



MACHINE LEARNING BASED MEDBOT

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Abstract : Machine learning techniques have demonstrated the most efficacy in training, learning, analyzing and modelling large structured and unstructured dataset. This autonomous healthcare robot navigates hallways and elevators around the clock, carrying medications, lab samples and other critical items. It also provides an automated door-to-door service which is composed of an area for the parcel they deliver, mounted on wheels, equipped with cameras and sensor, they are autonomous in their functioning. This ml based robot pushes the boundary on the level of intelligence and capability for many forms of autonomous and teleported machines. This paper employs on established rules of medical robot which is trained under various learning algorithms for the purpose to serve the people in need.

Keywords - Machine learning, Computer vision, Robotics, IOT, Healthcare, Autonomous, medical robot.

I. INTRODUCTION:

The hospital is an organization with a complex internal management system, therefore, it needs high accuracy and high precision in managing information, devices, materials or medical products including medical supplies, medical equipments and patients. In this paper we present the collaboration of machine learning with robotics, in order to deploy an intelligent system in healthcare sector. It is an excellent tool that greatly improves the quality of service and provides autonomy to dependent people. This intelligent system can be adopted to robotic or motorized kinematic system for people with functional disabilities allowing them to shower on their own by giving commands to the robots. The robot is equipped with a holder (plate) that allows the medicines to be delivered with an ease to the patients from a safe distance. This will result in making timely delivery of medicines for the patients and will also reduce the unnecessary contact with patients minimizing the risk for medical personnel. Indeed current differences in specific applications support designation of four distinct categories of robots in healthcare delivery: 1) surgical, 2) medical, 3) service and 4) rehabilitative. The distinctions are relevant because robots designed to perform task in any one of the four clinical areas would generally not be suitable for use in any one of the others. This task automated robot primarily serves healthcare professional by completing routine logistical task and sending a report once a task has been completed.

II. PROPOSED METHODOLOGY:

Electronics as well as hardware components are required to build this project. These components with their specifications are summarized below:

- Arduino Uno(r3)
- Smart Phone
- Batteries(9v)
- Raspberry pi 4
- Raspberry pi camera
- Geared Motor and Wheels(200 rpm)
- Motor Driver (L298 N)
- Bluetooth module(HC-05)

2.1 Arduino uno:

Arduino uno is a type of microcontroller prototyping board which works on the Atmega 328p ic and it works on 5v input on a clock frequency of 16mhz.

2.2 Raspberry pi4:

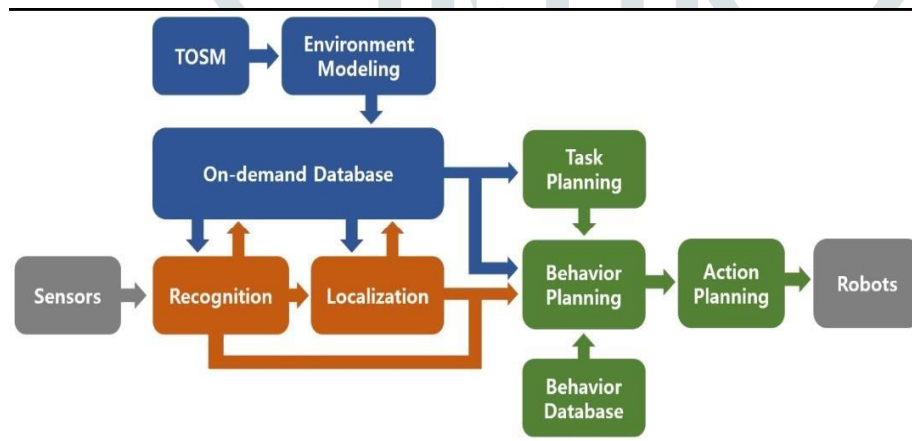
Raspberry pi 4 can be used for wide range application making raspberry pi into a retro arcade machine, using it as brain for a robot and can also be used for training the robot.

2.3 Bluetooth module:

Bluetooth module enable the data to get communicated wirelessly. The data is in the binary format which is transmitted by the smartphone using the application.

III. NAVIGATION SYSTEM:

To use the navigation system, an operator need to point a particular target on the map. Then, the robot will automatically process and create the shortest route to travel to that location. The application communicates with the robot to visualize, deduct and locate the position of the robot. Then, the system will send an exact position to be displayed on the interface program. The robot has the ability to determine its own position in its frame of reference and then to plan a path towards some goal location. The purpose of navigation is to navigate through cluttered environment in search for optimal path from the start position to target position.



