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Industrial processing water for an increased output using control intelligent Agent

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Abstract

Water treatment is crucial for agricultural production in order to maximize its value. It is suitable for use in agriculture, construction, and advanced technologies, and new technologies, especially in the field of IT. This paper presents an intelligent rule system based on a multi-agent architecture using fuzzy logic. This paper really solves the problem of regulating the supply of cold and hot water in industry. The problem of the lack of a clear mechanism for regulating water for use in the industrial process has led to unsatisfactory results in the production capacity of the financial sector. This can be solved through the development of the accessory function, which is an analysis of the causes of problems in the management of cold and hot water used in the manufacturing industry. The design of the accessory function, which consists of detecting deviations in the amount of liquid that had to pass through the hot and cold water tanks for industrial applications and necessity. Development of a smart rule that will control the amount of liquid in hot and cold water tanks, in trains, these are rules that must strictly follow the control format and consists in creating and developing a model of the water management process to increase production using an intelligent agent. The result is an increased level of performance where the intelligent agent that was used is concerned.

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1. Introduction:

Multi-variable process control, for industrial applications to control the level and temperature of the liquid in tanks, as well as the flow between tanks, is a major challenge in the recycling industry. For an electric water heater, a gas water heater is a system, but it is invalid as a result of a number of technical problems (Aneke and Ngang, 2021) to achieve this level of fluid control inside an industrial installation, it is necessary to enable an intelligent agent. Control for manufacturing industries requires liquids to be both stored in tanks and then in another container. (Bakare, and Ngang, 2021), in their study of the adoption of artificial intelligence (AI) technology is growing because of its potential to be predictive and sourcing(Banerjee, 2015). Growth and at the same time automation of operations; development of targeted marketing and pricing, as well as enriching the user experience. The reluctance to accept the use of artificial intelligence technologies is a serious problem for the market in the current case (Kaplan and Haenlein, 2019). Most of the time, liquids will be used in reservoirs, but always at the level, and the temperature of the liquid in the reservoirs must be checked, as well as the flow between the reservoirs must be organized. If the tanks are connected to each other, and that the levels in the tanks are with you, and this also needs to be monitored. Systems that have more than one input and/or more than one output will be referred to as a multi-input, multi-output (MIMO) system. Management, regulation and maintenance, services, and water resources are not given due attention by the Government. Therefore, it is important to take into account this factor, which hinders the realization of the right to water and provides a solution to this problem at the level of water resources management systems that are used in various processes. All processes of the human body, as well as fluid handling systems, depending on the tank level and control systems (Kumar, N., Kharkwal, 2016). The design of the control system is to understand how the tank, control systems, and the problem of power management. However, the interaction between loops complicates the design of PI and PID controllers.AI is still an extremely fuzzy concept, and many questions still remain open(Lasi and Fettke, 2014). The built-in system can be made easier to use. Increased food production, improved pasture management, agroforestry, integrated water resources management, reduction of post-harvest losses, and sustainable supply, source diversification, and disaster risk management (Liemberger, and Wyatt,2019).

Management systems use a variety of ways to perform any activity in the manufacturing sector. The development and changes that have taken place in the industry recently have entered a new phase in parallel with the development of computer technology, fuzzy logic, and, ultimately, a completely new field of artificial intelligence. Compared to Boolean logic, in which the value of a variable is 0 or 1, fuzzy logic is a fuzzy logic system, in which the value of a variable is between 0 and 1.A big challenge in power systems is to maintain a stable and acceptable system parameters such as voltage, power, reactive power, and active power under normal and abnormal conditions (Ngang, and Aneke,2021). The controller is designed using fuzzy logic to display a person's thinking process, which is programmed using fuzzy logic and language. The fuzzy logic process consists of the following steps • * Input/output of the membership function; • Resolution; • Decision-making, interpretation of norms) • * Defuzzification

1.2 Aim of the Study

In this study, the goal is to implement the process of water resources management to increase production using an intelligent agent.

