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Artificial intelligence enterprise human resource management system based on FPGA high performance computer hardware

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ABSTRACT

A significant role in Artificial Intelligence (AI) and Machine Learning (ML) tools in the recent development of intelligent systems. AI solutions to the many other areas, such as a different field of health care, the regional aircraft and vehicles, security, marketing, customer analysis and other significant changes. One of the major challenges hindering the potential of AI is high-performance computing resources on demand. Recently, the hardware accelerator to provide the required computing power of AI and ML tool development. In the literature, a hardware accelerator to accelerate the computationally intensive tasks built using FPGA. The accelerator provides high-performance hardware, while maintaining the required accuracy. In this work, proposed that the focus of AI and ML exploration tools available hardware accelerator, a systematic review of the literature. The results showed that, compared to the proof hardware implementation based on software implemented significant performance improvements due to the parallel operation similar precision, and using an optimization technique designed to exploit the target system device mapping. In addition, to achieve our FPGA-based neural network system to support its future use for other applications.

1. Introduction

Deep learning algorithms, artificial intelligence main components, which have attracted more and more Attention from the industry and academic institutions. There is an important use of learning predictive, future-oriented smart home environment, deepening FPGA configuration to user actions. Recent studies have discussed the use of different data sets based on the depth of learning, to assist in the interests of their results. However, ensuring optimal performance to meet the real-time applications, so use real-world data sets, the software is designed to ensure real-time use conditions.

Check boxes are scattered from sensors with climate activators in the real world. The author predicts the potential of hierarchical neural networks in shaping potential human psychology research. In deep learning mode, the hardware editor tools are FPGA. The smart home network connection ironmen was configured to comply with recently implemented policies. Defined as smart homes "that is environmentally intelligent automation and control home-like environment."

This definition indicates that there is a complex design automation and intelligent operating system that can use things on behalf of its users. In addition to the ability to understand the world using machine-based processes, because of their composition, this system can say with any certainty the needs of the inhabitants, working hard on the most necessary merit-based automation system. Sequence of events produced during the prediction phase after an in-depth evaluation of the consumer environment interaction. Data gathered from external distributed sensors and propellants must be collected.

Fig. 1 Produced machine learning algorithms using vector machine learning support and in-depth prediction models, such as artificial intelligence (AI) technology or neural networks (legislator). It should be noted that this type of application, one which causes the smart home to anticipate the next behavioral intention, deals with real-time applications that for a certain period of time are altogether different from other implementations. The maximum delay can impact seriououou in some applications, even in milliseconds, In other words, Smart home system of the prediction system, interactive, robust, must be fast enough to predict the behavior of the next user in the dynamic and real-time domain. Therefore, not only, by using the simulation software to the laboratory of the pad, as well as our system is, even under the constraints of real-time response in the real world of the environment, to discuss actively Built-in the FPGA hardware implementation kit, which is designed to ensure, throughout the experiment, work.

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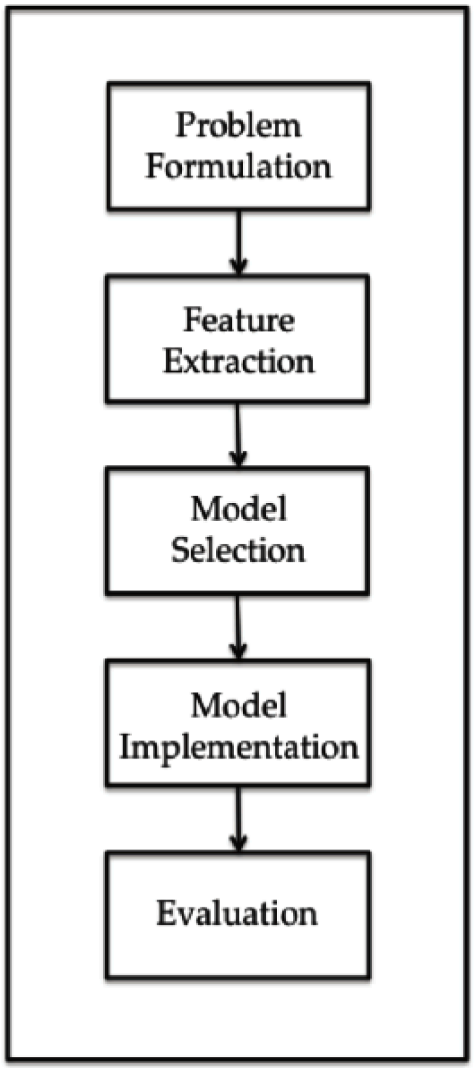

Fig. 1. Machine learning introduction diagram.