IV. RESEARCH DIRECTION:

It can be implemented on medbot for more precise and faster delivery. It can avoid most of the obstacle by implementing the same on the path. We can replace screen display with an information on the containing the order items. The robot can be made to interact with the customer like saying "Thanks For Ordering" or any other phrases. This can be achieved by using AI concept and using different modules like bluetooth module etc. The robot can be provided with medicines and emergency surgical items also, so that it more efficient. Codes can be added to allow the robot to follow rules and orders. Robot can be made even smarter by connecting it to internet using wifi module. This in turn helps the robot to connect through using cameras to display the monitor as faster and in a very effective way. The medbot is an advanced technology for a medical sector.

4.1 ADVANTAGES:

The medbot can perform delivery job with ease. Human labor is reduced and work efficiency is enhanced. It prevents burglary of the delivery of the medicines. More affordable and less expensive way for delivery. Fast delivery is possible. Special equipments are not required. It uses camera to display the monitor. Easy to access. There is no need to provide the details/information of the person/company we are paying to or buying from. The camera on the robot scans the room number. This will identify the patients to deliver the items of the person. Safety is increased. Storing the details on the system can be tedious and vulnerable to scanners. This type of robot can be implemented even more in the future, are interesting, easy and helps the patients the correct time.

V. FLOW CHART:

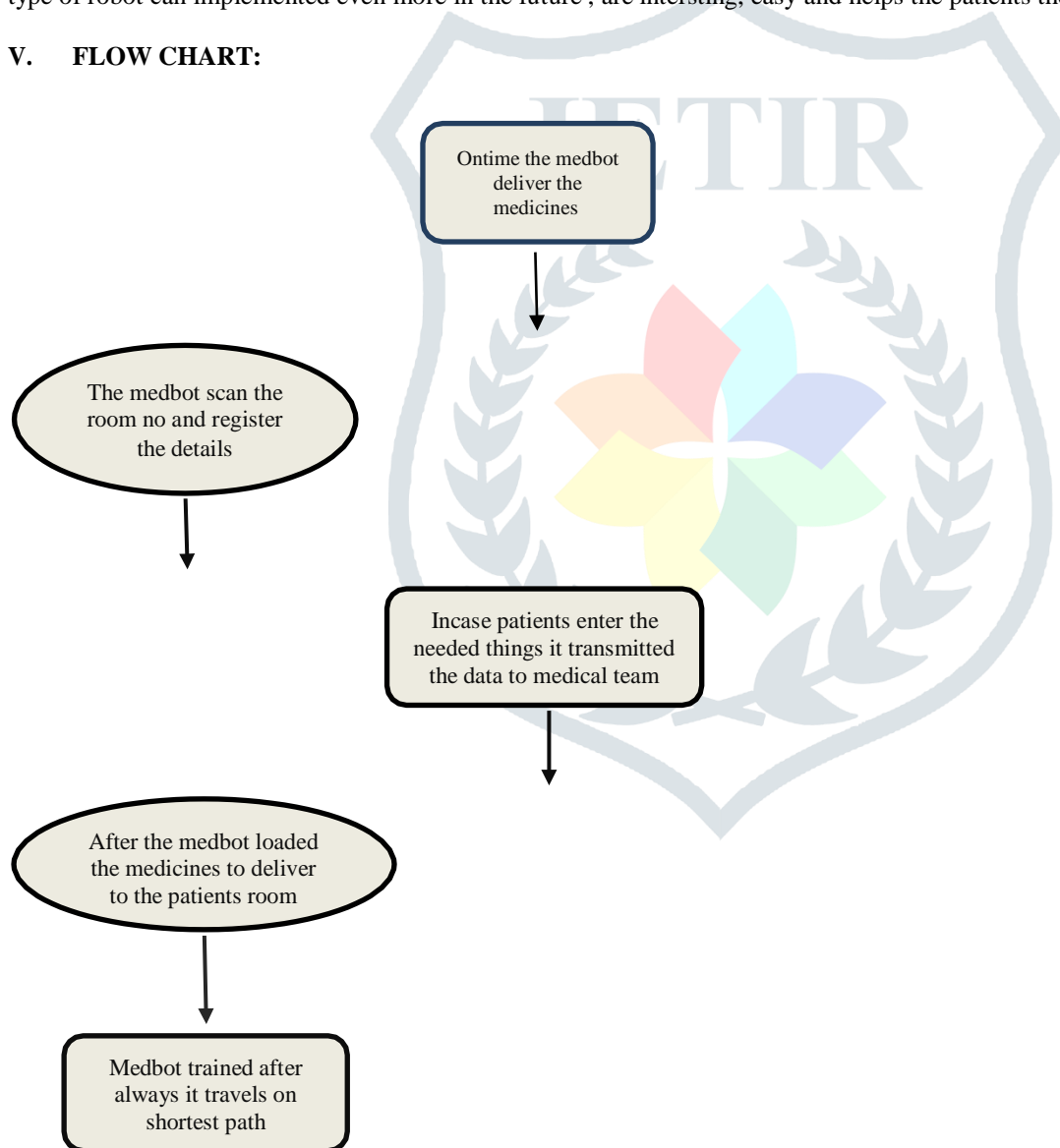


Fig.1

5.1 Flowchart of the Working of medbot:

The process begun by loading medbot with the medicines; it is then controlled by the mobile phone by observing the feed from the camera and the distance sent b the distance sensor.After establishing and making all the connections,the robot is loaded with required stuff and is controlled from a safe distance.The feed from the camera on the bot is transmitted wirelessly to the application running on the smartphone.The application is built using open-source platform called android studio.The live feed from the camera is visible as soon as the internet protocol(ip) address of the camera from the bot is entered.The slider is used to control the speed of the bot.This application is also connected to the hospital's database in order to view the details and services provided to the patient.A holder