

Privacy-Preserving LLM-Based Offline AI Tool for Academic and Commercial Natural Language Generation.

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Abstract: Assistance of blind or disabled person is a known issue in India and other countries and many of the researchers had worked to provide better solution to help them. There are stick/walker having ultrasonic sensor to avoid the collision of blind person with any object in between and there is an advanced wheelchairs are also available that is easy to operate but if the disable person also can't able to see then an integration of these technologies may help them.

In this we are going to create a SLAM and AI base wheelchair which will help "Blind and Disabled" with the help of this Robotic Assistance to assist the people to find theand communicate with the AI. Which will help to reach accurate destination.

Keywords: SLAM, Artificial Intelligence, Wheelchair, Automation, ChatBot.

1. INTRODUCTION

The integration of robots in the fields where human is not able to perform their daily routine work and an assistance is required have increase. Even in foreign countries an assistance pet robot is used as a companion of lonely and aged persons. Likewise blind and disabled persons are also needing the assistance and some of the researchers had worked a lot to provide the same. The proper use of sensors and automation are improving the assistive quality and reducing the collisions. In this paper researchers are taking the scenario of a social buildings like mall, hospitals, airport etc. where blind or disabled persons needs the assistance and human resources are used for the same in these areas. They are proposing an autonomous wheelchair integrated with a Artificial Intelligent ChatBot on it.

It is SLAM based wheelchair with AI assistant to help the "Blind and Disabled" to assist the correct destination and communication between people and AI assistant in indoor crowded area. Research papers on SLAM have already done but we should take advantages of AI to assist the "Blind and Disabled" persons specially indoor crowded social areas. we are proposing the SLAM based wheelchair along with the AI assistance for autonomous navigation and parallel voice assistance system for disabled needy people.

2. PROBLEM STATEMENT

In social environment buildings robot assistance is available, for example on airport robots are working as an informative kiosk. But to assist the disable person human resource is required but some time human cannot help to blind and disable person. So, we required automation assistance using AI and SLAM technology.

SLAM have already known technology to the indoor autonomous navigation and this technology is in market but problem is when “Blind and Disabled” people need assistance to tell the navigation, for this problem we are creating the AI assistance.

3. LITERATURE REVIEW

The author of this paper proposes a solution to the door boundary problem for a robot in an unknown environment the wheelchair is controlled by a Human Machine Interface (HMI) [1]. The author of this paper proposes a novel robotic system to assist the visually impaired in unfamiliar indoor and outdoor environments. Equipped with a vision sensor, a laser rangefinder and a loudspeaker, the robotic system provides information about the surrounding environment to the visually impaired [2].

The author of this paper proposes, according to the World Health Organization (WHO). That around 1.3 billion people worldwide live with some a form of visual impairment. Thanks to the rapid progress technology, every now and then a bit of innovation it has a positive impact on the lives of the visually impaired people [3].

The author of this paper proposes that there are many disabled people who find it difficult to move or perform daily activities. However, they can become independent with the help of aids and perform some daily activities independently [4].

The author of this paper proposes to provides a brief overview of the simultaneous localization and mapping (SLAM) problem from the perspective of using SLAM in an application, as opposed to SLAM research that focuses on the introspection of SLAM [5].

The author of this paper proposes about social robotics. This project explored the unprecedented perspectives of disability service organizations on social robotics. Since the views of community service workers shape community-based rehabilitation (a field of health intervention focused on social determinants), it is important to investigate their views on social robotics applications developed mostly from a clinical/medical disability perspective [6].

The author of this paper proposes the field of automatic navigation robot, the autonomous positioning of the robot car is one of the most difficult challenges. Also called visual SLAM. Extensive tests are carried out to ensure the effectiveness of the method. The results show that the presented method effectively improves the working efficiency of the visual SLAM algorithm and ensures the original accuracy of the algorithm [7].

4. PROPOSED WORK

A technical mapping technique called SLAM (simultaneous localization and mapping) enables robots and other autonomous vehicles to create a map and localize themselves on that map at the same time. On wheelchairs, SLAM (simultaneous localization and mapping) has been implemented.

