

ROTARY CAR PARKING SYSTEM

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Abstract - Lack of house handiness has invariably been a tangle in urban square measures and major cities and to feature to that there are vehicles position unfeelingly on the streets that any limit the house. this method has been enforced to scale back the surplus use of land house that is already terribly scarce in railway cities. differing kinds of car parking square measure applied worldwide specifically Multi-level automatic automobile Parking, and Rotary Parking System. In India, peoples square measure terribly convenient to park the automobile in rotary parking system. currently every day this parking system used just for cars in several areas like textiles, super market, industries, apartments, malls and public places. the current project work is aimed to develop a reduced operating model of vehicles parking system for park multiple vehicles like significant vehicle, medium vehicle and light-weight duty vehicle with in associate degree actual car park by victimization microcontroller. The chain and sprocket mechanism are employed for driving the parking platform. This total model is supercharged by a D.C motor. once the vehicle comes on the ramp the switch is going to be activated and also the bucket involves carry the vehicle. once the switch is going to be operated by the user, sprockets start to rotate and also the new house are going to be adjusted for brand spanking new vehicle. therefore, we have a tendency to took this chance to bring the technology of automatic parking to wherever it's required.

Key words: Automobile parking system, rotary, textiles, industries, significant vehicle, lack of house.

1. INTRODUCTION

The Rotary automatic automotive Parking System (RAAPS) belongs to the category of rotary good automotive parking systems. the standard parking systems like structure or multi-store automotive parking systems (non-automated), mechanism automotive parking systems, automatic structure automotive parking systems etc. are enforced on a large scale. however, these systems have a significant disadvantage of huge house consumption that is with success eliminated with the utilization of a rotary automotive parking system. Moreover, the latter provides the additional advantages of versatile operation while not the necessity of AN attendant and additional security and least possibilities of car injury. Since the model makes use of composite elements, it's straightforward to assemble and dismantle and is therefore a lot of convenient than the standard automotive parking systems. The rotary model is specifically designed to accommodate multiple cars within the horizontal house of 2. The structure will accommodate six cars within the house of 2 and might even be customized to carry a larger variety relying upon the necessities of the user and might be expeditiously place to use in abundant house fragment areas. Parking areas cannot address the expansion of the quantity of vehicles. In several urban housing societies, the automobile parking space magnitude relation is 1:1. The vehicles put willy-nilly, as a result of the main drawback Janus-faced in most of the metropolitan cities. depicts the interconnection between the varied subsystems of the project. Mechanical parking instrumentality is additionally referred to as stereo garage. As compared to the prevailing parking arrangements, the foremost obvious advantage is most house utilization; it's safer and a lot of convenient. The RAAPS is completely automatic with the user being given a novel ID love the tramcar being allotted to him/her. this sort of apparatus is helpful to unravel the difficulty of restricted automobile parking space obtainable in busy cities. Evidently, it may be seen that the quantity of personal cars is increasing once a year. personal garages, wherever solely one automotive may be housed at a time, don't give a possible answer to the matter since several families own quite one automotive. that the task was to style mechanical instrumentality which will store six cars in one traditional garage. it's referred to as a rotary parking shaft. the thought is to park and move cars with no disturbance to the already put cars in RAAPS.

2. LITERATURE REVIEW

The sensible parking system enforced primarily within the Europe, us and Japan is developed with the incorporation of advanced technologies and researches from varied tutorial disciplines Now-a-days, there's a ascension in parking system.