is attached on the top of the bot so that the medicine can be placed in it,which will be delivered to the patients.The operator can see the realtime surrounding of the bot and control it effeciently as it is equipped with the required sensors.Once the medbot is deployed in the floors of hospital,it roams around the hospital completely and learns all the different path with the help of machine learning algorithm which is programmed.After the learning process,now the medbot chooses the optimal path(shortcut) to reach the destination quickly.

VI. RESULTS AND DISCUSSION

As it obvious that the robot does not require daily wage and can work for long period of time without sacrificing productivity, are easily disinfected.As a result,medbot and other similar robots can be employed on every hospital floor or ward to reduce unwanted contct with isolated patients.Besides, additional navigational maps are derived by various packages of ros applied on 2d and 3d data obtained from sensory elements to increase the effeciency of the mapping,including the system that can avoid hurdles by itself.With the use of rechargeable battries,the medbot can serve upto 12 hours a day and 2 hours of recharge time.



VII. CONCLUSION

Various health organizations throughout the world,according to microsoft,have produced many Artificial intelligence(AI) chatbots and medical robots.Similarly, robots like medbot will be able to serve patients, nurses and also the doctors.These Ai-assisted medical robots have exploded and analyst predict that this trend will continue in this future.Finally, technology like this will continue to benefit humanity.Medbot and similar robots can reduce infection rate among doctors and healthcare workers by a significant amount.

VIII. REFERENCES

- [1] BY ELENA GARCIA,MARIA ANTONIA JIMENEZ,PABLO GONZALEZ DE SANTOS,AND ARMADA"THE EVOLUTION OF ROBOTICSRESEARCH"DOI:10.1109/MRA.2007.339608(DOI.ORG).
- [2] ONYINYE IKPEZE,TEMITAYO EJIDOKUN,AND MOSES ONIBONOJE"SMARTPHONE CONTROL MOBILE ROBERT FOR EDUCATION AND RESEARCH"DOI:10.1155/2022/5178629(DOI.ORG).
- [3] ZHIHONG JIANG,XIAOLEI CAO,XIAO HUANG,HUI LI, AND MARCO CECCARELLI"PROGRESS AND DEVELOPMENTTREND OF SPACE INTELLIGENT ROBOT TECHNOLOGY"DOI:10.34133/2022/9832053(DOI.ORG).
- [4] NICHOLAS AYACHE, INRIA-EPIDAURE FRANCE 06902 SOPHIA-ANTIPOLIS,FRANCE"MEDICAL COMPUTER VISIONVIRTUAL REALITY AND ROBOTICS"AYACHE@SOPHIA.INRIA.FR.
- [5] MUSTAFA M.AMAMI,CIVIL ENGINEERING DEPARTMENT BENGHAZI UNIVERSITY"FAST AND RELIABLE VISION- BASED NAVIGATION FOR REAL TIME KINETICAPPLICATIONS"DOI.ORG/10.22214/IJRASET.2022.40395.

