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An Intelligent Cloud Robot Training System

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A B S T R A C T

By utilizing internet-based innovations, the cloud robotics sector concentrates on numerous benefits for robotic systems including shared infrastructure and service delivery. Cloud robots are presently concentrating on being smart and collaborative in order to meet the rising demands for online education systems and e- commerce applications. When robots are linked with cloud, they take advantage of contemporary data centre processing and networking capabilities to analyze and share data acquired by other robots. The biggest issue in this study is the use of single server earlier. As several users attempt to access data from a single server, the strain on the server grows, and the waiting time for user increases, which has been identified as a proposed project concern. To address this issue, an effective solution for an intelligent cloud robot training system is required. The goal of the project is to create a Cloud robot system that uses incremental learning, Meta learning, co-operative learning and load balancing features. Several users access the essential information by means of three servers, which includes load balancing, which reduces the stress on the servers and eliminates the need for any user to wait because they may obtain the information readily from different users.

Keywords: Cloud robot, Java programming, incremental learning, Load balancing, Meta learning.

1. INTRODUCTION

A. Cloud Robots

Cloud allows saving files on a network and access whenever we go online. It provides rapid access and quick responses on a large scale as well as high security, regardless of location or situation. Robotics together with cloud computing provides for a new technology called cloud robotics. Here the robot is neither required to store plenty of data nor mandatory to conduct complex algorithms; instead, it may simply connect to a network as and when it wants to retrieve information. It has a higher learning capacity than earlier generations of robots. New models for robots consist of classic robots along with cloud computing and networking features. Duties of robots are becoming increasingly complicated and the restricted performance and storage space of conventional robots are not capable of meeting the requirements of new applications. This problem is nevertheless alleviated by employing internet- based storage and computation system with cloud robotics.

2. Related Work

Researches in [1] have presented models suited to individual robots enabled by the cloud. Their study looked at how robots communicate, work with and share cloud intelligence. It is suggested that adaptive group communication be implemented making the employment of multi-agent more effective. Data confirms a significant improvement to group communication above conventional ways because of a significant number of strong links of proposed algorithms. [2] Cloud robot systems will benefit from real-time multisensory data retrieval. Collaboration through cloud technologies allows robots to share data and learn new skills. The cloud robotic system can conduct complex and demanding operations with the help of several robots. MSDR is a crucial role for managing data sharing resources. Although there are technological challenges with this method; for example, regulating the cloud's unpredictability is particularly tough when a group of robots is performing multiple complex tasks at the same time. Multimodal ensemble is used to create a Sensorimotor representation-based self-learner [3]. Robots must be capable of predicting the circumstances and making judgments by themselves. It is critical to be able to recognize new situations and apply the information gained from them, even when unexpected information is discovered, in order to operate successfully. On the humanoid robot iCub, researchers investigated new strategies. Because the technique is not dependent on specific robot structures, it can be applied to a wide range of robotic platforms. Meta-Learning for One-Shot Visual Imitation Learning is implemented [4]. The method demonstrated allows robots to learn new skills more quickly by allowing them to learn from just one presentation. Data-

Efficient Multi-Robot, Multi-Task Transfer Learning for Trajectory Tracking is designed [5]. Transfer learning may allow for a reduction in time spent collecting data during the training period, as well as a reduction in risk. The architecture enables robots and their applications to complete a task by learning from a few samples of a different activity performed on a different system. This innovative approach combines L1 adaptive control and iterative learning, with the goal of allowing a community of robots to share learned skills. [6] The paper proposes an approach of Robotics Evolution: from Remote Brain to Cloud. In spite of previous predictions that robotic applications would want increased processing power, contemporary robotic technology actually necessitates a level of computer power that exceeds what can be supported on-board. The usage of cloud services and related technologies can help overcome hardware limitations and improve performance.

3. System Analysis

A. Existing System

There is no learning idea for the existing system, such as co-operative learning, where the user searches the information from the other servers, as the information only comprises of one server. It is restricted to single users, even when information is available on the server. The server cannot access information, because other users attempt to access the information from the same server and eventually error appears such as not found results and the client should be subject to a not so efficient time of waiting.

