

Rotary Car Parking Using Sensors

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ABSTRACT

This project deals with the manufacturing of a Prototype of Rotary Car Parking System using Sensors. Lack of space availability has always been a problem in urban areas and major cities and to add to it there are cars parked callously on the streets that further limit the space. In order to handle the issue of parking in busy places various types of vehicle parking systems are used worldwide namely Multi-level Automated Car Parking, Automated Car Parking System, Volkswagen Car Parking and many more. The present project work is aimed to develop a scale down working model of a car parking system which will reduce the excess use of land space. The chain and sprocket mechanism is used for driving the parking platform. This total prototype is powered by a D.C motor. This model also uses a RFID Tag and Reader. When the car comes on the ramp the switch will be activated and the pallet comes to carry the vehicle. When the switch will be operated by the operator, sprockets starts to rotate and the new space will be adjusted for new vehicle. Planners, developers, architects are finding out solutions to tackle this problem of parking, so we took this opportunity to bring this technology of an automated parking system which will reduce a lot of land space for parking purpose. By testing and analyzing the working model we can definitely get the view to develop the parking lots at difficult and busy commercial places.

Keywords: Automated Parking, Design Prototype, Design Automation, Rotary Car Parking System.

1. INTRODUCTION

As the city modernization progresses, the number of vehicles increases accordingly, instead of taking public transportation, people travel in personal vehicles to different locations in the cities for convenience and comfort. Due to the lack of a well-planned policy for parking facilities, the demand of parking spaces is generally much greater than the supply. Additionally, downtown areas are gradually saturated with commercial office buildings but not as many parking spaces. Drivers generally need to spend a significant amount of time circling the blocks around their destination searching and waiting for available parking spaces. To overcome above problem there is need of an advanced car parking system.

The Rotary Car Parking Using Sensors (RCPUS) has a place with the class of turning brilliant auto stopping frameworks. The conventional stopping frameworks, for example, multilevel or multi-story auto stopping frameworks (non-mechanized), robot auto stopping frameworks, robotized multilevel auto stopping frameworks and so forth have been executed on an enormous scale. However, these frameworks have a noteworthy detriment of extensive space utilization which is effectively wiped out with the utilization of a revolving auto stopping framework [2]. Besides, the last gives the additional advantages of adaptable operation without the need of a specialist and included security and slightest odds of vehicle harm. Since the model makes utilization of composite parts, it is anything but difficult to gather and disassemble and is in this manner more helpful than the conventional auto stopping frameworks. The turning model is particularly intended to oblige different autos in the flat space of two. The structure can oblige six autos in the space of two and can even be redone to hold a more prominent number contingent on the necessities of the client and can be productively put to use in much space crunched territories. Parking spots can't adapt to the development of the quantity of vehicles. In numerous urban lodging social orders, the parking spot proportion is 1:1. The vehicles stopped arbitrarily causes the real issue confronted in a large portion of the metropolitan urban areas. The idea is to park and move cars with no disturbance to the already parked cars in

RCPUS.

2. ROTARY CAR PARKING SYSTEM - A PROTOTYPE

Unique characteristics

- The space for parking 2 cars can hold more than 6 cars.
- It adopts rotating for mechanism so as to minimize the vibration and noise.
- Flexible operation.
- No caretaker is needed, key pressing operation.
- High safety, complete inspecting device
- Stable and reliable.

It is easy to work with the driver stopping and leaving the vehicle in the framework at the ground level. Once the driver leaves the joined security zone the vehicle is consequently stopped by the framework pivoting to lift the stopped auto far from the base focal position. This leaves a vacant parking spot accessible at the ground level for the following auto to be stopped on. The stopped auto is effectively recovered by pushing the catch for the applicable position number the auto is stopped on. This makes the required auto pivot down to ground level prepared for the driver to enter the security zone and turn around the auto out of the framework. But vertical auto stopping framework every single other framework utilize a substantial ground territory, vertical auto stopping framework is produced to use greatest vertical region in the accessible least ground zone. It is very fruitful when introduced in occupied regions which are entrenched and are languishing with deficiency of territory over stopping. Despite the fact that the development of this framework is by all accounts simple, it will be standard from comprehension without the information of materials, chains, sprockets, heading, and machining operations, kinematic and dynamic systems.[1]

Envision the time that programmed keen stopping frameworks would spare you. Each time you enter your office building you need to discover a parking spot and invest energy strolling all through the part also. Envision how much time it is costing you. Regardless of the possibility that you simply burn through 5 minutes a day to stop that means you spending more than an entire day simply stopping each year. In the event that you figure the time you spend strolling all through the parking garage, looking for space and such it will be effortlessly more than the above sum. A completely computerized framework mirrors a cutting edge sequential construction system structure where the autos are moved to an unfilled stage. The stage under the auto moves to an assigned spot and the various stages are organized so that no autos are trapped.

