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AI-Powered Personal Robots: Transforming Human Life through Intelligent Companionship and Assistance

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OVERVIEW RESEARCH

In recent years, the convergence of artificial intelligence, machine learning, advanced sensing, and robotics engineering has brought us to the threshold of a new era—one in which **intelligent robots for personal use** will move from the realm of science fiction into everyday reality. Already, research and industry are demonstrating breakthroughs that suggest soon we will live alongside robots not just in industrial or specialized settings, but within our homes, caregiving environments, and personal spaces.

A systematic review of emerging technologies in intelligent robotics highlights major trends: adaptive autonomy, improved perception and navigation, human-robot collaboration, and more intuitive human-robot interaction. For example, research into *embodied neuromorphic AI* seeks to create robots whose intelligence more closely mimics biological systems—allowing for better energy efficiency, adaptability to changing environments, and more natural responses.

A particularly striking development is the innovation in **brain–robot interfaces**, such as the NOIR system, which allows users to command robots to perform daily household tasks using neural signals (EEG). This integration of perception, intention recognition, and adaptable robot learning brings us closer to seamless partnerships between humans and robots in personal contexts.

In addition, the design of personal robots is increasingly focused on **Anthropomorphism**—human-like appearance, emotion recognition, conversational capability—and how these features affect user perception and acceptance. A study on consumer expectations found that people often hold paradoxical attitudes toward how human-like service robots should be, balancing desire for companionship and helpfulness with concerns about uncanny traits or loss of privacy.

On the commercial front, companies such as Figure AI, EngineAI, and others are rapidly iterating humanoid robots equipped with vision-language-action models. These robots are being trained on more diverse and large datasets, enabling them to perform multiple tasks in home settings, to grasp and manipulate objects they may never have encountered before, and to respond to natural language instructions. For example, the Helix robot from Figure AI can control multiple robots simultaneously and generalize its skills, reflecting an emerging trend towards multi-functional, generalist personal robots.

However, despite immense promise, there remain substantial technical, ethical, and social challenges. Issues around trust, privacy, safety, identity, emotional well-being, and the social acceptability of robots with human-like behavior are regularly highlighted in recent literature. For example, studies show that while human-like robots can enhance emotional engagement and acceptance, they also provoke technology anxiety, and societal concerns about over-dependence or dehumanizing interactions.

In summary, **the future of intelligent personal robots** is being shaped by rapid advances in AI and robotics that offer increasing autonomy, emotional intelligence, and adaptability. Yet, realizing their full potential—and ensuring they are beneficial—will require navigating significant ethical, design, and societal obstacles. In the sections that follow, we will explore these elements in greater depth: the enabling technologies, design and human interaction considerations, potential use cases, and the challenges that must be addressed to make intelligent personal robots truly practical, safe, and accepted.

LIST OF FIGURES

Appendix A: literature Review

ABSTRACT

This research consists of a literature review that looks at the various ways personal robots are being engineered to be useful in assisting elderly people. The need for personal care robots is constantly growing as a large population of people are growing old and living longer. At the same time, there are fewer younger workers to care for them. The work currently being done in this area of robotics is addressing this issue in that it is providing an alternative to human assistance in many of the areas that elderly people require. Issues addressed in the literature review include safety, reliability and the ethical concerns of using a robot to perform tasks that a human has performed in the past.

***Index Terms*—personal robot; socially assistive robotics; social robot; elderly people; human-robot interaction.**

INTRODUCTION

Personal robots are intelligent machines which can associate directly with humans. Personal robots can complete activities either by the "direct control of a human" or "using a computer program." The field of personal robots has become more important for people because it can provide many personal services in education, assessment, or protection in the home [1], [2], [3]. For instance, autistic students may benefit from interaction with robots. Robots have a consistent facial expression and tone of voice that autistic students may respond to better. Robots can provide home security by sounding alarms, videotaping intruders or trespassers and summoning the police. Personal robots can also help society to advance in entertainment technology. Perhaps the most important field for robots is that of assisting humans who need help because they are no longer able to care for themselves due to old age or disability. However, the question is how a personal robot could play an important role in the daily lives of both people who are disabled and people who are not. After all, personal robots should not simply be useful to their human users, but ideally people will genuinely enjoy having their robots around. The idea is to revise personal robots for daily life assistance, especially for dependent people by using the technology and manipulating it for supporting daily needs.

