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INTELLIGENT SELF-PARKING CHAIR

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ABSTACT

An amusing video has surfaced about an intelligent parking chair inspired by Nissan; the video shows the chairs swinging into action, self-guiding to finally park at a table in response to a person. They can also reverse and turn. "The Intelligent Self-Parking Chair" is a promotional project that materializes vision of 'enriching people's lives through technology. This concept aims at increasing knowledge around the latest technology adopted by Nissan vehicles, while showing how this is slowly changing our daily lives.

The "Intelligent Parking Chair" 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 webcams placed on the room's ceiling generate a bird's-eye view for image acquisition and to wirelessly transmit the chair's position and its route to destination. With this innovation in office technology, we are now freed from the troublesome task of arranging chairs. Conversely, the surprise and comfort earned from this effortless process can be equally seen in the "Intelligent Parking Chair".

Keywords: bird's eye view, webcams, image acquisition.

I. INTRODUCTION

Vision-guided robotics has been one of the major research areas in the mechatronics community in recent years. The aim is to emulate the visual system of humans and allow intelligent machines to be developed. Self-parking chair one kind of parking units that follow various working area. Nowadays the creations of Self-parking chair model can be found from Nissan technology, as it give advantages in our lives.

The base "Bird's-eye view" and "Automatic Movement" concepts are also introduced in the Intelligent Parking Chair. It works just like a robot as it is able to sense and response to the environment. Considering that, Self-parking chair should be well developed to optimize its benefits to our own living. The aim of this project is to build a prototype of a Self-parking chair model that can move on a flat surface with its two driving wheels and a free wheel.

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II.BLOCK DIAGRAM

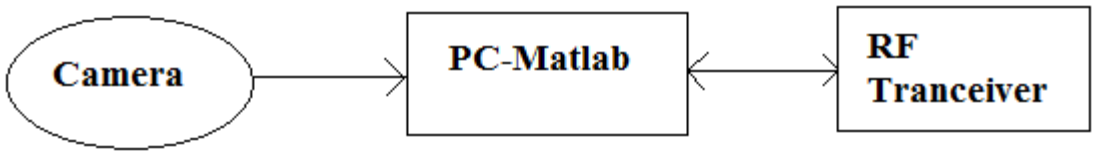

Fig.1 Monitoring & Path Determination System

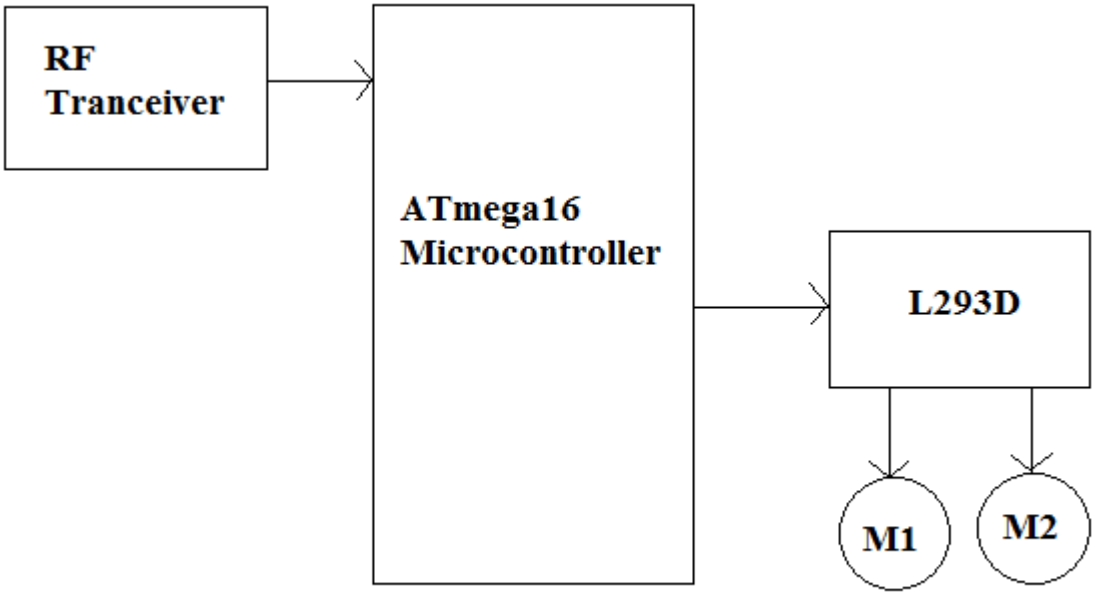

Fig.2 Chair Driver System

III. PROPOSED SYSTEM

Camera is interfaced with PC for image acquisition. MATLAB is used for image processing. Path can be easily determined by user on working area image by GUI application.

