

A
Project Report
On
HARDWARE IMPLEMENTATION CAR PARKING SYSTEM
Submitted to
RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES, KADAPA
in partial fulfilment of the requirements for the award of the Degree of
BACHELOR OF TECHNOLOGY
IN
ELECTRONICS AND COMMUNICATION ENGINEERING

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

RGUKT, RK VALLEY

**(RGUKT KADAPA is approved by UGC, AICTE, established in 2008, provide
Education opportunities for rural people)**

Vempalli, Kadapa-516330

2019-2023

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CERTIFICATE

This is to certify that the project report entitle **HARDWARE IMPLEMENTATION OF CAR PARKING SYSTEM**” a bonafide record of the project work done and submitted by

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INTERNAL EXAMINER

EXTERNAL EXAMINER

(i)

DECLARATION

We hereby declare that the project report entitled “ **HARDWARE IMPLEMENTATION OF CAR PARKING SYSTEM**” submitted to the Department of **ELECTRONICS AND COMMUNICATION ENGINEERING** in partial fulfilment of requirements for the award of the degree of BACHELOR OF TECHNOLOGY. This project is the result of our own effort and that it has not been submitted to any other University or Institution for the award of any degree or diploma other than specified above.

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We have great pleasure in expressing our hearty thanks to our beloved Director **Prof. K. Sandhya Rani** for spending her valuable time with us to complete this project.

Successful completion of any project cannot be done without proper support and encouragement. We sincerely thanks to the Management for providing all the necessary facilities during the course of study.

We would like to thank our parents and friends, who have the greatest contributions in all our achievements, for the great care and blessings in making us successful in all our endeavors.

With Sincere Regards,

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ABSTRACT

In today's days, motor vehicle use is increasing day by day, causing noise, traffic congestion, issues with parking spaces, and finding a vacant parking space is becoming increasingly difficult. In this paper we proposed a safe car parking management framework using Verilog HDL.

This machine has two main modules Module-1: Password entry and exit. Module 2: distance calculation and empty slot finding. Our execution time is very faster by using FPGA. This is about designing an efficient system which takes over the task of identifying free slots in a parking area that keeps parked vehicle records. Parking a vehicle also requires a password. With the rapid increase in the availability and use of cars in recent years, finding a vacant car park is a little complicated. It creates the issue of traffic congestion, emissions (noise and air), as the number of vehicles increases day by day

Main Objective:

The sole objective of this project is to identify a vehicle's presence or absence in a particular parking space with a high degree of accuracy, and to pass on this data into a system for visualization and analysis.