men are required for every automobile parking slot to pick out a parking slot manually and provides direction to drive properly into slot. So, there's a necessity to develop AN automatic parking system which can cut back manual work in addition as are helpful for careful parking of cars and different vehicles. Parking system habitually expertise parking connected challenges, particularly within the urban and metropolitan areas. whereas doing a survey we've got found that this automatic automobile parking system has been planned by varied researchers' mistreatment completely different technology. In some paper some researchers have planned this method mistreatment Around read Monitor (AVM). In their paper they need discusses fusion of AVM and inaudible sensing element, accustomed discover the vacant parking squeeze the automated automobile parking system. The AVM provides a nearly 360-degree scene of the automobile in bird 's eye read. The AVM helps the motive force to man oeuvre into parking spots. Through the bird 's eye read; a driver will check for obstacle round the vehicle. First, the parking slot marking detected within the AVM image sequence. A tree structure-based methodology discovers the parking slot marking mistreatment individual AVM image sequence and image registration technique. Second, empty slot is detected mistreatment inaudible sensors. The chance of parking slot occupancy is calculated utilizing inaudible sensing element knowledge nonheritable whereas the vehicle is passing by parking slots, and at last chosen the chosen empty slot is half-track and also the vehicle is correctly position in selected parking slots. other researchers have discussed this method mistreatment another technology i.e. GSM Technology. The practicality of the technology is that user sends a message to the GSM electronic equipment that is placed at the parking finish. The GSM electronic equipment can send a conformation message to the user whether or not the slot is vacant or not. If it's vacant then the user should message the precise time and period, he/she desires to park the vehicle within the parking slot. Then the GSM electronic equipment can send a parole and also the automobile parking space variety to access the reserved automobile parking space. Once the conformation message has been sent, the counter for the reservation time can automatically begin for causing message. Another paper tries to debate this method exploitation FPGA Technology. In their paper they need discuss a way to implement associate automatic automobile parking system exploitation FPGA technology, where the access within the parking that is formed by barrier, if their area unit vacancies with the lifting of the barrier a price ticket is issued with a consumer code and there starts a timer for measure the time left within the parking. The analog signals transferred through a digital analog convertor as input signals within the FPGA. To work with FPGA Xilinx software package needs to be used. Another paper discusses a system exploitation some digital key beside some robotic technique. once a automobile enters the entry of the machine-driven automobile parking system, associate IR detection scheme detects the presence. Then the driving force is promoted to enter a legitimate key and to settle on the choice of either parking or retrieving the automobile. every secret is checked for accuracy and assigned a delegated parking slot. Upon coming into the right key, automobile is picked up beside the pallet from the stack system and placed within the selected spot. When drivers come back to choose up the automobile, he enters the valid key that the system can sign in its info and also the automobile is come back to the drive manner. The stack system can pull down the pallets to form area for incoming pallet. The system includes robotic elevate with motors for selecting the automobile and putting it within the designating spots. Another paper discusses a system wherever microcontroller 89S51 has been used, in their paper they need mentioned a system that is machine-driven with the user being given a novel ID similar to the streetcar being allotted to him/her. the concept is to park and move cars with no disturbance to the already put cars in their system. other researchers have mentioned this method exploitation RFID. According to their system, the vehicle owner needs to initial register the vehicle with the parking owner and obtain the RFID tag. once the automobile needs to be put, the RFID tag is placed close to the RFID reader, that is put in close to the entry gate of the automobile parking space. As presently because the RFID tag is browse by the reader, the system mechanically deducts the required quantity from the RFID tag and also the entry gate human opens to permit the automobile within the lot. At an equivalent time, the parking counters increments by one. Similarly, the door is opened at the exit gate and also the parking counter decremented. when doing study on varied systems exploitation varied technologies, we've tried to debate a system exploitation frequency technology (RFID), IR (infrared) sensors, Microcontroller. RFID technology is extremely helpful in automation of car parking system in mall/building.

3. RESEARCH AND METHODOLOGY

- In smart parking system, the fingerprint scanner will store the prints of the person and provides a slot.
- The slots information can be displayed on a seven-segment display or LCD.
- Infrared sensors detect the absence/presence of cars and is interfaced with microcontroller which displays the information of slots on each seven-segment display.
- Likewise, to retrieve the parked car, one's fingerprints must match and the slot where the car is parked will be provided.
- The circular path will automatically rotate and will provide particulars ID corresponding to the slot being located in which division of slots is based on partition of 360 degree according to the size of garage.

