang, F. (2010). Parallel Control and Management for Intelligent Transportation Systems: Concepts, Architectures, and Applications. IEEE Transactions on Intelligent Transportation Systems, 11, 630-638.
7. Negnevitsky, M. (2001). Artificial Intelligence: A Guide to Intelligent Systems.
8. Pearl, J. (1988). Probabilistic reasoning in intelligent systems.
9. SM.Mohammed. 2017.DevOps Automation and Agile Methodology. International Journal of Creative Research Thoughts (IJCRT), ISSN:2320-2882, Volume.5, Issue 3, pp.946-949,