Robots have been used in laboratories and factories, and much has been written about that in the past. This study will explore the robot's use in personal areas such as home, school, store, and work. The idea to use the robot in a personal area can change the social environment into a technology environment. This study about the new intelligent robots will explore the ways in which personal robots can assist an old/ill person with their needs. It will also identify personal robot applications that would help old/ill people to assist in their daily activities and the future directions of its research and development. For example, one version of a personal robot will automatically track medicine time, carry the medicine to the person, set an alarm, and perform social activities. Of course, then the question of the ethics of increasingly anthropomorphic behavior in robots arises. Some wonder if creating robots to seem so real that they take the place of human companionship is ethical [4]. Ethical issues are also addressed in the literature.

OVERVIEW

A few years ago, robots became of use for ordinary people rather than just for use in laboratories and factories [5]. This innovation in technology needs time to appear in society and for society to become aware of it and accustomed to it. Robots can perform specific tasks that humans do not always want or have time to perform such as those that require repetitive movement. However, for robots to be able to safely interact, live and cooperate with humans, the behavior of robots has to conform to human standards of acceptability. That is the main reason for the development of the branch of robotics known as socially assistive robotics or SAR. It "aims to address critical areas and gaps in care by automating supervision, coaching, motivation, and companionship aspects of one-on-one interactions with individuals from various large and growing populations, including stroke survivors, the elderly and individuals with dementia, and children with autism spectrum disorders" [6]. People marvel at how far science has brought humans and how it has created wonderful ways to help people who need assistance, but they do not always realize what goes into building a robot that can go into a person's home and become part of that person's life.

Engineers working in SAR know that there are several reasons why it is important to address the issues associated with integrating robots into the personal care of human beings. Some of the people who are studying and writing about this issue talk about the concerns associated with integrating robots into the lives of human beings. For instance, socially assistive robots must combine several functional components including vision and speech recognition along with navigation. They may assist humans in the daily living activities (DLAs) such as shaving, washing, brushing their teeth, eating, drinking and other basic tasks that involve grasping, moving and operating other objects. Engineers are challenged with creating a well-defined robot that can do all of that. This means that the robots architecture must be designed to perform the task it is designed to perform. Besides ensuring that the robot can perform to design, it is also important to address the issues of SAR through the robot's architecture because the complexity of the robot will increase with each new update, and the initial components must be able to interact with the new ones sufficiently. Each of the associations among the components must be carefully scrutinized for future compatibility and integration [7]. However, it is not just the mechanical abilities of the robot that are of concern to scientists.

Some scientists are concerned with the cognitive environment of the robot and being able to refine robotic memory to use symbolic information such as those used in utterances and speech patterns. These cues must be obtained through collaboration with humans, which presumes robot interaction [8]. To successfully achieve such learning on the part of the robot, "well-designed interfaces are crucial... In particular, interfaces can be key in helping nonexpert users to collect good learning examples and, thus, improve the performance of the overall learning system" [4]. In other words, people who are not engineers need to be able to operate robots whose purpose is interacting with human beings. Also, there is a "preference for the relational over the nonrelational robot in terms of enjoyableness, companionship, and as an exercise coach" [1]. Most people would prefer to interact with a human-like robot than one that is strictly mechanical, although there are many that are useful as mechanical devices too.

