A Gesture Controlled Mobile Robot With Robotic Arm For The Reactions of Uranium And Its Isotopes

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Abstract- *A vision-based guidance method is presented to guide a robot platform which is designed independently to drive through the crops in a field according to the design concept of open architecture. Then two things called offset and the heading angle of the robot platform are detected in real time to guide the platform on the basis of recognition of a crop using machine vision. This project is basically developed to implement a number of agricultural production in many countries, such as picking, harvesting, weeding, pruning, planting, grafting, agricultural classification etc.,*

Keywords- Arduino UNO, Gesture, Uranium, Flex sensor, MAX 232.

I. INTRODUCTION

OBOTICS has impacted human life in many significant ways. Apart from revolutionizing the manufacturing sector, robots have now found their way out of the factory and into such applications as agriculture [1], aerospace [2], and education [3], just to name a few. Over the past decade, robots have also been integrated into operating rooms around the world and have enabled or improved many new minimally invasive surgical procedures. Minimally invasive surgery is beneficial because it can reduce patient discomfort, costs, and hospital time. The use of robotic technology in surgery brings precision, intuitive ergonomic interfaces, and the ability to access surgical sites remotely with miniaturized instrumentation.

Thus, robotics has the potential to further advance the benefits of minimally invasive surgery and make new procedures possible. In the last decade, the use of surgical robots has grown substantially [4]. Thus far, the most widespread surgical robot system is the da Vinci robot system (Intuitive Surgical Inc.) for minimally invasive surgery. The current system (da Vinci Xi) represents the fourth generation of the product, and 3398 systems have been installed throughout the world.1 As discussed in [5] and [6], the da Vinci is a teleoperated robot system, where the surgeon manipulates a master input device in an immersive visualization environment (surgeon console), and these inputs are translated into motion. Tele-operated surgical robots offer advanced instrumentation and versatile motion through small incisions directly controlled by the physician [7]. However, typical surgical robots require a large footprint in the operating room and use instruments that are rigid and straight with a functional articulating tip. Thus, it would be greatly beneficial to have manipulators which are scalable to a small size, flexible yet strong, and which can reach difficult-to-access surgical sites via nonlinear pathways and complete the surgical task with dexterity. In this paper, we discuss a category of robots that promises to provide these capabilities: continuum robots.

II. LITERATURE REVIEW

Eight subjects with carpal tunnel syndrome (CTS) (47.13 ± 7.83 years) and 8 matched controls (46.29 ± 7.27 years) manipulated a test object fitted with an accelerometer and force sensor, both before and after hand muscle fatigue. Grip force and object acceleration were recorded and used to calculate grip force control variables that included Grip Force Peak, Safety Margin, healthy controls during object manipulation. Once fatigued, both groups significantly decreased their grip force to perform the task (Grip Force Peak; $p = .017$ and Safety Margin; $p < .001$) [1].

Service-Robotic—mainly defined as “non-industrial robotics”—is identified as the next economical success story to be expected after robots have been ubiquitously implemented into industrial production lines. Under the heading of service-robotic, we found a widespread area of applications reaching from robotics in agriculture and in the public transportation system to service robots applied in private homes.

We propose for our interdisciplinary perspective of technology assessment to take the human user/worker as common focus. In some cases, the user/worker is the effective subject acting by means of and in cooperation with a service robot; in other cases, the user/worker might become a pure object of the respective robotic system, for example, as a patient in a hospital.

We present a comprehensive interdisciplinary framework, which allows us to scrutinize some of the most relevant applications of service robotics; we propose to combine technical, economical, legal, philosophical/ethical, and psychological perspectives in order to design a thorough and comprehensive expert-based technology assessment [2].

Robots with animal-like behaviour and integrated artificial nervous systems will open up totally new perspectives and applications. However, until now all presented studies on soft robots were limited to partly soft designs, since all designs at least needed conventional, stiff, electronics to sense, process signals and activate actuators. This is the first gesture controlled robot with integrated artificial nervous system which is entirely made up of dielectric elastomers [3].

The Camera (WACL) allows the remote collaborators not only to set their viewpoints into the wearer's workplace independent of the wearer's motion but also to point to real objects directly with the laser spot.

In this proposed paper, we can make the user test to examine the advantages as well as the limitations of the WACL interface in the remote collaboration which can be done by comparing a head-mounted display and a head-mounted camera-based headset interface.

Results show that the WACL gives better impressions on comfortability when wearing, eye-friendliness, and fatigue in spite of no significant difference in task completion time.

We first review related works and user studies with wearable collaborative systems, and then describe the details on the user test [4].

III. EXISTING SYSTEM

The system which used just controls the movement of the automatically by using the keypad alone.

Drawbacks of existing system:

- Paralysis people are unable use these technologies
- Its take more time for processing
- Complex to use

IV. PROPOSED SYSTEM

Here different types of sensors used to control the Ping and Place robot. This robot mainly developed for paralysis people Motion detection control the robot.

Advantages of proposed system:

- Flexible to use
- Less processing time
- It is affordable and simple
- High-level spinal cord injuries to control wheel chair.