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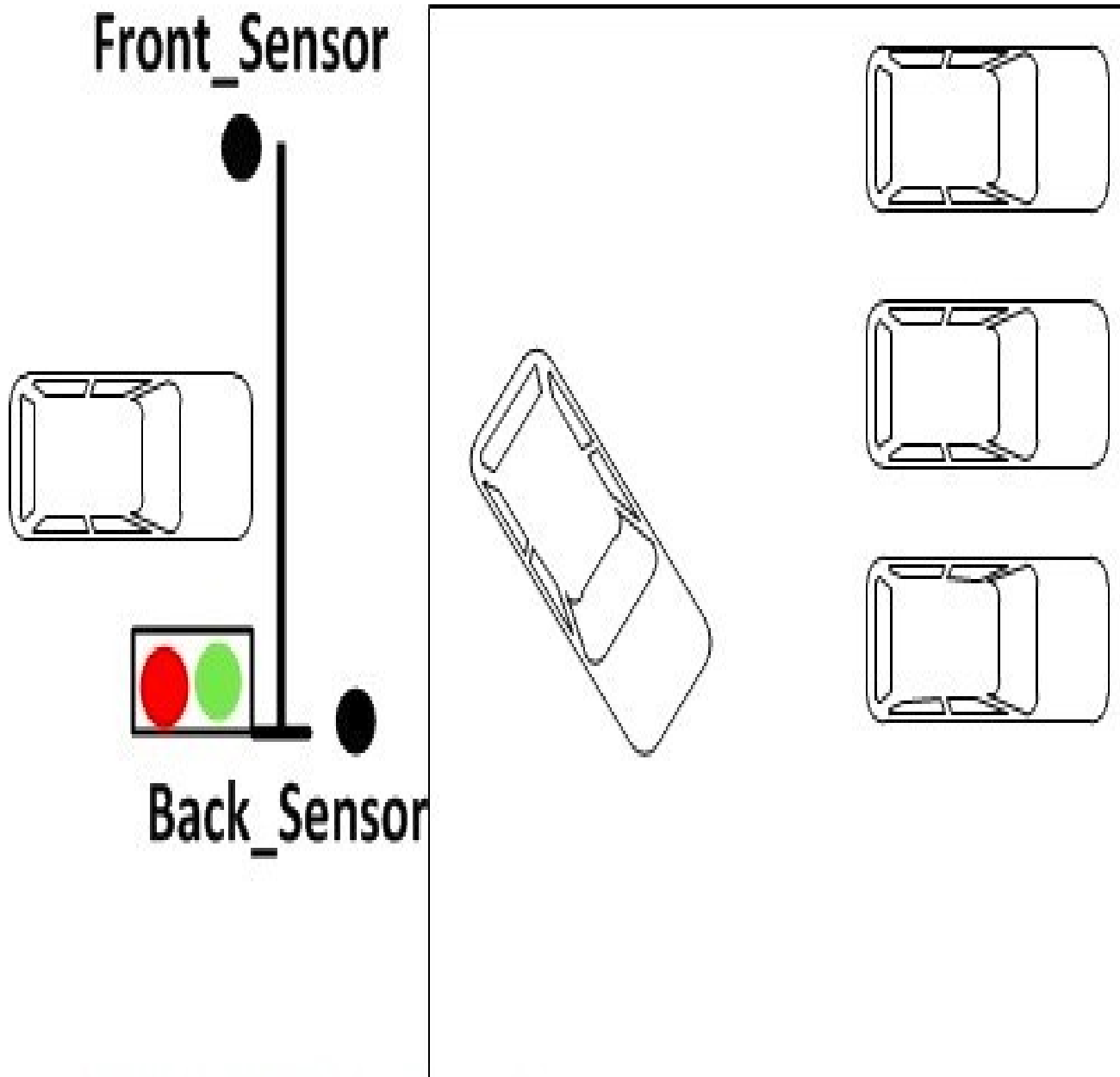
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INTRODUCTION

1.2 MOTIVATION ABOUT THE WORK

- In this realistic world each person carried out many tasks without being evasive. Thus, in order to carry out all the activities for the effective use of resources, wise steps should be taken to curb waste of time in ineffective areas such as the most frequently performed practice, which is unfruitful vehicle parking.
- The main goal is systematic parking with protection. Protection requires the use of password when parking, indication of number of available vacancies as well as their locations where only the adjacent vacancies are needed in particular, total number of vacancies available in a specific slot and even distance calculation to obstacles. Public services need a parking network which can effectively operate and be combined with other public utilities.
- In order to avoid these problems, design is proposed for secured car parking management system, which will be implemented on FPGA to check vacancies and provide car protection.

