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## Intelligent Chair Parking

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**ABSTRACT:** This project work presents the study and design of PLC based Automatic Multistoried Car Parking System. Automatic Multistoried car parking is an arrangement which is used to park a large number of vehicles in least possible place. For making this arrangement in a real plan very high technological instruments are required. In this project a prototype of such a model is made. This prototype model is made for accommodating Four cars at a time. A motor controlled elevator is used to lift the cars. Controlling of the platforms and checking the vacancies is done by PLC. For un parking of car, Pushbuttons is interfaced with the model for selection of required platform. Automation is done to reduce requirement of space and also to reduce human errors, which in-turn results in highest security and greatest flexibility. Due to these advantages, this system can be used in hotels, railway stations, malls etc

**KEYWORDS:** PIC16F877A, Internet of Things (IOT), Embedded System.

### I.INTRODUCTION

The "Intelligent Chair parking" is a unique chair that automatically moves to a set position. The chair includes a roller to automatically move 360 degrees paired with a system that indicates the target position. Four cameras placed on the room's ceiling generate a bird's-eye view to wirelessly transmit the chair's position and its route to destination. With this innovation in office technology, Japanese businessmen are now freed from the troublesome task of arranging chairs, using this new technology already adopted in the X-Trail Hybrid and other Nissan vehicles. The most common image of disability is the people in wheelchairs. Wheelchairs are used by people who find themselves unequipped to move without external aid. The special needs of the elderly may differ from that of a physically challenged person or a large individual but they all have "special needs" and often require some assistance to perform their daily routine. The physically challenged people, who use a normal wheelchair for navigation, usually require an external person to move around. In this busy world, the elderly people may be left alone at home and also may not find an apt person for external help. Here comes the need of an automated home navigation system, which consists of a wheelchair which can be used by the elderly and the physically challenged people without the help of an external person.

This project enables an economic assembly in any existing a chair that enables a smart system for automated motion which can be controlled by an PIC Controller. The main second part of our system architecture has a microcontroller PIC Uno which drives the various directions of the dc motor for directional movement of wheelchair and powers the DC motor for linear motion of the wheelchair. The DC motor controls the wheels for turning the chair while the pair of DC motor connected to the rear wheels enables linear motion. The aim of this project is to use smart chair automatically for moving forward, backward, Left & Right. The overall chair operation uses DC motor and motor driver module combines with microcontroller system. The "Internet of things" connects devices and vehicles using electronic devices and sensors. This paper focuses attention on continuous curvature path generation for parallel parking manoeuvres of autonomous conventional vehicles. The method is based on  $\beta$ -spline curves generation from a collision-free path previously calculated.

Several constraints have been considered in order to ensure the existence of collision-free and admissible curves. The self-parking office chair uses automatic steering, a 360 degree roller and a system of four cameras positioned around a room to navigate a fleet of the chairs into their appropriate positions around a conference table via Wi-Fi. Actually, this isn't really about catering to the planet's laziest office workers, it's about Nissan promoting their "Intelligent Parking Assist" technology, which is actually very useful and something I eagerly await becoming a standard feature in all cars one day. This is the future. And why stop at chairs? How much would parents pay for



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automated, self-cleaning toys? Imagine just clapping your hands at the end of the day and having all of your kids' stuff go back neatly where it belongs. What's the market for that? Literally every parent the age where we are getting ready to welcome autonomous cars into our lives, it seems like an understatement to say that technology has come a long way. Think of it; there are autonomous cars, cars powered by the human brain, synthetic fuel, self-parking cars - the list could go on and on. Considering the comparatively greater leeway for innovation, Nissan has introduced the world's first automated 'Intelligent Parking Chair' - a project that serves to promote the carmaker's motto of "enriching people's lives through technology".

## II. LITERATURE SURVEY

Here is implemented a home navigation system which comprises of a wheelchair which works on the inputs such as gesture commands via an android phone through Bluetooth and navigates according to command. It can be used by an elderly or physically challenged person to move inside the home without any difficulty. It is also equipped with obstacle avoidance technique, where the person may not be able to provide proper command at the right time. This project is to develop a wheel chair control which is useful to the physically disabled person with his hand gesture recognition using Acceleration technology [1]. This paper describes the experience of a team of two undergraduate students and one graduate student to design and implement an Internet of Things (IoT)-based research project in a final year capstone project class at Kennesaw State University. The Internet of Things involves connecting physical objects to the Internet, which provide opportunity to build intelligent systems and applications by leveraging Radio-Frequency Identification (RFID), Near Field Communication (NFC), Wireless Sensor Network (WSN), and universal mobile accessibility advanced technologies. To be specific, an assembled Arduino system is responsible for scanning user ID and obtaining chair occupancy status and then sending that information to the cloud server [2].

