

Artificial Intelligence and Robotics

Mrs. G. Anitha Krishnan
Asst. Professor, Dept. of MCA
SCMS School of Technology and Management,
SSTM, Muttom, Aluva.

Susmera N A
P G Scholar, Dept. of MCA
SCMS School of Technology and Management,
SSTM, Muttom, Aluva.

Abstract— Today, Artificial Intelligence is an important part of the computer science, their target is to create intelligent machines and humans are the inventor of AI. AI is written in Python programming language. It is the ability to memorize, think, recognize the patterns and learn from the experiences, etc. Artificial intelligence is concentrated on the algorithm development and analysis which performs the more intelligent behavior. These techniques can be applied in Robotics, games, mathematics, e-commerce. In this paper, I discussed Robotics for the caregiver to elderly people.

Keywords—Artificial intelligence, implement in India robotics, robot for elderly people, current scenario in India.

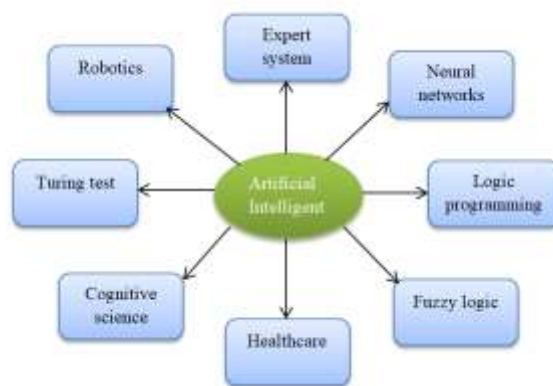


Figure: Different areas of Artificial Intelligence

I. INTRODUCTION

Artificial intelligence is intelligence proved by the machines, which is able to perform various tasks for needs of human intelligence. Some activities of computers with artificial intelligence are learning, speech recognition, problem-solving and planning. Robotics is one of the branches of AI. Artificial Intelligence and Robotics have a common root because both of them takes place in the same time period. But initially, there is no difference between these two technologies. Most of the technical problems and their solutions that need to design the robots with artificial intelligence.

The basic partition between these two fields can be seen in the 1970s, when the robotics concentrated on machine automation, although Artificial intelligence uses to establish that machines can also perform our daily tasks.

Later, in the design of robotics system met more difficulties, capable to act in unconstrained circumstances led AI researchers to decline Robotics as a priority testbed for Artificial intelligence.

II. WHAT IS ROBOTICS

Robotics is the study of robots and it is a branch of technology that deals with designing, construction, and applications of robots. Robots are machines, which are used to do the jobs. Most of the robots are doing their job themselves; other robots must have a person telling them what to do.

“The Robot Institute of America defines a robot as “a programmable, multi-function manipulator designed to move material, parts, tools or specific devices through variable programmed motions for the performance of a variety of tasks” [Russell and Norvig 1995,]. Another definition describes robots as “The intelligent connection of perception to action” [Brady 1985]. Both definitions are not very precise. The first does not include mobile robots and the second includes humans. However, the second definition points out two very important aspects of robotic systems: perception and action.”

In this study, a robot is a machine that is able to obtain the information from its surrounding and use the knowledge about its world to move safely and to operate in their own way without the help of humans.

For acting deliberately several functions are required. The boundaries between the above function may depend on specific architecture and implementations. There are five deliberation functions and each of them is explained below:

- **Planning:** This deliberation function combines prediction and searches for synthesizing a trajectory in an abstract space with the help of predictive models of feasible action and environment.
- **Acting:** It is based on implementing online close-loop feedback function. In order refine an control the achievement of planned actions, this functions processes streams of sensory stimulus to actuators commands.
- **Perceiving:** This function can extract the features of the environment for identifying the events and the states, and other situation which are relevant to the tasks. It also combines bottom-up sensing from sensors to meaningful data, with top-down focus mechanisms, planning for gathering information and sensing actions.
- **Monitoring:** This deliberation function combines and observes the differences between predictions and observations. It also performs trigger recovery actions and diagnosis.
- **Goal reasoning:** It keeps the current commitments and goals into perspective deciding about the commitments to be abandoned, accessing their relevance, opportunities, constraints, or failures and goals to be updated.