You are able to keep track of the entire structure and spend virtually no time driving the car in the parking you. You simply drop off the car at the entrance and pick up on your way out. Aside from the comfort that the automation brings you can also save space through incorporating the park lift system as well. [2]Through this we are able to utilize the vertical space in a parking lot that is usually wasted. You are also able to customize each stack parker so that you can fit different sized cars in each of the different slots. It would be meaningless to have all stack parkers adjusted to the height of a SUV when you can have different sets where you can park 2 SUVs or 3 regular sedans.



Fig1- Rotary Car parking System[1]

3. STEPS TO COMPLETE THE PROJECT

a. Market Survey

Amid this period detail showcase review has been done to learn accessible stopping frameworks and their utility additionally their literary works of various sorts of stopping frameworks and its distinction between have been watched.

b. Issues in existing Systems

The issues with respect to the current framework have been discovered, for example, Complicated programming, High spending plans, Unfeasible outline, top of the line robots, and so forth.

c. Conceptual Design

Taking issue articulation from above and concentrate the basic building ideas different ideas with respect to present day stopping framework are readied and among those best ideas configuration has been chosen for further stages.

d. Modelling in CATIA

Putting the thoughts on the demonstrating programming for representation of the model and making it more perfect so that there will be less intricacy in planning.

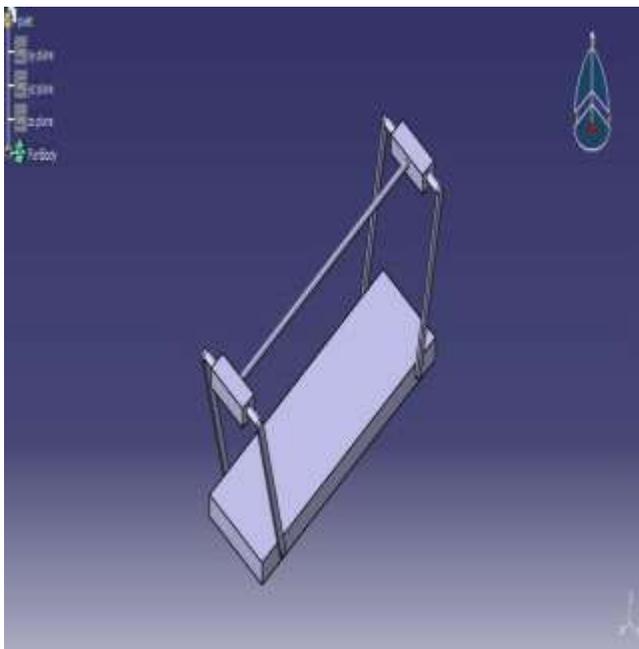


Fig2 – Modelling of Pallet in CATIA

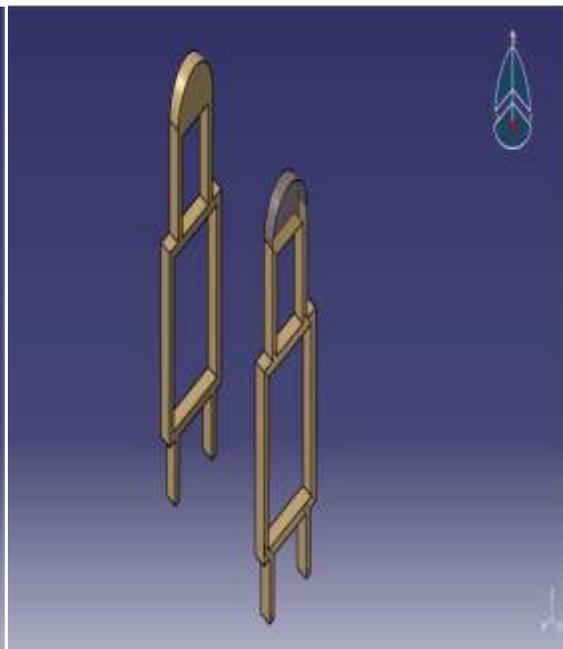


Fig3 – Modelling of Frame in CATIA

e. Material Selection and Procurement

In this stage material determination is done and furthermore its obtainment according to require the measurements are taken from CATIA demonstrate.

