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Cobot's in Community Services – A Comparative study on its functionality and future scope

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Abstract
The role of Cobot's in personal and professional area is shaping the society. The Cobot's are now an active part of effective community services. Ranging from Hotel services, medical assistance, automatic vacuum cleaner, guiding patients, volunteers for old homes, communication, health support system and personal assistant are the areas where Cobot's are making their prominent presence. The present paper provides an in-depth comparison of the various Cobot's engaged in community services. The major limitations of Cobot's popularity is high cost and the weight of the devices, which needs to be reduced substantially. However, there are some new segments like psychological counselling, behaviour and sentiment analysis, inventory management, grocery selection and it's home delivery, kids and old people support system, Research and Education, public areas like buses, lifts and malls are the few zones where Cobot's can play a significant role.

Key words: Community Service, Cobot's, Collaborative Robots, Volunteer, Social Work

I. Introduction

Collaborative robots or Cobot's, are different from industrial robots that are deployed besides humans. They are often designed to take on simple, regular, repetitive jobs, that allows humans to concentrate on strategic and important tasks. Cobot's are highly safe and cooperative and work along with human beings. For years Cobot's have worked behind the scene in logistics sector, service industry and manufacturing industry. Cobot's have felt their importance in other sectors too like healthcare, banking, telecom etc. But recently they have started venturing outside the shop floor, warehouses, operation theatres, ATM etc. and are more visible in public facing role in hotels and restaurants like preparing coffee, serving food, cleaning etc. Popular companies engaged in Cobot's manufacturing are ABB, Universal Robots, FANUC, Doosan Robotics, KUKA, Yaskawa, AUBO Robotis, Techman Robot etc. The Cobot's market is likely to rise to 9.2 billion by 2028. [10]

1.1 Community Service

According to Cambridge University, 'Community service is the work done free of cost to help other people'. Community service is when you do something for someone else without the intentions of getting a reward or money. This service should benefit someone other than yourself and it should be done because you would like to help and not because you are required to [1]. In other words, work done to help the society by and large and no payment has been charged against the service or the task performed. We can say that 'Community Service' is the task that benefits other person or community. It can be done individually or by group of people. Generally, it is done by the people in their nearby area so that their own community can enjoy the benefit of their social work. It is a non-paid service though sometimes volunteers get food, appreciation letter or some memento.

Community service is different from volunteering. It is performed for different reasons including society requirement, in lieu of criminal punishment, mandatory requirement for a course work, class or school, required to avail certain benefits etc. [2]. For example, in some cases 'Community Service' is required to complete graduation or service related courses. Community service can help any group of people such as children, elderly people, *divyangs* (people with special ability), orphans, women, uneducated people, below poverty

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line people, and more. It can also help animals like stay dogs, cows, monkeys etc. There are many ways people can participate in community service such as collecting study material to donate, visiting elderly homes, offering food to elderly people, helping them in their appointments, planting trees, collecting and donating used clothes.

Fig 1. Collins, 2021, Open colleges.

Community service can be hard, boring and challenging. Coming out of comfort zone and doing totally a different and new thing is always a challenge. This may cause anxiety and uncertainty. Fear deprived us from many opportunities. Normally people are not ready to drift from the routine and do things differently. Moreover, the resources are limited, the availability of volunteers is always a challenge. Sometime they feel exhausted and drained off. In the long run they lose interest in charity and social work. There are instances where people involved in community service get emotionally involved which leads to clashes. The hardest part about the social service or community service is to adjusting back to old routine [3]. There is always a scarcity of human volunteers, finding enough people is always a challenge. Retaining people for community services is very crucial. People often feel disengaged, undervalued or unsupported and drift away themselves from such noble cause as social service [4].

1.2 Importance of Cobot's in Community Services

Cobot's can be an option to human being in social services for several reasons. Cobot's can work around the clock without fatigue or breaks. In community services where assistance may be required at any time, Cobot's can ensure continuous support. Cobot's can perform tasks with speed and precision, this can lead to improved outcomes and customer satisfaction. Cobot's are designed to collaborate with humans, not to replace them. Cobot's can handle physical demanding task, freeing up human workers to focus on more complex and compassionate aspects of their roles, such sd counselling, emotional support, or building relationships. They can also assist in emergency situations by providing immediate support while waiting for human responders. Cobot's can provide standardized service delivery. Implementing Cobot's can be a cost-effective solution for community service organizations. Cobot's have lower operating costs compared to human labour in the long run. While Cobot's can offer valuable support, it is important to emphasized that they should not replace the human touch and empathy that are curial in community services.