1.3 Research objectives

The issue of water quality and its increase during winter and summer. Therefore, the goals of this study are listed in order from one step to the last step, the goals were stated as follows:
The design of the accessory function is developed, which is an analysis of the main causes of problems in the management of hot and cold water used in the manufacturing industry. The design of the accessory function is developed, which consists in detecting violations in the area of liquid passing through hot and cold water tanks in industrial buildings. Develop a smart rule that will control the amount of liquid in both hot and cold water tanks. To implement these rules, you should strictly follow them to control the format. Development of a model of the water resources management process to increase production using an intelligent agent.

2. Reviews:

2.1 Scope of previous suitable work:

Management, adjustment and maintenance, services and water resources are not given due attention by the Government. Therefore, it is important to consider this factor, which makes it difficult to implement the right to it, and offers a solution to this problem (Singh, 2013), as the water level monitoring system is used in various processes. The entire process of the human body, as well as fluid handling systems, depends on the fuel level management system. Building a control system is to understand how to tank, control systems and the problem of force management. However, the interaction between loops makes it more difficult to design PI and PID controllers. AI is still a very vague concept, and many questions remain open. The embedded system is much easier to apply (Shome and Ashock, 2012).

Increased food production, improved pasture management, agroforestry, integrated water resources management, reduction of post-harvest losses, as well as renewable energy, diversification of maintenance sources and disaster risk management, habitat and Thakur2015). Management systems use a variety of ways to perform any activity in the manufacturing sector, the development and changes that have occurred in the industry have recently entered a new phase in parallel with the development of computer technology (Wu, Karray, 2005). Fuzzy logic and, ultimately, into a completely new field of artificial intelligence [8]. Compared to Boolean logic, in which the value of a variable is 0 or 1, fuzzy logic is a fuzzy logic system, in which the value of a variable is between 0 and 1. The controller is designed using fuzzy logic to display the human thinking process, which is programmed using fuzzy logic and language. The fuzzy logic process consists of the following steps • * Input / output of the membership function; • Resolution; • Making decisions.

3. Methodology

The methodology requires in this work starts with the design of a membership function that will analyze the causes of irregularities in the control of cold and hot water used in the manufacturing industry; it requires to characterize the cooling and hot water system used the industry and follow the steps outlined in the objectives above. Figure 1 below is the first step in realizing our initial objective.

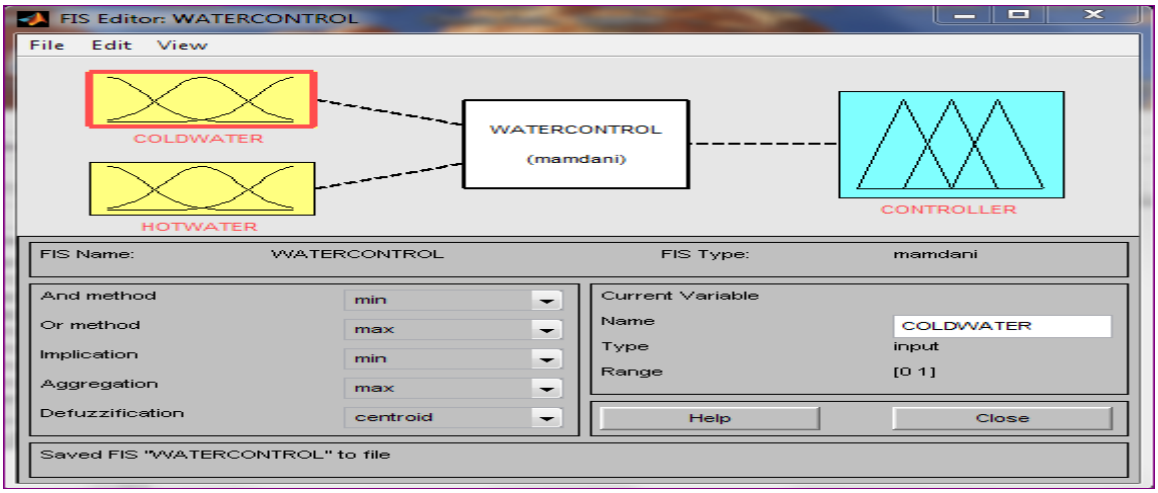

Figure: 1 Fuzzy inference editor for Industrial processing water control for increased output using intelligent agent

