Gesture Control Robot with Arduino

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Abstract. There is a growing need for industrial automation in various human cases, where employees are in difficulty or ineffective. Movement activities use liquids to facilitate control. Bakers require hands-free and liquid equipment. Respirators are used to record mobile mobility and guide the robot to move in the right direction. A wireless connection is used and helps to connect with robotics and parts of the body. This type is easy to control and use. Arduino Uno is used to produce a robot commander. The inspector can help you enter a friendly way. We can also increase productivity production.

Keywords: sensors, Arduino Uno, manufacturing industry.

1. Literature survey

Moniruzzaman Bhuiyan, Rich Picking Innovation Institute of Information at the University of Dhaka, Dhaka, Bangladesh; Center for Applied Internet Research, Glyndwr University, Wrexham, United Kingdom in September 2011 in the Journal of Software Engineering and addressing the difficulties of general registration, surrounding developments and an undeniably more established population, explorers have sought to separate themselves from traditional methods of Association.

They created a model of GCU1 application, called Open Gesture to allow customers to complete regular exercise, for example, make phone calls, check the TV and perform scientific calculations.

Stefan Waldherr, Roseli Romero, Sebastian Thrun represents a movement interface for controlling a versatile robot with a controller. The interface uses a camera to follow a man and perceive signals that include arm movement. Subsequent and rapid calculation allows the robot to trace and reliably complete a man in office situations with varying lighting conditions.
J. Koster, University of Twente, Media Human Interaction, in March 2006, recommends that signals are not used regularly to control residential machines in an advanced family. They represent an examination company on the current use of movements in local machines and the plausible use thereafter. Give a review in the field of continuous motion, an exploration shown on local devices with the use of movement. Using the information techniques illustrated, new strategies are presented to control movement in the domestic sphere. A remote control with touchpad or capacitive field controls turned out to be an intriguing gadget.

Rafiqul Zaman Khan and Noor Adnan Ibraheem of the Department of Computer Science, A.M.U. Aligarh, India, in the International Journal of Intelligence and Artificial Applications (IJAIA) in July 2012 proposed hand signal recognition: a survey of writing. They said the hand motion recognition framework had an amazing consideration in the couple of years because of their complex applications and the ability to interact with the machine effectively through human collaboration with the PC. They showed a review of the frames of recognition of last-minute movements. The key issues of the hand signal recognition framework are given the difficulties of the structure of the movement.

Wei Xin Sha, John Iachello, Steven Dow, Yoichiro Serita, TAZAMA St. Julien, Julien Fistre Faculty of Literature, Communication, Computer and Culture / GVU Center Georgia Institute of Technology proposed the continuous detection of gestures to control the audiovisual media. They represent how the detection of the incessant movement can be achieved by using low power remote sensing to improve the expressive control of the age constant of sound and visual supports

Rajesh Kannan mega lingam, SaiManojPrakhya, Nammily Ramesh Nair, Amrita Vishwa Mohan Mithun Vidyapeetham, Amritapuri, Clappana, Kerala, Indian proposal for unconventional inland navigation: wheelchair control based on gestures. They say there are a lot of people on the planet with debilitating physical disabilities and the elderly facing critical challenges in executing particularly critical activities, such as speed, to speak, to compose, etc. The most heavily influenced physical test class is that of people who have proven incapable of a high level of their body, namely quadriplegic line navigation (LFN) and location Aware and Remembering navigation (LARN). These strategies are basic and familiar with the financial situation of the place or of the internal itinerary.

Dr. R. V. Dharaskar S. A. Chhabria Sandeep Ganorkar proposed mechanical arm control using signals and voice in the International Journal of Computers, Information Technology and Bioinformatics (IJCITB). They said that the human-robot voice interface plays a key role in many fields of application. Hand movement is an exceptionally normal type of human communication and can be used appropriately in the human PC connection (HCI). They propose a "Human Machine Int".