V. BLOCK DIAGRAM

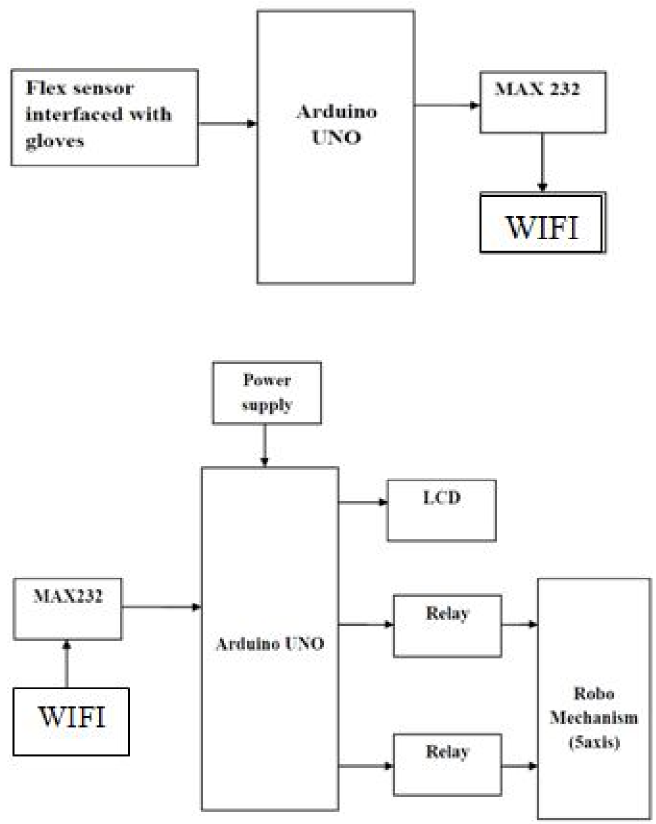

Fig.1 Block Diagram

VI. WORKING

To attain our proposed system need to use ARDUINO controller to monitor the field. In this proposed system we have the robot mechanism to place the material to correct location. Hand based robotic mechanism employed to navigate the robot throughout the field. And also the whole robot is controlled by Flex sensors interfaced with human hand. Controller status and everything is displayed in LCD.

The whole process is controlled by microcontroller. A Gesture Controlled robot is a kind of robot which can be controlled by your hand gestures not by old buttons. You just need to wear a small transmitting device in your hand which included an acceleration meter. Then this kind microcontroller will transmit an appropriate command to the robot which is to be operated so that it can do exactly what we do. The transmitting device included a ADC for analog to digital conversion and an encoder IC which is use to encode the four bit data and then it will transmit by an RF Transmitter module.

At the receiving end an RF Receiver module receivers the encoded data and decode it by and decoder. This data is then processed by arduino controller and finally our motor driver to control the motor's. The robot moves according to accelerometer direction i.e. left, right, forward, backward. The temperature sensor LM 35 is interfaced with Arduino controller it senses temperature in area where robot moves & sends back to operator

VII. HARDWARE USED

1. ARDUINO UNO:

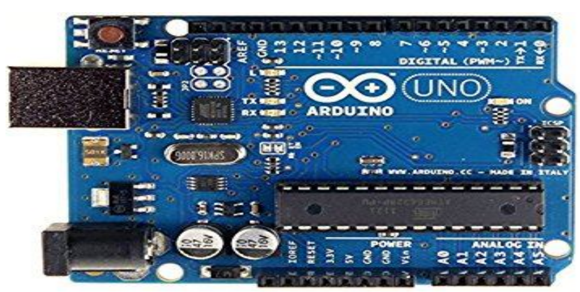

Fig 2: Arduino UNO

The Uno is a microcontroller board based on the ATmega328P. The microcontroller which is used contains fourteen digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs pins which is used to get analog input, a 16 MHz quartz crystal is there to produce clock signal, a USB port, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller simply connect it to a computer with a USB cable or power it with a AC-to- DC adapter or battery to get started. The microcontroller embedded in the board will be programmed by Arduino Software (IDE).

2. WI-FI

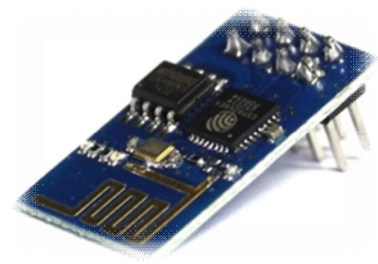

Fig 3: ESP8266 Wi-Fi Module

The ESP8266 Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. It is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fi ability. It is an extremely cost effective board with a huge, and ever growing, community. This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area.

3. LCD:

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. LCD display with two rows and sixteen columns is very basic module which is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs.

