Face Recognition Security Base AI Robot

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Abstract: In this paper, we are going to learn how to design a smart AI robot that can recognize a person's face, can recognize that person's voice and thus receive various commands for welcoming guests or for security purposes. One cab also preview live streaming with a camera through face recognition. Face recognition is an image processing method to locate the human face which need camera to capture the image of human face. The image processing will search the important feature of a human face on the image, thus another object will be ignored. The image processing locates human face used by various algorithm and method. This may vary according to the different shapes and sizes of the robot head design. Here, we are using the Open source INMOOV robot head that has been created using 3D printer. And make sure to securely screw the OLED displays onto the eye piece of the robot head. This paper also includes the gender, age detection through voice.

KEYWORDS:AI, Security Based Robots, IOT.

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INTRODUCTION

In the biological evolution process, logical thinking has been the last to evolve, and lies at the surface of our consciousness, its means and methodologies available for introspection. On the other hand, the intelligence required to interpret sensory signals and activate motor commands is so well known biologically that it is buried in the subconscious and is entirely inaccessible at the conscious level. The differences between human beings are also more pronounced in the logical reasoning area, than, say, in the ability to walk around a room avoiding obstacles, or to recognize human faces. Hence the variation in human intelligence is usually measured by the ability to process logical information, whereas the other forms of intelligence needed in daily life are not normally associated with the word intelligence.

Scientists and Engineers want to make a substitution or a helper of human being in the era of Information Technology. This helper works on the instruction of Man. Thus, it can also be called a servant, a servant who is faithful and perform the exact orders. It will think only in favor of his master. It will help in general works and in special tasks as well, like security, management etc. It will provide the high degree of security and perfect ness in performing orders. The Robot will become a perfect servant of human. Nowadays, Scientists have made efforts to make such Robots. But still, artificial intelligence is the main problem. A man can think and adjust himself in any condition, can take the optimal and possible decision. The Robot can perform only those tasks and take decisions, which are specified in its programming code.

In this paper, an attempt will be made to design a Robot and its software, which will have an optimal solution of conditions (for which the Robot is to be designed i.e. security). It will not only reduce the cost (the cost spend in security of VIP's is very high) but also will increase the security strength and stop the criminal activities.

The objective of the proposed method is to design and make a Robot and its Artificial Intelligence environment (software), which will perform all the basic and high end security checking. It will take snaps of the people presented towards it and match the snaps from its database to check for criminals. It will also check the thumb impression and perform metal detection and scanning. Thus, such operations with minimum errors will cause the better security. This Robot will also have arms to lift the objects and it will also have path planning to move avoiding obstacles.

The Robotics projects are basically implemented in educational and research institutions. Some institutions work only on Robot movement and arm manipulation. The use of digital camera and image processors, thumb impression detector, metal detector and other related things are not under consideration. Many research centers and institutes work on mechanical Robots.

The facilities are available but the exposure in artificial intelligence, Robotics and image processing is not much so that one can implement the thinking and ideas in real time projects. Some software are available for thumb impression detection and digital camera film creation but they are not implemented everywhere and have some difficulties in operation while in security checks.

In Japan, USA, UK, Korea, the real time Robotics projects is in very fast process. The scientist and engineers are working in such projects and they have achieved to make some Robots, which have the artificial intelligence, equivalent to lizard. NEC a Japanese company has made a Robot named PAPERO, which can recognize the faces of about 3000 human faces.

The main purpose of this project is to build such type of Robot, which has maximum numbers of algorithms to handle optimal security. It can self-manage the condition and may be able to take conditional steps. This would be widely used by police, military and other security agencies. This Robot could do the work of at least ten security men and react very fast. It would also be helpful for securing the household things. The Robot, on just changing some instructions in the program, can also handle the security of shops, houses, banks etc.

The paper structure as follows in section 2 mention the literature survey of different security based face recognition Robots, and sections 3 and 4 give the proposed methodology, and give an explanation about results. Finally, conclude this paper in section 5.

LITERATURE SURVEY

Face recognition has been an active research area over last 40 years. The face recognition has several disciplines such as image processing, pattern recognition. Face recognition has many applications such as 1.Biometrics, 2.Security systems, and 3.Control and law enforcement. Face recognition system can be tracked back to the 1960's developed by

woodrowwilson Bledsoe. The system retrieve the images that most closely resembled it from a database .In 1990's the U.S Defence advanced research projects agency and the National Institute of standards and tech designed a face recognition program which eventually led to more in 2018, using image processing technology to authenticate person to enter in home. For image processing, they have used pi camera module. This paper has discussed about the decentralized face recognition scheme.