3.1 Designing of membership function that will analyze the causes of irregularities in the water system:

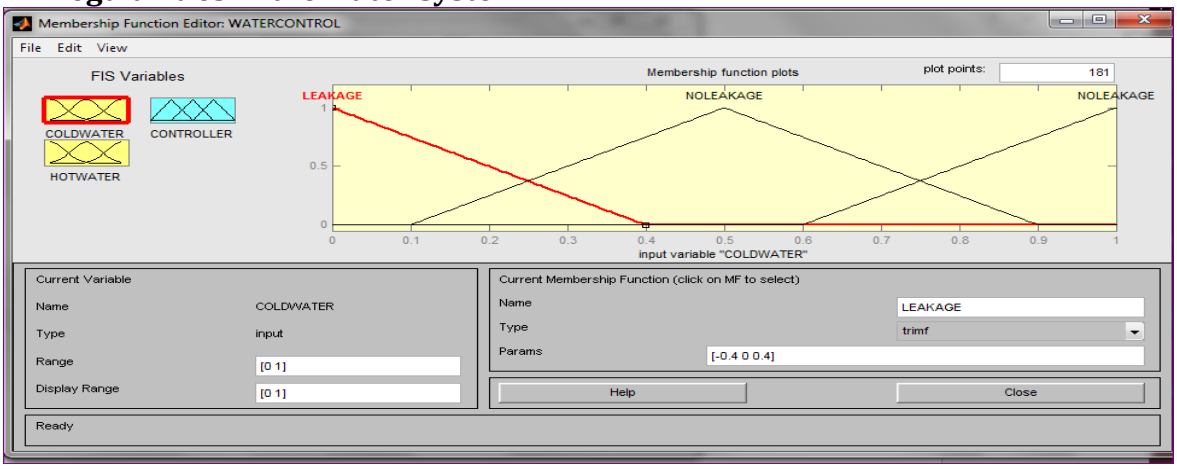

Figure: 2 Designed membership function that will analyze the causes of irregularities in the control system.

3.2 Designing of a membership function that will detect irregularities in the water system:

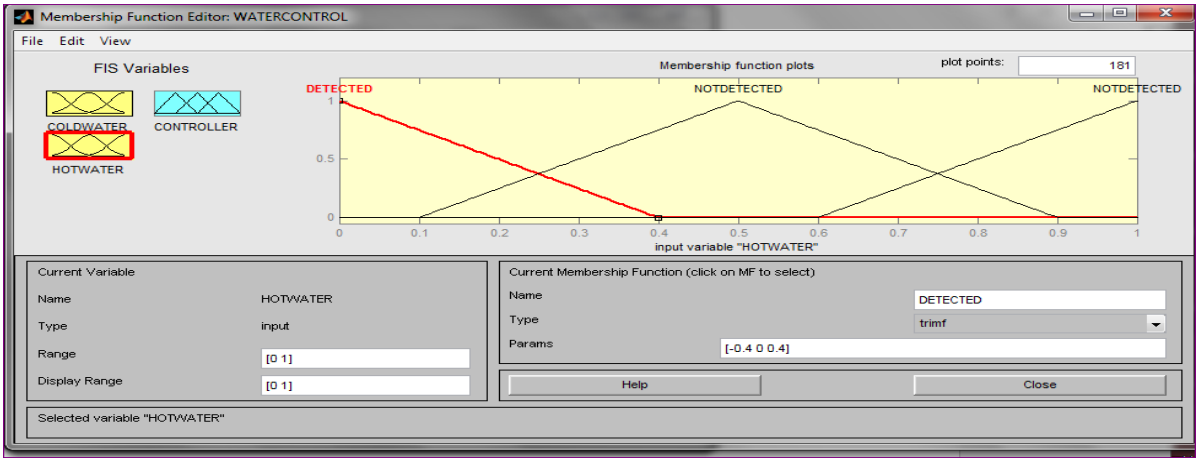

Figure: 3 Design of a membership function that will detect irregularities.