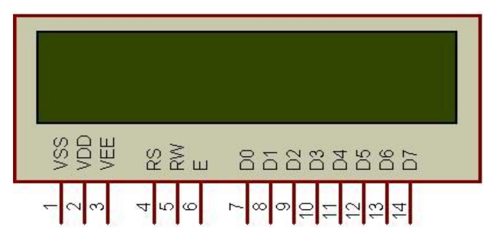

Fig 4: LCD

The key reasons for using these kind of LCDs are economical and easily programmable and there is no limitation of displaying special & even custom characters, animations and so on. When we give an instruction to the LCD to do a specific task like initializing it, clearing its screen, setting the cursor position, controlling display etc. This LCD display is interfaced which displays the result.

4. MAX 232:

Fig 5: MAX 232

In this project MAX232 which is a dual driver/receiver IC that includes a capacitive voltage generator in which supplies sufficient voltage to the zigbee connected to it. Each pin in the IC will delivers an output voltage of 5 volts. Each driver converts inputs levels into various EIA-232 levels. The P3_0 (RX) and P3_1 (TX) pin of controller is connected to the max 232 driver and the TX and RX pin of max 232 is connected to the GSM modem or PC.

5. FLEX SENSOR:

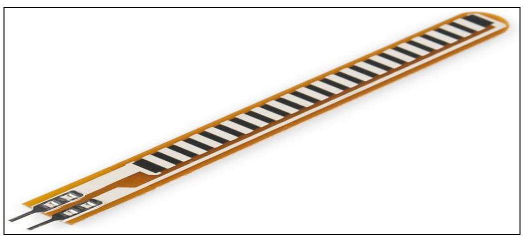

Fig 6: Flex Sensor

A **flex sensor** is used in this system in order to get the gestures produced by the user. A simple flex sensor 2.2" in length. As the sensor is flexed, the resistance across the sensor increases. Due to the changes occurs in the resistance of flex sensor when the metal pads are on the outside of the bend (text on inside of bend). Connector of the flex sensor is connected on the bread board friendly. Note: Please refrain from flexing or straining this sensor at the base. Although the range of the sensor if fixed without any problem but a care should be taken in order to minimize the flexing outside the usable range. Thus by moving it the gestures of the robot be controlled and it produces a better result.

6. DC MOTOR:

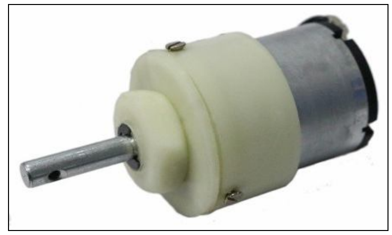

Fig 7: DC Motor

A DC motor is designed to run on DC electric power. The DC motor will get operated based on the gestures. When the hand is moved to corresponding direction due to the variation in flex sensor produces a variation in resistances. Thus by those variations the corresponding motor will be activated. Here the motor is provided with motor driver circuit to operate motor with more voltage.

7. RELAY:

A relay acts as electromagnetic switch to turn on or off a large electric current by using a small amount of electric current. The basic principle of a relay is an electromagnet where electricity flows through a coil of wire than it becomes a temporary magnet.

Fig 8: Relay

A Relay can act both as switch or amplifiers to turn on or off the bigger devices using a smaller electric potential since sensors are sensitive electronic components and produce only smaller currents. Most of the times we need to drive large potentials to activate larger ones. In our project Arduino UNO Produces 5v volt and potential need to drive for pump is 5v. So Relay bridges the gap to drive 5v to pump from 5v output of Arduino UNO.

VIII. SOFTWARE USED

1. ARDUINO IDE:

The Arduino Uno board can be programmed using the (Arduino Software (IDE)) then the code for the specific task is typed and saved then the code is uploaded to the board. Select "Arduino/Genuino Uno from the Tools > Board menu (according to the microcontroller on your board).The ATmega328 on the Arduino/Genuino Uno comes pre-programmed with a boot-loader in which allows the user to use the inbuilt libraries for various tasks. It communicates using the original STK500 protocol (reference, C header files).

2. EMBEDDED C:

Embedded C is a set of language extensions for the C Programming language by the C Standards committee to address commonality issues that exist between C extensions for different embedded systems.

IX. RESULT AND DISCUSSION

The robot moves in 4 directions as per hand gesture.

Fig 9: Movement of hand in forward direction

Fig 10: Movement of hand in left direction

Fig 11: Movement of hand in reverse direction

Fig 12: Movement of hand in right direction

When moving our hand in corresponding direction the robot also moves to the desired direction. Thus the above proposed system defines the controlling of robotic arm through hand gestures using various advance techniques.

X. CONCLUSION

In this project accelerometer is used. The new approach is interfacing of LM 35 for temperature sensing. The robot moves in different directions. More over it is also cost effective. It is applicable for area where human is unable to reach like mines, military applications etc.,

XI. ACKNOWLEDGMENT

We express our sincere thankfulness to our Project Guide Mrs. **G. BHAVANI** for her successful guidance to our project. Without the help it would be a tough job for us to accomplish this task. We thank our guide for her consistent guidance, encouragement and motivation throughout our period of work. We also thank our Head of the Department (ECE) Mrs. **S.JEYA ANUSUYA** for providing us all the necessary facilities and constant motivation.

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