

Role of Telepresence Robot in Library and Information Centers

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ABSTRACT

Robots can be helpful in library environments. This article focuses on how technological changes, including the rise of artificial intelligence, affect libraries. It also discusses how robotics is used for various tasks in various libraries and how robots will be used in libraries in the future. This study also explores the challenges libraries face when using robots. This study shows that incorporating robots into the library environment will increase efficiency and maintenance. It underlines the urgent need for technology, especially robots in libraries.

KEYWORDS: Robots, Technology, Library, Information centre, Museum, Mobile phone, Telepresence.

INTRODUCTION

In short, remote robots can help instantly place “you” in a remote location and provide you with a virtual presence or “distance.” It includes cameras, screens, speakers, and microphones so that people interacting with the robot can see and hear the operator, and the operator can simultaneously see what the robot “sees” and “hears.” Or a mobile phone that connects to the robot, while others include video and audio features.

People from various fields have implemented telepresence robots. School districts, corporate offices, hospitals, medical centers, retail stores, etc. seek the benefits that can be gained from the careful use of advances in robotics. Therefore, they are becoming increasingly popular as the capabilities of telepresence robots continue to be discovered, developed and used. Robot owners appreciate the cost savings, time and energy savings, and the improved communication and presence that telepresence robots can bring to multiple locations or locations. “This is interesting,” you may be thinking, “but what does this mean for me? What benefits can rural robots bring to me or my business?”

One answer, as mentioned above, is that rural areas can offer you several mobile “eyes” and “ears” at your fingertips, allowing you to manage your location wherever you have an Internet connection. For example, if you're dealing with setting up an office in London while you're at your home office in Seattle and you need to make sure everything is set up and correct the way you want it, then the rural area will allow you to do that. Visit the layout of your London office and manage exactly what you want to see with the press of a button or two from your Seattle

laptop, it makes it easy. To reiterate, users have full control over moving the robot around the London office and viewing all aspects of the robot's location.

Hospitals have been using telemedicine capabilities for years, and now telepresence robots provide more powerful tools that can help surgeons communicate ideas more effectively to colleagues during surgery, doctors can easily keep track of patients' and specialists' last visits every minute, and eliminate travel time. Millions of brain cells can be saved in an emergency situations such as stroke. In the medical field, these robots are often called "medical telepresence robots" or "hospital telepresence robots", as well as many other health-related applications for telepresence studies.

Robots go far beyond a simple video conference because employees have full control over what they want to see: many people do not need to get up from their seats and turn around to be seen voluntarily on the video screen. No need to wait for employees to set up remote meetings; You can go to them whenever you want. Do not fly or drive out to visit a warehouse or a patient in an emergency; All you have to do is log in to your robot to immediately assess the situation. Use your computer, tablet, or smartphone to direct the robot camera to see what or who you want to see whenever you want. This control is further strengthened by moving the robot around rooms and corridors, providing virtual practice. Some robots may also benefit from other features, such as laser pointers (which can help improve communication) and automatic navigation and map functions (which allow you to click on a site and make notes or relax while the robot works ... driving there autonomously); give you directions when you arrive.

WHAT IS A TELEPRESENCE ROBOT?

A telepresence robot is a robotic device that allows users to maintain a virtual presence in a remote location. Users can control the robot's movement and other actions from a computer, tablet, or smartphone connected to the internet or other network. Through this connection, the robot acts as the user's eyes and ears, allowing the user to see and hear what the robot sees and hears so that the user and the robot are in the same room even if they are in different locations. This is called remote working. Remote robots include cameras and microphones that allow users to maintain a presence in remote areas. The robot also provides a screen and speaker so people in remote areas can see and hear the user. This way, users can have two-way communication with distant people, similar to Skype, Group, or Slack calls, but with greater mobility and remote-control lamp.