We present the design and implementation of a Smart IoT Chair system for Internet of Things (IoT) that combines an embedded IoT device and a chair with separated seating pads. The proposed Smart IoT Chair records and visualizes user's posture through a smartphone application to help the users correct their unbalanced posture. It uses custom designed sensors for pressure and tilts sensing, and also uses iBeacon and Bluetooth communication to transmit data with low-power consumption. We implemented a prototype of Smart IoT chair combining six custom sensors, PIC, a Bluetooth module and a chair [3]. Slots and based on the condition, if space is available or not it glows the LEDs used for the indication whether the slots are vacant or not. So the green LED indicates the vacant slot and red LED indicates that no space is available. Not only is the system accurate but less complex. Drawbacks of these system are that it requires more number of sensors. Two sensors on elevator and two sensors on the floors are required which increases its cost. The system power consumption is also high [4]. The drawback of this system is that it is not affordable to all companies and buildings it would add to their cost of applying smart cards to their products which makes the implementation of such system difficult and non economic. Automatic Multilevel Car Parking- In this system the entry and exit of the car and the number of the car is automatically sensed. A microcontroller is used to sense the entry of car and check if space is available for parking the car. Two DC motors are used for gate and for lifting the lift which carries the car, and they also use infra-red sensors which are mounted on each floor [5].

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## III. PROPOSED SYSTEM

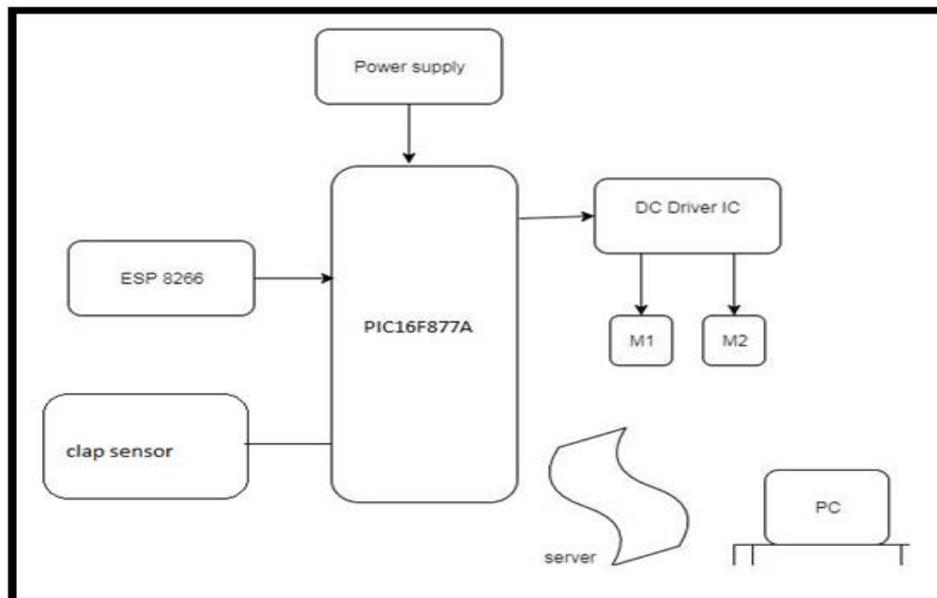


Fig 1: Block diagram of system

The framework followed in this paper is illustrated in the fig (1). First, ESP8266 will send values of sensor to the server, when the value reaches to threshold value then robot will get started, the robot will trace the path using RSSI. a routing protocol must exist that can connect and pass messages in from the initial location of the robot to its final destination, by creating hot-spot using ESP-8266. When robot will reaches to destination then one signal will send by using buzzer. Hybrid sensor networks with static and mobile nodes open a new frontier in the research into wireless sensor networks (WSN). Static nodes support environmental sensing and network communication. Mobile nodes have more resources for sensing and computing and can move to particular locations to perform more complicated missions such as rescuing the soldiers in fire fighting, war, rescue the people in Accidents, Exploring on others planets etc.

A. Elements of block diagram are as follows:

a) PIC16F877A

PIC16f877a finds its applications in a huge number of devices. It is used in remote sensors, security and safety devices, home automation and in many industrial instruments. An EEPROM is also featured in it which makes it possible to store some of the information permanently like transmitter codes and receiver frequencies and some other related data.

b) DC Motor

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current flow in part of the motor. DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems.

c) Wi-Fi Module

The ESP8266 is a low-cost Wi-Fi chip with full TCP/IP stack and MCU (microcontroller unit) capability produced by Shanghai-based Chinese manufacturer. The chip first came to the attention of western makers in August 2014 with the ESP-01 module, made by a third-party manufacturer, AI-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands



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### d) DC Driver (L293D)

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors. L293D contains two inbuilt H-bridge driver circuits. In its common mode of operation, two DC motors can be driven simultaneously, both in forward and reverse direction.