1.2 CAR PARKING SYSTEM DIAGRAM



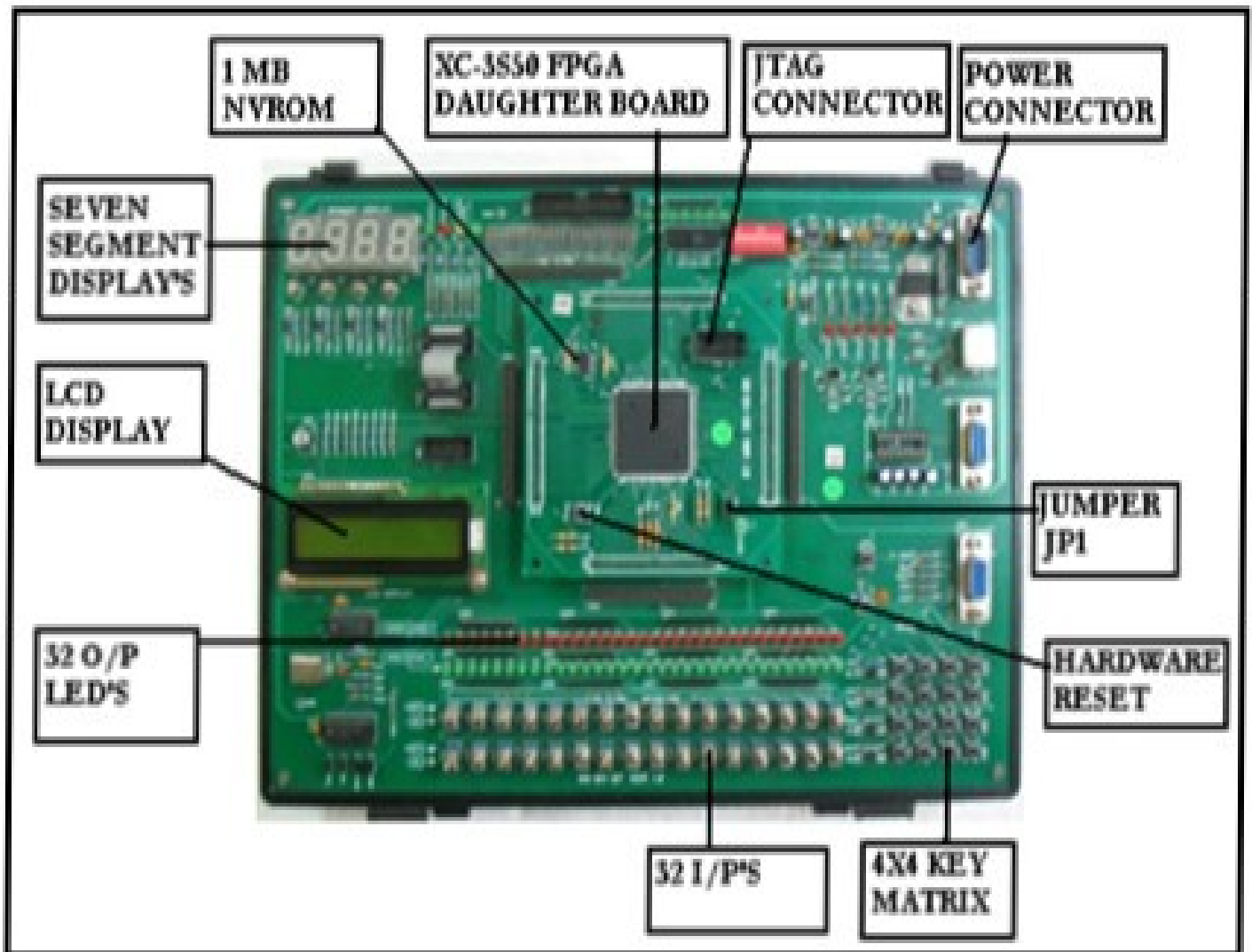
1.3 VERILOG LOGO



WHAT IS VERILOG ?

- verilog is a hardware description language .it is a language used for describing a digital system like a network switch or a microprocessor or a memory or a flip flop.
- It means by using a HDL we can describe any digital hardware any level.Designs which are described in HDL are independent of technology ,very easy for designing and debugging and are normally more useful than schematics particularly for large circuits.
- so by all these reasons ,we took verilog HDL for designing purpose in software
- **Verilog**, standardized as **IEEE 1364**, is a [hardware description language](#) (HDL) used to model [electronic systems](#). It is most commonly used in the design and verification of [digital circuits](#). It is also used in the verification of [analog circuits](#) and [mixed-signal circuits](#), as well as in the design of [genetic circuits](#).

1.4 FPGA DIAGRAM



What is FPGA ?

- Field Programmable Gate Arrays (FPGAs) are semiconductor devices that are based around a matrix of configurable logic blocks (CLBs) connected via programmable interconnects. FPGAs can be reprogrammed to desired application or functionality requirements after manufacturing. This feature distinguishes FPGAs have become highly popular in the VLSI area.
- The code for FPGA programming is written in languages like VHDL and Verilog. Its used to implement logic gates and other digital circuits.