The above photo shows the robots used in the library

REVIEW OF LITERATURE

To develop a robot service, Lin et al. Use modeling to understand how children find books. They see the location of the book as an important part of the library environment. This work describes an iterative process and a feasible process to create a robot that can help library users find resources. Library staff, including child care staff, are asked about their wants and needs. After the needs are determined, what is needed is put into the robot. Research results show that library robots, which are mobile humanoid service workers, can guide child customers in a positive way (Lin et al., 2014). Shelf-reading robots can be used to find lost or unusual books. When the library is closed, the robot can scan and identify books by identifying the RFID tags on the books. For lost books, which make up about 5% of the collection, library readers use a personal system to check digital data from archives. Most importantly, it solves the problem of readers not being able to find books in the library (Hearn et al., 2021). Chingath and Babu H also examined the impact of AI and how they can be used in the library environment. This study looks at how many libraries, such as the New York Public Library, Temasek Polytechnic Library, UMKC Library, University of Chicago Library, use AI and how they can be used. They also discussed various library tasks that robots can do, including book preparation, checking, retrieval, inventory, data processing, and more. Therefore, this study investigates the impact of robots on various functions in a library (Chingath and Babu, 2019). Raghviah and Sreekanth examined the feasibility of robots in academic libraries and whether library professionals are ready to adopt robots. They reviewed existing literature exploring the use and applications of robots in libraries. Even though the aim is to improve the functioning of the library, it has been shown that there is concern that robots entering the library may change the functioning of the library. This article is designed to help librarians acquire the skills they need and welcome robots into libraries to be successful in libraries (Raghvaiah and Sreekanth, 2023).

AIMS

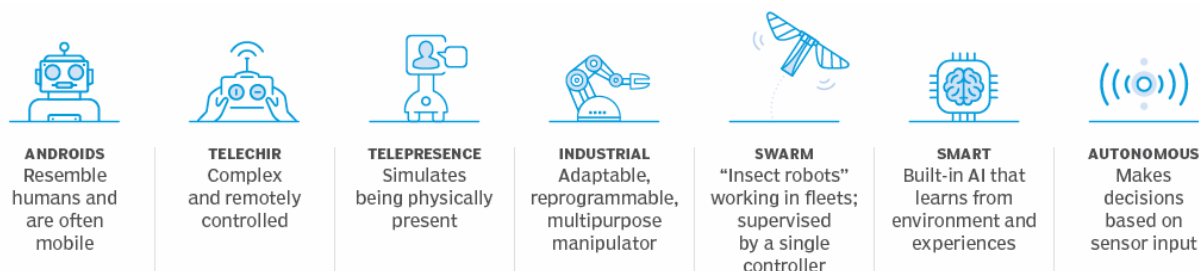
The project aims to investigate the impact of robots on human work, focusing on library professionals and users of library services.

OBJECTIVES

Analyze existing literature and research to understand people's perceptions of robots and how this affects libraries and information centers. Assess understanding of robots in the library environment and identify areas of library services where users and professionals may be willing to “cut out” for robots.

TYPES OF ROBOTS

The bellow figure shows the information of types of Robots;



TECHNOLOGY OF ROBOTICS AND THE HUMAN TOUCH IN LIBRARIES AND MUSEUMS

In the 2012 science fiction film *Robot & Frank*, a public library shortly will be staffed entirely by librarians and robots. The robot named Mr. Darcy, who works at the loan desk, holds books and answers reference questions. Libraries sometimes perform administrative functions. The main character is a former patron who remembers what the library used to be like and laments the lack of human touch in the building. This concern has existed for decades. Will technology replace libraries and leave many people unemployed? Will libraries succeed? Will robotics alienate libraries from users? Unbound investigates the current state of the art in library robotics and finds nothing to worry about. In public libraries, academic libraries, and museums, robots appear to be bringing people closer rather than separating them.