B. Proposed System

The system includes learning ideas along with incremental learning, which enable users to store the required information on the Cloud server by admin, and co-operate learning provides users with the lost data when the data is unintentionally removed from any cloud. Copying of the erased data is provided by Meta learning and is saved as a master file by default. In addition, the research employs load balancing as an additional feature that allocates its task to the right cloud server on the basis of cloud capacity and comprehension to minimize the load of the work and to enable its several users to make optimum use of this server at a time.

4. System Design and Methodology

Figure 1 shows collaborative learning of cloud robot. The components of the systems are explained as follows:

- Client: The client carries out actions such as login, register and downloads files.
- Admin: The functionalities of administrator are upload file, set server load and view users.
- Incremental learning: the user requests a specific file from the cloud server. If the file is available the cloud server will offer it otherwise the server will receive instructions from admin and it will keep a copy of the file to distribute to the users.

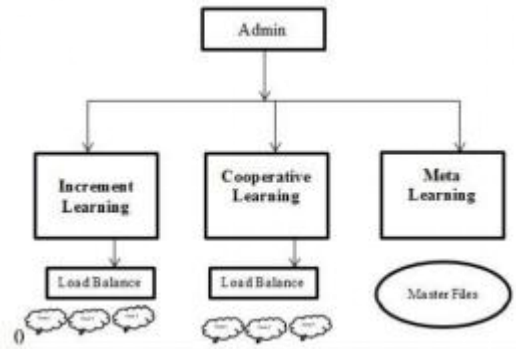

Fig.1: Cloud Robot Collaborative Learning

- Co-operative Learning: If a file isn't really present on the cloud server, it will gain knowledge about it from another cloud server store a duplicate of it, and make it available tousers.

- Meta Learning: If data is erased from all cloud servers, it will be copied to the master file that holds a replica of all files uploaded to all three servers. Admin is in charge of this master file.
- Load Balance: In load balancing the admin will configure the server load according to theserver's capabilities in order to reduce client latency.

The specific conditions of each robot, as well as other variables and other considerations, all influence how skills function on each robot. Because the result of accomplished task will provide job description for human operators, humans may provide final review once the job is finished. Even if the problem occurs after the task was therefore done, humans will be able to correct it. With the help of a learning algorithm, humans use execution outcome data to retain skill models.

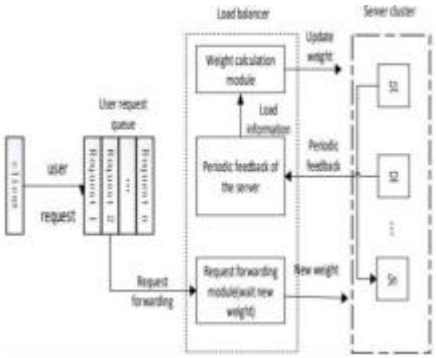

Fig. 2: Load Balancer Architecture

In some cases, even if the robots obtain the identical information, there will be some variances. In order to improve robot learning speed, incremental learning is used. We just keep bits of the received data, upgrade on the cloud robot platform and then utilize it to improve previously taught abilities and extend the number of known skills in the cloud database.Load balancer architecture is shown in the figure.

At first, the client asks any type of data from the server such as video, audio, images and so on, that continues to stay inside the user request queue before being transferred to the request forwarding module, which creates a fresh weight for the server. The server sends the feedback to a weight calculation module, which adjusts the weight and sends it back to the server to meet theclient's needs.

5. Implementation:

SYSTEM IMPLEMENTATION

A. JAVA

Java is a programming language and software environment created by Sun Microsystems and first released in 1995. Java is used by several apps and websites and new ones are created on a daily basis. When security comes under consideration Java is incredibly fast and dependable. Java is omnipresent with programs running on every computer to web- enabled phones. Java updates now consist of numerous improvements that will help your Java apps run more smoothly and securely. Be sure to download and install this free update.

The Java Runtime Environment (JRE) will be included in Java software. JRE includes basic classes and libraries. The only dditional component you willneed to execute Java in your web browser is a bit of code called Java's runtime software.

B. Java plug-in software

Java Runtime Environment includes a Java plug-in. Because of JRE, applets written in the Java programming language may run on a variety of browsers. As it is not a stand-alone application, Java plug-in software cannot be installed.