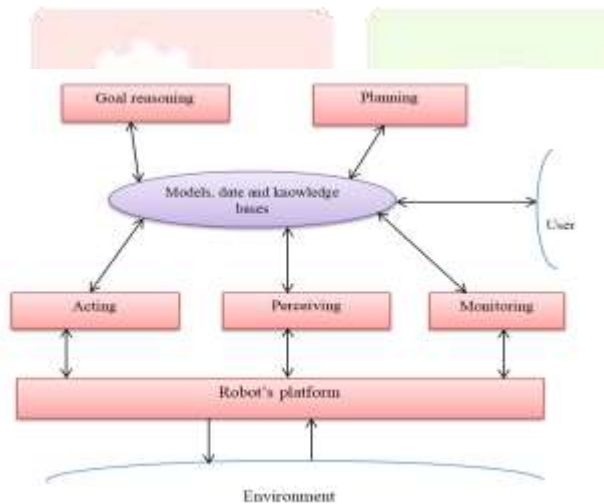


Figure: Various Functions of robotics

III. ROBOT FOR ELDERLY PEOPLE

Because of the busy life schedules, people are not getting enough time to after their elder ones. Based on this problem, I am aiming to develop a system for improving their daily life to ensuring health and care. So providing necessary health care to elderly people is an important factor. But because of the changing lifestyles and busy schedules, the families often find difficult to take care of their elder ones. Therefore I have

proposed a system where the robot partners will assist in daily aspects of the elder one. In this paper, we apply a concept of relational trust to act in a trustworthy manner. We also intended to discuss the effectiveness of relational trust for robot communications.

The robots that are based on relational trust uses simple text strings for patient reminders. For elderly people healthcare, during the period of illness, that person must require more detailed reminders. This system able monitor all the needs of the elder and provide reminders intelligently depending on the parameters such as the timing of the previous interaction, time of day, the user's mood and the other user required actions. The future robot must be capable of carrying and moving things for the users from one place to another. With the help of technology, there is no doubt that the above-mentioned elder care robots will be available commercially in the coming future.

Most of the researchers hope that such eldercare robots will have a number of possibilities and help the elderly people to perform the number of tasks. This task includes:



- Guiding the elderly people and reminding them to visit the bathroom, to take medicines on time, drink or to see the doctor
- Such future robots can help the patient with caregivers by connecting them to the internet.
- Obtaining the necessary data observing the patients well-being and other emergency conditions, such as high blood pressure, heart failures and so forth. By continuously monitoring and through systematic collection of data, the above-mentioned problems can be solved to a great extent.
 - Most of the elderly people are unaware of the home appliances such as refrigerators, washing machine or microwave. With the help of robots, the operations of such appliances are very easy for the elder ones.
 - It is about considering some social functions. Since the elderly peoples are forced to the alone, they are deprived of social contacts. A robot which can help the people in a number of ways can also help the elderly people feel less isolated.



Fig: providing text messages on a screen as a reminder

III. CURRENT SCENARIO IN INDIA

In India, we are not using the caregiver robots because of the following reasons:

- **Very expensive**

Today, if you looking for a robot to use in your house you must choose one of the following options: First type is that the product is a single task system such as a vacuum that is really more of an appliance. Another option is that, to get something that is basically a smartphone on a stand. The last choice is a robot for the sole purpose of entertainment. These machines are very friendly and interactive.

Robots are composed of motors, and gears, and magnets. Its Physical materials such as these have a floor price that they may achieve based on limited supply. Unlike chips, magnets do not get exponentially cheaper. So even with an economy of scale, robots will be expensive due to the cost of raw materials. These components, which are high performance, along with the gearboxes and other custom mechanics could easily run up to around 50,000 dollars. And that is before the sensing and computing are installed, which, though getting cheaper, are still expensive.

Essentially, robots are expensive because they are currently custom, high-performance machines.

- **Less knowledge about AI and Robotics**

People don't have enough knowledge of Artificial Intelligence and Robotics.

- **Availability of requirements**

Requirements for making robots are not available in India. It must have very costly requirements for this purpose. This is another reason for why not implement caregiver robots in India.

- **Fear of security**

If the people have any serious health issues the robot doesn't know what to do. For example, when the patient is unconscious the robot can't do anything for the patient. This is a major issue of this paper.