Robots are now used as teaching tools in public libraries. The Chicago Public Library recently partnered with Google Chicago to provide 500 Finch robots for indoor and outdoor use. Finch was created by Carnegie Mellon University's CREATE lab for use in computer science education. These robots have a powerful set of inputs such as accelerometers, light, temperature and matter sensors. They can create complex behaviors such as movement, light, sound, art. These features allow employees to start seeing direct, tangible results of their work, making the learning process more motivating and making the content more abstract again. These robots support a variety of programming languages, from simple visual language for grades K-2 to advanced languages such as Python and Javascript. The finches are available to all adult caregivers and can be loaned in packs of five for a basic classroom. The library at the Northtown branch has a Code Phreaks club for students in grades 5 through 12 where members can learn how to use Finch and develop their own codes.

The Westport Library in Connecticut has a similar robotics project but on a different scale. Instead of buying five hundred simple robots, they bought two very difficult robots. Two small humanoid robots named "Nancy" and "Vincent" are part of a French robotics company Aldebaran's NAO series. NAO is equipped with cameras, microphones, tactile sensors, Wi-Fi connectivity, sonar range finders, and various motion sensors. With these existing techniques, robots can be programmed to exhibit complex behaviors. For example, they turn their heads to see the person talking to them, to recognize and control objects, and to get information from the internet as well as speaking. Nancy and Vincent are charming machines that draw people into the library to see what they can do. Like CPL's Finch program, Westport Library hosts workshops to teach users how to use NAO. They run a variety of challenging courses from Level 1 to Level 3. Students who complete at least Level 1 will be invited to participate in weekly open labs where participants can create their own NAO coding projects with the help of developers. They also hold a weekly "robot watch" segment that showcases some of the characters created so far, including the "thriller" dance.

Robotics are being used in academic libraries to reduce space constraints and make information more accessible. The University of Technology Sydney (UTS) recently installed a massive storage and retrieval system (called the Library Access System or LRS) beneath its library. The UTS system uses six giant robotic cranes that move thousands of bookcases. LRS is automatically activated when a customer requests a book from the online directory. One of the cranes picks up the necessary boxes and hands them to workers who collect the necessary documents. The books are then sent to the library shelves where readers can pick them up. The entire process usually takes about fifteen minutes. LRS allows books to be stored very quickly, eliminates the need for expensive and cumbersome off-

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campus equipment, and frees up library space for new student services such as networked learning, production, and multipurpose repair.

LRS always raises the question of discovery – if everything is in metal boxes on the floor, how can students fall in love with a job they don't know they're looking for? The library has taken steps to alleviate this problem. Documents frequently used for storage are still available for students to browse. Additionally, UTS Library has added new features to its online catalogue, which will enhance discovery. The Collection Ribbon is a great visual way to narrow down your search results, and the Shelf View feature shows books as they appear on the shelf, surrounded by the books they first put on the shelf. They plan to add more suggestions about future features. Through quiet and well-placed spaces, LRS looks poised to create new opportunities for human interaction in libraries.

The museum is currently exploring technology to increase accessibility. The de Young Museum in San Francisco recently purchased a pair of remote-sensing robots. These machines are open on the ground floor for disabled people who cannot visit in person. Bots called BeamPros are almost like the active version of Skype. Customers can book a Beam tour in advance, log in to the robot from their home computer, and take it around the museum. The BeamPro is a 5-foot, 2-inch tall frame on wheels that supports the screen, microphone, speaker, and camera. A live video of the user's face is displayed on the screen, and the camera captures a high-resolution video of the scene for the pilot. The second camera points forward and prevents the pilot from being distracted.

BeamPro is completely mobile and completely controlled by the pilot. Unlike previous travel or dating sites, BeamPro gives authority and autonomy to its users. The BeamPro driver can move from place to place at will and stay on a given image for as long as he wants. They can interact with other museum patrons and staff. Expert and technology user Henry Evans said: "Within five years I would like to see museums around the world at least trying to use this technology, not 10 years to replace it. This will be the next great "cultural freedom". CBS News announced the partnership in this video news report. Although predictions in scientific research are often questionable, today the robotic environment seems very useful in libraries and museums. Whether used for education, organization, or accessibility purposes, these systems strengthen, not weaken, the bond between people. If we continue on our current path, Mr. Darcy from "The Robot and Frank" won't be building a subhuman library anytime soon.