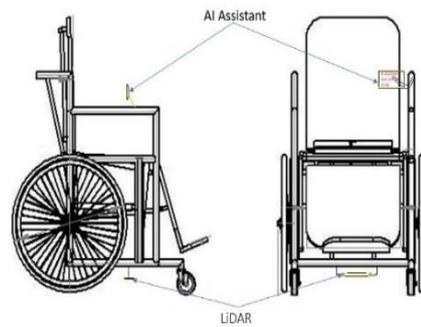
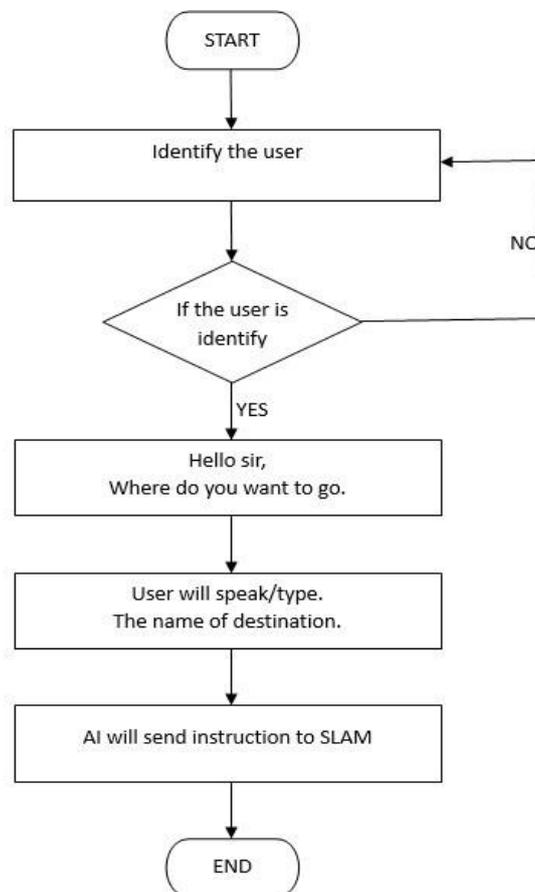


Fig IV.1:- Wheelchairs

➤ **AI Assistance**

- Greeting the person
- Asking name and reason of coming
- Voice assist by information proving
- FAQs solving
- Giving target command to SLAM

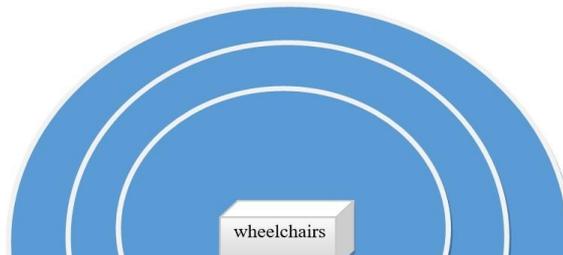
Robair: Robotics Assistance to Disabled Person



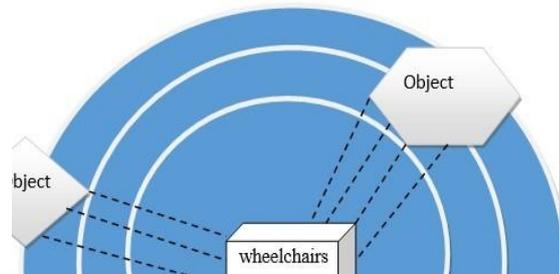
➤ **LiDAR Sensor**

It is a technology which helps to create a map of area with the help of the near-infrared laser. How Does Lidar Work?

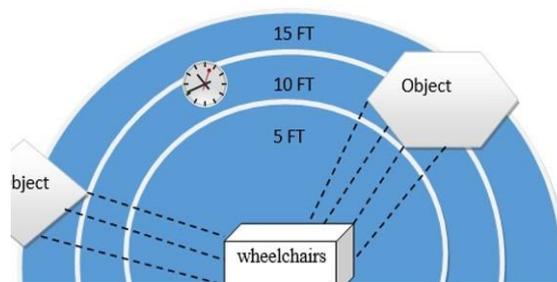
a. The lidar sensor emits pulsed light wave in surrounding environment.



b. The emitted pulses bounce off by surrounding object and return to the sensor.