3.1 SELECTION OF MATERIAL

- frame-ferrous
- square bar-ms (mild steel)
- Pallet (Thin sheet)
- Shape Connector
- Bush (mild steel)
- beam rod-ms (mild steel)

3.2 DESIGN

Frame

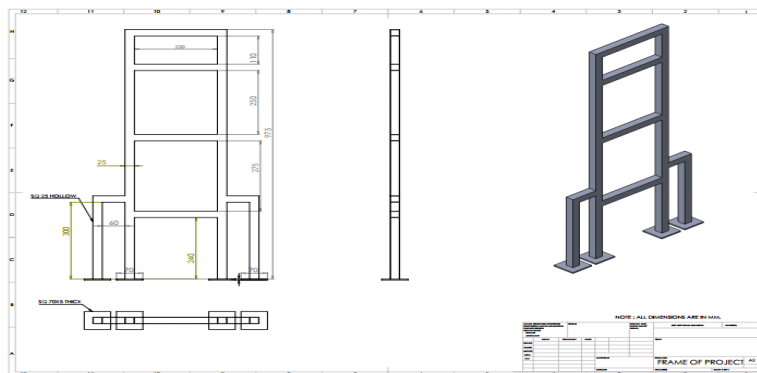


Figure 1: Frame

It is the structural body that holds the whole rotary system. each part just like the assembly of pallet, motor drive chain, sprocket, is put in over it.

Square Bar

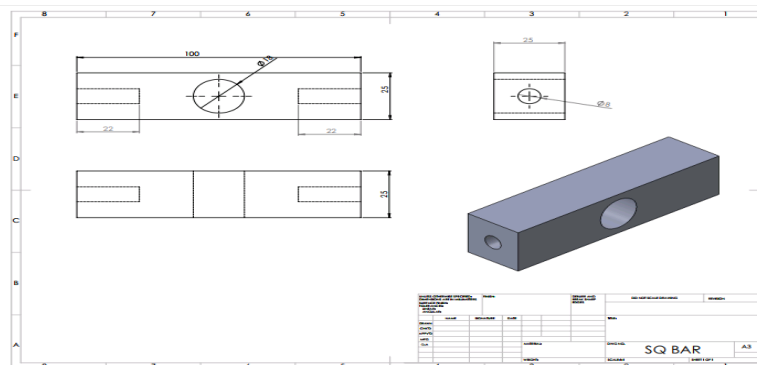


Figure 2 : Square Bar

Holds together, the L shaped connector, bar. Thus, holding the pallet.

Pallet

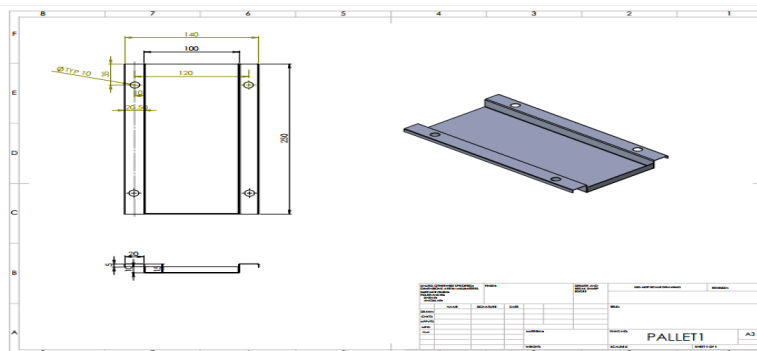


Figure 3: Pallet

Pallet is a platform like structure on which the car will stay or lift. It is designed in such way that all cars are suitable for this pallet. It is made from mild steel plate and shaped in fabrication process.