The next paragraph different has been represented by a number of researchers Other researchers, using the intelligent machines show, as was trying to improve the design of such a system, some of the recent studies, environment, witty, smart phones and remote control and monitoring system we describe the use of the number. Architectural design of the proposed list of smart home environment and use in our experiments using artificial neural network to explain the prediction process. Introduce the use Dataset our results. Discuss results and highlights the differences in the use of software and hardware implementation. Summarize our conclusions. Means that each sub-system by introducing new ways of intelligent agents, in order to improve the design of smart home field. Moreover, it is calculated using a fogging agent (storage agent), which is synchronized to a cloud computing environment. The idea behind this design is the personal assistant of a synergistic approach to be present in the home. In this design, want to focus on the presentation of which depends on the local computing Operation by the local IA prediction system. What is important here is that such systems, local monitoring also controls all the nodes in the home environment, without the need for external cloud-based systems, in order to predict the next move stakeholders It is to show that you do not have to manage. Cloud system proposed in recent studies, real-time applications its associated has been used in many of the concerns. Although want to show are arranged in a building in the middleware, and how to predict, as described in the next paragraph to be taken to overcome the problem of local places, it mentions. Predefined rules and variables present in the first stage in FIG automatic mode of operation, but also start the learning phase and operating phase. State learning phase began collecting nodes, aggregation and analysis of the environment and build an accurate assumption. Generation assumption is that the delivery of the final decision very necessary. The final decision to use technology and a strong focus on learning artificial neural network based on the formation of IA In the case of us. In the last stage, the action of the prediction must be made to the target actuator.

Table 1
Reproduction limits.

Limits	Values
Reproduction Tool	Embedded System
Package	Quality of Service
Transporting data	250
Files size	200 mb

The ability to make their case when because of human behavior in real life is inconsistent, should FPGA design had to accommodate the interests of a stakeholder stakeholders to change your mind (manual mode) sudden change. It made a deal with a lot of papers presented at the use of AI algorithms to predict a user action is very important. Prediction accuracy and time consuming process for selecting the best algorithm MLA art. Most research paper describing the results available to the system. However, these results were collected, and through the use of personal computers, servers, and even software environment supercomputers focus gather achieve.

2. Related work

Network configuration, such as the number and depth of the individual layers of neurons of the network, determines the calculation speed describe the network software [1]. Although the increase in NN depth increases the recognition rate consume More CPU and memory resources. In this task, network depth can use a neuron classification performance test to determine the number of resources for each layer, and the size of the train window by maximizing usage. First, we started implementing the hidden layer [2].

Then, in order to find the best performance, we increased the number of neurons in the layer hidden in the experiment. Then [3] add a second layer by increasing the depth of the network. By fixing the number of neurons in the first layer, we increased the number of neurons in the second layer, which is represented as the highest. Repeat this exercise to optimize the number of nodes, the third layer in our network.

The use of a dropout layer also reduces the impact of over fitting problems [4].Drop out between each layer of strands added layer completely it has been connected to the 0.5 times. Peeling some cells in preventing excessive network parameter update training process [5,6]. This technology can reduce the over-fitting drop-out effect. Our region, uses two types of experiment at the regional and global regions. To predict B5 actuator [7], as shown, a local area using the 7 input sensors. All use of the global zone, of these experiments are part-time. Use deep learning techniques implemented through multi-layered approach to promote the power of neural networks [8,9]. As shown in Table 1, only the processing accuracy of 95.85% 245 milliseconds with the desired layer prediction using a local sensor generated. The second support can significantly improve the accuracy of the performance range of 99.11% to real-time applications 387 milliseconds in an acceptable time of the first layer [10]. While adding a third layer design model, and did not improve accuracy. In addition, three prediction process response time is about double what have with two layers [11]. Using local sensors mentioned results show when you add a deep learning model to more layers, always it does not guarantee the best performance: therefore, when you add more layers to examine the need for the optimization process of the layers, the system architecture [12]. Second and add the

Fig. 2. Proposed diagram.

discussion of system performance prediction of the third layer. This experiment, because it uses a sensor layer 86, which is distributed throughout the environment, you can see that much higher than the response time using the first seven only experiments [13] of the sensor. It noted when the accuracy may be significantly enhanced A predicted time of 9.1 S add depth learning model of the second layer.