Besides using robots to assist people in their homes, SAR engineers have taken robots into the public to gain insight and detect any problems with integrating the robots with human beings. One common place to test robots is in malls. Some of the tests that have been conducted in that setting include one that involved combining a robot's sensing capabilities and knowledge are supplemented with human operators assisting the robot to complete its task (or the other way around depending upon how one looks at it) [5]. Another mall test found that robots can detect human interest in interaction through the use of human gaze, although there needs to be modifications made to improve robotic capabilities in this area. This particular function was tested in several settings including dyadic, group, interpersonal and scaffolding interactions [9]. Other studies in the same area of research, also conducted in a mall, tested simulation to analyze the effects of the robot interaction modifications [3]. Tests like these are conducted in order to improve the practical applications of robotic capabilities and to increase the robot's ability to interact at a level with which humans are comfortable.

Finally, much of the literature discusses how robots are used in practical application. They serve many functions including shopping support—innovations also tested at a shopping mall—in which the elderly or disabled person uses a smartphone to interact with the robot. Another version can be used by the caregiver or the elderly or disabled person in a nursing home or similar setting [10]. One of those settings may be a rehabilitative setting. "Robotic technology has been evolving to become more flexible and adaptable toward human rehabilitation technique. Assistive robots are made to help people, to support disabled and elderly people with special needs, inside their own homes and everyday environment" [11]. One of the robotic devices used for rehabilitation is a robotic arm. Current research discusses the need for criteria against which to rate the ability of robotic arms in several areas such as eating/drinking and picking up/manipulating objects [12]. One specific task that is described is that of support for a quadriplegic person who works as a librarian using the FRIEND system [13]. The FRIEND project passed four generations; first it passed simple drink-serving scenarios, then more advanced scenarios

requiring advanced manipulative skills. Furthermore, the project included extended drink-serving and meal-serving scenarios. In its fourth generation, FRIEND supports the disabled people, to work as a librarian show in Figure 1. Another interesting robotic companion known as Brian 2 engineered using Wii remote controls and a webcam will "focus on the core impairments of dementia and the ability to support working memory, attention, awareness, and focus on task behavior, to reduce a person's dependence on caregivers and provide him/her social interaction during the course of these activities [2].

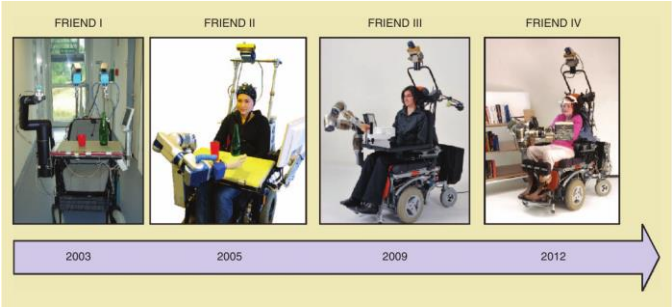

Figure 1:The timeline of the assistive robot FRIEND shows the system's development over the past decade. (Photos courtesy of IAT, Frank Pusch, and Riad Hamadmad.) [13]

The way the robotic components are designed and tested for these uses are discussed in section III. This paper consists of the following sections: section III defines the personal robot; sub sections A, B, C, and D explain how robots may help ordinary, disabled, children, or elderly people.

PERSONAL ROBOT

A personal robot is any robot or end-effector, and any contraption, apparatus, device or sensor that supports the robot in performing its task. Personal robots are intelligent machines that can perform some functions without being told to do so. The main difference between personal robots and industrial robots is that personal robots have been designed so that individuals can operate them.

Personal robots are important because they perform tasks for humans. Thanks to improvements in healthcare and sanitation, the world's population continues to grow older. Soon there will be many elderly people and not enough working age people to care for them when they are no longer able to be totally independent. Japan, for instance, already has more people retiring than there are young people entering the workforce. The United States and Europe are not far behind. By 2050, Europe's population will include 36% over retirement age, the United States will have 31% and China's will be a little more than 33%. Rodney Brooks, a leading roboticist, discusses this in his video titled, "Why we Rely on Robots." Of course, not every country will share this same issue in the future. India will not because one third of their population is currently under the age of 15. However, those living in countries with large aging populations like Japan, China, the U.S. and many countries in Europe, will be affected. Countries that have fewer people of working age to care for their elderly citizens will have to find ways to cope with the needs these people will present [14].