f. Fabrication

This stage incorporates creation of model in the workshop from the obtained material and setting up the Prototype to demonstrate in the product show.

g. Assembly and Testing

This stage incorporate Assembly of all the sub parts, additionally the game plan of the engine and its wiring is done, all completing operations like pounding, trimming, painting is done here. Testing stage incorporates testing of the Prototype display under genuine condition. Testing of the design model is done by using analysis software ANSYS.[4]

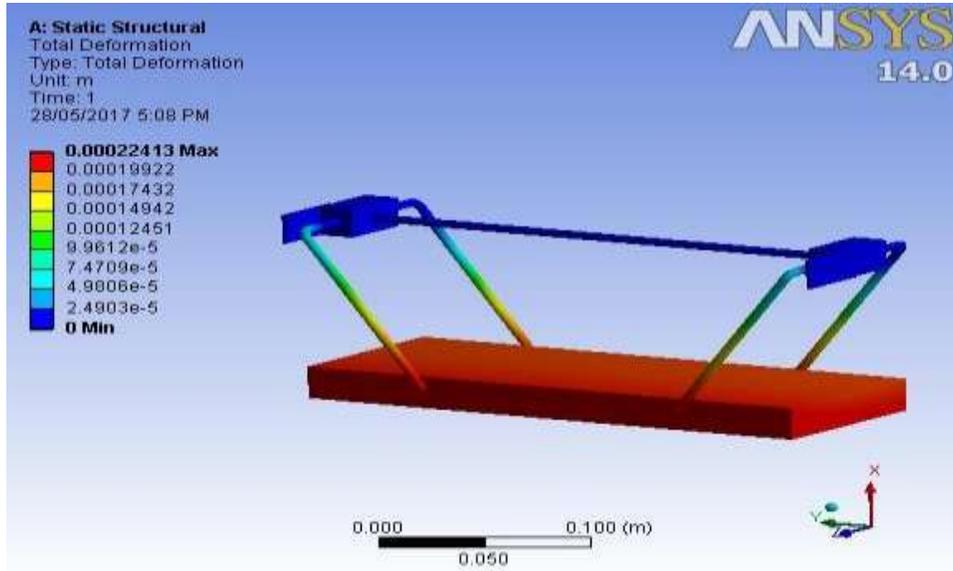


Fig4 – Total Deformation of Pallet

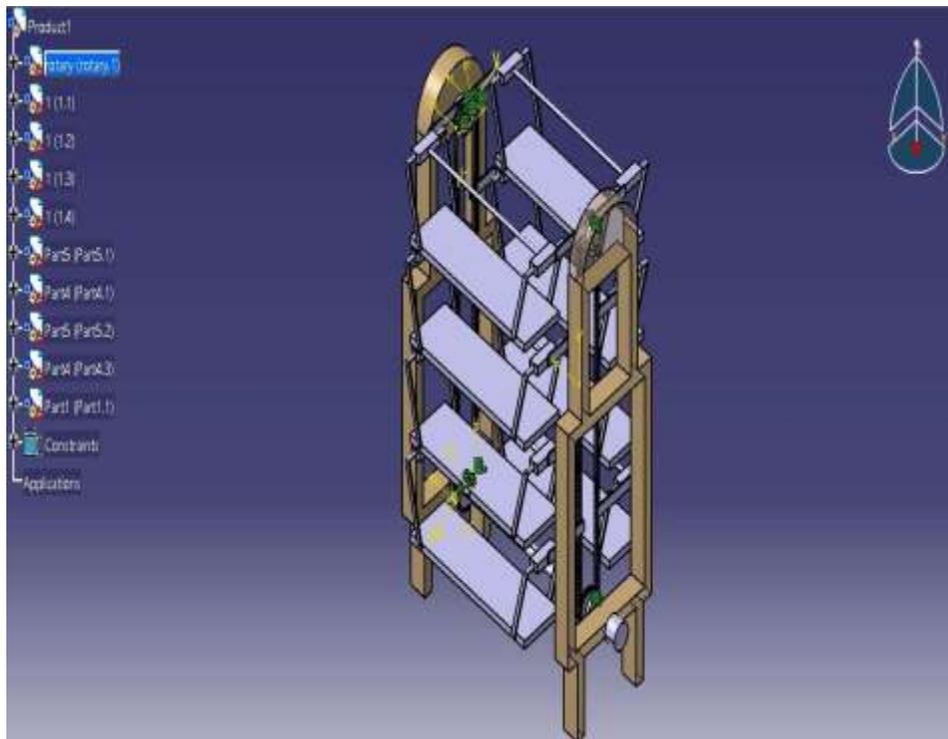


Fig5 – Assembly of Prototype

3. SENSOR AUTOMATION SYSTEM

ARDUINO BOARD

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

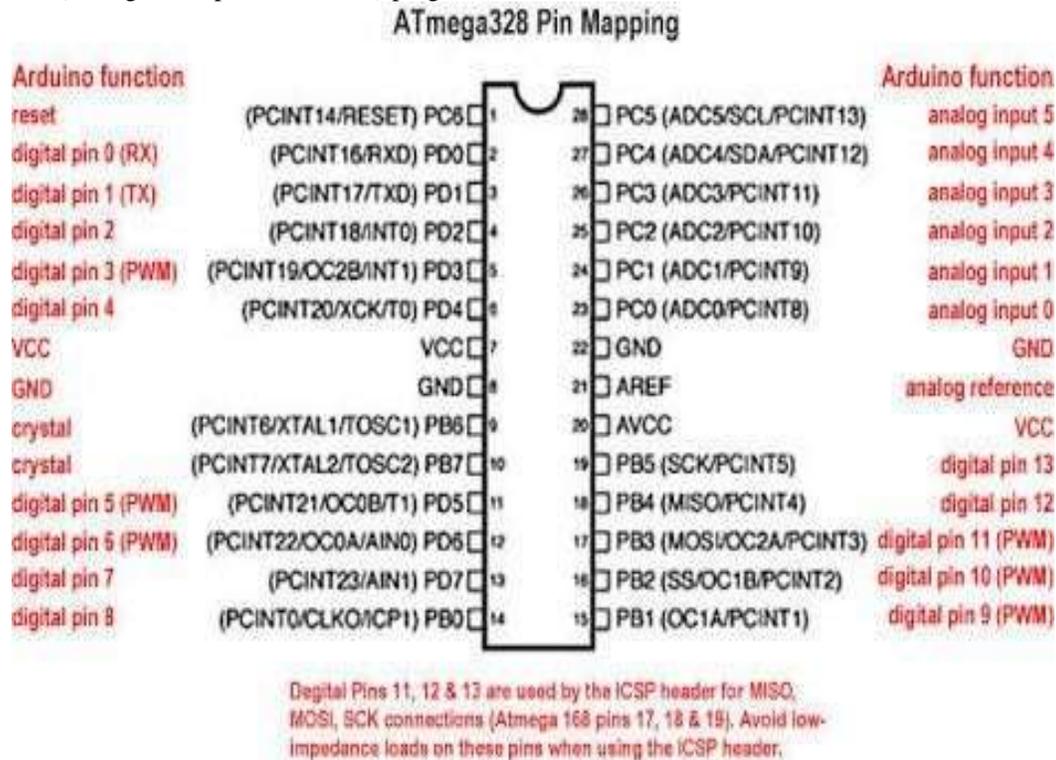


FIG6 – Pin Diagram of ATmega328

RFID TAG/READER

RFID is a shortening for Radio Frequency Identification. A RFID framework comprises of two sections .i.e. per user, and at least one transponders, which are otherwise called labels. RFID frameworks have advanced from scanner tag marks as a way to naturally recognize and track items and additionally individuals. In the RACPS, the client is allotted a remarkable ID relating to the particular trolley. This aides in fast distinguishing proof and development of the same.



FIG7 - RFID Module

IV. FEATURES

- It guarantees fast and mechanized stopping and simple recovery of vehicles.
- Up to 6 autos can be effortlessly and securely stopped in the outlined model.
- The surface space required is equal to the parking spot of two autos as it were.
- Most appropriate for parking in workplaces, shopping centres and comparable spots.
- The RCPUS is designed to guarantee driver security by utilization of an electronic wellbeing zone.
- Low upkeep levels are required by the framework.
- Does not require any stopping chaperon.
- It can be effectively developed in a little region, simply requiring a basic solid base and 3 stage power.

V. CONCLUSION

The RCPUS has been planned and all the composite parts in it have been produced and collected. Investigation of the model must be done while building up an existence measure show. The mechanical model has been planned and the product and also the control circuit have been actualized effectively. It exhibits the working of the arranged rotational stopping framework. The size and number of pallets can be redone as per the requirements and limit of the association or carport space accessibility.

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