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Research Paper

AI Based Interactive Robot for People Care

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ABSTRACT:
To reduce the cost of health care and improve the quality of life of elderly people, more and more robots are being designed to interact with a human being to provide the kind of care that traditionally can be offered by a health care professional. The approach is to design a sensorized "autonomous robot" to monitor the elderly person. The main robotic system is designed using Raspberry pi, which is a low-cost credit card sized single-board computer. The goal is to setup a low-cost home companion robot to provide some care to the elderly person by monitoring the health. The robot will move based on the IR Sensors detection of white and black path. If black is detected then it means the sensor will not get any signal until unless it moves to white path. For this we will use 2 IR Sensors. If one on black path automatically another IR will move as per the path. The camera captures the images and compares the images in data base which is already stored. And if the face is found in data base, then by using speaker it will say Hi and gives the details regarding their medicines and if any person has to do exercise, then it will announce through speaker need to do exercise and it will store the temperature in the cloud.

KEY WORDS: *Raspberry pi, L293D Motor Driver, IR Sensors, Ultrasonic Sensor, Contactless Temperature Sensor, DC Motors, Camera, Speaker.*

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I. INTRODUCTION

Because of the graying of our today's population, there is a growing necessity for new technologies that can assist the elderly in their daily living. The main arguments for this is that the shortage of staff for health care, also people prefer more and more to live in their own homes instead of being institutionalized. To address these issues, we not only need sufficient health care personnel but also the presence of high-tech devices. Robotics is developing quickly nowadays to play an important role in assisting the elderly. An autonomous user companion robot might be viewed as a special kind of service robot that is specifically designed for personal use at home. To assess where and how artificial intelligence (AI) may provide opportunities for improvement, it is important to understand the current context of, and drivers for change in, health care. AI is likely to promote automation and provide context-relevant information synthesis and recommendations (through a variety of tools and in many settings) to patients, "fRamilies," (friends and family unpaid caregivers), and the clinical team. AI developers and stakeholders should prioritize ethical data collection and use, and support data and information visualization through the use of AI.

II. LITERATURE SURVEY

P. Raja, SwapnilBagwari et al (2018) presented a MASS(military assistance and surveillance system) that uses different type of sensor to monitor the soldier such as their location, health conditions, surroundings, sending data to base station, etc. being a wearable device it monitors the pulse rate as well as send the respective data to the base station and by using GPS module the location can also be monitored by military base station. Since it is wearable installation will be cost effective and will add a heavy pack load for soldier. MinalS.Ghute, Kanchan P. Kamble, MridulKorde et al (2018) described a military surveillance robot system consists of a single unit, which will monitor the environment in various hazardous conditions and provide live video feedback. Gyro sensor has been used to move robot in hilly areas, metal detection for landmines. It uses Bluetooth connectivity for wireless communication through mobile application which make it range limited. Aditya prakash, Raheewalambe et al (2018) described about a simple military surveillance robot with the

commands for moving front, back, right, left and stop are being received from the remote controller and accordingly the input is fed to the Raspberry pi 3 which makes the robot setup respond as per the instructions given. The Kinect sensor works like a camera with an additional feature of depth measurement i.e., it depicts the distance of object from itself by representing the object in the form of gray scale values ranging from 0 to 255 where 0 amounts to black which implies the object is closer and 255 amounts to white which implies the object farther. Siva karteekbolisetti, Mohammad patwary, Mohamedabdel-maguid et al (2017) proposed RF sensing based target detector which is expected to give an energy efficient solution to the problem of target detection under the sensing conditions. The sensor nodes are required to operate in harsh sensing environments in the presence of clutter and interfering signals.