Communication between PC and controller robot can be carried out by RF module. Based on the location of vehicle, commands will be sent from pc to controller robot using RF module. Controller robot will then move robot forward, backward, left, stop or right.

IV.SYSTEM COMPONENTS

1. ATmega16 Microcontroller

ATmega16 is an 8-bit high performance microcontroller of Atmel's Mega AVR family with low power consumption. Atmega16 is based on enhanced RISC (Reduced Instruction Set Computing, Know more about RISC & CISC Architecure) architecture with 131 powerful instructions. Most of the instructions execute in one machine cycle. Atmega16 can work on a maximum frequency of 16MHz.ATmega16 has 16 KB programmable flash memory, static RAM of 1 KB and EEPROM of 512 Bytes.

The endurance cycle of flash memory and EEPROM is 10,000 and 100,000, respectively. ATmega16 is a 40 pin microcontroller. There are 32 I/O (input/output) lines which are divided into four 8-bit ports designated as PORTA, PORTB, PORTC and PORTD.ATmega16 has various in-built peripherals like USART, ADC, Analog Comparator, SPI, JTAG etc. Each I/O pin has an alternative task related to in-built peripherals. The following table shows the pin description of ATmega16.

2. L293D

The L293D is quadruple high-current half-H drivers. It is designed to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V. Both devices are designed to drive inductive loads such as relays, solenoids, dc and bipolar stepping motors, as well as other high-current/high-voltage loads in positive-supply applications. All inputs are TTL compatible. Each output is a complete totem-pole drive circuit, with a Darlington transistor sink and a pseudo- Darlington source. Drivers are enabled in pairs, with drivers 1 and 2 enabled by 1,2EN and drivers 3 and 4 enabled by 3,4EN. When an enable input is high, the associated drivers are enabled and their outputs are active and in phase with their inputs. When the enable input is low, those drivers are disabled, and their outputs are off and in the high-impedance state. With the proper data inputs, each pair of drivers forms a full-H (or bridge) reversible drive suitable for solenoid or motor applications.

3. RF Module

An RF module (radio frequency module) is a (usually) small electronic device used to transmit and/or receive radio signals between two devices. In an embedded system it is often desirable to communicate with another device wirelessly. This wireless communication may be accomplished through optical communication or through radio frequency (RF) communication. For many applications the medium of choice is RF since it does not require line of sight. RF communications incorporate a transmitter or receiver.

RF modules are widely used in electronic design owing to the difficulty of designing radio circuitry. Good electronic radio design is notoriously complex because of the sensitivity of radio circuits and the accuracy of components and layouts required to achieve operation on a specific frequency. In addition, reliable RF communication circuit requires careful monitoring of the manufacturing process to ensure that the RF performance is not adversely affected. Finally, radio circuits are usually subject to limits on radiated emissions,

and require Conformance testing and certification by a standardization organization such as ETSI or the U.S. Federal Communication Commission (FCC). For these reasons, design engineers will often design a circuit for an application which requires radio communication and then "drop in" a pre-made radio module rather than attempt a discrete design, saving time and money on development.

RF modules are most often used in medium and low volume products for consumer applications such as garage door openers, wireless alarm systems, industrial remote controls, smart sensor applications, and wireless home automation system. They are sometimes used to replace older infra-red communication designs as they have the advantage of not requiring line-of-sight operation.

Several carrier frequencies are commonly used in commercially available RF modules, including those in the industrial, scientific and medical (ISM) radio bands such as 433.92 MHz, 915 MHz, and 2400 MHz. These frequencies are used because of national and international regulations governing the use of radio for communication. Short Range Devices may also use frequencies available for unlicensed such as 315 MHz and 868 MHz.

RF modules may comply with a defined protocol for RF communications such as Zigbee, Bluetooth low energy, or Wi-Fi, or they may implement a proprietary protocol.

4. DC Motor

A DC motor is any of a class of rotary electrical machines that converts direct current electrical power into mechanical power. 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. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances.