Besides providing care for elderly and disabled people, personal robots can perform other useful functions. For instance, there are already robots that vacuum, help to do other types of cleaning, home security robots, robots who lift and move objects, and those that help to keep track of things like medications and important dates. Personal robots can improve life in a number of different ways. Robots are being developed that even help a disabled person to hold down a job, like the robot discussed above that allows a person to work in a library by moving books on and off the shelves for people who are disabled. In addition, because there are so many businesses interested in developing personal robots for home and personal use, it is likely that more and more useful types of robots are going to appear in the near future.

These businesses include large multi-national corporations and small start-ups alike. Each company is looking to fill the personal robot market niche. The scientific research has been available for years and it can support the commercial venture of putting personal robots on the market in terms of supply, but there are those in the robotic community who are more comfortable using robots for the betterment of society rather than for entertainment or profit pursuits. However, they and their noble intentions may be left behind by those who see the market for development of a personal robot for commercial gains as ready for exploitation [14].

A. Personal robot for ordinary people

Many kinds of personal robots have been developed in recent years. One kind is the personal-interaction robot model that is able to exchange information with individuals in the form of requests and responses [3]. These robots can direct a person to the business he is looking for in a mall, for instance, and can answer customer service inquiries. Some robots have become so much like humans that they walk, talk and even shake hands. Some robots are capable of recognizing human emotions and responding with the appropriate "emotional signals." Some robots can also recognize people they have encountered previously. Robots pets that have the need to care and seem to respond to affection have even been developed [15]. While these robots may not serve a useful function in the same way those that provide a necessary service for disabled people, they do enhance the lives of people in other valuable ways. Some of these ways have already been discussed, but one general capability of social robots is that they are meant to become an everyday part of life so that interaction with them is seamless much as if interacting with an ATM machine has become in the space of a couple decades [9]. Personal robots for everyday use are simple to operate because they must appeal to all different types of people and provide general services that many types of people can use. They should be considered universal assistance with the few exceptions of things like the robot pet that some people may prefer to an actual pet. Figure 2 shows a robot place in the shopping mall to guide people in the mall.

Figure 2: Typical sequence of robot's behavior. (a) Waiting for a human. (b) Finding a human. (c) Having a dialogue. (d) Ending the dialogue [5].

B. Personal robot for disabled people

Personal robots for disabled people have functions that are more specific. For instance, three types of robotic systems currently in use include "static systems in structured environments where the disabled person lives or works include wheelchair-mounted robotic systems, and mobile manipulator companions capable of following the user for personal and care applications" [11]. These robotic systems can help a disabled person perform daily living activities (DLAs) such as bathing, grooming, preparing meals, eating, moving about. They can even help to perform work as in the FRIEND system that allows a disabled person to perform the tasks of removing a book from a shelf, entering bibliographical information into a data system and then returning the book to the shelf [13]. Being able to complete the DLAs with a personal assistive robot and without human assistance helps to provide a disabled person with a sense of autonomy and independence. Making it possible to have a profession only adds to that person's self-esteem. While robotic arms may not be the most sophisticated looking robots, they certainly are useful and beneficial to a person who cannot perform such tasks without assistance.