3.3 Training the rules to stick strictly to the control format:

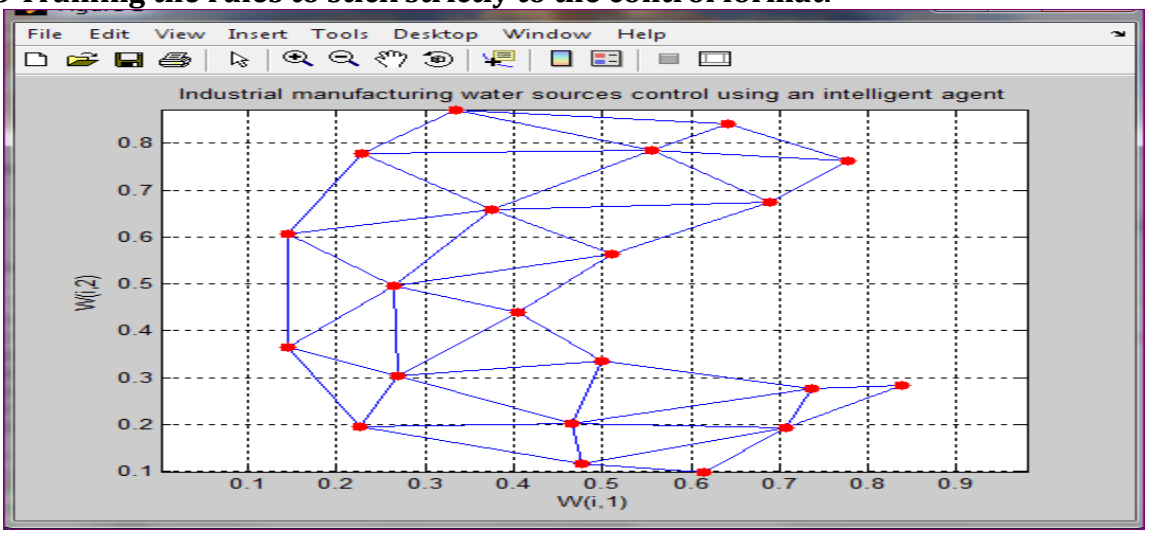

Figure: 4 trained rules to stick strictly to the control format

3.4 Designing of a model without intelligent agent for an industrial manufacturing water system:

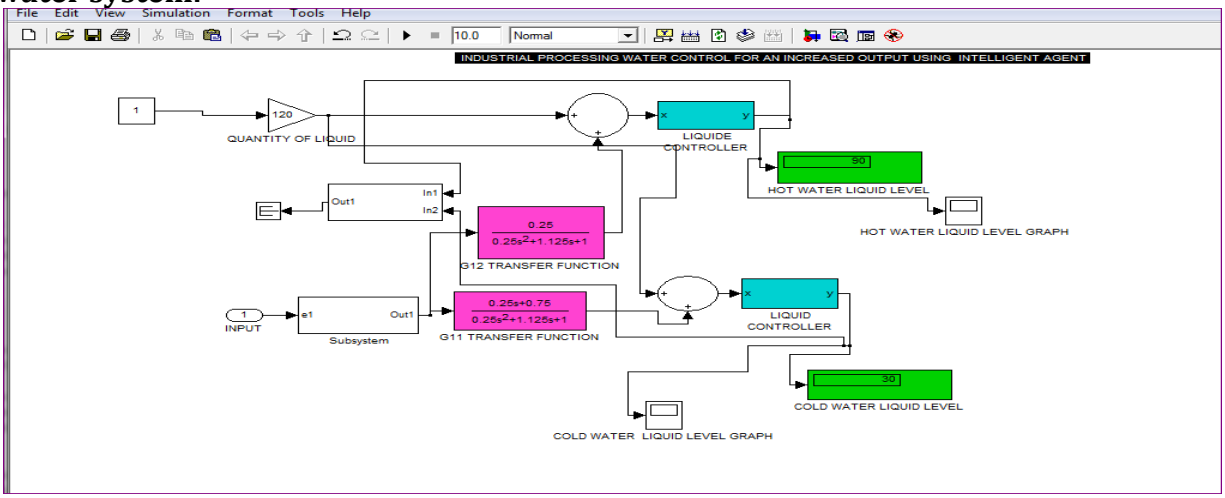

Figure: 5 System without Intelligent agent for increased output

3.5 Designed a model with intelligent agent for increased output:

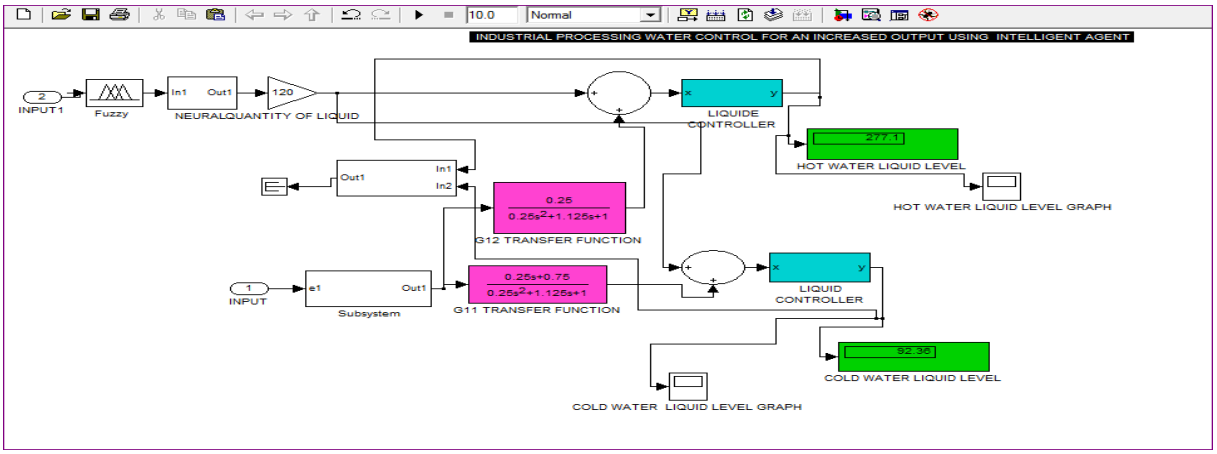

Figure: 6 Designed model for Industrial processing water control for an increased output using intelligent agent

4 Results and Discussion:

The following are the results obtained using the intelligent agent technology in the course of the study. Fig 1 shows FIS for industrial processing water control for an increased output using intelligent agent. There are two inputs of cold and hot water and also has an output of control. Figure 2 is the Designed membership function that will analyze the causes of irregularities in the control of cold and hot water used in the manufacturing industry. It identifies if there is leakage in the pipeline that is meant for cold and hot water in an industrial process. Figure 3 detects if there is irregularities in the quantity of liquid that passes through cold and hot water tanks for industrial processing; Fig 4 shows trained rules that stick strictly to control and increase the output of industrial processing water control. Fig 5 shows designed model for an industrial manufacturing water control for an increased output without using intelligent agent. The model is designed in a manner that the proportion of hot water to cold water for an