6. EXPERIMENTAL RESULTS AND DISCUSSIONS

Fig. 3: Login Page

The experimental results of the work carried out in the paper are contained in this chapter.Choose the URL that leads to the login page as shown in figure 3 in a particular search engine. The user must first input their email address and password then select a login option. After that the user will be able to access their respective search results of matched data from several clouds that the program manages

Fig. 4: Cloud server page

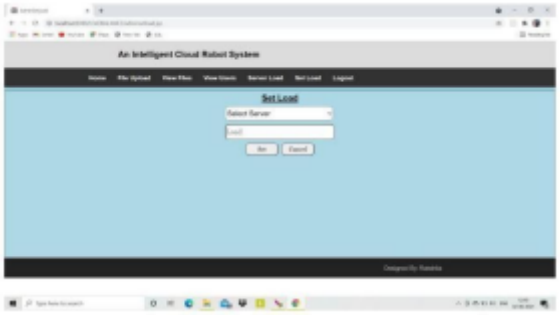

Fig. 5: Set load page

The cloud server webpage for an intelligent cloud robot system is shown in figure 4. Following the login screen select the server load where admin chooses a file in any format such as text file, audio, video or image file and uploads it to the multiple cloud servers.
When the uploading of different types of cloud servers is completed, the admin will assign a load to each cloud server. Some of the limitations are however associated with each cloud, for example - the maximum amount of traffic it can handle.

Fig. 6: File display page

The administrator's files are synched to the cloud robot, which can select them and save a replica in its personal cloud as well as grant its access to u sers as required as shown in figure 6.

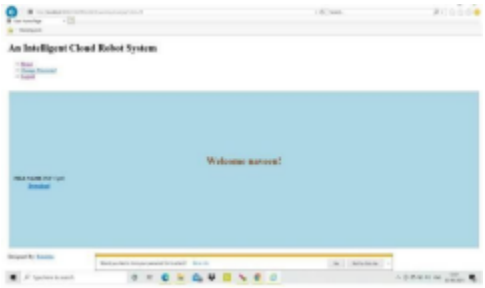

Fig. 7: File download page

The users will select a file highlighted with the download option. Cloud robot will be connected to the file after the download is selected. If the file is not found on the linked cloud robot, it will be communicated to other cloud robots where a duplicate of the file will be stored and the file will be downloaded.

7. Conclusion

The research presents an intelligent cloud robot training system derived from a web application written in Java. By utilizing effective methods like load balancing, incremental and Meta learning cloud robots can learn easily. Furthermore the information gathered by the robot is transferred to the cloud, where it can be shared with other robots. It is possible that robots won't have to relearn everything from the beginning. To reduce work burden, the load balance technique is applied. If the strategy turns out to be feasible and practical it can be applied in online reservation systems and multi-media applications thatuse the client-server architecture.

In future this strategy can be enhanced to make the applications more secure by integrating user verification using CAPTCHA and to provide alternatives for forgotten password, which will allow users to recover their lost password by email or SMS. To improve the speed of providing service to clients online, cloud robots would be provided their personal memory and computing storage capacity. Presently, applications that are stored on a shared server can be switched to a private server, which boosts the speed of the applications in comparison to each cloud robot and provides the option of using speech and text to lessen the burden of typing search requests.

REFERENCES

Romeo Mark Mateo, Jaewan Lee et, "Researcherspublished a model of information sharing adapted to individual cloud-enable robots", 013.

Lujia Wang, IEEE, Ming Liu, IEEE, and Max Q.-H Meng, et, "Real- Time Multisensory Data Retrievalfor Cloud Robots Systems", 2015.

Martina Zambelli and Yiannis Demiris et, "Self-learned Sensorimotor Representaion-based Self- learner, sensorimotor learner built on multimodal ensemble", 2016.

Chelsea Finn, Tianhe Yu, Tianhao Zhang1, PieterAbbeell, Serge Levine et, "Meta-Learning for One- Shot Visual Imitation Learning", 2017.

Karime Pereida, Mohamed K. Helwa and Angela P. Schoellig et, "Data-Efficient Multi-Robot, Multi-Task Transfer Learning for Trajectory Tracking", 2April 2018.

Alaa F. Sheta1, Nazeeh Ghatasheh2, Hossam Faris and Rodan et, "Robotics Evolution: fromRemote Brain to Cloud".