
THE BRIEF REVIEW ON THE ROBOT IN THE ACTION

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ABSTRACT

The term "animatronics" refers to a subfield of mechatronics that combines mechanical and electrical concepts. Animatronics has grown increasingly popular, although it was formerly known as a robotics curriculum. Muscles, limbs, and a cell composed of hard and soft polymers are used to make robots that function like humans. The article depicts an experiment using an animation hand, which is nothing more than a dummy human hand that responds to commands provided by humans. The project is made up of a controller, a sensor, and a motor, all of which are controlled and operated wirelessly thanks to the Wi-Fi module connected to this project, which allows the hand to function without the need for a cable connection. The primary goal of this project is to put it to use in a variety of settings, such as hospitals, military bases, and factories, in order to minimize human participation and make labor more efficient.

KEYWORDS: *Animatronics, Mechatronics, Robot, Universal Serial Bus (USB), Wireless Fidelity (Wi-Fi).*

1. INTRODUCTION

Mechatronics, often known as mechatronics engineering, is a branch of mechanical engineering. In both the mechanical and electronics departments, this area is interdisciplinary. (1–5). Robotics, telecommunications, electronics, control, systems, and so on are all included. Previously, mechatronics was only associated with mechanical and electronic systems, but as we all know, the world is moving at a breakneck pace, especially in the field of robotics. Different sensors are being used for various applications, such as fiber optic cables, accelerometers, force sensors, magnetic sensors, and so on, all of which add to the complexity of technology (6–9). The aforementioned cannot be used in every situation and may be expensive. Animatronics is the use of self-regulating robotics systems to mimic humans or animals, or to provide a lifelike characteristic to an otherwise insensible creature. Animals, plants, and fictional brutes all play a role in its creation(10–13).

Researchers have created a soft robotic hand that can grasp things and 'sweat' to cool itself off when it gets too hot. One of the most difficult problems for robot cists, according to a study published in Science Robotics, is keeping the temperature down, especially when the robot is working in hot settings. Mechanical devices are never completely efficient, and part of the energy they produce is constantly wasted as heat. They'll require a cooling system if they're going to run for extended periods of time without overheating and causing harm(14–18).Figure 1 shown the soft robotic hand that can grasp things and 'sweat' to cool itself off when it gets too hot.

Human skin excretes perspiration as it becomes hot, which cools the body as it evaporates. It's one of the reasons we're so good at running long distances. The researchers) wanted to see if they could duplicate the impact with a 'soft' robot to see if they might assist the bot operate more effectively for longer(19).

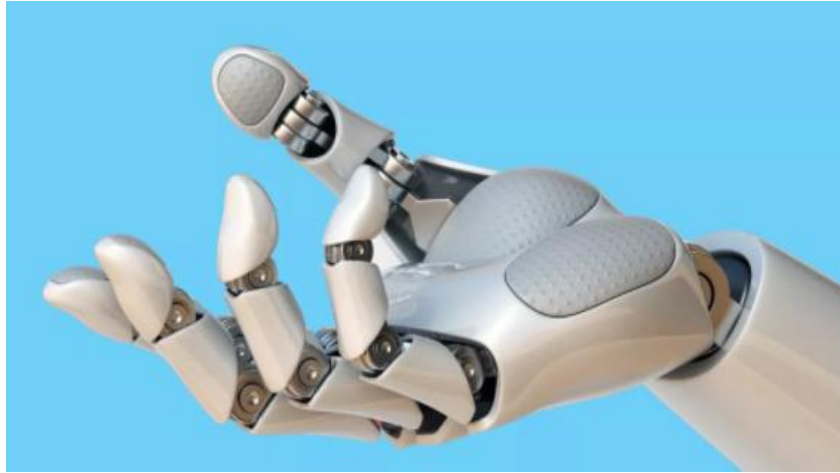


Figure 1: A Soft Robotic Hand That Can Grasp Things and ‘Sweat’ To Cool Itself off when it Gets too Hot.

A bionic person is more formally defined as a robot that is a convincing replica of a human. Contemporary animatronics have developed a broad approach in a variety of applications, and the applications produced by animatronics are really entertaining. This article is based on the application of animatronics in which a wireless animatronics hand, specifically a robotic hand, is used in many areas such as factories, hospitals, and military reasons to minimize manpower, make it easier to use, and even lessen the hand-held effort undertaken by humans(20).

When the human hand isn't up to the task of handling huge quantities of labor, the robotic hand solves the issue by working faster and more effectively than the human hand. There are certain jobs that pose a risk to human life, such as bomb diffusion, where even the most skilled individual faces danger and anxiety when defusing the bomb, thus this robotic arm may be used in the bomb diffusion process. This program may be used for prestige reasons, such as assisting the deaf and dumb in learning sign languages. An atmega2560 controller is used in this project, together with a flex sensor, a motor, and a Wi-Fi module, to control the whole process mechanism (21).