Human teleoperated robots come in a large variety. They are used for many different purposes such as inspection, bomb disposal, as well as other operations with high risks [1]. The main two reasons for using teleoperated robots rather than autonomous robots are [1], [2]. Teleoperated robots have some advantages [3] such as: 1. Getting humans out of harm's way, such as in hazardous or polluted areas, and 2. to access areas unreachable by humans for any reason.

In [4] and [5], models of teleoperated robots which utilize a range of different sensors are offered to carry out diverse missions such as surveillance, explosive ordinance disposal, vehicle inspection, and route clearance. The different models have different capabilities depending on their design and sensors they employ.

In [6] a ball shaped robot is designed and used for surveillance and rescue operations. It has video transmission capability, and due to its unique design, it can be maneuver to narrow places and, hence, can also be used to find survivors in rescue operations. In [7] a robot is used to scan an indoor location such as a house, gather images, and send them to a website (where a user can see and use the images) and can be controlled through a browser window through the internet and in [8] a remote controlled robot is used to scan an area for fire or intrusion. The robot is equipped with camera to send back video and a manipulator for firefighting purposes.

In [9] a Packbot Scout robot's operation and utility is tested by a SWAT unit in their operations. It can be used for scanning certain site as well as conduct negotiations with suspects or people inside, while in [10] the prospects of using natural language to communicate with and supervise a robot is investigated. The robot is proposed to be used by military and security personnel in their operations. In [11], a robot has a different 'unique' design. It can transform from a vehicle to a walking robot. When the terrain is even, the vehicle mode can be used to move fast with less energy, while the walking mode can be invoked to navigate a rough terrain. The robot is teleoperated and is equipped with a camera to enable the user to view the robot's environment.

In [12], a teleoperated, semi-autonomous robot is equipped with a camera and a GPS and can be used to conduct surveillance of an outdoor environment. The robot's six-wheel design enables it to traverse the rough terrain of the outdoor environment. The robot can be controlled wirelessly and instructed to move to any location; it then autonomously navigates the terrain and avoids obstacles to reach the specified location. In [13] another semi-autonomous robot is used to monitor an indoor environment. Again, the operator can set a target location, and the robot will move to that location while avoiding obstacles in its path. The robot is equipped with smoke and fire sensors and can notify the operators of such events during its operation. The operators can also use the onboard camera to monitor the robot's environment.

In [14][15][16] a security robot can be controlled using a CDMA based mobile phone. The system allows the user to view images from the camera onboard the robot as well as command the robot's movements, while in [17] the robot is remotely controlled over the internet by security personnel. The robot streams the camera view to a server which performs identification, and if an intruder is detected a message is sent to the operator as well as the intruder.

In [18] a robot equipped with a wireless camera is controlled with a joystick to approach desired locations. The robot is equipped with an ultrasonic sensor which stalls the robot for five seconds when an obstacle is encountered allowing the user to respond afterwards by moving the robot away from the obstacle. The camera is used to capture images of any location or event in the environment.

In [19] a quad-copter is equipped with a camera and used to track people by extracting body information. The problem with such robots is the limited payload

capability resulting in reducing the usefulness of the acquired information while requiring high operation costs in terms of energy spent on flying and controlling the platform.

In [20] a robot equipped with an omnidirectional camera is used for fire and intruder detection. When a fire or intruder is detected, the PC alerts the owner by sending an SMS to his/her mobile phone as well as posting the captured images on website. Although the proposed system can detect fire and alert the user, it does not take any other action, which is a very important point in case of a fire. Also, the robot is controlled by a PC which makes it vulnerable in locations where the signal is lost or damaged by noise. Finally intruder detection is done by background extraction. While being an effective method for stationary robots and fixed cameras, it may be less robust on a mobile robot as the background would change constantly during the robot motion.