C. Personal robot for children

SARs are not just useful with disabled adults, but also have been invented to be safe and useful for children with various disabilities. One area where they have been found to be useful is with children with Autism Spectrum Disorder (ASD). An

SAR system that has been developed specifically for children with ASD is the Roball, which is a self-propelling robotic ball. It senses position and motion and responds to the play of the child. This type of robot can work in a therapeutic setting or at home with the child to encourage play with a therapist or parent. Typically, children with ASD demonstrate limited social interactive behavior, so any type of play with others is encouraged and beneficial. Not only is the interaction good for the child, but also good for those who love the child and do not get to experience much reciprocity of emotion from the child. Besides providing precious moments of contact with the ASD child, Roball can be used to diagnose or to develop new tools that can help in diagnosis and therapy [6]. Other similar robotic tools may be developed from the idea of robotic toys like the Roball. These new toys may also provide families of ASD children with not only therapeutic help but also with moments of contact with their child who does not normally participate in such things.

D.Personal robot for elderly people

Maybe the area where SARs can be most useful is with elderly people. With the growing number of elderly people in the population in many countries of the world, and the shortage of workers to care for them, SARs may offer the alternative that works best to solve this problem. SARs have been developed already and some are still in the developmental stages, and the tasks for which they have been invented are far ranging in scope and function. SARs specifically created to assist elderly people can be motivational, social and/or therapeutic. They have the potential to allow elderly people to live independently longer than their declining physical capabilities may have once allowed them to. SARs for the elderly can help to improve their overall health and make their lives better in many ways.

Some of the SAR systems that are already in use include mobility aids and navigational guides such as a robotic cane/walker that helps individuals by providing physical support and guidance along with monitoring of vital signs and offering encouragement. Another SAR system that was created specifically to help elderly people that have undergone field-testing is a robot escort for elderly people who live in an assisted-living facility. The escort reminds people of their schedule appointments and to take their medication. It also provides them information like the weather report and the activities that are scheduled for the day. Another SAR directs elderly people to exercise, encourages them, and helps to facilitate it [1].

PARO can help elderly people by providing companionship and some semblance of a real pet as seen in figure 3. It responds to affection in much the same way a real pet might. It has been used with stroke survivors and people who suffer from dementia and is particularly therapeutic for those conditions common among the elderly. It is also ideal for a nursing home setting where pets are often not allowed. PARO looks something like a baby harp seal and it makes simple sounds and movements similar to what a real animal might make. PARO has been shown in tests to help reduce stress in nursing home residents and to increase socialization when placed in common areas. Such SARs as PARO provide not only therapeutic benefits but also social ones [6].

Figure 3: PARO Robot [Online source]

The types of SARs that perform this wide variety of activities have various types of architecture included in their makeup. Some include components such as Smartphones that act as sensor and actuation devices. The Smartphone controls the robot

so that people who interact with the SAR can direct its activities. A robotic aid system or an adaptive guidance system may support SARs like the robotic cane/walker. Other systems include a baggage carrying system and a mobile shopping cart. While these are all useful in a practical sense, some of the systems that have been developed include uses that are beneficial in other ways too like the PARO, which may help patient with mental health issues like dementia and depression [10].

These types of SARs require architecture that is designed with interactive capabilities. For instance, the Korea Institute of Science and Technology (KIST) has developed a new design for an SAR for the elderly known as T-Rot shows in figure 4. In these types of systems particularly, it is essential that the design be focused on the interactive characteristics of the robot. Not only should the software architecture be well defined, but also the technical components must function both systematically and comprehensively [7]. Some of the proficiencies such SARs will need include object and/or person recognition and language acquiring capabilities [4].