Shape Connector

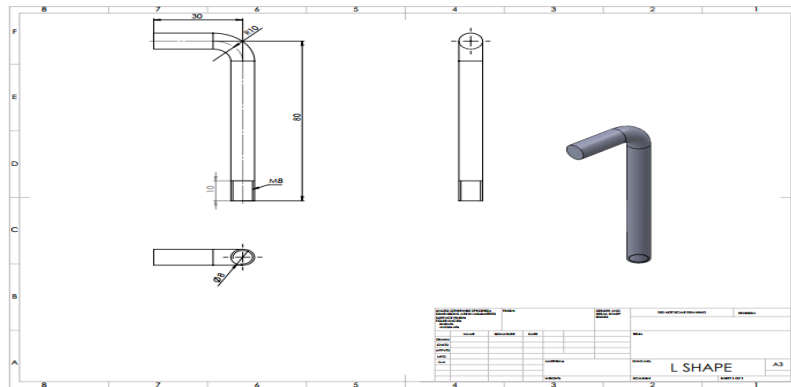


Figure 4: Shape Connector

the connector shape allows you to contain all of the information that is needed to connect to a data source or application within your Boomi processes.

Bush

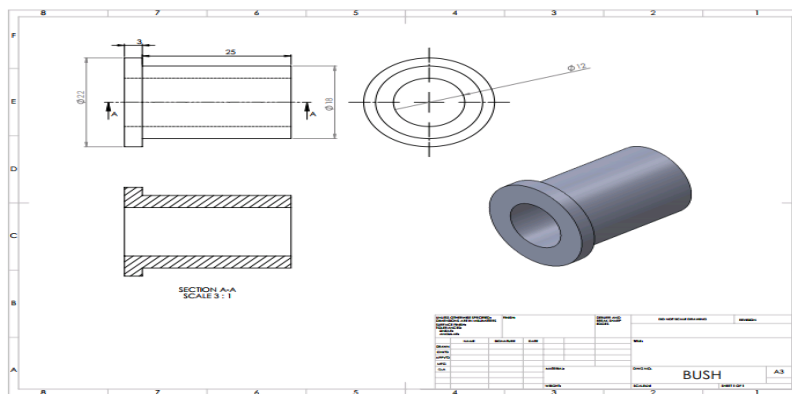


Figure 5: Bush

A bush bearing, conjointly referred to as a bushing or bush, is one classic kind of freelance plain bearing. it's a mechanical part that is meant to supply a control surface for rotary applications, reducing friction between the spinning shafts and stationary supporting parts.