In our Design ,We used W/L ratio is 16.67

i.e., $W=2.0\mu$ and $L=0.12\mu$

- n-MOS works faster than the p-MOS Semiconductor. A drawback of FPGAs compared to other PLDs is that they do not remember their design when the power is removed. An FPGA therefore needs a separate configuration memory chip that holds the FPGA design. When the power is given back to the FPGA a fixed part of the FPGA reads the configuration from the configuration memory chip. After the FPGA is configured it will be able to do the function it was given by the design. An FPGA is different from a microprocessor or microcontroller. An FPGA in its basic form is not able to run software. Only when the FPGA is given a configuration that contains a processor-architecture it has the ability to run software

CHAPTER 2

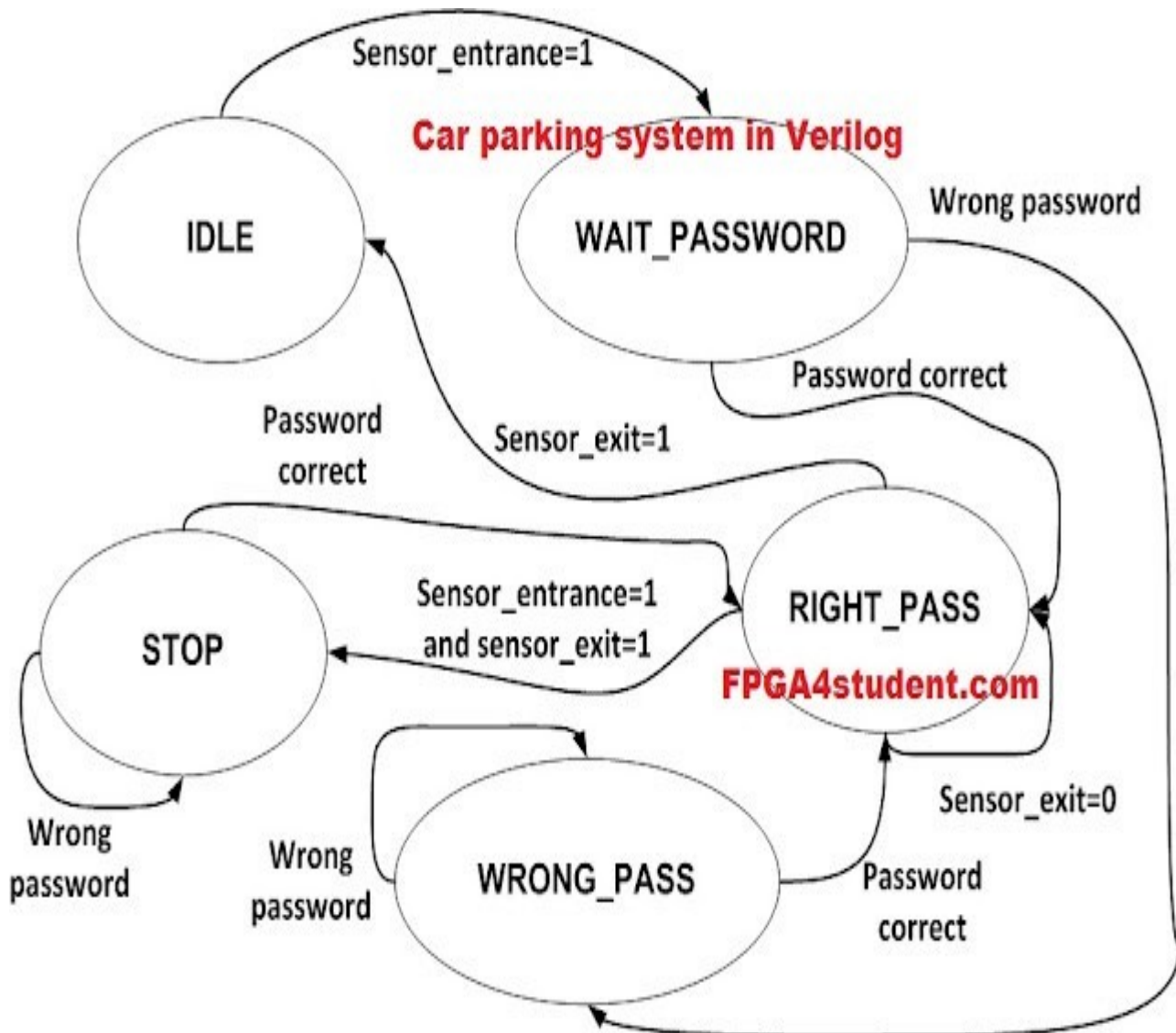
CAR PARKING SYSTEM

2.1 DESIGNING OF CAR PARKING SYSTEM

- in the entrance of the parking system, there is a sensor which is activated to detect a vehicle coming. Once the sensor is triggered, a password is requested to open the gate. If the entered password is correct, the gate would open to let the vehicle get in.

- Otherwise, the gate is still locked. If the current car is getting in the car park being detected by the exit sensor and another the car comes, the door will be locked and requires the coming car to enter passwords.
- Block diagram shows the over view of inputs and outputs of the design.
- By features and flowchart we have to design the respective by making parts which leads to make the complete desired one.
- In the entrance of the parking system ,there is a sensor which is activated to detect a vehicle coming.Once the sensor is triggered ,a password is requested to open the gate.If the entered password is correct ,the gate would open to let the vehicle get in.Otherwise ,the gate is still locked.

