MINI PROJECT REPORT

ON

"SMART LASER ALARM SECURITY SYSYTEM"

Submitted in partial fulfillment of the requirements of the degree

BACHELOR OF ENGINEERING IN **COMPUTER ENGINEERING**

BY

Vishal V. Shigwan	ROLL NO. DSE63
Gauri S. Kamble	ROLL NO. DSE 34
Rutik N. Tavanoji	ROLL NO. DSE 67

UNDER THE GUIDANCE OF

PROF. Vishal Shinde

DEPARTMENT OF COMPUTER ENGINEERING

SHIVAJIRAO S. JONDHLE COLLEGE OF ENGINEERING AND TECHNOLOGY,

ASANGAON 421601.

UNIVERSITY OF MUMBAI

2020-21

MINI PROJECT REPORT APPROVAL FOR S.E.

This project report entitled

"SMART LASER ALARM SECURITY SYSYTEM"

By

Vishal V. Shigwan	ROLL NO.63
Gauri S.Kamble	ROLL NO.34
Rutik N.Tavanoji	ROLL NO.67

Is approved for for the degree of

Bachelor of Engineering in **Computer Engineering**

Prof. Vishal Shinde

[PROJECT GUIDE]

Prof.	Prof.
[INTERNAL EXAMINER]	[EXTERNAL EXAMINER]
Prof. Vishal R. shinde	Dr.Mrs. Geetha K.Jayaraj
[HEAD OF DEPARTMENT]	[PRINCIPAL]
Place: Asangaon	Date :

ACKNOWLEDGEMENT

This is great pleasure and immense satisfaction to express our deepest sense of gratitude and thanks to everyone who has helped us in completing our work successfully. We are presenting this Mini Project report on "WEBSITE SUMMARIZATION WITH IMAGES AND TEXT" as part of the curriculum of S.E. Computer Engineering. Inspiration and guidance are invaluable in every aspect of life especially in the field of academics, which we have received from our respected **Project Guide:** Prof. Vishal Shinde and **Head of Computer Department:** Prof. Vishal Shinde. Besides, we take this opportunity to express our sincere gratitude to the **Principal:** Dr. Mrs. Geetha K.Jayaraj, SSJCET for providing a good environment and facilities to complete this project. We would also like to thank all our staff and friends who have directly or indirectly guided and helped us in the preparation of this report and also for giving us an unending support right from the stage this idea was conceived.

Vishal V. Shigwan

Gauri S.Kamble

Rutik N.Tavanoji

TABLE OF CONTENTS

ABSTRACT

The objective of this project is to design a Laser & LDR based Security System. This is based on the principle of voltage divider circuit. When the laser beam continuously falls on the LDR, the voltage drops across it is very low as the resistance of LDR becomes less. And as soon as the laser beam is interrupted by any means of object or a barrier the voltage drops across it becomes high due to change in the LDR's resistance. This triggers the alarm or siren in the circuit. This project is very simple and helped us to learn more about the components we generally use in our labs and has increased our knowledge to a certain extend.

CHAPTER NO. 01

INTRODUCTION

1.1 INTRODUCTION

Need of security is the basic necessity of any individual. The feeling that we are safe and everything around us is all right is imperative for a peaceful living. But in this unsafe world, when crime, terror and threats are on their peak, how can one attain that sense of security? Here, laser security system provides us with a solution and for this reason more and more people are installing them in order to stay safe and secure. Various electronic security systems can be used at home and other important working places for security and safety purposes.

Laser Security alarm is a device used for security purposes. It has a wide application in fields of security and defense starting from the security of a simple house hold material to a very high valued material of an organization. They once used to be expensive solutions for security needs. Owing to cost cutting and fast technological advancements. this form of security system is becoming more affordable.

We probably seen an old Western movie where the good guys settle down and run a string at ankle height around their camp, tying it to a can filled with rocks. When the bad guys try to sneak up in the middle of the night, they kick the wire and pull the can over, making a rattle that awakens the sleeping good guys, who win the day. A laser security system works along the same principle. Instead of a string, there's a beam of light surrounding the area, and instead of a can of rocks, there's an alarm of one sort or another.

