Smart Car Parking System

Submitted in partial fulfillment of

Mini Project 1A

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CERTIFICATE

This is to certify that the project entitled **"SMART CAR PARKING SYSTEM"** is a bonafide work of

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Project Report Approval for S.E.

This project report entitled **'Smart Reverse Car Parking System'** by **Adarsh Rao, Gouresh Sankhe, Rakshita Khantwal, Umer Shaikh** is approved for **Mini Project 1A.**

Examiners

1. _____

2. _____

Date : / /

Place : **Kurla, Mumbai**

Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea / data / fact / source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Date : / /

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Date : / /

ABSTRACT

If you are a new driver, then it is very difficult to judge the distance while packing the car. Reverse car parking sensor circuit solves this problem by indicating the distance between the car and obstacle with the help of three LEDs and a buzzer. This car parking assistant can protect your car from any damage while reverse parking. It indicates the distance of car from any object and raise an alarm when it reaches close to the wall or the object and needs to be stopped. This car parking sensor circuit is quite easy and uses few commonly available components.

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List of Abbreviations

IPAS	Intelligent Parking Assist System
APGS	Advanced Parking Guidance System
IR	Infrared

Chapter 1

Introduction

It is somehow difficult to park vehicles or to reverse the vehicle in tiny spaces. More importantly without damaging the vehicle parts. Here is a very helpful and effective solution this car parking assistant can protect the car from any damage while reverse parking the distance between car and obstacle is understood by IC LM358 and the group of LEDs glow according to the range of distance and a buzzer buzzes which gives gives an alarm to the person who is driving.

1.1 Problem Statement

The aim of this project is to create an automatic reverse parking system which will help in parking the vehicle in a very easy manner.The driver won't be forced to look into rear mirror and make adjustments and so it will be helpful.

1.2 Scope of the Project

The initial requirements and proposed outcomes are :

1. Using it in robots.
2. Making it available for all types of vehicle for their safety.
3. Using several sensor to get proper reading around the whole car not in just reverse direction.
4. Effective implementation on Intelligent Parking Assist System (IPAS), also known as the Advanced Parking Guidance System (APGS).
5. Prevents vehicle damage.

Chapter 2

Literature Survey

LM358

In this IC we have two operational amplifier which can we use as a comparator. LM- The low power drain also makes the LM358 a good choice for battery operation.

https://www.electroniclinic.com/lm358-ic-pin-configuration-working-lm358-circuit-examples/

1. LM-358 is Compatibility with all forms of logic.
2. Two Op-amps, compensated internally we can use both op-amp at a time or if we need only one op-amp we can used it.
3. Permits direct sensing close to GND VOUT.
4. It can be used as Integrator, Summer, Differentiator, adder, Voltage follower, etc.
5. There is no need to give separate supply to the op-amp.

https://components101.com/misc/buzzer-pinout-working-datasheet

A buzzer is a small yet efficient component to add sound features to our project/system.It is very small and compact 2-pin structure hence can be easily used on breadboard.

https://semicomp.in/product/ir-sensor-pair/

Infra-Red Sensor commonly known as IR Sensor is nothing but a combination of IR source and a light detector called photo diode and it work on principal of transmitting light and receiving it and comparing the received amount of light with the help of a comparator LM358. IR Sensors are commonly used in detecting object and obstacles; it can also detect color. In short we can say IR sensor gives ability to autonomous robots to detect lines or nearby objects to autonomous robots. The Sensor have Digital as well as analog output also it have 4-pin header which make it easy to connect to main board via female to female jumper wire. A mounting hole lets you easily connect one or more of these on any surface.

Chapter 3

Working

We have shown the reference voltage and relative parameters in the below table. But one can set distance by changing the value of potentiometer.

Obstacle v/s Vehicle	LED status	Reference Voltage	Distance
not close	All OFF		Greater than 15 cm
Close	Green ON	2.0 Volt	About 15 cm
More Close	Yellow ON	4.0 Volt	About 10 cm
More Close	Red ON	6.0 Volt	About 5 cm
Touch	Car Damaged		About 0 cm

Figure 3.1: Working in tabular form

The clock divider module is also used to control the sampling rate of the entire project. It divides the clock frequency by 'n' for any value of n to produce a desired sample rate.