III. PROPOSED SYSTEM

In this proposed system we are using line following robot which does not requires any external apps to control robot. The robot will move based on the IR Sensors detection of white and black path. If black is detected then it means the sensor will not get any signal until unlessit moves to white path. For this we will use 2 IR Sensors. If one on black path automatically another IR will move as per the path. To reduce the cost of health care and improve the quality of life of elderly people, more and more robots are being designed to interact with a human being to provide the kind of care that traditionally can be offered by a health care professional. The approach is to design a sensorized "autonomous robot" to monitor the elderly person. The main robotic system is designed using Raspberry pi, which is a low-cost credit card sized single-board computer. The goal is to setup a low-cost home companion robot to provide some care to the elderly person by monitoring the health. Driver section consists of Motor driver and two B.O motors. Motor driver is used for driving motors, because arduino does not supply enough voltage and current to motor. Arduino sends commands to this motor driver and then it drives motors in any direction as we want. Working of line follower and obstacle avoidance robot is very interesting. Then Arduino drives the motor according to sensors' output. The camera captures the images and compares the images in data base which is already stored. And if the face is found in data base, then by using speaker it will say Hi and gives the details regarding their medicines and if any person has to do exercise, then it will announce through speaker need to do exercise.

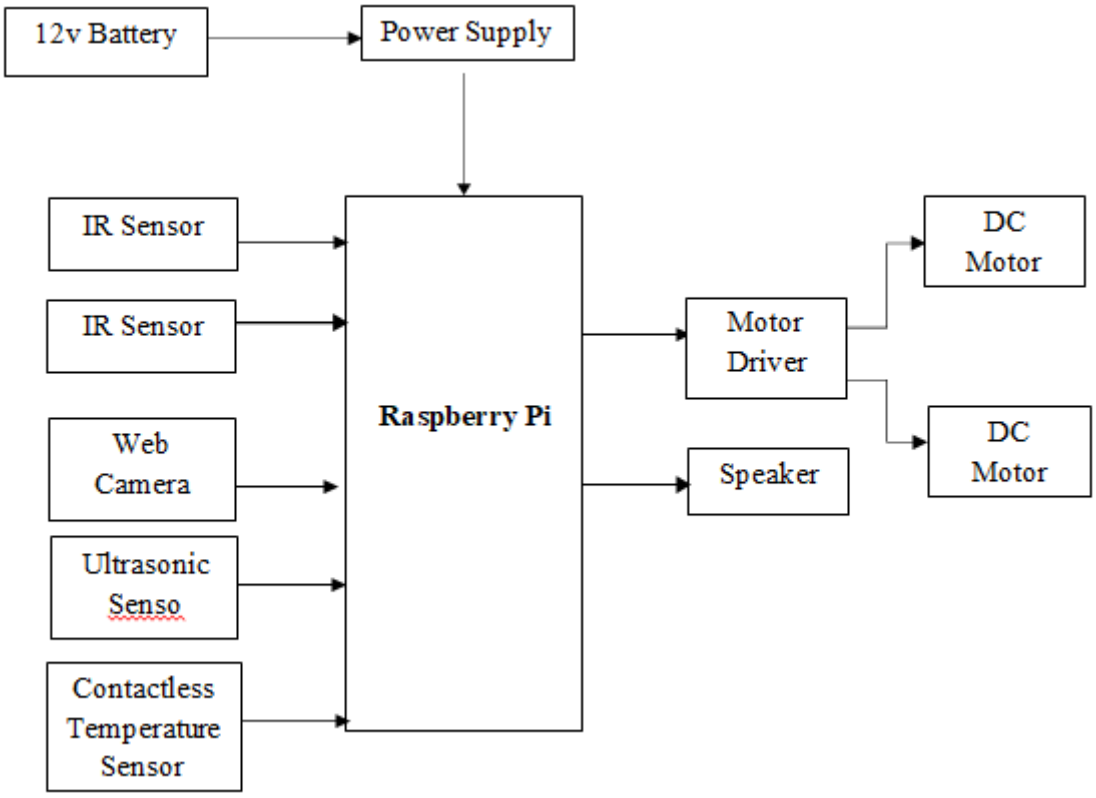

Fig: 3.1 block diagram of an AI based interactive robot for people care

IV. RESULTS AND DISCUSSION

Human beings perform face recognition automatically every day and practically with noeffort. Although it sounds like a very simple task for us, it has proven to be a complex task for a computer, as it has many variables that can impair the accuracy of the methods, for example: illumination variation, low resolution, occlusion, amongst other. In computer science, face recognition is basically the task of recognizing a person based on its facial image. It has become very popular in the last two decades, mainly because of the new methods developed and the high quality of the current videos/cameras. Note that face recognition is different of face detection:

Face Detection: It has the objective of finding the faces (location and size) in an image and probably extract them to be used by the face recognition algorithm.