1.1.1 The Principles of Laser Security Systems

There are three essential components to a laser security system: a laser, a detector and sensing circuit. The laser is a concentrated light source that puts out a straight line "pencil beam" or light of a single color. The detector is sensitive to light and puts out a voltage when the laser light hits it. The detector is connected to the sensing circuit. When the laser beam is interrupted and can't reach the detector, its voltage output changes, and the circuit sense the change and put out a warning signal.

1.1.2 Lasers

Lasers differ from other light sources in a few significant ways. There are two features that are most important for security systems. Unlike a lightbulb or flashlight, laser light doesn't spread out, it stays in a narrow beam. And laser light is essentially a single color. Because laser light doesn't spread much, you can send it a long way and still have enough energy in a small area to trigger the security system detector. Because it's a single wavelength, you can put a blocking filter on the detector to let laser light through without letting background light onto the detector

1.1.3 System Layout

Laser light travels in a straight line. If you just wanted to protect the front of your yard, putting the laser at one corner and the detector at the other corner would do the job. That's not a very practical configuration, though. More typically, you'll want to protect the perimeter of a room, or at least the entrances. So, laser security systems start with a laser pointing to a small mirror. The first mirror is to direct the beam to a second small mirror, and so on until the final mirror directs the beam to the detector. If the beam is interrupted anywhere between the laser and the detector, the electronics will put out the warning signal.

1.1.4 Warning Signal

Laser security systems are available in many configurations, with many levels of sophistication. There are do-it-yourself kits that will buzz or ring when the beam is interrupted. The electronics also can be set to trigger an auto-dialer that contacts local law enforcement or a monitoring Company. The electronics can also trigger the exterior lights of the house to flash, helping police locate the house where the alarm has been triggered.

1.2 OVERVIEW OF PROJECT

We all know that movies present exaggerated images of reality, and that's especially true of the way laser security systems are presented by Hollywood. The typical image will show a pattern of crisscrossing red or green shafts of light tilling or outlining a room. The hero (or villain)

then carefully steps through the maze, avoiding those lines of light and making it to the diamond. In reality, laser beams are not visible as they travel through the air, unless there is dust or moisture in the air. On the other hand, there will be some scattered light from the mirrors and the detector that can be a giveaway that a laser security System is installed.

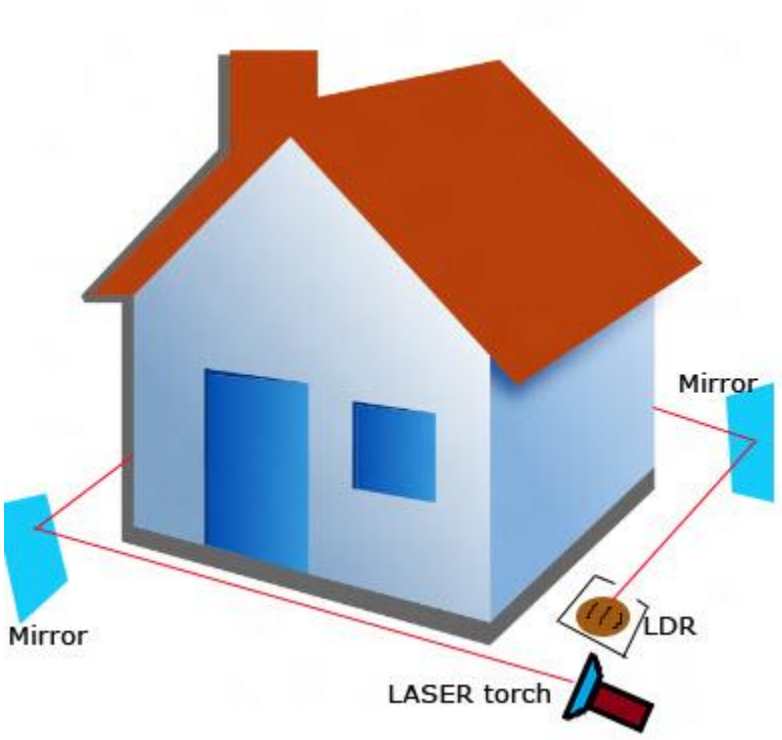


FIG 1.1. OVERVIEW WORKING

1.3 PROBLEM DEFINATION

Security incidents can be brutal, they can cost a fortune and even human lives. Installing security systems to encounter potential security threats seems like a solution but like most other systems, current security systems do have common shortcomings associated with them. These shortcomings range from price to installation and from performance to maintenance of these systems.