### IV. FLOWCHART

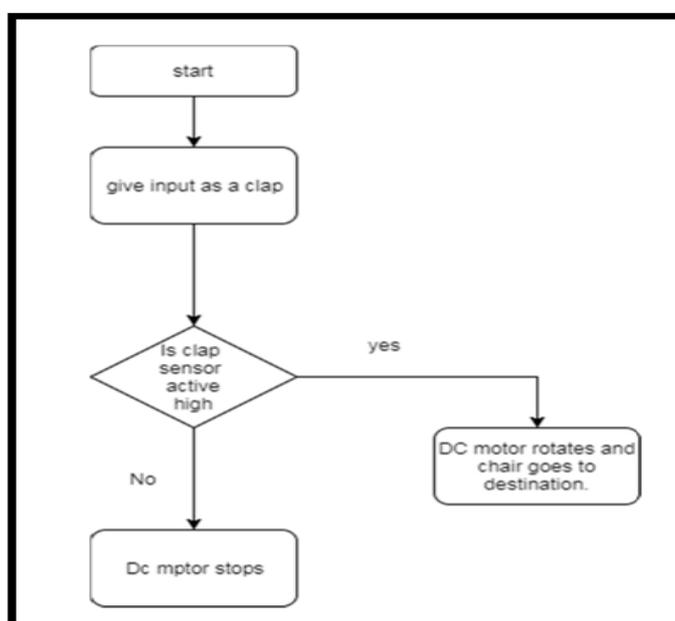


Fig 2: Flowchart of System

### V. APPLICATIONS

- Precise and self control.
- It can be used for physically disabled persons.
- Saves time as the user need not search for a parking slot.

### VI. EXPERIMENTAL RESULTS

A virtual circuit containing PIC 16F877A microcontroller and Tower-pro SG-5010 and Tower-pro SG-90 are designed in Proteus in order to simulate and analyse the results. Figure show the simulation steps in order to compile the program and write it on the microcontroller. Since there are two types of servos with different specifications in the arm robot, the results obtained from the simulation on Proteus differ in terms of pulse width, angle and servo motor behaviour. The simulation considers the rotation angle with respect to the generated pulses with the pulse width ranges.

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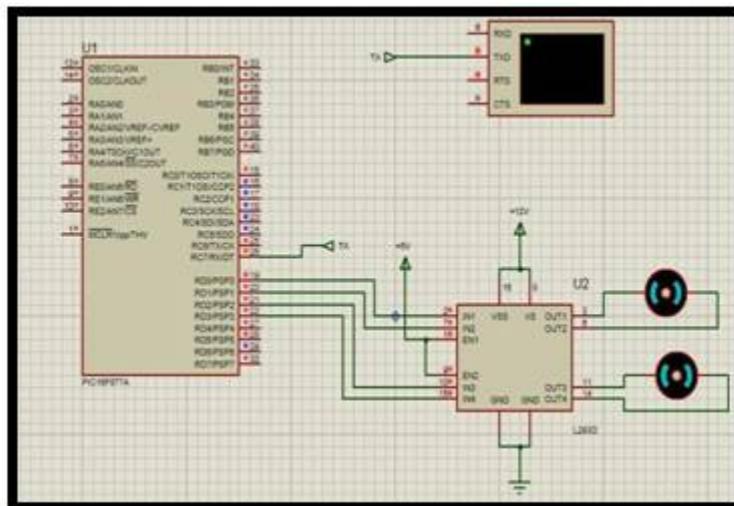


Fig.3: Simulation of result

## VII. CONCLUSION

The design and development of this intelligent Smart chair based wireless sensor network can be successfully implemented on a commercialized scale for the physically handicapped and old age people. Our project is capable to control the chair motion for disabled people using wifi module. This project elaborates the design and construction of Smart Electronic Wheelchair with the help of Bluetooth Module. The circuit works properly to move as the command given by the user. After designing the circuit that enables physically disabled to control their wheel using an android application in their smartphone and it has also been tested and validated. The detection of any obstacle is successfully controlled by the microcontroller. As the person switches on the circuit and starts moving, any obstacle which is expected to lie within a range of 4 metres will be detected by the Ultrasonic sensor. This proposed system contributes to the self-dependency of differently abled and older people.

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