- **Lack of awareness**

Most of the people don't know how to use the robot, and what are different advantages of robotics and so on. There are two types of awareness are: First is, Human awareness of the robots and second awareness is the knowledge required for the overall mission. This refers to the understanding of the goals of the mission as well as the progress made towards the goals.

V. ADVANTATGE OF CAREGIVER ROBOTS IN INDIA

In India, Our elderly people face many problems, such as memory loss, Depression, loneliness, physical and psychological problems. Depression, memory loss, and loneliness are considered to be the major problems leading to impaired quality of life among elderly persons. A dramatic increase in the elderly population along with the explosion of nursing-home costs poses extreme challenges to society. Current care for the elderly is insufficient, and in the future, there will be fewer young people to help older adults cope with the challenges of aging.

If the functioning of the robot is failed then it must generate an automatic message by itself and sent it to the corresponding authority.

This paper is proposed an intelligent obstacle avoidance algorithm to navigate an autonomous robot. Here the Intelligent Bug Algorithm (IBA) can perform to reach their goal with less time as compared to current Bug algorithms. The amended algorithm offers a goal-oriented strategy by following the smooth and short trajectory. This has been achieved by continuously considering the goal position during obstacle avoidance. The proposed algorithm is computationally inexpensive and easy to implement.



Bug algorithms are deep and complete algorithms with provable guarantees since they let the robot made to act like a man to get stretched its place where one is going if lies in given space. In case the place where one is going is not reachable the machine made to act like a man has the power to come to an end, put an end purposes position and distance while keeping out of a thing in the way. It has two behaviors, “move to end, purpose” and “thing in the way overlooking”. In thing in the way overlooking behavior, it keeps out of a thing in the way by just supporters the edges. It then changes the behavior to move to end, purpose after keeping out of the thing in the way that is it restarts moving towards an end, purpose without giving thought to as any other parameter trouble one another on the base of their behavior of thing in the way overlooking that is, decision while meeting a thing in the way.

The Dist-Bug algorithm is the final improved version of Bug algorithm series. It traverses comparatively shorter distance allowing the robot to reach the destination in less time. This algorithm employs different obstacle avoidance behavior. When the robot encounters an obstacle in its path, it starts following the edge of the obstacle simultaneously calculating and storing the distance from its current and next position to destination.

The objective of this research is to improve these algorithms by addressing their inherent problems and limitations. An algorithm having comparatively more intelligence and efficiency that can reach the goal in comparatively less time by following the smooth and short trajectory. The proposed, Intelligent Bug Algorithm (IBA) is attempted to achieve these objectives. The proposed IBA algorithm is based on two behaviors: move to goal and obstacle avoidance. Similar to the Dist-Bug algorithm, the behaviors in IBA also depend on the present sensorial information of environment i.e. whether obstacles are sensed or not.

In my study, caregiver robots are operating appliances around the home such as the refrigerator, washing machine, or microwave. When the robot is move to the appliance, initially, robot move to goal, a reference path is generated from source point to appliance position and the robot is forced to follow it until an obstacle is encountered or destination is reached. if any obstacle is encounter, the behavior of the robot is changed to obstacle avoidance and the robot is commanded to follow the edges of the obstacle until leaving point is reached. Then the robot monitors the obstacles in the path towards destination while detecting an edge in obstacle avoidance behavior. This condition introduced in IBA, the robot leaving point is not taken on the basis of the minimum distance to destination. The obstacle-free path towards appliance is also considered. This ensures that the robot does not have to wait for the point having a minimum distance to the goal. The robot changes its behavior to move to goal in order to generate new reference path, in case an obstacle-free path is sensed.

