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Content Implementation of Cloud Connected Smart Robot for Environmental and Industrial Platform

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Abstract

Cloud robotics is an emerging field that is centred on the benefits of converged infrastructure and shared services of a cloud computing environment. In this paper, a system is designed with an autonomous Pick and Place robot to sense environmental data such as temperature and Motion, along with GPS coordinates and sends them on the cloud. The mobile robot is controlled using an LPC1764 microcontroller and communicates with the cloud via a CC3200 Launchpad. A private cloud is set up using Open Stack that provides Infrastructure as a Service. The collected data are stored in a cloud server which could be viewed through a mobile app and can be used to create awareness about the environmental changes of the location under study. A proof-of-concept prototype has been developed to illustrate the effectiveness of the proposed system.

Keywords*: CC3200, LPC1764, Cloud, GPS, Robotics*

1. Introduction

Cloud mechanical autonomy is a developing field that consolidations the ideas of cloud advancements and administration robots. It is a troublesome innovation in view of the upsides of fast fall in expenses of servers, server farms, and broadband get to, reasonable distributed storage, and conveyed registering. Web is utilized to supplement the abilities of the robots by easing them from on-board calculation escalated undertakings and empower them to give compelling administrations on request. Mechanical autonomy is an innovation that arrangements with the outline, development, operation, and utilization of robots, and PC frameworks for their control, tactile criticism, and data preparing [1]. The human administrator may control the robot from a separation by sending orders and accepting data by means of correspondence system. Automated frameworks have conveyed huge monetary and social effects to human lives in the course of recent decades. As of late, mechanical frameworks are used as information social affair apparatuses by researchers for a more noteworthy comprehension of natural procedures [4]. Robots are additionally being intended to investigate profound seas, to track unsafe algal blossoms, screen climatic condition ns, and to learn about remote volcanoes. Cloud is a specialist co-op that gives administrations, for example, foundation, programming or assets. Framework as a Service models an association that outsources the assets required for its operations, including capacity and systems administration parts. While the distributed computing worldview was initially created in the digital world and connected programming as an administration, over the most recent couple of years it has been reached out to the digital physical world, including vehicles like autos and individuals with advanced mobile phones, and robots like ground vehicles and unmanned airborne vehicles Generating a digital signature based on new cryptographic scheme for user authentication and security is explained in [8].

2. Existing System

In the current framework complex components are utilized for pick and place operations. The current framework has a low achievement rate [5]. What's more, the articles that can be gotten a handle on by the robot are of unmistakable shape. Thus there are a few imperatives in the current arrangement of pick and place robots. The current pick and place

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robots depend on sensors to distinguish the items. Sensors, for example, infrared sensor and piezoelectric sensor can be utilized. These sensors can't work when the protest is put at extremely far separation.

3. Architecture of Smart Robot

The design of the proposed keen cloud robot framework is appeared in Figure 1. The versatile robot is of wheeled sort that is anything but difficult to explore inside, however can likewise be utilized for route on smooth open air surfaces. The robot might be scaled up later on with all the more capable engines and elastic wheels for working in uneven open air territories. The robot is made to move in a manual way controlled through UI utilizing Blynk and GPS [3]. The robot conveys the sensor readings to the cloud server utilizing CC3200. In this investigation, temperature and Motion sensors were utilized to watch the adjustments in the ecological conditions.

4. Features and its Description

The schematic outline of the versatile robot design is appeared in Figure 2. The portable robot is worked with a gel corrosive battery fueling the 12 V DC servomotors, through a H-connect engine driver under PWM yields from the Arduino. A GPS shield is mounted on the Launchpad to tag the scope and longitude directions of the robot's position notwithstanding readings from a temperature/Motion sensor. The Launchpad imparts the perusing of the sensors to the cloud server through Wi-Fi. With on-board bolster for simple information sources, simple or heartbeat width balance (PWM) yields it can control upto six servo engines A survey on query processing in mobile database is discussed in [7] .The microcontroller might be interfaced to a PC or a Launchpad for programming and information obtaining through a USB port. The Launchpad is customized in a C-like coordinated improvement condition, with implicit illustration code known as portrayals. Broad implicit libraries are accessible with custom code for different applications. Launchpad can be utilized for making intuitive items or conditions. The microcontroller sheets can be either worked by hand with the assistance of equipment reference plans (CAD documents) or bought preassembled [2]. Various Temperature sensor and Motions sensors are associated with the board to watch the factors in the earth. The Global Positioning System (GPS) is a satellite based route framework that sends and gets radio signs. GPS collectors obtain these signs and give Information. Utilizing GPS innovation we can decide area, speed round the check in any climate conditions anyplace on the planet. We have to interface LPC1764 with GPS.

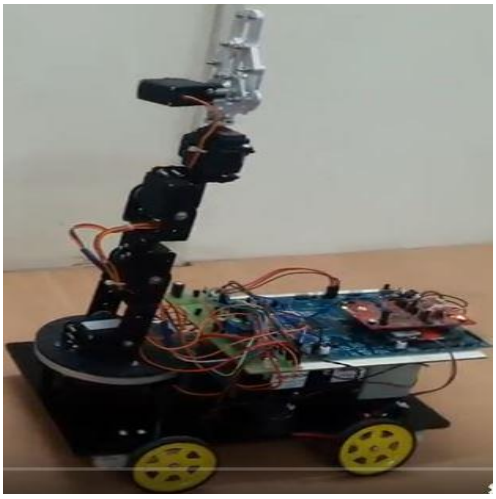

Figure 2.Overall hardware design

6. Conclusion

In this paper, a robot is intended to move self-governing in the open space and to screen the natural conditions and it can pick the protest and place it all over. In auto mode, animatronics idea is actualized to mechanical technology arm consequently record the position given before and continues when we require. The sensor information gathered by the robot are put away in a cloud server that could be additionally be shown in a portable application also. Since a lot of spatio-fleeting natural information are gathered simultaneously, a cloud server is utilized for prudent stockpiling, examination, and recovery of the information.

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