1.3.1 Expensive hardware and total cost of ownership

Despite the widespread adoption and growing numbers of installations across the globe, prices of security systems are still not very affordable. Expensive hardware is what most buyers notice during their first encounter with security system. Variation in pricing is also huge. Some DIY home security alarming systems offer starting prices as little as $50, however these products will have comparatively lower quality when it comes to performance and durability. They may require more frequent maintenance calls than high quality security systems. However, high quality security systems will not be cheap. Advertisements of home security systems often show starting price to be surprisingly low, however, pricing can also be tricky. Price of some very basic, systems is kept very low just to publish it with the advertisements. This basic low-price system will not serve much purpose and will be largely inadequate for an efficient security implementation. Actual systems that will be able to serve your purpose can be way more expensive than the advertised starting price.

The cost of ownership will again be way more than purchase price, which will include maintenance charges, monitoring subscription fee if it is a monitored system, price of parts, battery replacement cost, contract termination fee, etc. Sometimes a system, claimed as DIY installable equipment, may not actually be the one, despite the claim, on the other hand, some customers may not be able to install it even if it is a Do It Yourself type of equipment. For example, in case of elderly or challenged people, DIY is of not much use, they will require external help to install it. If the security system is a monitored one, you may have to pay monthly monitoring subscription fee that may range from $150 to $1500 per year.

1.3.2 No guaranty of threat prevention

Installing a security system is not a guarantee of protection from the potential threats or occurrence of the security incidents. Criminals have also become smarter and they are aware that security systems are commonly found in homes and business these days. They come prepared. They already know the common locations these systems are installed at and know the methods to disarm them. Sometimes even security equipment's get stolen. Security systems like

surveillance cameras will only record the incident and cannot do anything to prevent it. Sometimes intensity of the incident will cause security system to fail, for example a fire security system will fail if fire is breaking out due an explosion or huge volume of highly inflammable material. Same way an armed robbery, in which people are taken hostage, will actually expose people to threat when they start searching for the reason of security alarm.

1.3.3 Maintenance

Maintenance not only increases the cost of ownership; it can leave home insecure if equipment had to be uninstalled to fix it. Maintenance may cost more if a security system is being used beyond its recommended limits, for example, in extreme environments.

1.3.4 Failure to precisely sense the surrounding

Security system like motion sensors cover specified area, if area is bigger than the sensor coverage, or the sensors are not properly installed to cover the area, it may leave some insecure patches. Some constructions designs may require more sensors while installing lesser number of sensors will leave some area insecure.

1.4 OBJECTIVES

No matter where you live, being at home should always feel safe. Having a wireless home security system can give you the added peace of mind you and your family need to feel safe around the clock. When you consider purchasing a security system, there are three objectives the device should meet. These objectives include minimizing break-ins, protecting your possessions, and avoiding danger.

1.4.1 Minimizing break-ins

The main purpose for having a laser alarm security system is to minimize break-ins. Just the simple fact that you have a security system could keep a potential burglar away from your house. Decals in your windows or a sign in your yard advertising your security could keep a burglar from attempting a break-in. Criminals don't want to get caught and know there is a high chance of being stopped because of a security system. Therefore, your wireless home security system has already done something without even having to be triggered.

1.4.2 Protecting possessions

Replacing your possessions is hard and some things, especially sentimental items, cannot be replaced. Having a laser alarm security system means that you can worry less about a criminal breaking in and taking your items. If a criminal does actually get into your house, he or she will only have seconds before the police are alerted. This means you may not suffer a loss as large as one you may have incurred if you didn't have the system in place.

1.4.3 Avoiding danger

Nothing is scarier than having to fight off or confront a burglar in your home. You may not be equipped to handle this type of situation, so leave criminals to the police, even when you have a wireless home security system. If you come home to an alarm going off, you know there is a chance someone entered your house. You can avoid danger by staying out of your house until the police arrive to investigate.

CHAPTER NO. 02

LITERATURE SURVEY

Security and comfort are an aspect that man seeks in living. Guarantee of safety for family, possessions and wellbeing is significant. There is an inseparable relationship between man and their belongings as foretold by Alvin Toffler in his prediction of the future in his book “FUTURE SHOCK”. Man gives importance to the welfare of his family and protection from possible instances of accidents and crime. With this matter, man has created and innovated further security and safety.