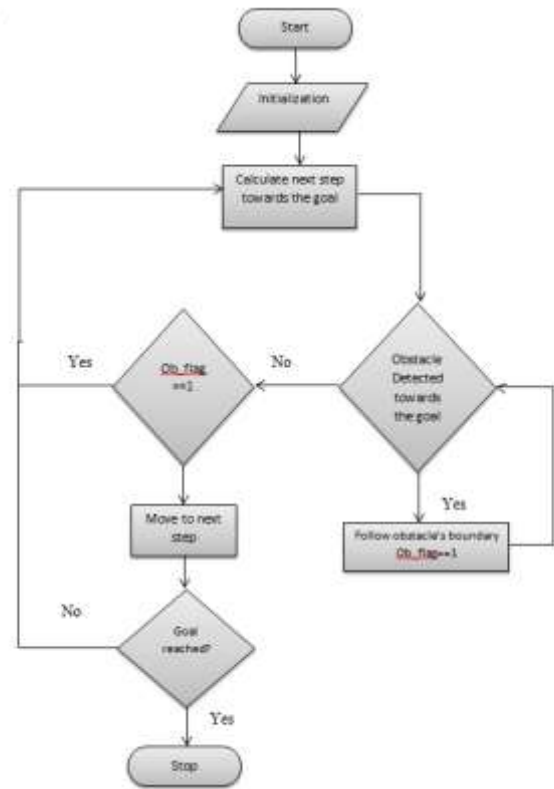


Fig: IBA Flowchart

VI. HUMAN-SYSTEM INTERACTION

Most of them do not have knowledge of English and more than a Billion is uneducated. Yet most personal knowledge processing machine designers take to be true that the user knows English (or a few other languages to do with industry nations). In this way, it's not necessary the technology that is the wall to keep persons out to the wide able to say yes and ready way into knowledge processing machines, but rather companies that target their designs at well-off and having knowledge of reading and writing users into doing with industrialized nations. Anyone can learn to use a television or the telephone or viewing the part telephone, even though these are able to make an argument some of the more complex technologies invented by society.

The basic technologies to add multimedia functionality to a PC have been around for over 15 years. By adding a TV tuner chip, a PC can become a TV and DVR. Adding a camera and microphone permits video and audio inputs, which enable telephone functionality as well as video phone, video conferencing, and video and voice email—capabilities currently unavailable to most users even in industrial countries. The key improvement is to insist on a radically simple user interface that doesn't require literacy—what we call an appliance model. So, even if users can't read or write, they can easily learn to use voice or video mail. If they can't use a text-based help system, they can benefit from the video chat, which is useful for poor and illiterate people.



Mrs. G Anitha Krishnan, Master of Computer Applications (MCA) from Noble P.G. College, Osmania University and Bachelor of Science (MPC) from Nizam College (Autonomous), Osmania University. Currently She is working as Asst. Professor at SCMS School of Technology and Management (SSTM), Muttom. Her Research interest lies in the area of Artificial Intelligence

Fig: For the video phone, the user clicks on the video-phone picture and then selects one of the faces.

VII) CONCLUSION

Here I've presented several technologies and intelligent system applications that could significantly impact the well-being of our society—helping elderly people, those who are poor, sick, or illiterate—much work remains before these tools are routinely available and widely deployed. A new approach IBA is presented in this paper for autonomous navigation of mobile robots. The proposed algorithm IBA follows the short and smooth path and achieves the goal in less time as compared to reported Bug algorithms. IBA is a goal-oriented algorithm. The improved characteristics of IBA make it efficient to prove its convergence with relatively short and smoother path in contrast with the Dist-Bug algorithm.



Susmera N A is currently pursuing Post Graduation in MCA at SCMS School of Technology and Management (SSTM), Muttom, Alwaye, Cochin. Her keen interest lies in the areas of Artificial Intelligence.

VIII. REFERENCES

1. Robotics and Intelligent Systems in Support of Society, Raj Reddy, Carnegie Mellon University, Vol. 21, No. 3 May/June 2006
2. "World Population Aging:1950-2050,"tech. report, Population Division, 2002 World Assembly on Aging, 2002.
3. M.E. Pollack, "Intelligent Technology for an Aging Population: The Use of AI to Assist Elders with Cognitive Impairment," AI Magazine, vol. 26, no. 2, 2005, pp. 9–24.
4. D. Jajeh, "Robot Nurse Escorts and Schmoozes the Elderly," Circuit, 24, Aug. 2004, www.intel.com/employee/retiree/circuit/robot.htm.
5. Intelligent Bug Algorithm (IBA): A Novel Strategy to Navigate Mobile Robots Autonomously Muhammad Zohaib¹, Syed Mustafa Pasha², Nadeem Javaid³, Jamshed Iqbal⁴, 2012-13.
6. Iqbal, J., Islam, R.U., Khan, H.: Modeling and Analysis of a 6 DOF Robotic Arm Manipulator, Canadian Journal on Electrical and Electronics Engineering, vol. 3, no. 6, pp. 300-306 (2012)

AUTHORS