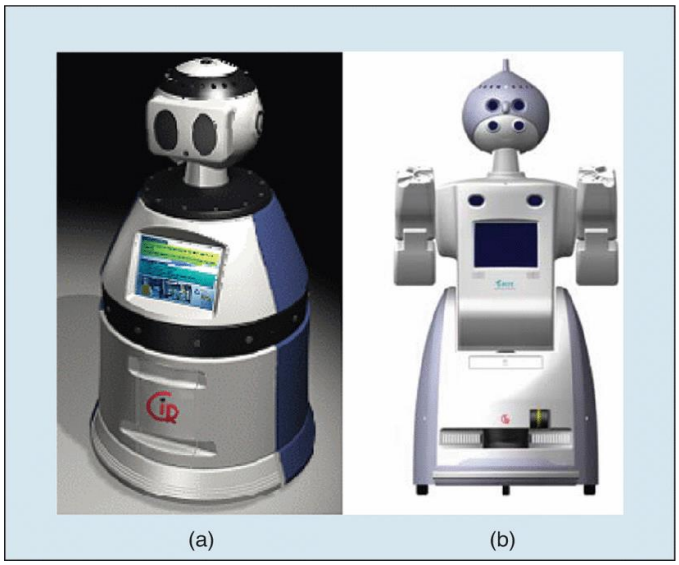

Figure 4: T-Rot robot hardware platforms: (a) the initial version and (b)the second version [7].

Finally, there is some research being carried out in the area of cognitive training for elderly people who are suffering from cognitive impairments. The goal of the research is to design cognitive training interventions for such people. These interventions will include SARs that are capable of providing cognitive assistance, social interaction and independence in such areas as eating, dressing, and grooming activities. The robots that will carry out such activities will focus on the deficiencies that accompany dementia. They will be able to support memory, attention, awareness, and attention to task abilities. This will reduce a person's dependence on others for care, but it will also provide social interaction for the elderly person with the SAR [2]. The hope is that SARs will replace human caregivers, at least to some extent, so that the elderly will be able to have a reliable and constant companion who can help them to remain independent and functional for as long as possible.

SAFETY AND USABILITY ISSUE

One of the issues that those who design robots for human use must keep in mind is that a robot that assists elderly or disabled people will be doing so in their homes, not in a laboratory. This raises a safety issue. Social robots, as Sabanovic, Michaelowski, and Simmons [9] call them, are meant to function as part of everyday life even though they are created in a lab. The robot helps the elderly or disabled person to do things like brush his teeth, shave, and reach items too high for the person to reach [12]. They must perform these tasks with the safety of the individual they are assisting as a priority. Groothius, Stramigioli and Carloni [12] say for the eating, drinking or personal hygiene tasks, safe behavior is the most important feature [12]. Feil-Seifer and Mataric [6] point out the importance of conducting detailed studies in realistic and monitored settings before commercializing the robotics technology in order to improve not only effectiveness but also safety. When they are first created these social robots are lab robots. Lab robots perform their work in a closed environment, away from most humans. They can be noisy and clunky, and may operate unsafely. That is why robots are tested in a lab where damage may be part of what is expected, but people relying on a robot to assist them in their daily activities do not expect their home to be damaged. Those who design social robots to function for a disabled person must think about how to create a robot that can interact with humans and not pose a serious threat to human safety.

To understand what is needed to accomplish the social integration of social robots, engineers must test the robot behavior in a lab that duplicates what the experience of interaction between a disabled or elderly person and a robot might be like. Some of the places in which this can take place are shopping malls, conventions, and trade shows [5]. When scientists take robots out into these public realms, they can observe what type of contact between humans and robot takes place. They can note the items that need to be improved in terms of both safety and effectiveness. Testing robots in a more realistic setting helps scientists to figure out ways that they can improve the way a social robot safely interacts with humans. Sabanovic, Michaelowski, and Simmons [9] say, "Interactions with robots in the laboratory, under the watchful eye and expert guidance of the robot's designers, do not provide insights into the aspects of human robot interaction... It is therefore necessary to evaluate human-robot interactions as socio-culturally constituted activities outside the laboratory, or 'in the wild' [9]. Often social robots are only tested in the lab. Unfortunately, what develops is a type of groupthink which leaves designers seeing only how the robot functions in relation to the way they designed it. If it works the way they designed it to, then it appears to be a success. They cannot get a perspective on the way other humans might view the event of a robot interacting with them. They cannot imagine what sort of safety issues especially may arise.