In the past few years, the crimes and cases within Koronadal has been gradually arising. The cases of theft have reached 26.82%, robbery cases with 27.42%, crime vs. property with the percentage of25.02%, car napping with the percentage of 2.89%, and crime vs. persons 18.18% (PNP annual report, 2015). The alarming percentages of crimes have triggered the researchers to create this research project.

2.1. Existing Source of Laser Security System: -

There are many companies which provides Laser Security System, some are

2.1.1. Local Electronic shops

Laser Security System is available in local electronic and hardware shops. Customers preferring offline products as compare online shopping. They go to shop and checks that security system works properly or not and purchase it.

2.1.2. Online Shopping

Laser Security System is also available at online platform like amazon, Flipcart etc., Those who are not able to purchase by going at shop or don't have time to purchase it, they preferred buy it online. Also, many companies official site gives option to customer for buying their products.

2.1.3. Creating Own Security System

Many websites and YouTube channels are providing tutorials of how to create own's Laser Security at home. Also, they are providing list of components required for creating system and giving them option for buying it online or offline as they want.

2.1.4. Developing Own Security System

Many customers built their own Security System as per their requirements. They are developing their own code for system and adding multiple functionalities in it.

2.1.5. Offline System

There is various seller selling their system but main drawback of that system is all seller selling offline system that means there is no verification of valid or invalid user in it.

2.1.6. Drawbacks of Existing Sources of Laser Security System

There were many sources and companies are providing Laser Security System, but they had many disadvantages like cheap product quality, no assurance of system that even they work or not, not user friendly, Hard installation requires extra money as installation charge and many things that normal customer can't afford it.

2.2. Problem Solving

To overcome the problems of existing sources we are created a Laser Security System. This system overcomes many problems in existing sources and completing all user requirements. We are selling our system at very low price as everyone from rich to poor can buy it.

2.2.1. Good Quality Product

We are providing good quality product so they can use it as long as they use so no need of buying security system again and again. Also, we are giving customer repairing service so due to some issue if our product fails to work then rather than buying new product customer can repair it and use it so user can save its money.

2.2.2. Online System

There is various seller selling their system but main drawback of that system is all seller selling offline system that means there is no verification of valid or invalid user in it. This drawback of system is overcome in our system. In this system a Wi-Fi module is connected to our system and an android application is given to the user to control the working of laser security system. When customer use our system, the user gets full control over the system also they can turn ON/OFF the Security system when they required. If alarm is beeping then user can turn it off from anywhere so physical presence of user is overcome and fully remote environment are created so user can control the system anytime from anywhere.

2.2.3. Easy Installation

In market many systems are available but their installation is not friendly. They need a guy who has knowledge about it so customer need to pay extra money for installation so we overcome this problem using fully organized and user friendly installation as we organized all components in a small box and all connection is already connected so user only need to connect system to power and connect it to the internet. Also, we are giving simple user manual for installation if user isn't able to install the system then they can install it by following user manual.

2.2.4. Affordable Product Price

We are using less expensive components for creating Security System so overall cost of product is less as compare to other products.

Comparison

Sr. No		Laser Security System	Existing Sources of Laser Security System
1	**GUI**	GUI of Laser Security System is very simple and neat	GUI of other systems are jumbled
2	**User Friendly Installation**	Laser Security System Installation is very simple and no need of knowledge about it	Installation of other systems is not easy and required knowledge about it
3	**Main Motive**	Provide better system with additional features in affordable price	Main motive of existing system is to earn more and more by selling it in high rate
4	**Easy Access**	It gives direct access to system through internet	It doesn't give direct access to system
5	**Quality**	Best quality product and most usable components are used in it	Cheap quality product and uses china components
6	**Guarantee of Product**	Giving guarantee of product and its working	No guarantee of product if they work or not
7	**Price**	Affordable price with price category on the base of system's features	Very high price with less features

CHAPTER 03

SCOPE OF THE PROJECT

The Core objective of this project is to design a laser security system with laser and light dependent resistor, which will protect the individuals from crime, terror and threats in unsafe world in order to stay safe and secure.

3.1. Aim

The main aim of Laser Security Alarm is –

- Totally reduces man power.
- Prevent the entry of unauthorized person in the particular area.
- And also improve the security system.
- To provide a very modern and highly sensitive system.

