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SMART GLOVE-CAPABLE ROBOT

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ABSTRACT

Internet of Things (IOT) technologies are developing rapidly and finding applications in every industry today. As more and more people from more and more places start using IoT, the notion is rapidly evolving. The term "Internet of Things" is often used to describe the practise of linking together electronic gadgets that include sensors, software, modules, etc., in order to share data wirelessly. There's no denying that IoT is a cutting-edge advancement in today's technological landscape, what with how it's streamlining processes and automating tasks. There are older persons who live alone and are unable to communicate effectively with their families. Thus, a channel for their message must be found. More and more crimes, including murder, sexual assault, kidnapping, trafficking in women, etc., are being committed every day in our uncivilised and unsafe society. Therefore, there has to be measures in place to ensure the security of females. In order to ensure the safety of women and the elderly, we have recommended developing a BOT using IOT. There are thus two components to the project, and the Bot supports both of them. The "Smart Gloves" are the glue that keeps the rest of the BOT's gear together (ultrasonic sensors, flex sensors, Bluetooth modules, motors, etc.). The Bot is equipped with 4 storage compartments to hold the necessary supplies. The project is divided into two parts: the first details how the bot assists the elderly by using the Smart Gloves, while the second discusses the implementation of the Smart Gloves for women's protection and security. The elderly wear SMART GLOVES linked to flex sensors in the first scenario. The IoT-based bot is a finger-gesture driven bot that glides back and forth in response to the elderly person's precise finger motions.

The bot features storage compartments for consumables like food, medicine, water, etc., as was previously indicated. When a user puts on the smart gloves and uses hand gestures to communicate with the robot, the robot will go to the location where the user wants the item to be delivered. Without the need for the old person to make any physical or vocal adjustments, the Bot will be able to reach out to them based on the information sent to it through the figure motions shown to the camera. We are also attempting to use the smart gloves to ensure the safety of women in the second scenario. Connected to a buzzer, the Smart Gloves sound an alarm at the first sign of an inappropriate touch, giving bystanders a chance to intervene before the victim's loved ones or the police arrive. The Smart Gloves would play a crucial role in these critical circumstances, perhaps saving the lives of women. It would be a little gesture toward helping the ladies who, in today's impolite society, must deal with a great deal of difficulty? We utilise Arduino, an open-source microcontroller, to programme the bot for the bot's motions, and Arduino IDE, also open-source, is used to dump the programme to Arduino. Using Internet of Things technology, this bot would be fully autonomous, helping the elderly acquire their basic needs and protecting women in perilous circumstances.

Keywords:

Robots that can be controlled by gestures of the fingers, wearable computers, and flexible sensors.

INTRODUCTION

In the rapidly expanding scientific landscape, IoT stands out as one of the most prominent technologies. The Internet of Things (IoT) refers to a set of interconnected computing devices, services, and endpoints that can collect and analyse data from their surroundings and share that data with one another and other devices in the network. The Internet of Things (IoT) is a potentially rapidly developing technology that integrates many significant technologies at once, such as sensors, machine learning, and reliable embedded systems. Devices that aren't connected to the internet but may nevertheless exchange data with one another across a network called the "Internet of Things" The term "Internet of Things" (IoT) is synonymous with the notion of a "smart home," whereby appliances like lights, fans, and electronics may be managed and monitored automatically and remotely. The Internet of Things (IoT) has also spread to new heights in the realms of security and privacy, where it plays a pivotal role in achieving all of the organization's security objectives and helping to make the world a safer and more secure place. Everything around us, from electronic equipment and gadgets to air conditioners, fans, and lights, may be made fully automated with the help of IOT. There are long-term advantages to the IoT because of