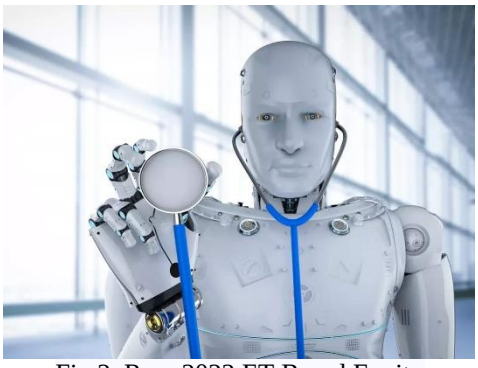

Fig 2. Roy, 2022 ET Brand Equity

1.3 Popular Cobot's in Community Services

Collaborative robots, or Cobot's, are becoming increasingly prevalent in various industries, including community services. Cobot's versatility and ability to work alongside humans make them potentially valuable assets in community service environments.

'Rita', is a Cobot developed by Bear Robotics is used in Chili's restaurants to help staff by seating customers, singing on their birthdays, serving food etc. Vacuuming is another area where Cobot's are highly successful. 'Whiz', an autonomous vacuum cleaner (a Cobot) is successfully working in more than 20,000 outlets including hotels, hostels, schools, colleges and universities, elder homes etc. in North America [2].

In the healthcare industry Cobot's are used as an additional support to healthcare professionals so that it can reduce the work pressure of the healthcare professionals and be more beneficial to the patients. They are highly useful in administrative jobs like billing, insurance claims, sorting of samples in

the lab. Their demand is also increasing as surgical aids, in patient monitoring, e-prescription etc. Cobot's are the part of modern healthcare ecosystem, during Covid 19 pandemic some hospitals used Cobot's as their frontline workers to sanitised the wards and rooms before their staff and employees.

After the pandemic, there is a high demand for telehealth and telemedicine. "**Boymax**" is a classic example of medical assistance. It can interact even with a child. The voice interface of "Boymax" reduces the need of typing prescription and instructions. Its sensors can check temperature, blood glucose level etc. with ease. The Robotic Arm of "**The da Vinci surgical system**" control the hand movement of surgeon more precisely. In Japan the Cobot's are used as 'Nursing staff' for in-patient monitoring. They also help the doctors by presenting patients' information, history etc. Cobot's are becoming highly effective in elderly care as well. They not only manage life of elderly people but also give them company through conversation. [1]

Cobot's can aid in rehabilitation canters by guiding patients through physical therapy exercises and providing real-time feedback on their movements. They can also help patients with mobility issues by assisting with walking or using assistive devices. Cobot's can be utilized in educational settings, especially for children with special needs. They can provide personalized tutorial, and even act as interactive learning companions. Cobot's can help in libraries by sorting and shelving books, assisting visitors in finding specific titles or sections, and managing inventory. Cobot's can support various tasks in community centres, such as cleaning and maintenance, event setup and breakdown, and serving as information assistants. Cobot's can assist social workers by automating administrative tasks, such as data entry and report generation, allowing them to focus more on direct client interactions and providing support to those in need.

Pepper is a humanoid robot developed by SoftBank Robotics. While it has been predominantly used in retail and customer service settings, it has also been tested in social service contexts such as elderly care and autism support. PARO is a therapeutic robot designed to resemble a baby harp seal. It has been used in healthcare and social service settings, particularly for individuals with dementia or mental health conditions. Buddy is a mobile robot developed by Blue Frog Robotics. It can remind individuals to take medication, monitor their daily routines, and offer entertainment and companionship. Care-O-bot can assist with household tasks, provide information, and interact with users through voice commands and gestures. NAO is a humanoid robot developed by SoftBank Robotics. It can engage in conversations, play games, and provide basic assistance.