3.2. Features of System

- Easy installation and low maintenance.
- Fully automatic, saves man power.

Consume very low energy and provides flexibility in operations.

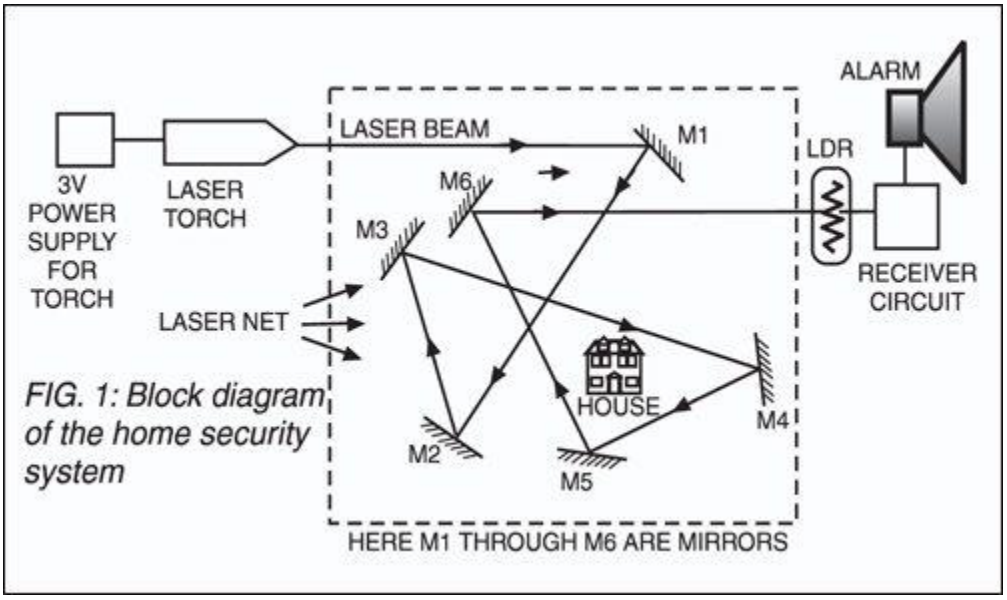


FIG. 1: Block diagram of the home security system

CHAPTER 04
METHODOLOGY

4.1. HARDWARE USED:

4.1.1. NodeMCU Esp 8266

IoT based Applications. It includes firmware NodeMCU is an open-source Lua based firmware and development board specially targeted for that runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module.

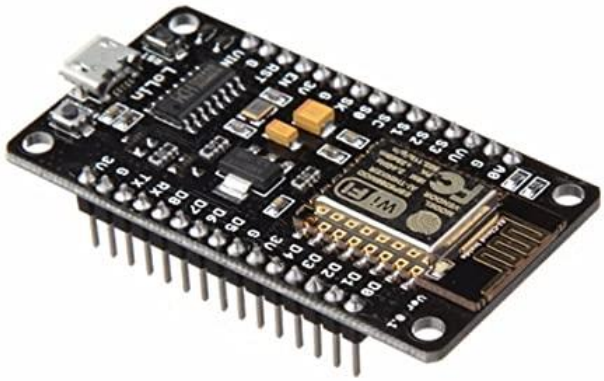


Fig. 4.1 Nodemcu esp8266

4.1.1. JUMPER WIRES

Jumper wires are simply wiring that have connector pins at each end, allowing them to be used to connect two points to each other without soldering. Jumper wires are typically used with breadboards and other prototyping tools in order to make it easy to change a circuit as needed. Fairly simple. In fact, it doesn't get much more basic than jumper wires. Though jumper wires come in a variety of colours, the colours don't actually mean anything. This means that a red jumper wire is technically the same as a black one. But the colours can be used to your advantage in order to differentiate between types of connections, such as ground or power. Jumper wires typically come in three versions: male-to-male, male-to-female and female-to-female.

Fig. 4.2 Jumper Wires

4.1.1. WIFI MODULE ESP8266

The ESP8266 is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by manufacturer in Shanghai, China. The chip first came to the attention of Western makers in August2014 with the ESP-01 module, made by a third-party manufacturer Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes style commands. However, at first there was almost no English-language documentation on the chip and the commands it accepted. The very low price and the fact that

there were very few external components on the module, which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, chip, and the software on it, as well as to translate the Chinese documentation.

