

Application of Robotic Hand

Amit Sharma

Faculty of Engineering, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India

ABSTRACT: *Animatronics is one which refers to the branch of mechatronics involving both the concept of mechanical and electronics. The term animatronics has become more common but previously it was termed as a robotics curriculum. The robots involve muscles, limbs and a cell which is made of hard and soft plastics to work as human beings. The paper draws a project which involves an animation hand which is nothing but a dummy human hand which works as per the command given by the human beings interest. The project is made by comprising a controller, a sensor and a motor which is controlled and run with the input command wirelessly because the Wi-Fi module attached to this project helps the hand to work without any cable connection. The main purpose of this project is to make it use in different purposes like hospital, military, industries to reduce human involvement also make the work faster and efficient.*

KEYWORDS: *Mechatronics, Wireless fidelity (Wi-Fi), universal serial bus (USB), Servo motors, Application.*

INTRODUCTION

Mechatronics which is also named as mechatronics engineering. This branch is multidisciplinary in both the mechanical and electronics department[1]. It also submerges robotics, telecommunication, electronics, control, system etc...previously mechatronics was only known for the mechanical and electronics but as we know that the world is progressing very fast specially in the field of robotics, Different sensors are being used for different applications like fiber optic cables, accelerometers, force sensors, magnetic sensors etc. which involve the complexity of the technology so to reduce this complexity the mechatronics is broadened in many other technical areas also[2]. The above Mentioned cannot be suitable in every application and can be costly.

Animatronics introduce the implementation of self-regulating robotics devices to imitate a human or an animal, or present a realistic attribute to a differently insensible entity. Its formation incorporates animals, plants and also fictitious brutes. A robot is delineated to be a compelling emulation of a human is more categorically marked as a bionic person. Contemporary animatronics have established an extensive approach in many applications through the application created by animatronics is really a source of amusement. This paper is based on the application of animatronics where a wireless animatronics hand more specially a robotic hand which is made to involve in many places such as industries, hospitals, military purposes to reduce the manpower, easily usable and even decrease the hand held effort handled by the human beings.

Sometimes the human hand is not efficient to handle large amounts of work where the robotic hand reduces this problem by working more time and efficiently than the human hand. There are some tasks which involve risk to human life such as bomb diffusion where even the trained person also has risk and fear while defusing the bomb, so this robotic arm can be made use in the process of bomb diffusion. This application can be used for eminence purposes even helping the dumb and deaf person to learn sign languages. To complete this project an atmega2560 controller is attached with a flex sensor, a motor and a Wi-Fi module which control the entire process mechanism[3].

FUTURE SCOPE:

The main purpose of this wireless animatronics hand is to construct a perfect specimen of a human hand which favors the capability of an artificial hand. However, this artificial hand can be controlled by the controller without any cable connection i.e. wirelessly. This implementation in the future time can perform task like[4]:

- It can uplift any massive material
- Wireless communication can be possible.
- More elasticity can be achieved in robot arms

These features can be implemented in many applications as medical, military, industrial and many other applications also. The future scope basically depends on the improvement of gloves, improving hand design and the most important is smooth movement of the animatronic hand[5].

REVIEW OF LITERATURE

This section is discussion about the previous literature review which performs different applications on the basis of Animatronic hands. This portion of the paper carries the benefits and drawbacks of the literature. Cesar Guerrero-Rincon et. al. had presented a hand based tracking animatronics interaction application which comprises leap motion sensor, USB communication, web socket, servo motor and Arduino UNO. This paper presents the development of a hand tracking application whose motion controls different servo motors on an animatronic. The main aim of this paper was to have a better understanding of robot morphology, sensors, actuators and kinematics for the one who are new to this field. This application was tested using hand and finger as a controller while the basic concept was presented. In this paper the application provides advantages to human ergonomics by increasing comfort, accuracy and performance during task performance[5].

In this paper Dr. Shreenivas Jog et. al. had developed an animatronic hand using XBEE wireless module and Arduino UNO. In this project only a robotic hand was developed to reduce the cost which will be spent in making the whole robot[6]. This robotic hand acts as a shadow hand. This main aim of this project is highlighting the use of wireless communication and its application which can be used in many fields such as medical, defense, chemical industries etc.

In this paper Aman gupta et. al. had performed a research project based on a project named wireless animatronic arm. This project comprises a flex sensor, power supply source, servo motor, XBEE radio and an at mega 328 microcontrollers which perform two separate movements i.e. to grab and to release any object controlled by the servo motor. A wearable glove is present to control the animatronics hands without any wire connection[4]. The flex sensors attached to the gloves sense the user hand by the controller attached to it and the possessed signal from the at mega 328 sends the analog signal data to the servo motor to control the animatronic arm. The aim of this application is to step in the various practices to make the task easy such as in medical purposes, in heavy industry work etc.

CONCLUSION

This design represents a cellular or wireless animatronic harm which is executed using recent wireless technology. The animatronic hand is mainly an animated robot hand which work on the command with human involvement. In this project a technology is designed “animatronic hand” using an electronic component which are a flex sensor which work as a finger movement sensing device which sense the movement of the human finger and this this data to the controller then the controller sends this information or command to the servomotor to move the robotic figure. All the transmission and receiving process is done wirelessly using a Wi-Fi module. The aim of this project is to participate in the industrial application, medical application, military purposes, chemical industry etc. While human performing in the above mentioned industry it involves a lot of risk and danger, it even involves skin defect. So by including animatronic hand the human risks can be reduced and task will be completed effortlessly including human safety.

REFERENCES

- [1] A. Bicchi and V. Kumar, “Robotic grasping and contact: A review,” *Proceedings-IEEE Int. Conf. Robot. Autom.*, 2000, doi: 10.1109/ROBOT.2000.844081.
- [2] K. Moorthy *et al.*, “Dexterity enhancement with robotic surgery,” *Surg. Endosc. Other Interv. Tech.*, 2004, doi: 10.1007/s00464-003-8922-2.
- [3] “All you want to know about Animatronic Hand.” .
- [4] A. Gupta, R. Jain, D. Bang, and J. Kori, “Wireless animatronic arm,” 2016, doi: 10.1049/cp.2016.1130.
- [5] C. Guerrero-Rincon, A. Uribe-Quevedo, H. Leon-Rodriguez, and J. O. Park, “Hand-based tracking animatronics interaction,” 2013, doi: 10.1109/ISR.2013.6695605.
- [6] S. Jog, A. Dwivedi, S. Ashtankar, and G. Gautam, ““ Animatronic Hand Using Wireless Module ,”” pp. 1529–1531, 2016.