2.2 OVERVIEW OF CAR PARKING SYSTEM



CHAPTER 3

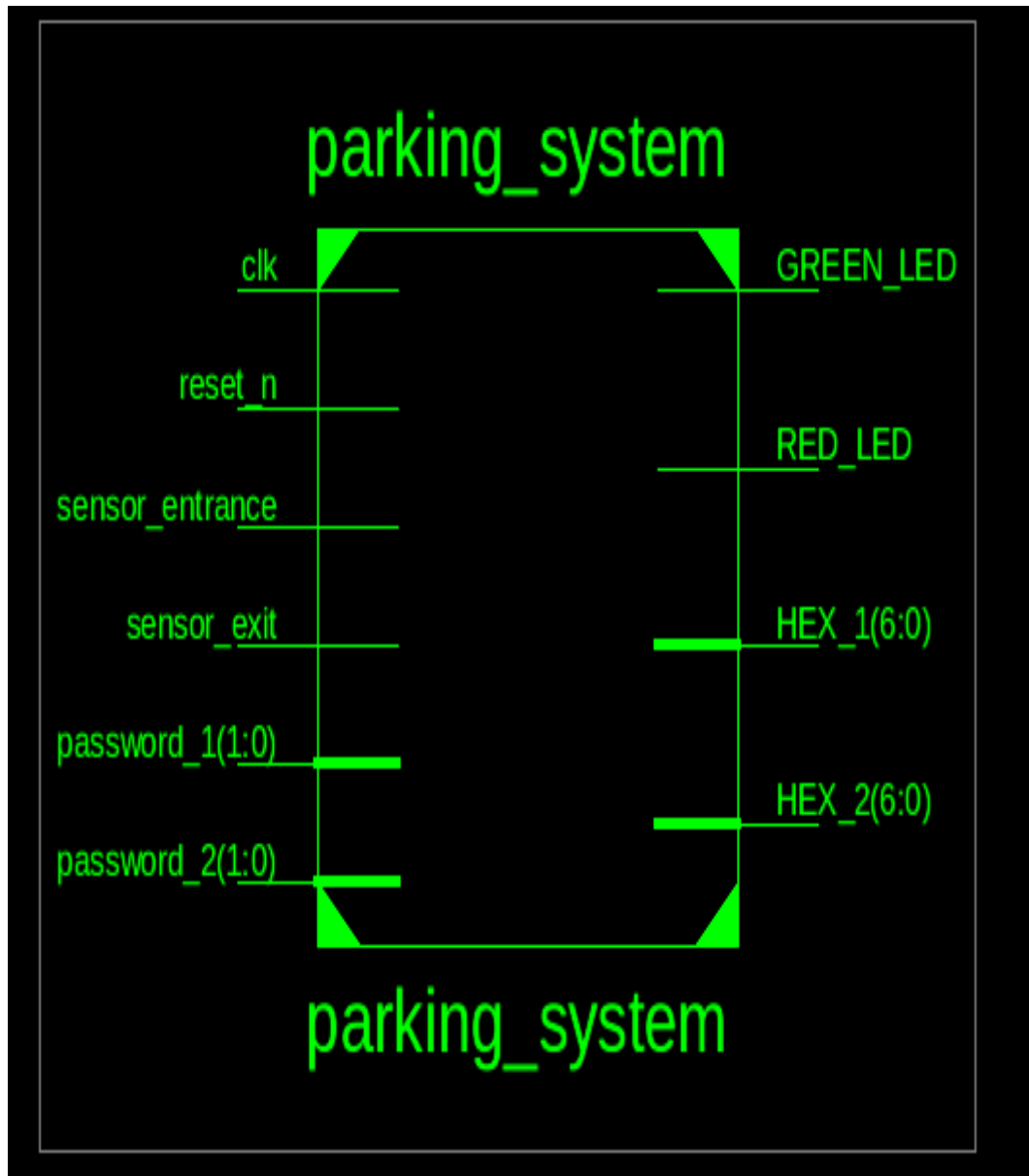
LIST OF INPUT AND OUTPUT TERMINAL OF STATE MACHINE

List of input and output terminals of the state machine

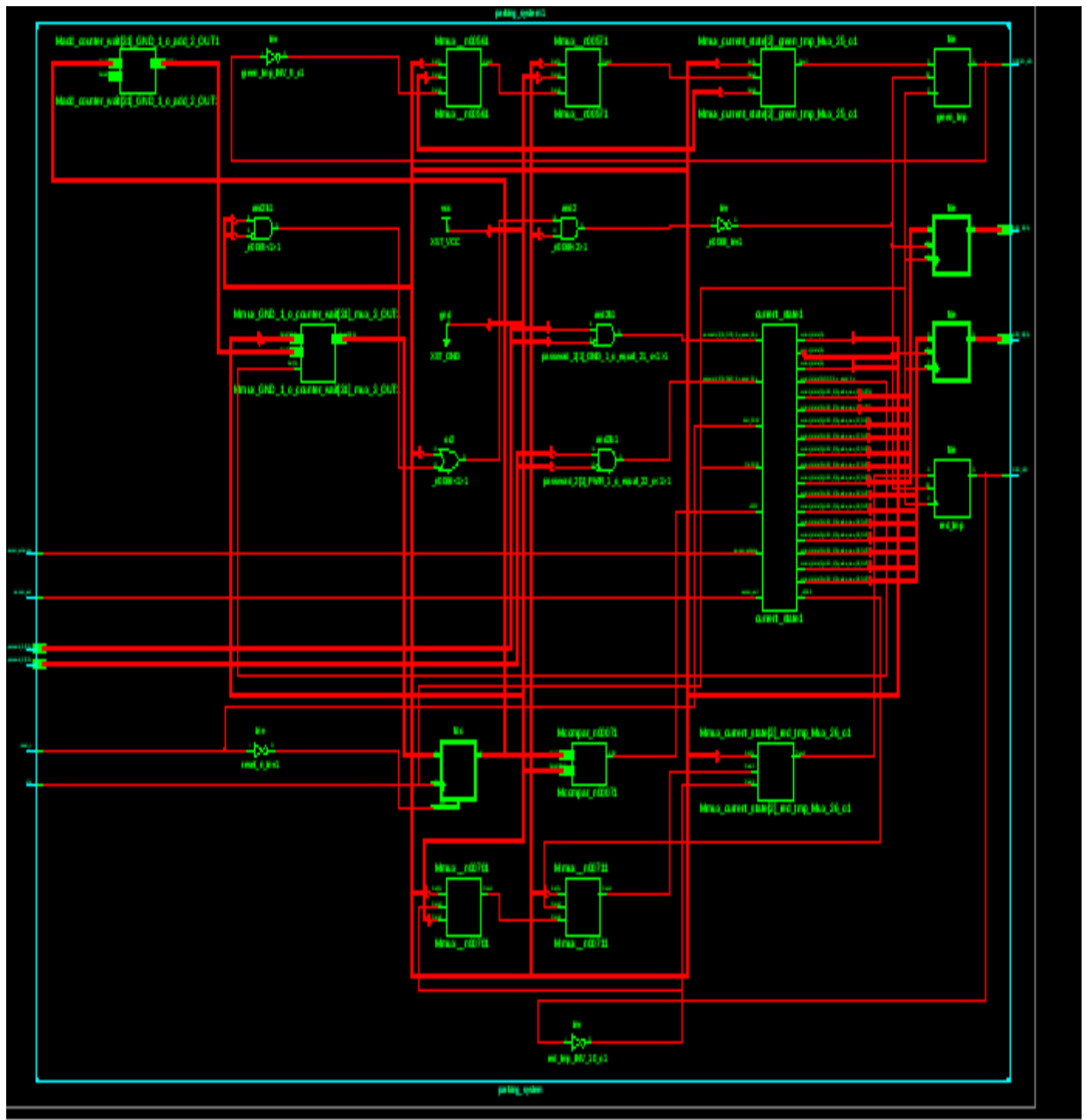
Signal Name	Direction	Description
Clock	Input	Clock input to the state machine
Reset	Input	Reset signal to "reset" the state machine to a known state
<u>sensor_entrance,</u>	Input	Detect the coming vehicles
<u>sensor_exit,</u>	Input	Detect the car into the car park
Password 1	Input	Gate is opened to let the car into the car park
Password 2	Input	If paas_1 is incorrect it will check again and let the car into the car park
Green LED	Output	FSM turns to RIGHT_PASS state; a Green LED will be blinking.
Red LED	Output	Wrong pass state and if the next car is coming before parking the current car then Red LED will be blinking
HEX 1	Output	Display 7-segment LED
HEX 2	Output	Display 7-segment LED