industrial use should be 3:1; since industries use more of hot water than cold water for manufacturing process. In fig 5 when 120liters of water is used for industrial process 90 liters will be hot water while 30 liters will be for cold water. Fig 6 shows designed model for Industrial processing water control for an increased output using intelligent agent. Fig 6 shows that there is an increase output of hot water (277.1 liters) and cold water (91.36 liters) when 120 liters of water are used for the process. Table 1.shows the Volumes of hot water without and with intelligent agent, Fig 7 shows the comparison between volumes of hot water without and with intelligent agent; it also show that there is an increase output of 277.1 liters when an intelligent agent is incorporated in the system than when it is not used. Fig 8 shows that volume of cold water for an industrial process without an intelligent agent is 30 liters while its volume when an intelligent agent is incorporated is 91.36 liters which shows that there is an output increase when an intelligent agent is incorporated.

Table 1: Volumes of hot water without and with intelligent agent

volume of hot water without intelligent agent	volume of hot water with intelligent agent	Time
90	277.1	0
90	277.1	1
90	277.1	2
90	277.1	3
90	277.1	4
90	277.1	5
90	277.1	6
90	277.1	7
90	277.1	8
90	277.1	9
90	277.1	10

Table: 2 Comparison of the volumes of cold water without and with intelligent agent

Volume of cold water without intelligent agent	Volume of cold water with intelligent agent	Time
30	91.36	0
30	91.36	1
30	91.36	2
30	91.36	3
30	91.36	4
30	91.36	5
30	91.36	6
30	91.36	7
30	91.36	8
30	91.36	9
30	91.36	10