Add precision value for the third layer, similar results have been seen. In other words, support and performance model is not conducive to a better model of the third layer; therefore, I decided to consider the design of deep learning mode, only the first two, which has the highest average accuracy and minimum average prediction time [14]. Math neural network model is very simple. However, a large number of operations, requires a lot of computing resources. Therefore, fast and efficient realization of the benefits of the neural model to be achieved. FPGA-based system, the designers greatly digital design, test immediately, you can create change in the make-up, and to shorten development time. In addition, non-linear activation, for example, one of the challenges sigmoid function, hardware implementation, hardware resources due to the implementation of division of labor and time complexity and index-related [15]. Thus, the approximation method has been proposed based on the S-shaped To effectively achieve functionality and to maintain acceptable levels of accuracy, for example, with a lookup FPGA platform hardware-based neural network system smart home reconfigurable [16].

The proposed architecture is the number of hidden layers in the neural network and can be configured according to. To achieve high performance, each neuron has a processing unit so that they work in parallel [17]. The structure of hidden layer 3 is achieved by assigning it to each of the processing units of the intermediate layer neural network. In the case of a hidden layer configuration, all processing units are directly connected to the input buffer and output layer. Figure Reconfigurable switches are connected with the activation required for reconstruction purposes. What is the result of the FPGA to achieve the same accuracy neural networks propose is that achieve in mat lab, and accuracy is not compromised, using fixed-point arithmetic units due [18]. Use hardware platforms feature calculation being executed in parallel mathematical neural network. This feature is not available with the software-based, because the neural network to perform sequential code to achieve [19]. Illustrate the results of the prediction time of the sensor local and global region Different network structure. The result is a greatly simulation hardware implementation, as compared with the local and global areas, respectively, it showed increasing two, ten, three times the average prediction time factors. The average forecast of a significant improvement [20].

3. Materials and methods

In today's era of globalization and the global business market, companies It has been forced to fight with the considerable competition from all over the world to compete. The trend, recently, the company incorporated enterprise groups to enhance the competitiveness of China's place in the steel industry. Then, after the establishment of enterprise groups, a lot of problems. This includes how to manage geographically distributed enterprises, how to redesign business processes, optimize the allocation of global resources, how to handle the group and each subsidiary company is a joint-stock company, an independent financial statements, as well as how to solve the relationship between And each company in the group's business units. At the same time, from material requirements planning, manufacturing resource planning enterprise resource planning system to achieve enterprise information systems in growing demand, those who cannot meet the conglomerate's business management needs. Supply and product delivery, etc., because It is, in the separate financial statements, is a public Corporation. However, the company is sold, did not have the right to purchase. Business processes, will be introduced to the re-grouping of advanced enterprise management model for the group. For example, customer orders.

Fig. 2 shows normally, if a customer would like to order steel, orders must be sent to the Ministry of the collective contract, then the ability to produce the balance of all potential equipment contract by the Ministry of scheduling control room, after that, the contract schedule, and sends the contract to the corresponding Limited. After the task is completed, the logistics company of the product will start the production. Similarly, the purchasing department of the group to buy, in order to store them, you will receive the material requirements from companies. This is, in order to suppress the purchase price of the material, it is possible to