Face Recognition: With the facial images already extracted, cropped, resized and usually converted to gray scale, the face recognition algorithm is responsible for finding characteristics which best describe the image. The face recognition systems can operate basically in two modes:

Verification or authentication of a facial image: It basically compares the input facial image with the facial image related to the user which is requiring the authentication. It is basically a 1x1 comparison.

Identification or facial recognition: It basically compares the input facial image with all facial images from a dataset with the aim to find the user that matches that face. It is basically a 1xN comparison. Each method has a different approach to extract the image information and perform the matching with the input image. However, the methods Eigen faces and Fisher faces have a similar approach as well as the SIFT and SURF methods. Today we talk about one of the oldest (not the oldest one) and more popular face recognition algorithms**:** Local Binary Patterns Histograms (LBPH**)**. The objective of this post is to explain the LBPH as simple as possible, showing the method step-by-step. As it is one of the easier face recognition algorithms I think everyone can understand it without major difficulties. Local Binary Pattern (LBP) is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighborhood of each pixel and considers the result as a binary number. It was first described in 1994 (LBP) and has since been found to be a powerful feature for texture classification. It has further been determined that when LBP is combined with histograms of oriented gradients (HOG) descriptor, it improves the detection performance considerably on some datasets. Using the LBP combined with histograms we can represent the face images with a simple data vector. As LBP is a visual descriptor it can also be used for face recognition tasks, as can be seen in the following step-by-step explanation.

Fig: 4.1 displays the person details

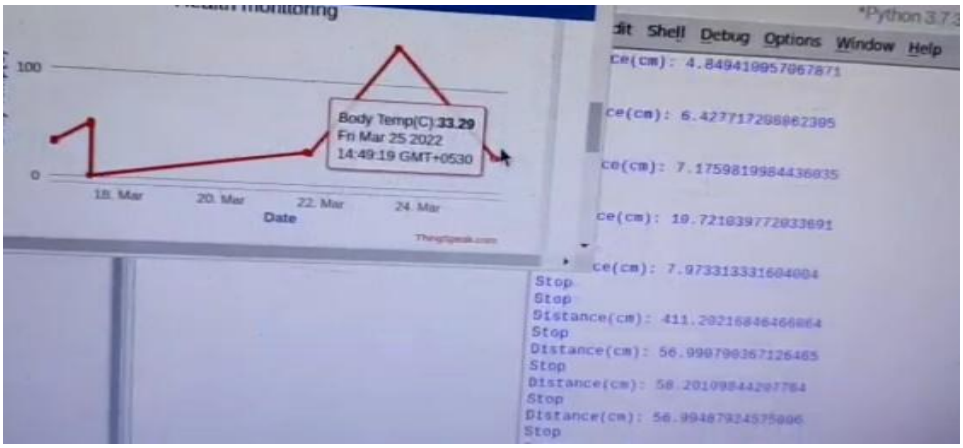

Fig:4.2 Temperature waveform

The above figure shows the patient details stored in the database that produces the output as like this i.e., Hi <patient name>, age<patient age>, health details<patient health details like temperature etc.,>

V. CONCLUSION:

We have described a robot system designed to be used by persons operating in assistive environments in homes, typically carers, relatives or the elderly person themselves. In these studies, the robot was operating primarily as a cognitive prosthetic. However, a question that could be asked is "why use a robot?" and not simply another device such as a mobile phone? We would argue that the use of a robot differs in a number of ways to that of a mobile phone. First, the robots will find the person to inform them (a mobile phone may be somewhere else and ignored). Second, there is some evidence that the robot, by having a physical presence, is perceived as more authoritative, i.e., a person is more likely to follow a robot's instructions or suggestions rather than, say, a phone.

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