The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

Electrical DC Motors are continuous actuators that convert electrical energy into mechanical energy. The DC motor achieves this by producing a continuous angular rotation that can be used to rotate pumps, fans, compressors, wheels, etc.

As well as conventional rotary DC motors, linear motors are also available which are capable of producing a continuous liner movement. There are basically three types of conventional electrical motor available: AC type Motors, DC type Motors and Stepper Motors.

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V.SYSTEM FLOW

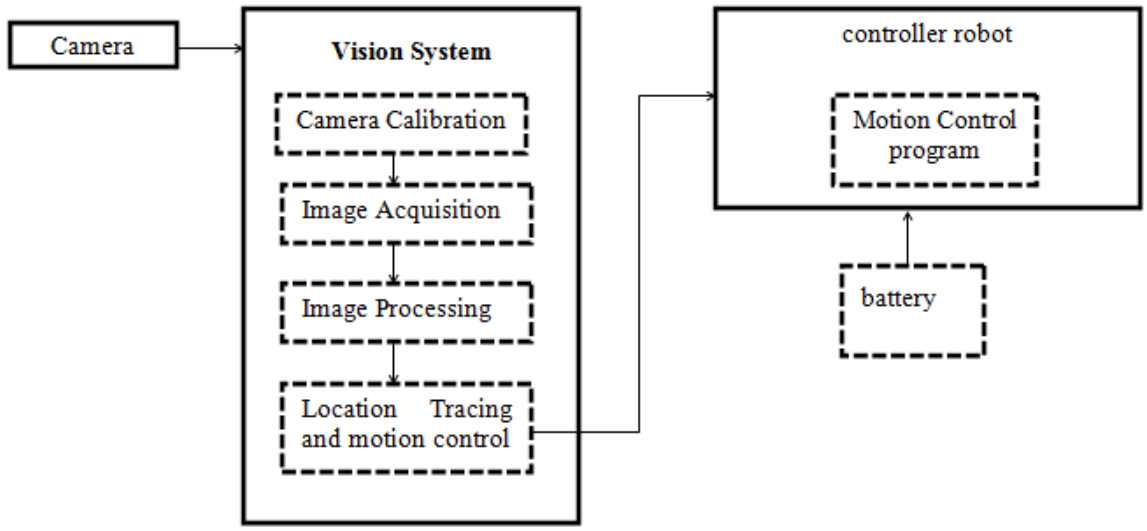

Fig. (a)

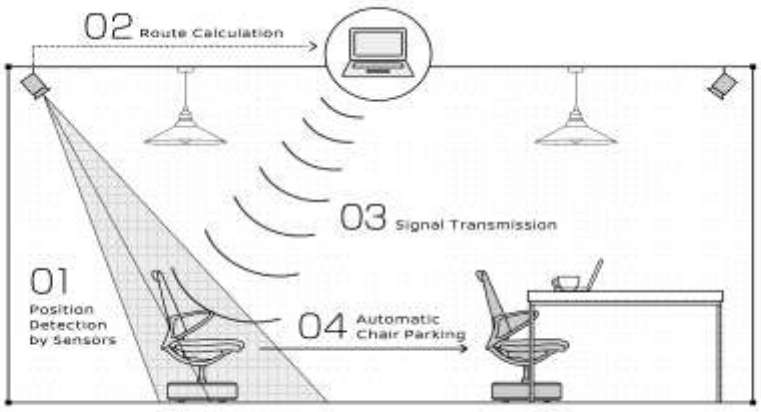

Fig. (b)

Fig.3 Flow of System

From above fig.3 the exact operation of the "Intelligent Self-parking Chair" can be understood properly.

VI.ADVANTAGES

1. Path can be easily updated.
2. Eliminates the need of different sensors (IR, Proximity, Magnetic field sensor) thus makes system more compact and cost effective.
3. Possible to avoid obstacles in path by using IR sensors and by continuous tracking of chair.

VII. APPLICATIONS

1. Widely useful in conference halls, offices, public fields.
2. Can be useful for physically challenged people.
3. Most importantly it cab used in hospitals.
4. It can be used st home and shopping malls also.

VIII. CONCLUSION

According to this review paper, we have concluded that by using image processing application we can easily recognize the shape of an object, location of any object. It is helpful to minimize the labor cost and time. We also conclude that the efficient communication can be takes place between various components using wireless communication devices.

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