Part of what scientists who test social robots saw in social settings research is safety of their product. In fact, according to Zheng, Glas, Kanda, et al. [3], safety is the first priority of testing. "Supervision by a human operator is necessary when deploying social robots in the real world to: 1) ensure safety of both humans and the robot; 2) deal with unexpected situations; and 3) enrich the content of social interactions between humans and robots by incorporating an operator's knowledge and common sense." People who are not involved in robotics may not be able to imagine a robot being a part of their everyday lives. Maybe it will be so functional that a person would expect it to do things that it cannot do, which could harm the robot, so testing is also done for the sake of the robot too. Even in 2014, having a robot as a family member seems like an odd notion, and it may leave people with greater expectations than what they should have. Of course, many lay people's ideal of a robot is Rosie of the animated television show, The Jetsons.

Having the ability to construct a robot that can assist people in living their lives more autonomously is a wonderful thing. Some researchers like Huete, Victores, Mart´ınez, Gim´enez, and Balagueron, [11] who talk about the ASIBOT system, talk about several of the system's features including dependability, but they also say, "Dependability of a complete system for human–robot cooperation is dominated by the safety issues... For the sake of user safety, we assume that the user is always in the control loop, at least with the role of supervisor, and can override the current control actions in case he or she is not satisfied with the system behavior". For this reason, Huete et al. point out the features of velocity control that makes the robot move more slowly in the vicinity of humans, software safety motion control, which requires the user to press a button during the motion of the robotic arm, and the safety under the power off feature. The robot is completely shut off when in power off mode [11]. These make sense considering a robot would have no way of understanding that it had harmed a human inadvertently unless it was programmed to look for that specific result, and these social robots are not designed to harm, but to help.

When a robot is tested in the lab, some of the characteristics it is tested on are the speed and agility it has. Those qualities may be great for a lab robot, but a social robot careening at high speeds around a person's home could cause problems. Issues such as that may not be obvious to the designers who create the robots, or at least not initially. Therefore, for safety's sake, robots should be tested in homes with people willing to allow an untested robot in to their home. This will enable engineers to address the safety issues that exist and get away from the groupthink that prevents them from seeing how the robot could negatively influence its users. Robots must be tested before being turned loose on society or there could be all sorts of problems including the safety of the humans who come into contact with them.

PERSONAL ROBOTS AVAILABLE TODAY

A. Personal robot for ordinary people

Some of the robots in use in society now include those that people have grown accustomed to like the Roomba Room Robot and self-checkout machines in the bigger chain stores. Besides these common robots, there are window cleaning robots and lawn mowing robots as well as robots for education and security. New ones currently coming on the market include a robot store clerk at an Orchard Supply store in the Silicon Valley, CA. OSHbot shows in figure 5. It can interact with customers and help them find the products that they are looking for in the store. Of course, then there are the drones that have, all of a sudden, begun to fly about everywhere and look in on the lives of us all. A company called Parrot AR manufactures them, and several other companies do too.

Figure 5: OSHbot Robot [Online source].

Meet JIBO, The World's First Family Robot developed by Indiegogo shows in figure 6. Promised for the 2015 holiday season, JIBO is billed as a personal robot that looks something like a retro television set on wheels. Besides being fully equipped with Bluetooth and WiFi, JIBO will also act as a storyteller that uses sound effects, graphics and physical movements to enhance its narrative, a photographer and a communications device for users. These functions exist in addition to the typical personal robot function of companionship [16].

Figure 6: JIBO [16].

B. Personal robot for disabled people

Several robotic companies are developing a wide range of robots that assist disabled people. The types of robots range from prosthetics that act as arms and hands for people who have upper limb disabilities to those attached by electrodes to a disabled person's brain. Prosthetic robots can act as human hands and grasp and maneuver objects. They can also be attached to a wheelchair and can help a disabled person perform the tasks of daily living such as dressing, brushing their teeth and preparing food. Other robots enable a person with paralysis in their limbs to operate the robot with the use of brain waves that direct a robot's movements. With an Emotiv EPOC shows in figure 7, a disabled person can direct a robotic arm to perform different functions such as grasping or moving objects. A disabled person can also direct the robot to type, play music, draw or move the wheelchair just be using his/her emotions and thoughts [17].