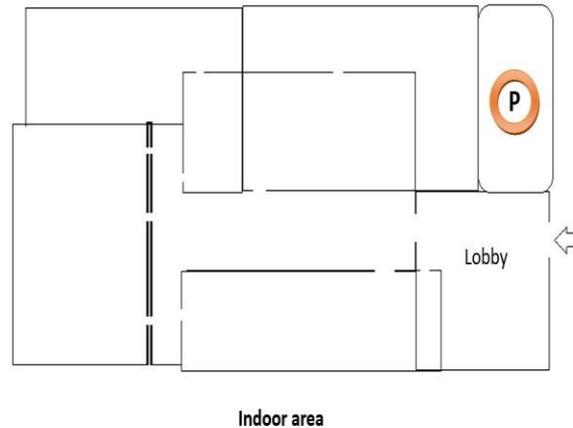
c. To calculate the distance used the time that take to return of each pulse.



➤ **Indoor Area**

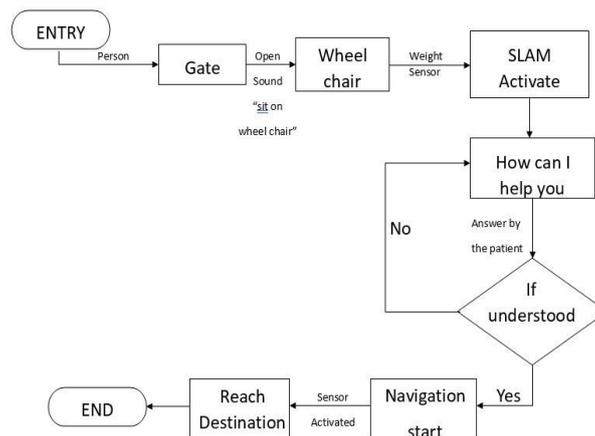
The indoor navigation is to safely navigate new and unfamiliar area from the entrance lobby to the destination by finding shortest path. There are different type of solution have been proposed VIB navigation in an unknown place, some of those have used SLAM technology. In GPS it does not provide indoor mapping but with the help of SLAM techniques we can easily navigate indoor area. Importantly, this system should have high reliability and efficiency to help/guide to user safely and independently.

There are different obstacle while navigating indoor area like walls, object, peoples, etc. so in this scenario we can say that SLAM navigate indoor mapping with the help of LiDAR sensor and to reach destination by using AI assistance.



➤ **Ideology**

In this we define our ideology flowchart of how “ROBAIR” exactly work in indoor mapping by using SLAM and AI assistance to “Blind and Disabled”.



5. CONCLUSIONS AND FUTURE SCOPE

Robair system is made up of SLAM, LiDAR, and AI assistance for “Blind and Disabled” people. SLAM is used to mapping the indoor area. LiDAR used for detecting the obstacle and assist the “Blind and Disabled” people.

Future Scope: -

The system that we provided will be massively used in indoor navigation such as mall, hospitals, banks, large cooperation and so on. Now a days AI widely used in advance technology, we can improve the system in feature by adding cloud communication.

6. REFERENCES

- [1] Ricardo Carelli, “SLAM-based Cross-a-Door Solution Approach for a Robotic Wheelchair”, International Journal of Advanced Robotic Systems, Vol. 6, No. 3 (2009), ISSN 1729-8806, pp. 239-248.
- [2] Genci Capi, Hideki Toda, “A new robotic system to assist visually impaired people”, RO-MAN, 2011 IEEE, July 2011.
- [3] Tufel Ali Qureshi, et. Al., “AI Based App for Blind People”, International Research Journal of Engineering and Technology, Volume: 08 Issue: 03, Mar 2021.
- [4] Kedar Sukerkar et. Al., “Smart Wheelchair: A Literature Review”, International Journal of Informatics and Communication Technology (IJ-ICT) Vol. 7, No. 2, August 2018, 63 – 66.
- [5] Rene Wagner, et. Al., “A SLAM overview from a user’s perspective”, KI - Ku_nstliche Intelligenz 24(3), 2010, 191-198.
- [6] Wolbring, G., Yumakulov, S. Social Robots: Views of Staff of a Disability Service Organization. Int J of Soc Robotics 6, 457–468 (2014). <https://doi.org/10.1007/s12369-014-0229-z>
- [7] Ma. Tianji, et. Al., “Research on the Application of Visual SLAM in Embedded GPU”, Volume 2021, Article ID 6691262, <https://doi.org/10.1155/2021/6691262>