1.4 Comparative Analysis of the Cobot's in the service segment

In this research, the researcher has worked with collaborative robots, which are essentially made to cooperate with people in a shared workstation or environment. They are made especially for interacting and working together with people, improving output, effectiveness, and security. Cobot's can be described in terms of several variables or traits as shown in the figure 3.

It is advent from the above table 1.0 that the effectiveness of the Cobot's is quiet substantial as far as community service is concerned. The various analysis parameters like safety features, payload and reach, user interface, the programming language, flexibility and versatility of the device, communication and connectivity, sensing and vision system, reliability and maintenance, functionality, physical parameters and cost effectiveness are some of the key features where the comparison is being done.

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Figure 3: Robots Parameter

Table 1: 1.4 Comparative Analysis of the Cobot's in the service segment

Robots	Parameters									
	Safety Features	**Payload and Reach**	**User Interface and Programming**	**Flexibility and Versatility**	**Communication and Connectivity**	**Sensing and Vision System**	**Reliability and Maintenance**	**Cost Effectiveness**	**Functionality**	**Dimensions**
RITA ('Riveting, Innovation Technology in Assembly')	Human Have total control. Human decide when to start and intervein if require						Highly Reliable	Cost around $25,000 per unit. Saving a total of 17 seconds in process time	fixings to the car's anti-roll bar	

Servi (Bear Robotics)	It's pretty safe. Safely navigate from Point A to Point B.	44 lb (20 kg)		Servi automatically knows to return to its post when internal weight sensors detect a delivery has been completed.	Upgrade to a fleet that synchronizes with each other to avoid collisions.	Advanced LiDar sensor and multiple cameras,	Highly Reliable	Operating cost around $2.75 per hour. It's monthly fee is $999.	For bar running, drink delivery, and table bussing	41 inches tall and 17 inches wide.
Pepper	With its curvy design, Pepper is danger-free and offers a high level of user acceptance	weight 28 kg, Speed 3km/h	open and programmable platform, utilizing a NAOqi operating system	Pepper, a social robot, recognizes faces and makes sense of basic human emotions.	Touch sensors, LEDs, and microphones,	The bumpers, infrared sensors, 2D and 3D cameras, and sonars allow for omnidirectional and autonomous navigation	Very Reliable	It could range from $14,000 – $14,600	Aid customers in retailing stores	55.1 x 22.8 x 22.8 in (HxWxL)
PARO	Paro is very safe and durable	2.7 Kg weight		Paro, showed greater verbal and visual engagement levels	Paro also responds to sounds and can learn names, including its own.	Light sensor, temperature sensor, tactile sensors (body and whiskers), microphone array.	Very Reliable	It cost $6,000 per unit. Reduce labour turnover and operations cost	Paro has been used in hospitals and care facilities as a therapeutic tool	35X 16 X 57 cm (WxHxL)
Buddy	Buddy has the capacity to safely look for a user and react to human presence and assess its engagement	5 Kg weight	SDK and java coding tools	Appealing design, its anthropomorphic face able to display emotional reactions and its ability to be proactive	The robot makes decisions based on stimuli linked to the robot's environment and previous interactions. It also plays sound and uses a speech synthesis engine.	Time Of Flight, Ultrasound, 3D camera, groundsensors	Very Reliable	The price range of Buddy will be between US $1700 and $2000	the personal assistant within the home.	560 mm x 350 mm x 350mm (Hx Wx D)
NAO	NAO robot can encourage participation, teamwor	5.5 Kg weight, Speed 0.6 K/H	Linux-based operating system, dubbed NAOqi,	Able to track objects and recognize speech. Speech recognitio	Fall manager and fall recovery.	Two 5-megapixel OmniVision cameras, inertial unit with three-axis accelerometer	One has to be very careful when program movem	Ranges from $12,000 to $15,000	Multi-interactive: verbal, visual and tactile engagem	31.1 cm x 58 cm x 27.5 (W x H x L)