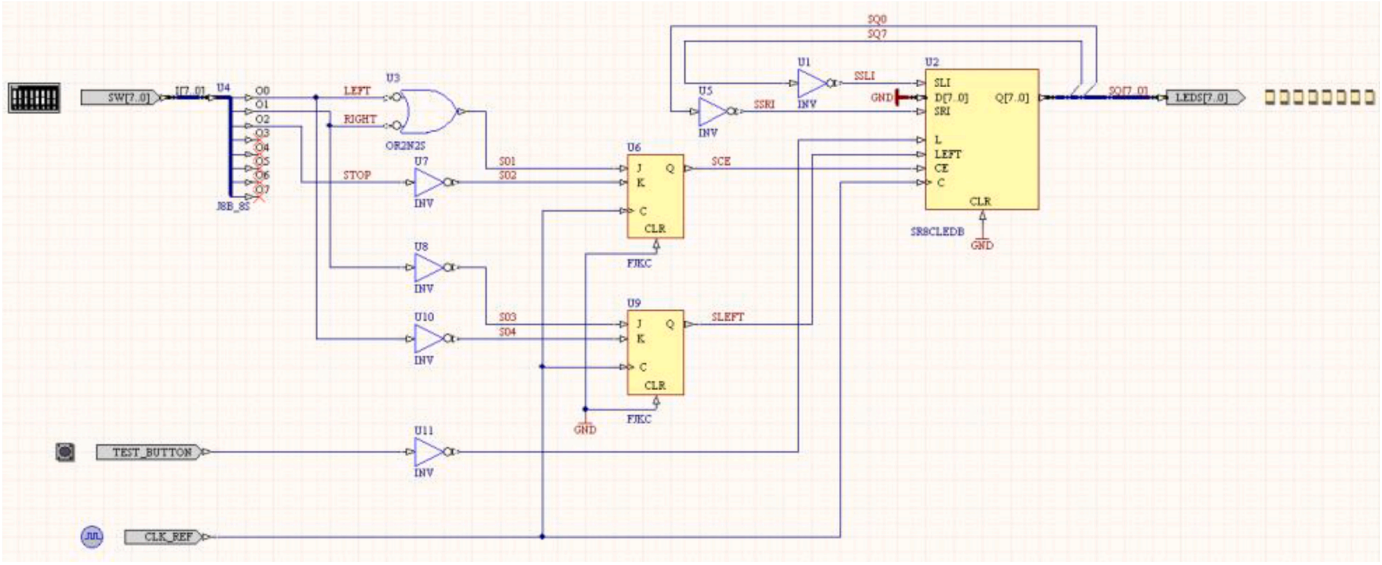

Fig. 3. ERP management circuit diagram.

reduce the procurement costs to the requirements of the bulk purchase. By recycling the whole group domain business processes, not only to avoid competition between enterprises, enhance the influence and improve the quality of materials procurement, reduce procurement costs, but also can be used in its own production of each company's strengths, Equipment and products. All in all, the target group management model, in order to pursue the best interests of the entire group, is to optimize the business processes.

3.1. Enterprise resource management

According to management, and steel conglomerate course of business, corporate hierarchy frame structure is designed as a MES (Manufacturing Execution System). Level of the corresponding extended functional group administered enterprises, which allow distributed throughout the group to share data and company business processes and groups such collaboration. Level aimed at achieving the group control and decision-making functions. Its overall resource scheduling and business groups, and help managers make important decisions.

Fig. 3 Enterprises can optimize business processes and the ability to balance each company, in order to avoid competition between marketing and sales company, material procurement, and improve the Group's total revenue. In the function, Enterprise G- including sales management, purchase management and resource management. Companies can make a single company, In order to achieve the self-management and operations, in order to accept the orders and plans of the business of the group, marketing management, supply chain management, inventory management, in charge of logistics management, cost management, and other companies, generating statistical data It is carried out on the basis of decisive reliable administration in order to. Enterprise help, in order to meet the customer's order from the ERP, to determine the actual need generate demand and sent to the floor plan to send two scheduling what is the purpose of processing Production management, production operations to provide significant functional advantages. It Production, in order to provide achievable realistic production planning, is the business planning and site management systems. We need information more specific operational planning and data quality assurance processes and standards. Device status, so as to pave the way for the manufacture of the way.

4. Result and discussion

However, the implementation of enterprise systems, it may become time-consuming process of cost push. This is, it is necessary to functional business processes and organizations have a deep understanding. To form a single integrated solution, so as to abandon the system used in various fields and existing software, human resources - Hard Further, the entire enterprise - not only IT and network resources, the software there is a need to change. This is just not acceptable in the global business market of today, time and money is the main driving force. On the other hand, enterprise application integration (EAI) is defined as the application "of various software models to the existing set of enterprise computer applications Integration.