Beam Rod

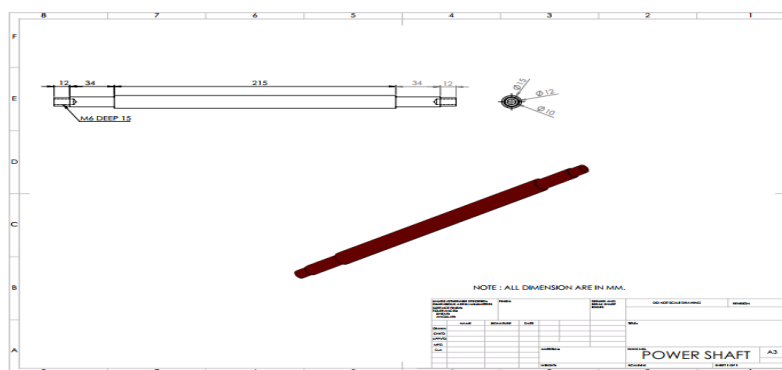


Figure 6: Beam Rod

Used in pallet assembly, connecting pallet to frame

3.3 ELECTRIC COMPONENT

Arduino uno

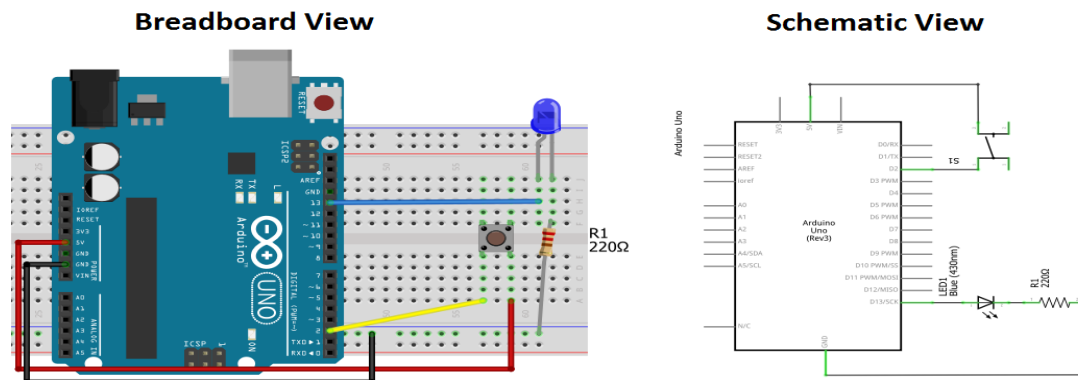


Figure 7: Arduino uno

Arduino could also be a single-board microcontroller meant to make the appliance further accessible that area unit interactive objects and its surroundings. The hardware choices with associate American Standard Code for Information Interchange document hardware board designed around associate 8-bit Atmel AVR microcontroller or a 32-bit Atmel ARM. Current models consists a USB interface, half-dozen analog input pins and fourteen digital I/O pins that allows the user to attach varied extension boards. Arduino could also be a single-board microcontroller meant to make the appliance further accessible that area unit interactive objects and its surroundings. The hardware choices with associate American Standard Code for Information Interchange document hardware board designed around associate 8-bit Atmel AVR microcontroller or a 32-bit Atmel ARM. Current models consists a USB interface, half-dozen analog input pins and fourteen digital I/O pins that allows the user to attach varied extension boards.

1. Microcontroller	ATmega328
2. Operating Voltage	5V
3. Input Voltage recommended	7-12V
4. Input Voltage limits	6-20V
5. Digital I/O Pins	14 (of which 6 provide PWM output)
6. Analog Input Pins	6
7. DC Current per I/O Pin	40 Ma
8. DC Current for 3.3V Pin	50 Ma
9. Flash Memory	32 KB (ATmega328) of which 0.5 KB 10. used by boot loader
11. SRAM	2 KB (ATmega328)
12. EEPROM	1 KB (ATmega328)
13. Clock Speed	16 MHz

16*2 Lcd display

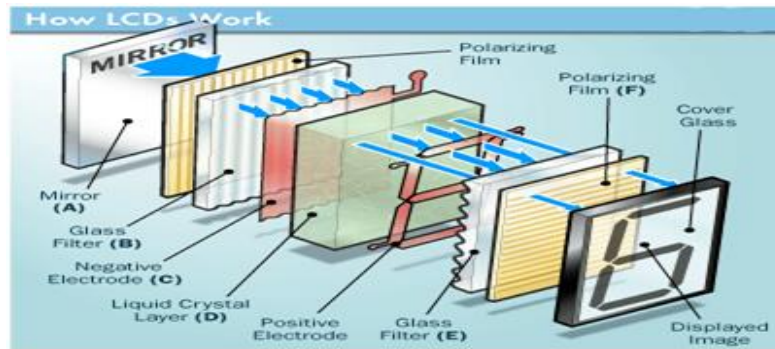


Figure 8: 16*2 Lcd display

The principle behind the LCD's is that once Associate in Nursing electrical current is applied to the liquid molecule, the molecule tends to straighten. This causes the angle of sunshine that is passing through the molecule of the polarized glass and additionally cause a amendment within the angle of the highest polarizing filter. As a result, a bit lightweight is allowed to pass the polarized glass through a selected space of the alphanumeric display. so that exact space can become dark compared to different. The alphanumeric display works on the principle of interference lightweight. whereas constructing the LCD's, a mirrored mirror is organized at the rear. Associate in Nursing conductor plane is formed of indium-tin compound that is unbroken on prime and a polarized glass with a polarizing film is additionally accessorial on the lowest of the device. the entire region of the alphanumeric display needs to be capsule by a typical conductor and on top of it ought to be the liquid matter.