CHAPTER 4

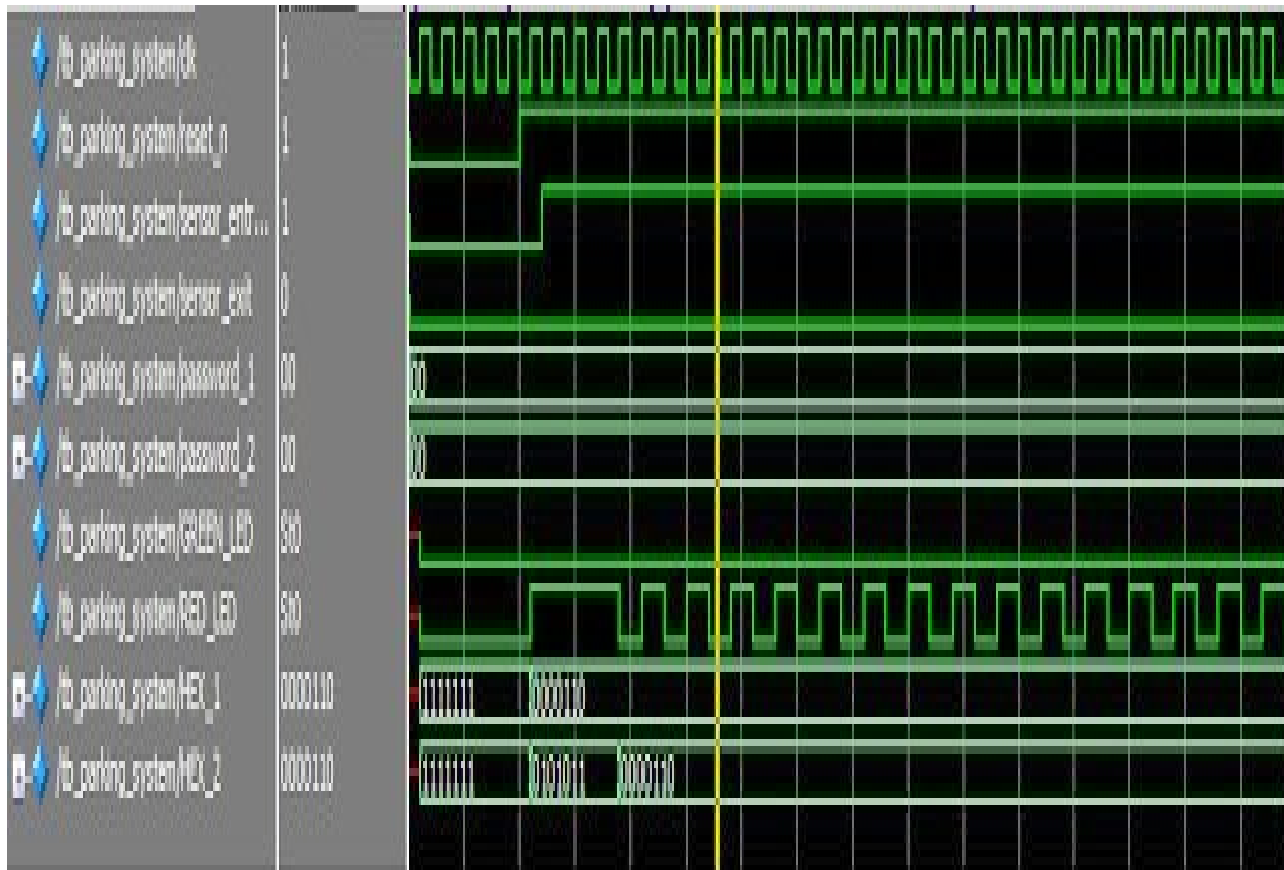
RTL SCHEMATIC DIAGRAM



5.1 IMPLEMENTATION OF CAR PARKING SYSTEM



5.2 STIMULATION OF CAR PARKING SYSTEM



- The simulation waveform shows the functional operations of the car parking system in Verilog. You can change the VHDL code to increase the blinking period of the Green LED and Red LED. Also, you can change the per waiting for password being entered in the Verilog code of the car parking system.

CHAPTER 6

APPLICATIONS OF CAR PARKING SYSTEM

- Sensors such as IR (Infrared) are used in order to identify the enter and exit of the car at the parking slot. The password required for car entry and exit is done using FPGA. The number of slots available was identified by fixing cameras. The details of number of vehicles parked are not stored.
- When a vehicle enters the space ,sensors detect its presence and calculate available parking slots .this information is then sent to the driver's phone via the app.
- It provides details of the vacant parking slots in the vicinity and reduces the traffic issues due to illegal parking in the vicinity.It is designed with an objective to meet the requirements of controlled parking that offers effortless parking tactics to the authorities.

• CHAPTER 7

ADVANTAGES &DISADVANTAGES

7.1 ADVANTAGES OF CAR PARKING SYSTEM

- Our execution time is very faster by using FPGA. This is about designing an efficient system which takes over the task of identifying free slots in a parking area that keeps parked vehicle records.
- Safety.
- Parking facilities have to focus on security and privacy.