This system is placed at the rear of the car and sensor's front side toward the obstacle (wall). Now suppose car is moving back toward the wall or obstacle in the parking slot. If distance between car and obstacle is more than 15 cm then no LED will glow. Now if car moves toward the obstacle and suppose greed light turned ON, it means car is about 15 cm away from the obstacle. Now car is moving more close toward the obstacle and yellow light appears or turned on it means car is about 10 cm away from the obstacle. Now car is moving closer toward the obstacle and red light appears it means car is about 5 cm away from the obstacle and same time buzzer start beeping. Buzzer and red light indicates that the car need to stop now otherwise car may be damaged.

Chapter 4

Testing and Troubleshooting

We initially faced a lot of issues while sampling the refractive surfaces. We intended to work at 12 V DC Power supply but got a 9V power supply instead. Finally we built our hardware and made sure that all the three potentiometers were set at prover values in order to meet their respective required voltage demand (as of based on distance sensing).

Also while created the 3D model in KiCad we faced difficulties with the footprints of the components being used. Later, it was resolved when we found the proper footprints with the help of our guide and a proper 3D model was made.

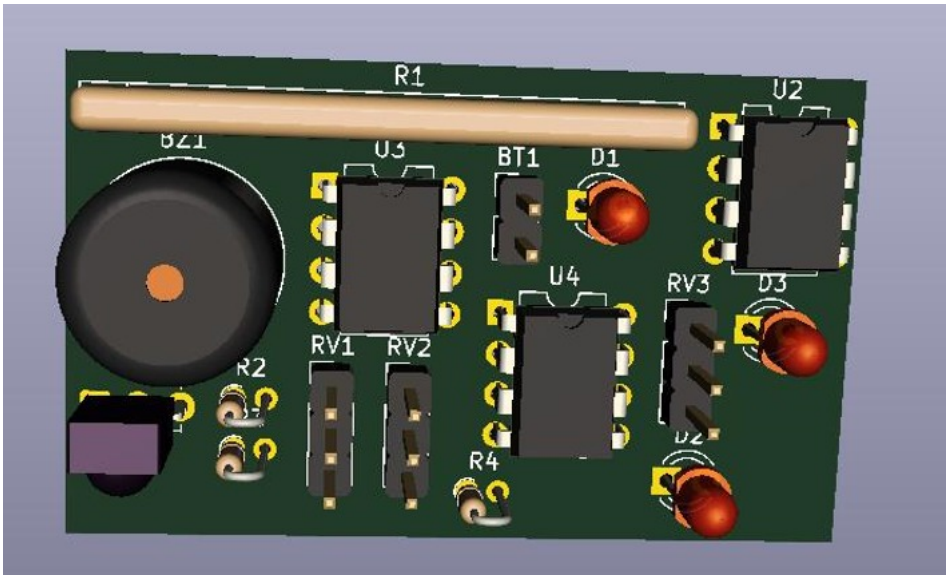

Figure 4.1: 3D Model

Chapter 5

Results and Discussion

The working of the entire Smart Car Parking system was carried out with the help of IC LM358.LM358 is a Dual Low Noise Operational Amplifier which has Two Op-Amp in a single chip. Two of them are used. The Pots played an important role for comparing the voltage with the reference voltage.

1. When an object comes forward, these rays are reflected back and the ir receiver catches them. Therefore, some voltage is generated across the LEDs. This voltage generated depends on the power of the IR rays that are reflected back to the receiver. If the signal is of more power it leads to more voltage difference. i.e lesser is the distance between the obstacle and car, more is the voltage difference generated.

2. This is to adjust the reference voltage. LED U1:B ,U2:B,U2:3 and a buzzer are connected to show the op.

3. suppose the car is moving backwards if the distance between obstacle n car is more than 15 cm no led will glow. If U2B turns on that means it's about 15 cm away from the obstacle. Similarly at 10 and 5 cms other 2 led will glow and at the end the buzzer will buzz.

