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Assistive Robots: A Review

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ABSTRACT

In the Era of technology various gadgets are available to make our life easier. There are many fields in the industrial sector which, a few years ago required rigorous human labor are now replaced with automated machines which provide more efficiency, Human life has become so fast paced that for many individual it has become difficult to manage work life and family. Many families include specially challenged or elderly people who need to be taken care of. This paper discusses the various ways in which automation can help aid to people who need some extra care and attention.

KEYWORD robotics, automation, Arduino, voice recognition, assistive robots.

I. INTRODUCTION

Robotics and automation is being used in various industries now a day. We see automation is industrial sector, I.T. sector and also medical sector. It was inevitable for automation to be used for managing household errands. We have seen many such robots which are used for automating lights, fans, air conditioners, humidifiers, etc. With the increase in technology and needs for automation at home, many researches are done to make automation useful to look after elderly people and especially abled people. Few of such ideas are listed down.

II.LITERATURE REVIEW

1. Voice Recognition Based Home Automation.

The aim of this project is to develop a system that will control the home appliances through voice and also provide security in the absence of the owner with the application of Raspberry Pi. The main objective of this project is to save time and man power. Python is used as a main programming language by default, provided by Raspberry Pi. Voice recognition is developed by using Google API. (K.Y.Durga Prasad1 , S.Alekhya2 , A.Naresh3 , K.V.N Rajesh4)

2. A Concept of Needs-Oriented Design and Evaluation of Assistive Robots

In this paper, creator depicted our thoughts on the advancement of assistive robots which fit the genuine requirements of clients in light of ICF (International Classification of Functioning, Disability and Health).The development process of assistive robots - analyzing and discovering needs in daily lives, designing robots and evaluating the products - will be achieved in more objective manner than before, and believe that this will lead to the realization of assistive robots which can be utilized by many users who needs assistance in daily living. (Yoshio Matsumoto, Yoshifumi Nishida, Yoichi Motomura)

3. A review of high-level robot functionality for elderly care.

This paper presents an evidence-based overview of the functionality that robotic care systems should provide. The results identify a number of key characteristics that range from existing commercial products to research prototypes. For example, social care needs voice assistance that already exists in the form of smart speakers. Such systems provide an opportunity for entertainment and the ability to stay in contact with caregivers, friends and family. Consequently, a good speech recognition and ability to perform conversations were highly valued by elderly users. (Nico Sun1 ,Erfu Yang1 , Jonathan Corney1 , Yi Chen2 and Zeli Ma2)

4. Assistive social robots in elderly care: a review.

In total, 10 devices were included in our review. For each study, we report on research design, type of assistive social robot, main outcome measures used in the study to measure the effects of the intervention, number of participants in the study, whether or not the results were positive, negative or mixed and the time period the study spanned. (JoostBroekens, Marcel Heerink, HenkRosendal)

5. Speech recognition system for blind people using raspberry pi.

Using Jasper, authors have built a Voice based Control System which helps to perform routine tasks in a much simplified way. Which is very useful for blind people also for physically handicapped people too. A microphone is used as the input to it. There is much scope for further development in various applications such as Home Automation, Artificial Intelligence, Health Monitoring, Mobiles etc. Jasper can also be integrated with Internet of Things (IoT) for superior performance and detailed analysis in order to make. Jasper significantly more smoothed out and organized. (PradnyaJawale, Chirag Joshi, Dr. MilindNemade)

6. Medicine Dispensing Machine.

7. The medicine dispensing machine offers a flexible, simple and rugged solution for extending basic healthcare to all places, at a very moderate cost. The machine can be customized to suit any type of terrain or climate with minimal changes to the hardware and software. This machine will be extended to add an intelligent medicine unit, which sends a refill notification message to the nearest chemist when the number of medicine strips decrease below a certain level. (Vishal Tank, SushmitaWarrier, NishantJakhiya)

8. Socially Assistive Robots in Elderly Care: A Systematic Review into Effects and Effectiveness.

There seems to be a potential for the use of robot systems in elderly care. The generally positive effects reported prompt for further research into the effects and potential use of socially assistive robotics in elderly care. Additional research is required to experimentally investigate the effects of interventions featuring socially assistive robotics within real elderly care settings. Albeit the reported effects of the SAR systems indicate positive results, whereas negative or no results are hardly reported, the collected evidence so far should be seen as first steps in an emerging application domain for robotics. (Roger Bemelmans MS a,*, Gert Jan Gelderblom PhD a , Pieter Jonker PhD b , Luc de Witte PhD, MD)

9. Impacts of robot implementation on care personnel and clients in elderly care institution.

research findings suggest that while there is potential for H. Melkas, et al. International Journal of Medical Informatics 134 (2020) 104041 4 rehabilitative work and activities with the help of the Zora robot – multi-faceted rehabilitative work, combining mental, social, and physical aspects of rehabilitation, there are also substantial barriers. To be successful, the robot's use must be well-planned with an understanding that the robot's usefulness varies and may increase over time. Realizing a robot's full potential may depend on providing

staff with a proper orientation, usage time, and clear motives for use. With commitment by organizational leadership, benefits may increase for the clients and personnel in the establishment phase (e.g., from the viewpoint of meaningfulness of work). However, benefits may remain negligible if the use is not well-planned. (HelinäMelkasa, *, Lea Hennalaa ,SatuPekkarinena , Ville Kyrkib)

10. Design and Development of Smart Medicine Box.

this device can help and give advantage to the nurses. The main objective for this innovation is to monitor the consumption of medicine intake for intrinsic patients. It is practical in the morning and evening but also can be used at night. This device is controlled by using Bluetooth system, so the nurse does not need go to the personal ward to give the medicine. This system is a very good to apply in the hospital because it can make the nurse job easier besides making the patients more comfortable to stay at the hospital (Ekbal Rosli1 ,Yusnira Husaini1,2)

11. Automatic Human Following Trolley Using Raspberry Pi.

The trolley; designed to identify and track the particular human was able to follow the user. The complete assembled bot with some of the results. (Kiran Ingole1, S. R. Khedkar2)

12. Experimental speech recognition system based on Raspberry Pi.

This paper has realized a public API based speech recognition system with Raspberry Pi and USB microphone as hardware and several programming languages like C and bash. It gathers references to base speech recognition algorithms and structures and their important application in existing speech recognition systems. The paper also covers the hardware specification of the speech recognition system which is very important as size and supported platform. It maps an application of public speech APIs and show a realization using one of them and appropriate hardware. (Hasan Gyulyustan1 , Svetoslav Enkov2)

13. Monitoring Systems for Counting People

An image-based application, the ability of the system is needed to capture and identify good objects. Some initial processes (pre-processing) are needed to obtain good image results, so that application performance can increase. This process is the process of separating objects with background, morphology, and contour confirmation. The process of separating objects with the background is done so that only parts of the object can be obtained for the sake of analysis. The results of this process still leave noise that is eliminated by the morphology process (opening and closing). The opening and closing kernel values that give the best results are 9 × 9 and 6 × 6. To determine whether an object (person) caught on camera moves into or out of the room, virtual help is used. (K.Rantelobo,CendanaKupang,D. M. Wiharta, UdayanaDenpasar,H. F. J. Lami,N. P. Sastra)

IV. CONCLUSION

After referred lot of research paper it is concluded that a number of methodology are available but above paper gives an idea about determining the ways that elderly people or people specially challenged people can be assisted.

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