- With a management system, owners can ensure authorized entry or exit of vehicles, eliminating the risk of stolen, damaged, vandalized cars.
- Parking management systems have technologically advanced security features that enable you to prevent parking misuse and suspicious activity in your parking facility.
- Parking management systems provide upgraded security,safety and privacy ,so car owners can rest assured that their cars are well protected.

7.2 DISADVANTAGES OF CAR PARKING SYSTEM

- Expensive construction and installation .A parking management system can cost a lot of money.
- Requires regular maintenance .The parking systems are usually automated ,but they require regular maintenance to ensure everything is working smoothly.
- System Breakdown.
- Parking your car outside is not damaging just to the exterior but also takes a toll on the interiors.The dashboard and upholstery ends up fading.

CHAPTER 8

CONCLUSION

- Adopting parking management system significantly reduces the amount of time consumed in seeking the parking space, renders valuable data upon the availability of the parking area, accurate mapping of the parking space, offers guidance and suggestion for proper vehicle parking.
- The system is made more efficient as vehicle travel time and search time are significantly reduced due to the information provided by the smart parking system. With the information, drivers are able to avoid car park that are fully occupied and locate vacant parking spaces with ease elsewhere.

CHAPTER 9

REFERENCE

➔ <http://www.internationaljournalsrg.org>

➔ fpga4student.com