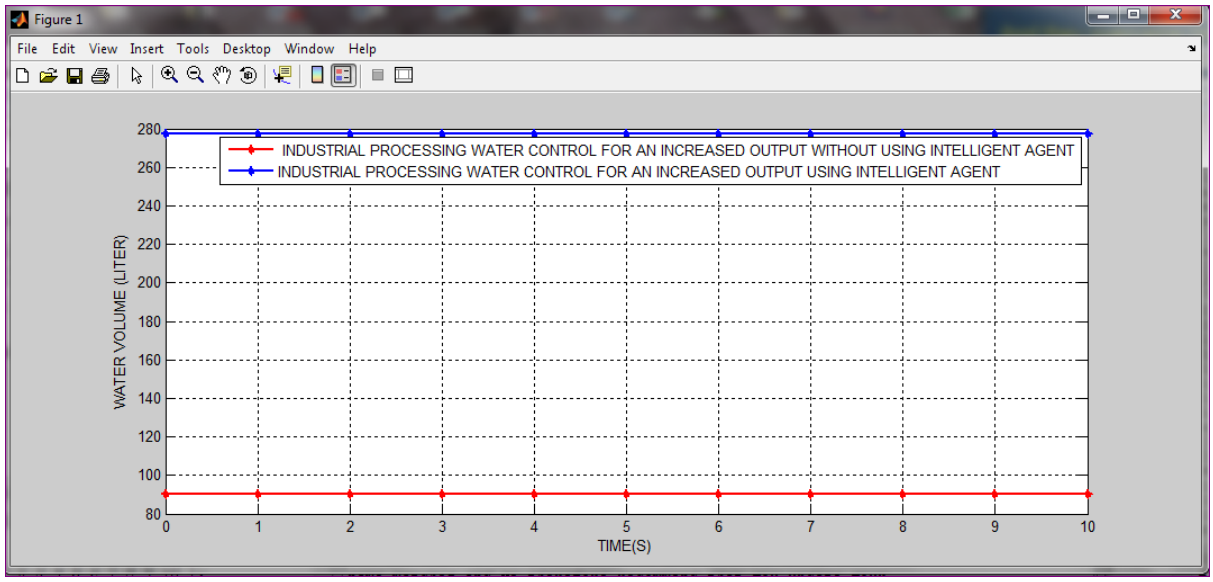

Figure: 7 Comparison between volumes of hot water without and with intelligent agent.

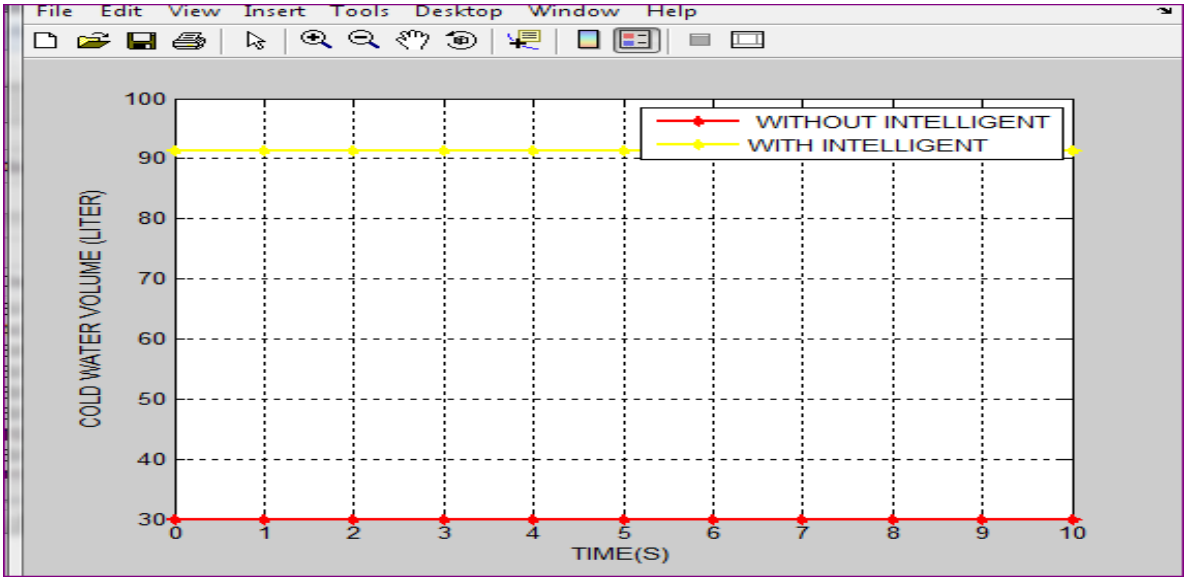

Figure: 8 Comparison between the volumes of cold water without and with intelligent agent