TECHNOLOGY IMPACT ON LIBRARY AND INFORMATION CENTERS

Since the 1980s, we have seen libraries continue to abandon some traditional spaces. In the 1980s, catalogs were replaced by machine readers, in the 1990s, the Internet-enabled Online Public Access Catalogs (OPACs), and RFID now allowed items to be borrowed, returned, and cataloged without a home library. Libraries use technology to provide better, faster, and more continuous service. Modern mobile communications and related technologies have created new types of library users. What other services can machines or systems dedicate to seamlessly informing, encouraging, or delighting today's users? ⁶ In their book *The Future of Work*, Richard Susskind and Daniel Susskind explore how new technology will change what they call the "network social" roles of lawyers, consultants, educators, doctors, and other "custodians of traditional knowledge." The authors point to some current signs of a shift in work from manual work, which was part of traditional services, to external and shared work, which is now referenced to machines, machines, and even intelligence. They concluded that "increasing machine capacity will fill many jobs that were historically reserved for professionals." The book does not envision the future of libraries, but it

is not easy to imagine our work along these lines. We must ask ourselves what tasks we can send to increasingly capable machines and, more importantly, what are the important tasks we still face as libraries. The author believes that innovation should be implemented every day and that it is important for libraries to teach robots.

FUTURE TASKS FOR ROBOTS IN LIBRARIES

We start with the effectiveness of robots in libraries, taking inventory and finding books. However, today robots can perform many tasks in libraries. There are currently no robots specifically designed for libraries, or in rare cases they only do one type of work. But I see a day when robots can do many jobs. Let me give you some ideas and examples. An interesting and easy thing to do is to put a map in the library showing where subjects (such as law, mathematics, and physics) are located on the library shelves and rooms. Using a robot to scan the surface and update rack plans will be helpful, especially when getting updates when all the parts are being moved to a new location. This is not a new idea because this is where the term “Internet of Things” (IoT) began. Nowadays, there are many electronic products besides RFID. Electronic devices are used in the library to monitor humidity, temperature, open windows, lighting, customer presence, etc. It can provide additional information such as: Can we send robots to interact with users? We call these types of bots “social bots” because they interact with users, answer their questions, and provide advice and information. The company SoftBank offers the Pepper9 robot suitable for such tasks. Additional assistance may be required to suit your specific environment. Pepper is a humanoid creature that can walk at human speed. Verdo Polytechnic is teaching Pepper to understand and answer questions. Recognizing speech and providing an adequate response is a challenge, but roboticist Janet Mohnke and library director Frank Seeliger hope Pepper may soon become a reader of the nightly letter. Japan is a country that is extremely open to the penetration of robots into many areas of life. According to Shinto, everything, even inanimate things, has a soul. This belief may be why robots are so well understood today. With the rapidly aging population, the government has created special incentives for the development of robots. Libraries will soon see robots taking care of their users.

According to the article on Robostart, the Pepper robot will be sent to five hundred (500) Japanese libraries. Having robots in our library will enable us to be open 24/7, provide accurate and up-to-date information, and better assist and entertain our users. Whether the robot will assist or replace the writer is a legitimate question. When asked this question, 91.84% of the participants said they had no such fear. Libraries will be freed from repetitive tasks and can spend their time better understanding and serving their users. Activities that involve analysis, innovation, reflection and critical thinking will continue to be at the core of the writer’s role. Our greatest strength lies in people, and always will.

RECOMMENDATIONS

At present we live in a technology-based world and by arranging more grants from the government for the development of libraries, it seems more appropriate to introduce this robot-based technology in the libraries.

CONCLUSION

This article examines the literature discussing the use of robots in libraries and the role robots play in many libraries. The author explores the current use of robotics in library studies, its future potential, and the challenges encountered during implementation. However, as technology advances, it cannot be denied that the current structure and location of libraries benefit the use of robots in libraries.

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