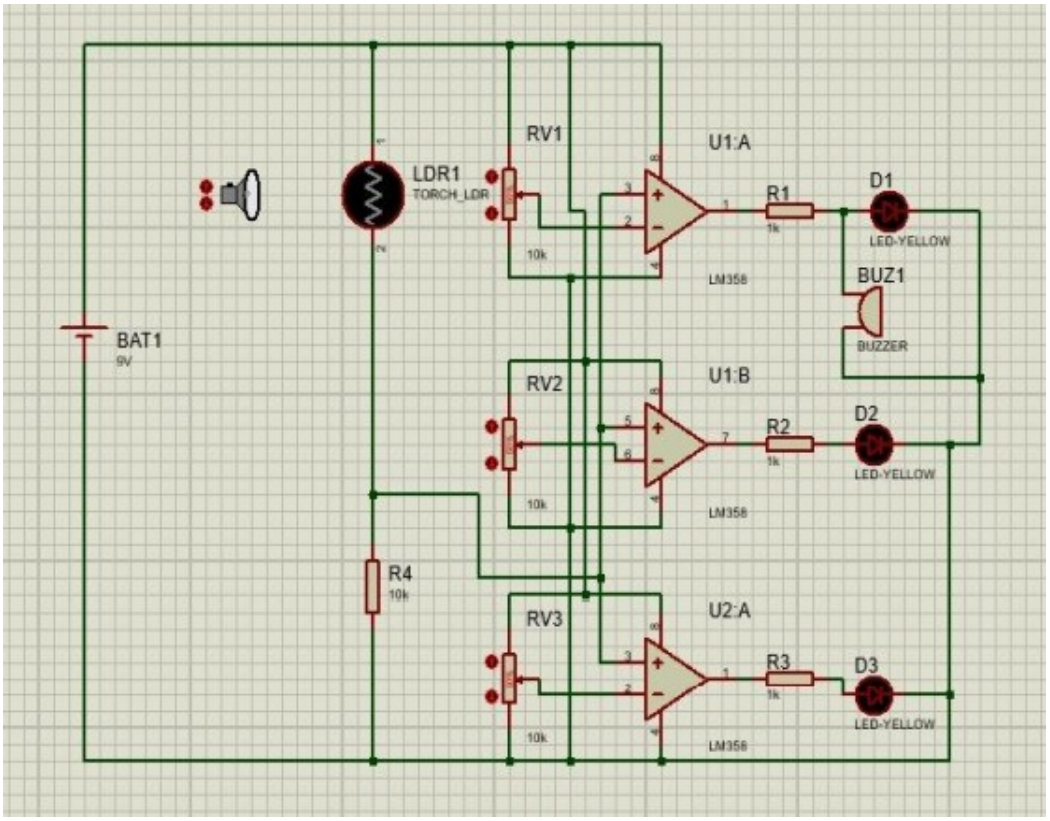

Figure 5.1: Simulation model. Here, torch and LDR are used in place of an IR transmitter Receiver pair

Chapter 6

Conclusion & Future Scope

The completed project has fulfilled most of the stated objectives. Effective time management along with KiCad and Proteus apps which have played a large part in making the project a success. All cars can install these gadgets in rear part of their vehicles. People can rely on this in the future as this will help them to park their car smartly without causing any damage to it.