2. Introduction

At the moment, robots regularly assign jobs, in particular, do unnecessary work. In general, the autonomy of the application is divided into two territories, modern mechanical and administrative technology. The Federation of Global Robotics (IFR) manages the robot as a fully or fully self-controlled robot for the management of state and technical facilities, with the exception of manufacturing operations. These robots are now used as part of various sectors, such as offices, military communications, treatment centres, hazardous conditions and the agricultural industry. In addition, it may be problematic or dangerous for people to perform specific tasks, such as obtaining sensitive chemicals, decontaminating pumps or storing them in the worst case, dropping, monitoring and maintaining them in organizations. Thus, the robot can be replaced by people for the task.
3. **Definition of the robot hand**

A mechanical identifier is usually a programmable robot controller with the same capabilities as human hands. This type of controller connection is associated with a junction that allows rotation (e.g., in a configurable robot) or translation (direct) extraction. It can be assumed that the control connection is connected to the kinematic chain. Commercial termination of the controller's kinematic circuit is known as the ultimate effect and resembles a person's hand. Finally, the effector is designed to perform any purpose task such as placing, fixing, rotating, etc., depended upon the application. It can be controlled autonomously or physically and can be used to perform various efforts with incredible precision. The automatic lever can be installed or transported (with wheels) and can be used for mechanical or domestic use.

![Diagram of the proposed robot system](image)

**Figure 1.** Representation of the square diagram of the proposed robot system

4. **Hardware requirements**

1. Accelerometer
2. Servo motors
3. Arduino Uno
4. Battery
5. DC motors
6. Bluetooth (HC-05)

4.1 Accelerometer (sensor)

This accelerometer assists us to interface with the directions. It contains 3-axis which are X, Y and Z. Accelerometer, a dynamic sensor fit for a huge scope of detecting. Accelerometers are accessible that can quantify increasing speed in 3 different axes. They are regularly utilized as a part of one of three modes:

- As an inertial estimation of speed and position;
- As a sensor of slant, tilt, or introduction in 2 or 3 measurements, as referenced from the quickening of gravity (1 g = 9.8m/s²);
- As a vibration or effect (stun) sensor.

There are extensive points of interest to utilizing a simple accelerometer instead of an inclinometer, for example, a fluid tilt sensor – inclinometers tend to yield parallel data (showing a condition of on or off), in this way it is just conceivable to identify when the tilt has surpassed some thresholding edge.

![Figure 2. diagram of an accelerometer](image)

4.2 Servo motors

Servomotors are a kind of electromechanical actuators that do not persistently become DC / AC motors or stepper motors; rather, they are used to position and maintain a question. They are used when a persistent revolution is not needed, so they are not used to drive the wheels.
Figure 3. Servo motor and its parts.

Specifications
Item Name: MG995 Metal Gear Servo
Dimension: 40x19x43mm
Weight: about 69g
Operating Speed: 0.17 sec/60 degrees (4.8V no load)
Operating Speed: 0.13 sec/60 degrees (6.0V no load)
Stall Torque: 13 kg-cm (180.5 oz-in) at 4.8V
Stall Torque: 15 kg-cm (208.3 oz-in) at 6V
Operation Voltage: 4.8-7.2 Volts
Gear Type: All Metal Gears

4.3 Arduino Uno

The Arduino Mega 2560 is a microcontroller board in view of the ATMega328p. It has 14 Digital and 6 Analog pins.

Figure 4. Arduino Uno board
4.4 Battery

![9V battery and connector]

**Figure 5.** 9V battery and connector

4.5 DC motors

![12V DC motor]

**Figure 6.** 12V DC motor

4.6 Bluetooth Module (HC-05)

This module is designed for transparent wireless Serial connection setup. The module can be used in master and slave configuration, making it a great solution for wireless communication.

![Bluetooth module]

**Figure 7.** Bluetooth Module

5. Design
6. Implementation
The accelerometers are connected to Arduino uno development board which is then connected to the computer via serial communication.
7. Conclusion

The targets of this task, which comprised of the advancement of equipment and programming for an automated arm controlled by an accelerometer, have been accomplished. From the perception that has been made, it obviously demonstrates that its development is exact, simple to control and simple to use for the client. The automated arm has been effectively created since the development of the robot can be controlled accurately. This technique for control of the automated arm is relied upon to take care of the issue, for instance by putting or gathering objects from the client, gathering and situating perilous protests in an extremely straightforward and fast way.

Reference

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