5. Conclusion

Intelligent agents and computer soft products with good knowledge workers have great potential in the future, as one of the best and most effective ways to improve the efficiency of the machine. This work was presented in the process of producing water to increase power, using a smart agent. Some of the advantages of the proposed system are low price, reliability and higher energy efficiency. The comparative analysis was also carried out earlier, both with and without an intelligent agent. The simulation results indicate potential results in favor of embedded systems using intelligent agents. The uncontrolled amount of hot water that is used in the production process, and this has led to a drop in production in these industries. This can be overcome by creating an accessory function, which is to analyze the causes of problems in the management of cold and hot water used in the manufacturing industry, designing an accessory function, which is to detect violations in the area of liquid passing through hot and cold water tanks for industrial applications, designing a smart policy that

will control the amount of liquid in the warm tank, as in cold water tanks, in the train, these rules must strictly comply with the control scheme, and developing a model of the water production process to increase capacity, using a smart agent.

Reference

Aneke,N.E.,Ngang,N.B. (2021). Improving the Efficacy of the Nigerian Electric Power Transmission Network Using Static Synchronous Compensator(STACOM).*Journal of Information Engineering and Applications*,(JIEA),11(2),7-17.

Bakare, K., Ngang, N.B. (2021). Improving Voltage Stability in Nigerian 330kV Transmission Network Using Intelligent Solid State Var Compensator (SSVC). *Journal of Electrical and Electronic Engineering (JEEE),*9(3), 60-68.

Banerjee, R. (2015). Water Level Controller by Fuzzy Logic. *International Journal of Innovative Research in Advanced Engineering (IJIRAE)*,2(2),250-261

Kaplan, A., & Haenlein, M. (2019). Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence. *Business Horizons,* 62(1), 15–25.

Killough, B. (2019). The Impact of Analysis Ready Data in the Africa Regional Data Cube. In IGARSSIEEE Symposium (pp. 5646–55655). https://doi.org/10.1109/IGARSS.2019.8898321

Kumar, N., Kharkwal, N.(2016). Ethical aspects and future of artificial intelligence. *International Conference on Innovation and Challenges in Cyber Security (ICICCS-INBUSH)* (pp. 111–114). IEEE. https://doi.org/10.1109/ ICICCS.2016.7542339

Lasi, H., Fettke, P., Kemper, H.-G., Feld, T., & Hoffmann, M. (2014). Industry 4.0. Business & *Information Systems Engineering,* 6(4), 239–242. https://doi.org/10.1007/s12599-014-0334-4

Liemberger, R., & Wyatt, A. (2019). Quantifying the global non-revenue water problem. *Water Supply,* 19(3), 831–837. https://doi. org/10.2166/ws.2018.129

Ngang, N.B., Aneke,N.E. (2021). Reducing the effects of Power Harmonics on Distribution Transformers using Simplex Optimization Technique. *Journal of Engineering Research and Reports (JERR)*, 20(6), 1-8

Singh, H.D. (2013) Design of Water Level Controller Using Fuzzy Logic System. National Institute of Technology, Rourkela.

Shome, A. and Ashok, S.D. (2012). Fuzzy Logic Approach for Boiler Temperature & Water Level Control. *International Journal of Scientific & Engineering Research,* 3(6),1-6.

Singh, A., Thakur, S. H. and Wadhwani, S. (2015). Designing of Fuzzy Logic Controller for Liquid Level Control. Madhav Institute of Technology & Science. *International Journal of U- and e-service,science and Technology,*8(9),267-276.

Wu, D., Karray, F. and Song, I. (2005). Water Level Control by Fuzzy Logic and Neural Networks. IEEE Conference on Control Applications, 3134-3139.

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