References

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[5] https://semicomp.in/product/ir-sensor-pair/

[6] https://www.electronicshub.org/reverse-parking-sensor-circuit/

APPENDIX

Appendix A

Datasheets

A.1 LM358

Features

Wide supply range of 3 V to 36 V (B version)
Quiescent current: 300 µA per amplifier (B version, typical)
Unity-gain bandwidth of 1.2 MHz (B version)
Common-mode input voltage range includes ground, enabling direct sensing near ground
Low input offset voltage of 3 mV at 25°C (A and B versions, maximum)
Internal RF and EMI filter (B version)
On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

The LM358 devices are the next-generation versions of the industry-standard operational amplifiers (op amps) LM358 and LM2904, which include two high-voltage (36 V) op amps. These devices provide outstanding value for costsensitive applications, with features including low offset (300 µV, typical), common-mode input range to ground, and high differential input voltage capability. The LM358 amplifiers are available in micro-sized packaging, such as the SOT23-8, as well as industry standard packages including SOIC, TSSOP, and VSSOP

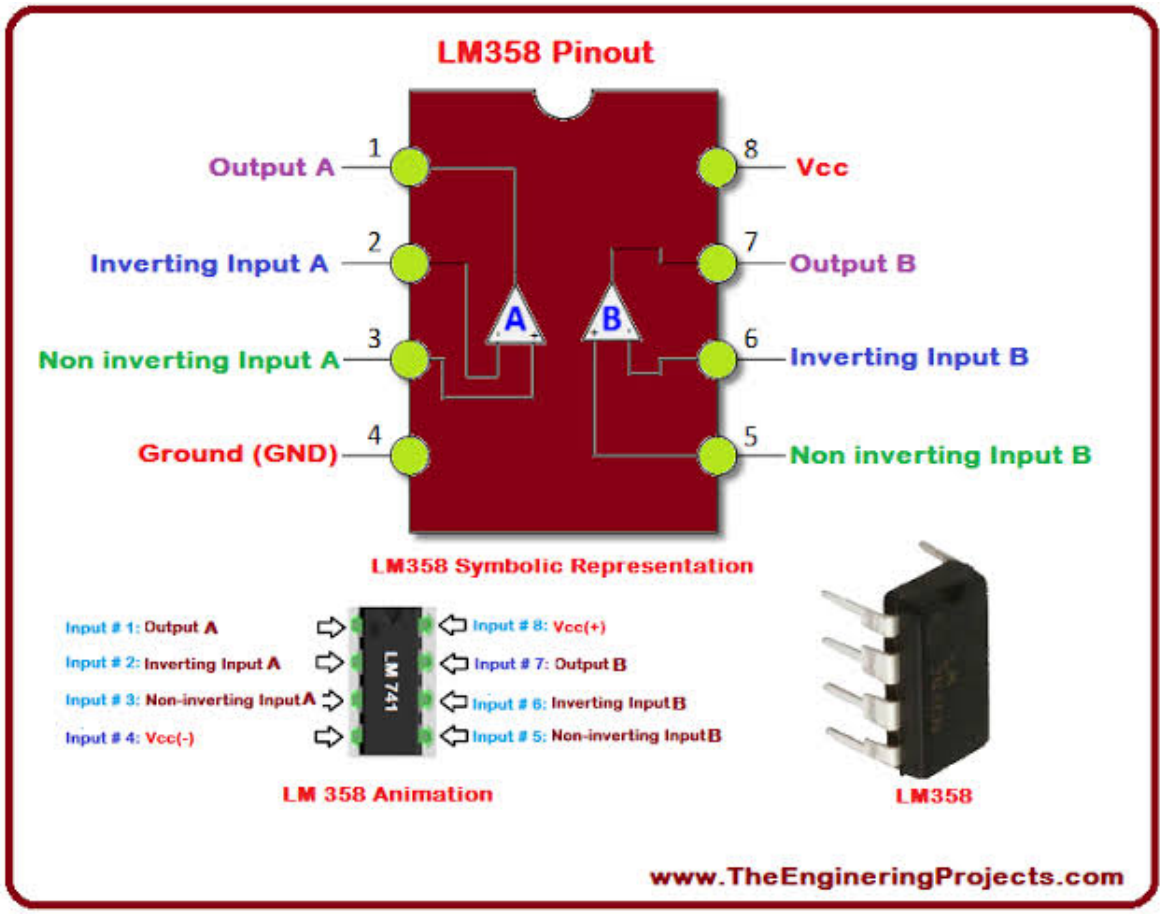

Figure A.1: IC 358