Table 1 these applications, supply chain management, can customer relationship management, or business intelligence applications. Together to streamline and automate business processes to such an application within an organization connected to the maximum extent possible, while avoiding the need for a comprehensive adjustment of existing applications or data. However the process, reportedly failed mainly because of the need to manage Dynamic aspects of the system, it also requires a lot of technical knowledge. However, focusing on the point in the integration of the point of a number of enterprise applications, technology is still in development. Therefore, I no matter, it is necessary to the system integration, unified use existing software by different departments of the software and hardware platform, proposes the key attributes of the enterprise system. This model, enterprise systems, multiple databases of different departments will be able to realize the support service-oriented architecture.

4.1. Enterprise resource management accuracy

The rapid development and wide application of the EPS provides information systems (IS) the opportunity to study the effects of both the theory and practice to develop. Our concern is the use of the EP: How enterprise portal, used to design an integrated system, can you are helping the collaboration manufacturers in the form of virtual enterprise? However, implementation and inappropriate way of corporate portal of the theoretical guidance of many challenges, and the lack of support for other types of virtual factories and virtual enterprise collaboration tools. For small and medium-sized enterprises, in order to support to deal with these problems, the new strategy, has proposed a virtual factory information system designed. Name this enterprise portal

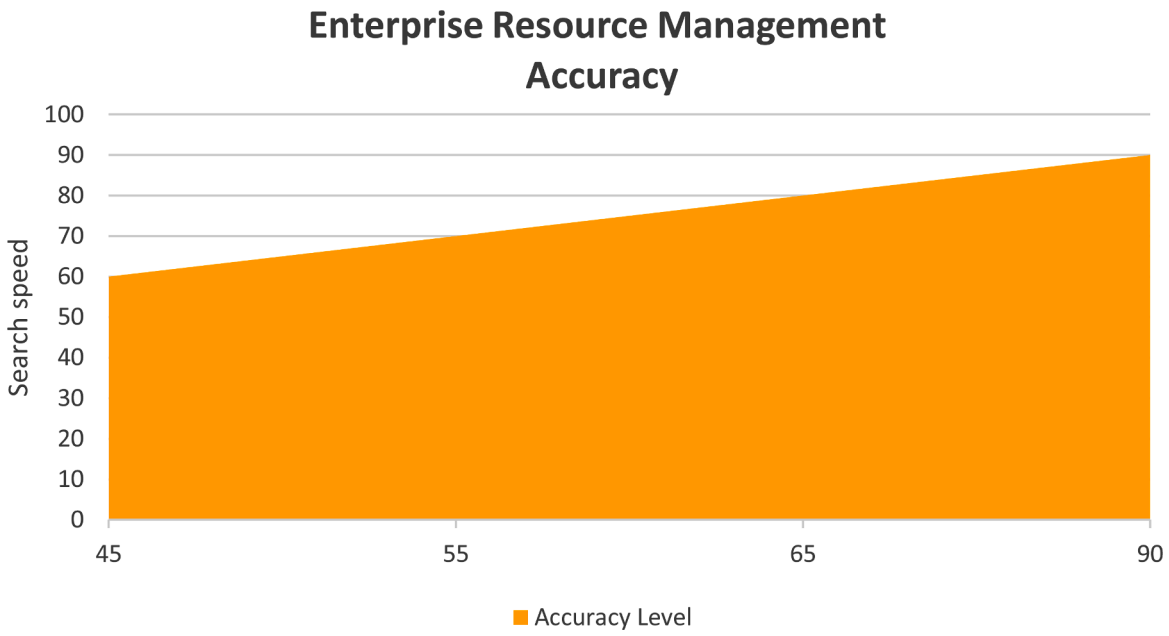

Fig. 4. Enterprise resource management accuracy.

