**Simple Smart Parking System Via Raspberry Pi**

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Abstract- An efficient and intelligent way to automate the management of parking systems that use the Internet of Things technology to allocate efficient parking space. IoT provides wireless access to the computer and allows users to monitor the parking space. Therefore, we proposed a method with a raspberry pi camera, ultrasonic Hc-SRO4 sensors and servo motor 9g. From space and image detection we detect and handling data with a python txt file with efficiently.

**Introduction**

The parking system faces many problems when parking environment. To solve these problems, be smarter

A parking system has been developed. different approaches And Research underway to overcome parking

Difficulties Squares are the result of many systems and technologies. Built for parking. Types of different

systems and the methods are described in the following sections. What The technology in the parking

system uses a wireless sensor (WSN) Identification and communication network process. Has the ability

to transmit data over the Internet of Things (IoT) Network without contact with people. The Internet of Things

allows It also allows users to enjoy wireless technology at an affordable price. User to transfer data in the

cloud. Supports IoT user Maintain transparency. IoT idea started Identification of things to connect various devices. It Control or monitor devices via computers Through the Internet. There are two keywords in IoT "Internet”. And "things" in which the Internet is a vast network Connects servers to devices. Internet is activated Sending,

receiving or contact information Devices. Air pollution caused by parking problem Traffic congestion. In today's scenario, parking It is difficult to find it in people's daily lives. According to There will be rapid growth in the latest poll by 2035, the car park will exceed 1.6 billion [7]. The world burns about a million barrels of oil Daily. Therefore, a smart parking system is an important solution. To reduce fuel waste. Solution to this Issues raised. Smart parking can be A solution that reduces user time and productivity Total cost of fuel burned when searching for parking Space. in which the data is collected by the sensor, and as a result of analysis and processing, the result is obtained.

**SMART PARKING SYSTEM**

The car parking system is now an intelligent system Various technologies and advanced research. Clever Parking system implemented in many environments Various aspects of solving the problems they encountered during the day Daily activities, and these systems benefit the rich [1]. The structure of the system is based on the principle of multiplicity Function. There are three tiring functions, the least Detection function, level including middle level Work with data sharing and over-the-counter processing Data storage, processing and client interfaces. Thus the

Diagram

Description automatically generatedsystem architecture is depicted in Fig.

Fig 1. (it’s connected to our raspberry 1)

Diagram

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Fig.2(2nd raspberry pi)

Diagram

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Fig 3. (3rd raspberry pi)

In the entrance raspberry it detect the object from ultrasonic sensor with in 10cm it returns the parameter as 1. if the parameter 1 it opens the servo motor until the 90 degrees. After 5 second it will close the toll gate again. In parking lot raspberry if the vehicle comes to the parking lot it detects the object from ultrasonic sensor with in 10cm it returns the parameter as 1 and camera start detect the number plate and store in a txt file. If another vehicle comes to the parking lot it will append to the same file. In the exit camera it detects camera start detect the number plate and remove the string which detected from the txt file.

A picture containing athletic game, sport

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Graphical user interface, website

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Graphical user interface, website

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**Method and Theory**

1. **Object Detection (Canny Edge Detection)**

Canny Edge Detection is one of the most popular edge finding algorithms. This algorithm was developed in 1986 by a man named John F Canny. Canny Edge Detection consists of the following multi-step algorithm.

Finding the edges properly can be difficult if there is noise in the image. Therefore, the first step is to reduce the noise in the image by using a 5x5 Gaussian filter. Gradients are obtained in each direction by applying the Sobel kernel learned earlier to the image from which the noise has been removed with a Gaussian filter in the horizontal and vertical directions. The gradient in the horizontal direction is called Gx, and the gradient in the vertical direction is called Gy. The edge gradient at a pixel (x, y) can be found by the following equation.

the entire image is scanned to remove pixels that did not contribute to the edges. While scanning the image, find the pixel with the maximum value of the gradient in the scan area in the gradient direction. See the picture below to help you understand.

Chart

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1. **Distance measurement using waves**

Diagram

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To solve for distance, use the formula for distance D = ST, or distance equals speed times time.

Distance = Speed x Time

Rate and speed are similar since they both represent some distance per unit time like miles per hour or kilometers per hour. If rate r is the same as speed s, R = S = D/T. You can use the equivalent formula D = RT which means distance equals rate times time.

Distance = Rate x Time

To solve for speed or rate use the formula for speed, S = D/T which means speed equals distance divided by time.

Speed = Distance/Time

To solve for time, use the formula for time, T = D/S which means time equals distance divided by speed.

Time = Distance/Speed

**References**

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