Stepper motor



Figure 9: stepper motor

Model: NEMA23 Stepper motor-JK57HS (1.8 degree)

General Specification:

- Step Accuracy ----- ±5%
- Resistance Accuracy ----- ±10%
- Inductance Accuracy ----- ±20%
- Temperature Rise ----- 80°C MAX.
- Ambient Temperature Range ----- -20°C~ +50°C
- Storage Temperature Range ----- -30°C~ +60°C
- Insulation Resistance ----- 100M Ω MIN. 500V DC
- Dielectric Strength ----- 500V AC 1min
- Radial Play ----- 0.02mm MAX. (450g Load)

End Play ----- 0.08mm MAX. (450g Load)

Max. Radial force -----75N

Max. Axial force ----- 15N

Electrical Specification:

model no:	jk57hs112-3004
step angle (degree)	1.8
motor length (l) mm	112
current/phase (a)	3.0
resistance/phase (ohm's)	1.6
inductance/phase (mh)	6.8
holding torque (n.m)	2.8
lead wires (no)	4
detent torque (g.cm)	1200
rotor inertia (g.cm)	600
motor weight (kg)	1.

Calculation:

Motor speed	40rpm
Detent torque (g.cm)	1200
Rotor inertia (g.cm)	600
Length of Chain	1.6 m
Sprocket diameter	17.78cm
No of teeth	48
Length of shaft (L1)	29 inch
Length of shaft (L2)	32 inch

Pallet Specificification:

Thickness = 5 mm

Length = 260 mm

Width = 160 mm

Height = 20 mm

Frame

Dimensions of the Frame:

Height: 1000 mm

Width: 240 mm

Total load on the Frame = {Weight of vehicle × 8 +Weight of Pallet×8 +Weight of Rod×2 + Weight of Chain×2+ Weight of Rotor×4 +Miscellaneous} = {150×8+1.120×8+2000+1700+1.100×2+430×4+600+1.5+20}=7252.66N.

4. BENEFITS OF ROTARY CAR PARKING SYSTEM

- The lay cars and their contents safer since there's no public access to lay cars.
- Minor automobile parking space injury like scrapes and dents eliminated.
- Drivers and passengers safer not having to steer through parking tons or garages.
- Driving around in search of a parking zone is eliminated, thereby reducing engine emissions.
- Only minimal ventilation and lighting systems required.
- Handicap access is improved.
- The volume and visual impact of the parking structure is reduced.
- Shorter construction time.

- Parking house breadth and depth and distances between parking lot parking zone automobile parking space car parking zone dramatically reduced since no allowance would like be created for driving the automobile into the parking space or for the gap of automobile doors (for drivers and passengers).
- No driving lanes or ramps required to drive the automobile to from the entrance exit to a parking zone.
- Ceiling height is reduced since there's no traffic drivers and passengers within the park.
- No walkways, stairways or elevators required to accommodate pedestrians within the park.

5. CONCLUSION

the team chosen developing with Associate in manufacturing of associate degree a rotary parking system as a result of the feeling of responsibility towards their country as this kind of parking will facilitate lots to find the holdup issue in Egypt. Making a rotary parking system project was a extremely helpful issue that helped the project team to follow all the topics that they have studied in electrical power and management department. From sort of mechanical structure and bearings alternative passing through electrical circuits until reaching the management methodology. throughout the journey of this project the team have learned tons of skills that's going to facilitate them inside the truth work, like: 1-choosing PLC kind that match the required application 2-building a full electrical panel that may management a complete project 3-finally, the project team would love to tank another time our big- cheese for his time, effort and recommendation.

6. FUTURE SCOPE

The RACPS are often put in with a security installation like, whenever there's human movement within the system, the rotation of the system ought to be at once stopped. The platforms can even be equipped with safety sensors guiding the movement of vehicles within the platforms. Moreover, the model is often programmed in such some way that the trolleys traverse the minimum attainable distance throughout parking still because the retrieval of the vehicle. The platforms can even be equipped with safety sensors guiding the movement of vehicles within the platforms.

7. REFERENCES

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