The primary goal of this wireless animatronics hand is to create a flawless replica of a human hand that favors artificial hand capabilities. This artificial hand, on the other hand, may be operated by the controller without the need of a cable, i.e. wirelessly. In the future, this solution will be able to do tasks like (22–25):

- 1) It can lift any large material
- 2) It can communicate wirelessly; and
- 3) It can produce more flexibility in robot arms.

These characteristics may be used in a variety of applications, including medical, military, industrial, and many more. The future scope is mostly dependent on glove improvements, hand design improvements, and, most importantly, smooth movement of the animatronics hand.(26).

2. REVIEW OF LITERATURE

This section expands on the preceding literature study, which examines several applications based on Animatronic hands. This section of the article discusses the literature's advantages and downsides. Cesar Guerrero-Rincon and colleagues showed a hand-based tracking animatronics interaction application that included a jump motion sensor, USB connection, web socket, servo motor, and Arduino UNO. The creation of a hand tracking application that controls various servo motors on an animatronic is described in this article. For those who are new to this area, the primary goal of this article was to get a better knowledge of robot morphology, sensors, actuators,

and kinematics. While the fundamental idea was given, this application was tested utilizing the hand and finger as a controller. In this article, the application benefits human ergonomics by improving comfort, accuracy, and performance while doing tasks(26).

Dr. Shreenivas Jog et al. created an animatronic hand utilizing an XBEE wireless module and an Arduino UNO in this article. Only a robotic hand was created in this project to save money on the overall cost of the robot (27). This robotic hand serves as a stand-in for a human hand. This project's primary goal is to emphasize the usage of wireless communication and its applications, which may be utilized in a variety of sectors such as medicine, military, and the chemical industry, among others. In this article, Aman Gupta et al. conducted research on a project called the wireless animatronic arm. This project includes a flex sensor, power source, servo motor, XBEE radio, and an AT Mega 328 microcontroller that performs two distinct motions, namely, grabbing and releasing any item controlled by the servo motor. There is a wearable glove that can be used to operate the animatronics hands without the need of any wires (22). The controller connected to the flex sensors senses the user hand, and the possessed signal from at mega 328 transmits the analog signal data to the servo motor to operate the animatronic arm [4]. The goal of this program is to integrate into different activities in order to make tasks easier, such as in medical settings, heavy industrial labor, and so on.

1. DISCUSSION

This paper discusses about the Mechatronics is a field of mechanical engineering that is also known as mechatronics engineering. This topic is multidisciplinary in both the mechanical and electronics disciplines. Robotics, telecommunications, electronics, control, systems, and other related technologies are all covered. Previously, mechatronics was exclusively linked with mechanical and electrical systems, but as we all know, the world, particularly in the area of robotics, is advancing at a rapid speed.

Fiber optic cables, accelerometers, force sensors, magnetic sensors, and other sensors are utilized for different purposes, all of which contribute to the complexity of technology. The preceding cannot be utilized in every circumstance and may be costly. Animatronics is the use of self-regulating robotics systems to imitate people or animals, or to give an otherwise insensible creature a realistic feature. It was created with the help of animals, plants, and mythical brutes.

A bionic person is a robot that is a convincing copy of a human, according to the official definition. Animatronics has evolved a comprehensive approach in a wide range of applications, and the applications created by animatronics are very entertaining. This article is based on the usage of animatronics in which a wireless animatronics hand, particularly a robotic hand, is utilized in various sectors such as industries, hospitals, and military settings to reduce manpower, make it simpler to operate, and even reduce the amount of hand-held work required by people.

When the human hand is unable of managing large amounts of work, the robotic hand addresses the problem by working quicker and more efficiently than the human hand. Certain tasks, such as bomb diffusion, pose a risk to human life, requiring even the most competent person to confront danger and worry while defusing the device; therefore, this robotic arm may be utilized in the bomb diffusion procedure. This software may be used for prestige purposes, such as helping the deaf and dumb with sign language acquisition. To control the whole process mechanism, an atmega2560 controller is utilized in this project, along with a flex sensor, a motor, and a Wi-Fi module.

2. CONCLUSION

This design depicts a cellular or wireless animatronics hurt that is created with the use of cutting-edge wireless technology. The animatronics hand is primarily an animated mechanical hand that responds to human commands. In this project, a “animatronics hand” is created using an electronic

component called a flex sensor, which acts as a finger movement sensing device, sensing the movement of the human finger and sending the data to the controller, which then sends the data to the servomotor, which moves the robotic figure. Using a Wi-Fi module, the whole transmission and receiving procedure is carried out wirelessly. The goal of this research is to engage in industrial, medicinal, military, and chemical applications, among other things. Human performance in the aforementioned sector entails a great deal of risk and danger, as well as the possibility of skin defect. As a result, by incorporating animatronics hands, human hazards may be minimized, and tasks can be done quickly while maintaining human safety.

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