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this, including the protection of a lot of energy by turning off or shutting down anything that may not be in use, or by alerting people to the consumption. The Internet of Things (IoT) also plays an important role in the business world by facilitating the sharing of more data and knowledge about a company's own goods or products, as well as information about the company's internal operations, to facilitate the swift implementation of any necessary adjustments. The Internet of Things (IoT) enables previously dumb items to gain intelligence via communication and collaboration with other devices and people through a network. The Internet of Things (IoT) is a network of interconnected computing devices that collect, transmit, and process data from disparate sources using embedded systems such as communication hardware, sensors, and central processing units (CPUs). Connecting to an IoT gateway or another edge device allows the sharing of information gathered by IoT-based devices, which is then sent to the cloud or locally processed. These devices periodically share information with one another and take appropriate action based on this exchange of knowledge. These devices operate independently of human intervention. Smart surroundings, autonomous vehicles, augmented reality, electronic health records, and other pervasive or widely used technology are all brought together by the IoT. Data rates, latency, capacity, bandwidth, and throughput are all factors that must be optimised for these concepts to work well. The Internet of Things (IoT) has changed the world by illuminating these emerging ideas by facilitating optimum connectivity across various networks. Ultimately, the Internet of Things aims to simplify and streamline the usage of IoT systems by making them more accessible to end users via features like remote controllability, setup, and operation. As of right now, IOT is held in high esteem on both the academic and personal fronts. A variety of operations, including logistics, smart supply chain management, trade, and transportation, may benefit from the expertise of those familiar with IoT.

IoT improves people's quality of life in several ways, such as via the development of "smart" houses, advancements in the field of medicine, the introduction of remote monitoring and control, and many more applications. As a result of the various advancements made possible by IoT, people's professional and personal lives are both experiencing a revolution. The Internet's reach has grown to include the whole globe, and its influence on modern society is far-reaching. Now that so many household gadgets can access the internet, we may soon enter a period of unprecedented connection. A lot of people are interested in the many parts of a future IoT Ecosystem, such as Smart Cities (and regions), Smart Cars and Mobility, Smart Homes and Assisted Living, Smart Industries, Public Safety, Energy & Environmental Protection, Agriculture & Tourism. These features are used to check the article's current status and, if necessary, modify it. A new form of environment in which almost all of the devices and appliances we use are linked to a network is often referred to as the "web of Things" (IoT). We want to integrate them to carry out intricate activities that call for a high degree of intelligence. The integrated sensors, actuators, CPUs, and transceivers in IoT devices make it possible for them to be intelligent and interconnected. It's possible that the Internet of Things is not a single technology but rather a set of interrelated technologies. Electronic equipment such as sensors and actuators facilitate human interaction with the physical world. In order to get useful conclusions from the data acquired by the sensors, it is necessary to store and process that data in an intelligent manner.

APPROACH

The Internet of Things is expanding at a dizzying rate and finding applications in every sector at the current time. Internet of Things (IoT) is a rapidly expanding term due to its widespread usage in a wide variety of contexts. The Internet of Things (IoT) is the networked interconnection of physical objects equipped with sensors, software, modules, etc., with the purpose of exchanging data. The Internet of Things (IoT) is a game-changer in the technological landscape today because of the way it can simplify and automate tasks. People of advanced age who are unable to express themselves clearly to their loved ones at home are a common occurrence. There must be a way for them to get their message through in such situations.

Crimes against women, such as homicide, sexual assault, kidnapping, trafficking, etc., are on the rise in our society. As a result, there has to be measures put in place to ensure their security in this unkind and unsafe environment. Our proposal utilises IoT to build a BOT that assists the elderly and plays a significant part in ensuring the security of women. There are thus two components to the project, and the Bot supports both of them. Ultrasonic sensors, flex sensors, Bluetooth modules, motors, etc. might all be part of the BOT, but the "Smart Gloves" are the glue that keeps the whole thing together. The robot is equipped with four storage compartments that can hold the objects you choose. Part One of this project explains how the robot uses Smart Gloves to aid the elderly, and Part Two discusses the ways in which these gloves are used to ensure the safety of women. The elderly wear SMART GLOVES linked to flex sensors in the first scenario. The IoT-based robot may be operated by the old person's precise finger movements, allowing the robot to move back and forth. The bot features storage compartments for consumables like food, medicine, water, and so on, as was previously indicated. By donning the smart gloves and directing the robot with hand signals, the user may easily get the sought-after commodity. Instructions from the software are given to the Bot when the user makes hand motions, and the Bot then reaches