PROPOSED METHODOLOGY

In reference to the Research and Implementation of Designing IOT Face Recognition AI Robot by Pravinkumarsingh, MandeepKaur. Security is one of the main objectives of every creature. This security requirement increases as the importance of the premises increases. For this reason it is usual to see guards in places such as banks and other establishments of high importance, and may use surveillance cameras for monitoring the designated area. High cost of employing many guards to secure the area 24/7.Boredom which may result in the guard(s) being busy. Intrinsic human inadequacy. It's hard for a human to monitor a number of screens showing video streams from surveillance cameras continuously for a long period of time.

Fig. 1. Block Diagram of Face Recognition Security based AI Robot

The general aim of this research is to design a robot capable of performing security related tasks to help organizations. As well as individuals with safeguarding their properties or other important assets with low cost and better efficiency. The specific aim of this research is 180 degree vision and surveillance using a Raspberry pi camera method.The possibility of using face recognition efficiently to determine strangers from known individuals. That is fast enough to efficiently interact with strangers in real-life environments. The possibility of applying speed on a robot to conduct its operations and to what extent.

The problem of face recognition is limited memory. In automatic face recognition system the main task is detection of faces from cluttered background. Proposed Block diagram of face recognition security based AI Robot is illustrated in Fig.1.

For Security provide AI Robot follows the given Steps:

1. The input will takes images of a person from camera module through raspberry pi.
2. The RTC clock module is used for track of time and gives to the Arduino Nano .Arduino Nano is used for connection of time through RTC.
3. The output of the Arduino Nano is fed to relay module. Relay modules takes the output as the input and it is separates low power signal from a

microcontroller. When activated, the electromagnet pulls to either open or close an electrical circuit.

4. The relay module is fed to the power supply which generates power.

5. Raspberry pi which takes input from camera module output and power supply to activate raspberry pi.

6. The output of camera module and relay module and power supply the raspberry pi recognizes the input faces.

7. Recognizes input face which detects face and shows age and gender when the person face is known it welcomes the person with their name and greet through a speaker with voice.

8. If unauthorized person is detected it will not allow the person. To allow the unauthorized person we want to create new database.

RESULTS AND DISCUSSION

After booting the Raspberry Pi, open the face recognition script that we have made and run that script. Now, on the OLED display, you can see the robot's eyes move. Whenever you will go in front of the camera, the robot will recognize your face and will say your name. The robot start speaking to you and tells you your gender is male or female and playback your recorded audio as well. So here it is our smart AI robot that can recognize us and our gender just like we Humans and tell us about our gender and also recognize age using voice of human. The output was from voice through speaker. Face Detection output, and proto type of Face Recognition Security based AI Robot is depicted in Fig. 2, and Fig. 3.

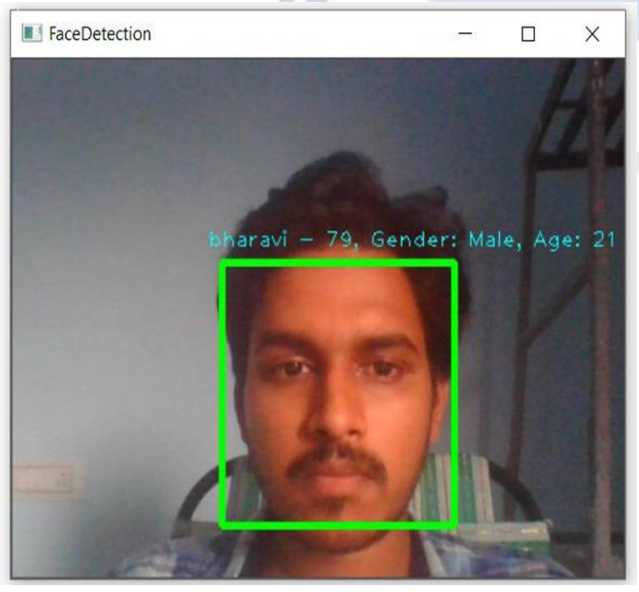

Fig. 2 Face Detection Output

Fig. 3 Proto Type of Face Recognition Security based AI Robot

CONCLUSION AND FUTURE SCOPE

In this paper an attempt was made to design and built a security robot that conducts its operation based on face recognition. The main robot operation involves face detection, face recognition, navigation and emotion detection .The fundamental thought of utilizing IOT and AI for face and feeling acknowledgment. This type of robot is to protect against known threats, it is also capable of greeting VIPs with a personal message and notifying our clients of VIP arrivals on site.

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