- [6] ABHILASH JOY,ROJIN ANTO VARGHESE,ANGELA ARGHESE, ANNAMARYSAJEEV,MRS.SUPRIYA MARY SUNIL"MEDICINE DELIVERING AND PATIENT PARAMETERMONITORINGROBOT-MEDROBO"DOI:10.17148/IARJSET.2021.8679(DOI.ORG).
- [7] SRIKANTH KAVIRAYANI,DIVA SREE UDDANDAPU,ARAVIND PAPASANI"ROBOT FOR DELIVERY OF MEDICINE TO PATIENTS USING ARTIFICIAL INTELLIGENCE IN HEALTH CARE"GAYATRI VIDYA PARISHAD COLLEGE OF ENG,VISAKHAPATNAM,INDIA.
- [8] MANIDA SWANGNETR AND DAVID B. KABER "EMOTIONAL STATE CLASSIFICATION IN PATIENTS-ROBOT INTERACTIONS USING WAVELET ANALYSIS AND STATISTICS -BASED FEATURESELECTION"DOI:10.1109/TSMCA.2012.2210408(DOI.ORG)
- [9] D.QIN ET AL"EFFICIENT MEDICAL IMAGE SEGMENTATION BASED ON KNOWLEDGE DISTILLATION"DOI:10.1109/TMI.20213098703(DOI.ORG)
- [10] BOGDAN MARIS,MARINA-CAMILA FIAZZA,MICHELA DE PICCOLI,CHIARA TENGA,LUIGI PALLADINO,STEFANOPULIATTI,ANDREA ISEPPI,RICCARDO FERRARI,ADELEPIRO,LUCA REGGIANI BONETTI,GUIDO LIGABUE,ALESSANDRO TAFURI,SALVATORE MICALI,PAOLO FIORINI"PRECLINICAL VALIDATION OF A SEMI- AUTONOMOUS ROBOT FOR TRANSPERINEAL PROSTATE BIOPSY"DOI:10.1109/TMRB.2022.3159737(DOI.ORG) [11]ANDREA MAGLIA, KONSTANTINOS GEORGIOU, BLAGOI,MARINOV, EVANGELOS GEORGIOU, RAFFAELLA NICEBERCHIOLLI, RICHARD M.SATAVA , ALFRED CUSCHIERI"5G IN HEALTH CARE FROM COVID-19 TO FUTURE CHALLENGES"DOI:10.1109/JBHI.20223181205(DOI.ORG)
- [12] ZHIWEI CUI, WEIBING LI , XUE ZHANG, PHILIP WAI YAN CHUI, XHENG LI, "ACCELERATED DUAL NEURAL NETWORK CONTROLLER FOR VISUAL SERVOING OF FLEXIBLE ENDOSCOPIC ROBOT WITH TRACKING ERROR,JOINT MOTION,AND RCM CONSTRAINTS" DOI:10.1109/TIE.2021.3114674(DOI.ORG)
- [13] VIGNESH SUBBIAN, JONATHAN J.RATCLIFF, JASON M.MEUNIER, JOSEPH J.KORFHAGEN, FRED R.BEYETTE, GEORGE J.SHAW "INTERGRATION OF NEW TECHNOLOGY FOR RESEARCH IN THE EMERGENCY DEPARTMENT :FEASIBILITY OF DEPLOYING A ROBOT ASSESMENT TOOL FOR MILD TRAUMATIC BRAIN INJURY EVALUATION"DOI:10.1109/JTEHM.2015.2424224(DOI.ORG)
- [14] MOHD MAHMEEN ,RAHUL DAVID DOMINGUEZ SANCHEZ, MICHAEL FRIEBE, MACIEJ PECH, SULTAN HAIDER, "COLLISION AVOIDANCE ROUTE PLANNING FOR AUTONOMOUS MEDICAL DEVICES USING MULTIPLE DEPTH CAMERAS" DOI:10.1109/ACCESS.2022.3159239 (DOI.ORG)
- [15] LAUREN R.KENNEDY-METZ, PIETRO MASCAGNI, ANTONIO TORRALBA, ROGER D.DIAS, PIETRO PERONA, JULIE A.SHAH, NICOLAS PADOY, MACRO A.ZENATI "COMPUTER VISION IN THE OPERATION ROOM:OPPORTUNITIES AND CAVEATS" DOI: 10.1109/ TMRB.2020. 3040002 (DOI.ORG).