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out to the old person based on the data from the gestures that it has received through code, eliminating the need for the user to make any physical or verbal movements. In the second scenario, we are attempting to instal the smart gloves for the protection of young women. When the Smart Gloves detect an unwanted touch, the attached buzzer sounds an alarm, prompting bystanders to come to the victim's aid before family members or law enforcement have a chance to do so themselves. The Smart Gloves would play a crucial role in these types of crises, perhaps saving the lives of women. It wouldn't be much of a help to the women who, in today's uncivilised society, must deal with a lot of hardships on a daily basis. Because we utilise Arduino to programme the bot for the bot's motions, and because Arduino IDE is used to dump the programme to Arduino, this open-source microcontroller is the core functional unit for the whole project. Using Internet of Things (IoT) technology, this bot would be highly autonomous, serving as a resource for the elderly in pursuing their fundamental needs and protecting women and girls in potentially risky circumstances. The heart of our project is the Arduino Uno and Mega, two of the board's most powerful variants. The Arduino, a programmable board available under an open-source licence, will be used in anything from elementary to advanced maker space endeavours. The board's microcontroller may be instructed to monitor and manipulate physical items.

The Arduino has a number of outputs it may send data to, such as lights, motors, and screens. Therefore, Arduino's adaptability and affordable price have made it a popular option among DIYers. Groups of makers with an interest in creating custom-built, user-interactive gear. Instructions for the bot's movement in response to the user's figure movements are sent to the Arduino Uno through the flex sensors connected to the gloves. As part of this project, two Bluetooth modules are used to establish a wireless link between the robot and the smart gloves. When one of the Bluetooth modules is linked to an Arduino Uno, the latter can issue commands to the former. The smart gloves consist of this full assembly. The bot's hardware consists of an Arduino Mega, a second Bluetooth module, ultrasonic sensors, and a motor driver, all of which are linked to the robot's four wheels. The ultrasonic sensors determine how far away an object is from the robot. Motors are driven by converting a low-current signal into a high-current one, and this is accomplished by sending instructions from one Bluetooth module to another Bluetooth module, which in turn delivers the instructions of the flex sensors to Arduino Mega for processing. Once the instructions have been received, the motor drivers will turn the wheels, allowing the bot to move back and forth in response to the user's gestures until it reaches the elderly person who will be served. Thus, the bot could be of assistance to the elderly.

MODELING AND ANALYSIS

RESULTS AND DISCUSSION On Completion of the IOT based bot we can draw conclusions that the bot can serve as a helping hand for the elderly people by helping them get their basic requirements like food, water, medicines etc without any means of communication and movement. The Smart Gloves would also serve as a rescue system when a woman is in danger and is being attacked by someone as the buzzer rings upon sensing a wrong touch and alerts the nearby people to call The IOT based robot is a finger gesture-based robot which uses Bluetooth modules Arduino Uno and Mega, Flex sensors as the main functional units. After the complete setup is done it has been observed that the movements of the bot which are controlled by the Bluetooth module are not done as expected as there are defects in the Bluetooth module. Hence to rectify this, we have made use of the flex sensors by interfacing them with Arduino. The movement of the flex sensors attached to the smart gloves determine the direction in which the bot has to move in order to provide the required item to the person. For example, if the smart glove or flex sensor is turned forward, the both moves in the forward direction and if the flex sensor is bent the bot moves backward and so on. So, for the time being, the movement of the bot is now controlled by the flex sensors. On showing the finger gestures the instructions are sent to the Bot through Arduino and the required action is performed and the specific task is completed.

The instructions are as follows:

flex1 – forward

flex 2 -backward

flex 3- right

flex4 left

flex 1 flex 2

flex 3 foo

flex 1 flex 2 water

flex1 flex 2 flex 3 flex4 tablet.





CONCLUSION

A boon to the elderly, the IoT-based bot can be operated with simple finger gestures, eliminating the need for a human operator or a separate remote. They need not get up or yell for assistance. As an alternative, they may sit in one spot and direct the robot with hand signals; the robot will then approach the elderly and provide them with food, drink, medication, etc. This bot would improve their lives since they would no longer be alone because of their inability to talk correctly due to old age. Everyone, from the illiterate to the deaf and stupid, may utilise them. However, smart gloves are also being utilised to keep women safe, and these gloves might double as a rescue mechanism to help women escape dangerous situations. Using Internet of Things technology, this bot would be highly autonomous, serving as a resource for seniors in need of assistance with daily tasks and for women in perilous circumstances. Serving the finest possible product, this endeavour would rank among the world's greatest contributions.

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