	k, and creative problem -solving,			n and dialogue available in 20 languages		and two gyros, sonar rangefinder, four omnidirectional microphones, two infrared sensors, nine tactile sensors, and eight pressure sensors.	ents for it because it can easily fall and break.		ent. Patient, tireless & judgement free. Research Robot	
Whiz	It automatically avoids people, glass, walls cliffs and other hazards	66 LBS weight, Wiz learns all the routes your team needs and cleans up to 1500 m^2 per charge	Autonomous SAAS based navigation software	User friendly, Whiz words right out of the box, so teams can start befitting right away. A notification pager alerts when whiz is done.	Anomaly detection, Cliff sensor, Wheel contact sensors, emergency brake system	LIDAR sesor, 3 D Camera, Impact detection, (sensor-installed bumpers)	Highly reliable. Avoids obstacles and continue cleaning. Pauses in places until route clear	Save 486 minutes per day equivallent to $2525.20 per month	Cleaning offices and building	455X474653 mm (width, length, height)

1.5 Results and Conclusion

The hospitality and the tourism industry are likely to engage Servi Cobot's. It's effectiveness in shaping the customer services is phenomenal. Rita is also effective in Manufacturing units. Paro Cobots is likely to hit the hospital industry all because it is used as a threptic tool where Pepper Cobot is popular in retail stores, Buddy emergences as a personal assistant in the lifestyle is encouraging whereas Nao is helpful in Education and Research.

The Major Cobot's are in varied payload (less than 5 Kg, 5-10 kg and More than 10 Kg), components, Application (handling and processing), Industry (like equipment, healthcare, hospitality, electronics) and Geography. This is an upcoming market where consumer utility, ease of use, technological intervention, cost effectiveness, device weight will lead the market. Various prominent players are already in this Cobot's development market and it is likely to emerge as a new segment for the user's commodity and support system.

1.6 Future scope of the Cobot's in Community Services

The Cobot's are very effective in personal assistance to kids, old people and even the home makers. They can play a major role in proving psychological counselling especially to the old people and home makers. They can be programed in such a way that they can keep track of behaviour and sentiments of the individual, groups of the society and they can provide the needed intervention to have better society.

The Cobot's can play a major role in grocery management in retail stores. They can keep track of the utility items, need and consumption in a particular home, keep tracking of the nearest utility mall and if needed order the desired grocery from the nearest service provider. Cobot's can also be effective in budgeting the house needs, fare comparison and quality services and goods procurement on behalf of elder people and kids.

The house cleaning, management and the safety are the areas where the Cobot's can play a more decisive

role. The home needs to be managed manually and it is a routine work for all the house makers. The Cobot's can be more effective in planning and execution of the house-keeping, cleaning and safety measures to be taken for the needy fellows.

The public areas like Buses, Trams, Metros, Public transport system, Airport, Railway station where the support system is a must for elderly people and kids, the Cobot's can play a major role in felicitating the help to the needy ones. The research and education are another major areas where Cobot's can help the students. The students' career counselling, health counselling and accordingly the selection of education institution can help the student significantly. The Cobot's can also be helpful for the research scholars in order to search, categorize, design and analysis of the research contents, helping in preparing and deliver of the presentation, probable questions and their relevant answers, code generation are the few more areas where we will find the Cobot's in coming years.

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References

[1]. "The True Meaning of Community Service." Baldwin Group of Education, Socyberty, Web. 11 Apr. 201
[2]. Christine Sarikas, 2018, Definition: what is community service, prepscholar, July 19, 2018
[3]. David Bailey, 2020, The wild life wanderer, Halsgrove publication, ISBN-10 : 1785621831
[4]. Alice Tumbull, 2021, Rosterfry - https://www.rosterfy.com/blog/the-5-biggest-volunteer-management-challenges-you-might-face
[5]. https://brandequity.economictimes.indiatimes.com/blog/Cobot's-the-rise-of-the-health-companion/91875230
[6]. https://builtin.com/robotics/cobot
[7]. Nikhil, S., (2023), "Future market insight, collaborative robots market outlook 2023 to 2033", January 2023, https://www.futuremarketinsights.com/reports/collaborative-robot-market
[8]. Amanda Collins, 2021, Open Colleges, 10 reasons to start a career in community services
[9]. Atin Roy, May 2022, ET Brand Equity
[10]. Collaborative Robot Market, 2022, Market and Markets, November 2022, https://www.marketsandmarkets.com/Market-Reports/collaborative-robot-market-194541294.html