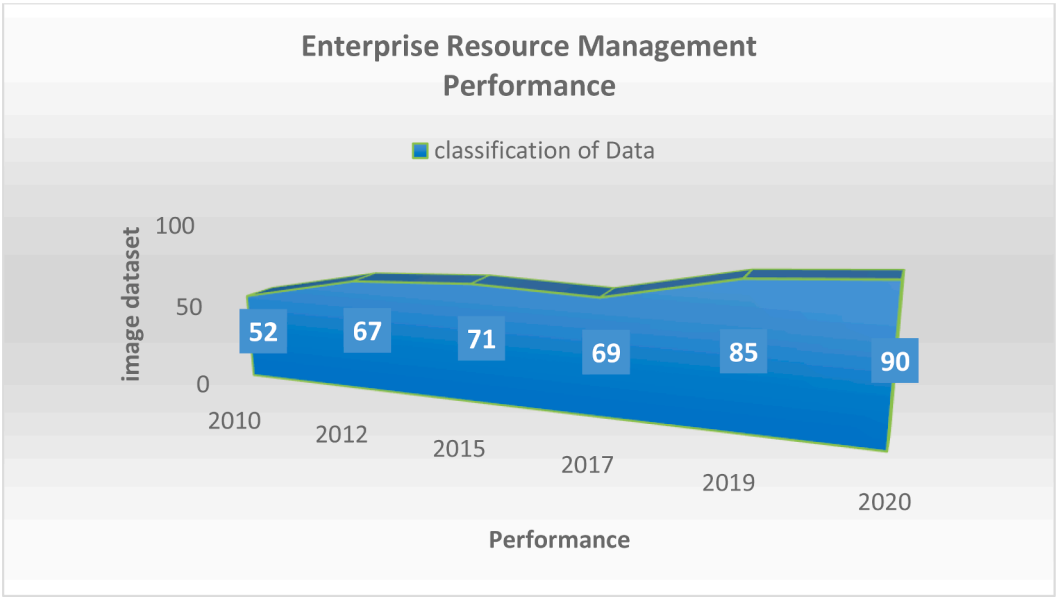

Fig. 5. Enterprise resource management performance.

solution as a virtual factory. This is designed to establish a process-based collaboration network, and enterprise portal by using the exchange of information between different manufacturers.

Fig. 4 shows in now this is a complete market of the time of increasingly fierce competition. Companies in order to win the competition, will continue to implement the technology research and innovation, there is a need to maintain the core competitiveness. Monopoly utility U, loss of knowledge sharing of knowledge, cost sharing of knowledge C, the income of my knowledge-sharing, when the monopoly interests of L, other interests have been through knowledge sharing like status, prestige and honor and improve profit sharing knowledge absorption from other knowledge and interests of member.

4.2. *Enterprise resource management performance*

In general, promote corporate hegemony is referred to member companies and other enterprises. In general, there is a virtual enterprise core business for supremacy enterprises, many member companies with a number close to or knowledge. In the virtual business operations, member companies In order to protect its core technology, all of the core knowledge, it does not share a virtual company. Hegemony companies in order to encourage member companies to invest more knowledge, you will need to build some incentives. According to the member companies, to stimulate the choices of policy, or will you share the knowledge within the range of hegemony makeup of the company? Sharing of virtual knowledge, competitiveness of enterprises, is even more of the Constitution and key confusion. Therefore, knowledge sharing mechanism of virtual enterprise is very important.

Fig. 5 shows the Dynamic Enterprise Alliance is called virtual or virtual enterprise alliance. Virtual enterprise, to establish a dynamic alliance of several different core competence of market opportunities on the basis of the network of technical information, is a study by companies and organizations. They share a part of the eugenics of resources by signing a contract to have a common goal. There are several methods for analyzing the knowledge sharing game. Knowledge sharing between the two dominant companies hegemony member companies. In the latter case, you can use the analysis recovery induction and working model of competition.

5. Conclusion

The development of the knowledge economy, companies will pay a high new technology research expenses; at the same time, it may not be possible in fierce competition with other company's good returns in the market. Instead, it can be highly combine dynamic alliance of companies can collaborate, share information and knowledge with each other and improve competitiveness. Tucker proposed prison dilemma game, has become a classic game mode, it has been applied in many fields. Complementary knowledge, assuming that two member companies A and B exist to share knowledge of A and B are their two, and will share a separate decision or not, at the same time. Assuming that the policy set, it is possible to influence the decision-making factors.

Declaration of Competing Interest

We declare that we do not have any commercial or associative interest that represents a conflict of interest in connection with the work submitted.

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