Figure 7: Emotiv EPOC [Online source].

C. Personal robot for children

Another area of life where robots are seen commonly is in toys designed for children. Robotic toys can be useful for teaching language, memory skills and focus. Some robotic toys have been developed to help a disable child, those with autism. One robot called the ASK NAO, shown in figure 8, initiative works to assist with language and communication. Autistic children seem to be attracted to technology, so creating a robot to help them seems like the perfect solution. Other types of robots that specifically help children are the education robots. Some of them snap together without programing and not only provide hours of entertainment, but they also teach children that robotics is a fun and useful field to go into [17].

Figure 8: ASK NAO [17].

D. Personal robot for elderly people

One new robot on the market is Pepper shown in figure 9, by a company called Aldebaran. Pepper interacts with humans on a personal level. This robot can read emotions by facial expression and body language. For example, Pepper will detect when the person is sad and attempt to cheer them up by playing their favorite song. Pepper can also provide information by accessing the internet or through its memory. Pepper also speaks several different languages. Pepper works by analyzing voice patterns and body language. The better a person gets to know Pepper the more helpful Pepper becomes. It is conceivable that Pepper could help a person to remember to take medication, and perhaps a robot like Pepper is the answer to remind elderly people takes their medication. Pepper is known as a companion robot and not just for the elderly, but there are robots that have been made specifically to help care for elderly people [19].

Figure 9: Pepper Robot [19]

Robots that assist the elderly are becoming more common. One of them is PARO, a robot seal that combines aspects of animal therapy with socialization, motivation and relaxation for elderly people who may not be able to get out much anymore. A robot pet provides the companionship of a real pet without the necessary feeding and walking of a real pet. Another robot that assists the elderly called Giraff shown in figure 10. It includes a monitor with which healthcare workers and patient can see each other. With it, a healthcare worker can perform what amounts to a home health visit without having to leave the facility and drive to the patient's home. Giraff uses a feature similar to Skype to interact with the patient in his/her home, but Giraff can move about the home too. All the healthcare worker has to do is move the mouse and Giraff will move about the home. This way the healthcare worker can see how the elderly person is physically, can remind about medication and can see the environment is such as it should be with just a few clicks of the mouse [17].

Figure 10: Giraff Robot [17].

CONCLUSION

Projections are that the number of people over the age of 65 will increase by over 150% by the year 2050. At the same time, the number of those aged 18 to 65 will only increase by 33%. If those projections are true, there will not be enough people to care for the elderly around the world. Something must be done to remedy this situation before it becomes a crisis. One way to help is by developing robots that can assist in the care and companionship of elderly people. More research and development needs to be done that will not only improve what robots can already do, but also to prototype robots to address the issues that could arise [14].

Researchers have already created several types of personal assistance robots that are useful or can be adapted to be useful in the care of the elderly. More fine-tuning needs to take place in some areas though. More education is needed also for those who would benefit most from SARs and their families as well as healthcare workers. SARs have wonderful potential to solve the looming crisis, but more work is needed.

SARs are a wonderful advancement in robotic technology. They are capable of helping people in many ways. Some SARs are designed to help ordinary people by bringing them not only entertainment and companionship, but also useful functions like cleaning and helping them with their shopping. SARs also help disabled people to be able to perform some of the tasks of daily living without further assistance from other humans. Personal robots are useful for teaching children and can even be the lesson themselves. SARs can also help elderly people providing companionship and monitoring as well as reminder services. With the future that is approaching with an extraordinary amount of elderly people living longer than ever before and requiring the assistance of others, SARs are going to be vital in providing that assistance. They must be designed to be safe and ethical while also serving well in their practical application. Only with continued research and improving design will this be possible and it is exciting to be a part of this approaching future.

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