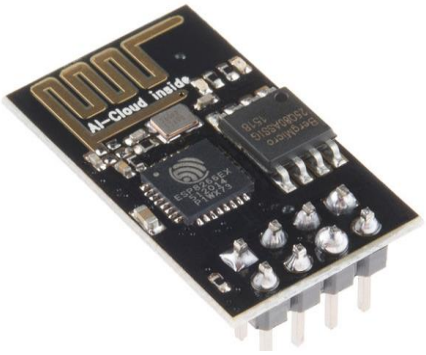


Fig. 4.3 ESP8266 Wi-Fi Module

4.1.1. LIGHT SENSOR

A Light Sensor generates an output signal indicating the intensity of light by measuring the radiant energy that exists in a very narrow range of frequencies basically called “light”, and which ranges in frequency from “Infra-red” to “Visible” up to “Ultraviolet” light spectrum. The light sensor is a passive device that convert this “light energy” whether visible or in the infra-red parts of the spectrum into an electrical signal output. Light sensors are more commonly known as “Photoelectric Devices” or “Photo Sensors” because the convert light energy (photons) into electricity (electrons).

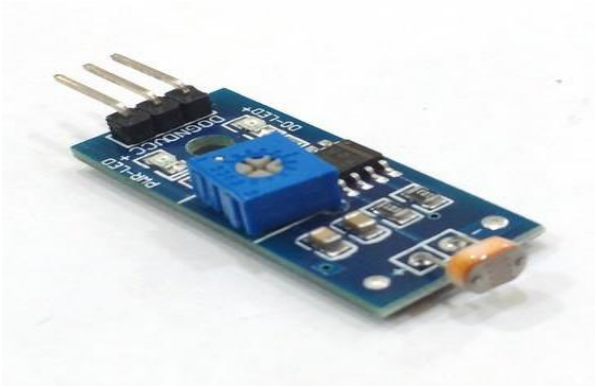


Fig. 4.4 Light Sensor

4.1.1. BUZZER

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

Fig. 4.5 Buzzer

4.2. SOFTWARE USED:

4.2.1. ANDROID BLYNK APPLICATION

Blynk is a mobile application which has its own server to process user requests. It is an open source application and anybody can use it in their Home Automation to control devices, monitor sensor data and get a notification by some trigger actions. It has a nice GUI with Graphs, Timers, Slider, Joystick and even Video Streaming. Blynk is a Platform with iOS and Android apps to control Arduino, Raspberry Pi and the likes over the Internet. It's digital dashboard where you can build a graphic interface for your project simply dragging and dropping widgets. It's really simple to set everything p and you'll start tinkering in less than min. Blynk is not tied to some specific board or shield. Instead, it's supporting hardware of your choice. Whether your Arduino or RaspberryPI is linked to the Internet over Wi-Fi, Ethernet or this new ESP8266 chip, Blynk will get you online and ready for Internet of Your Things.

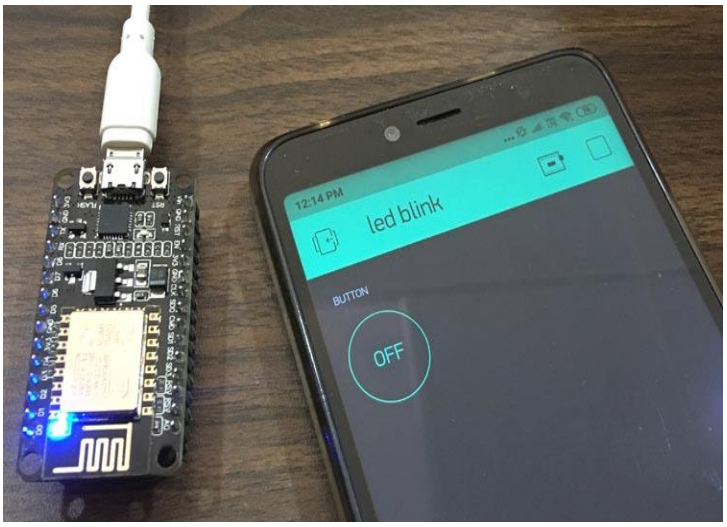
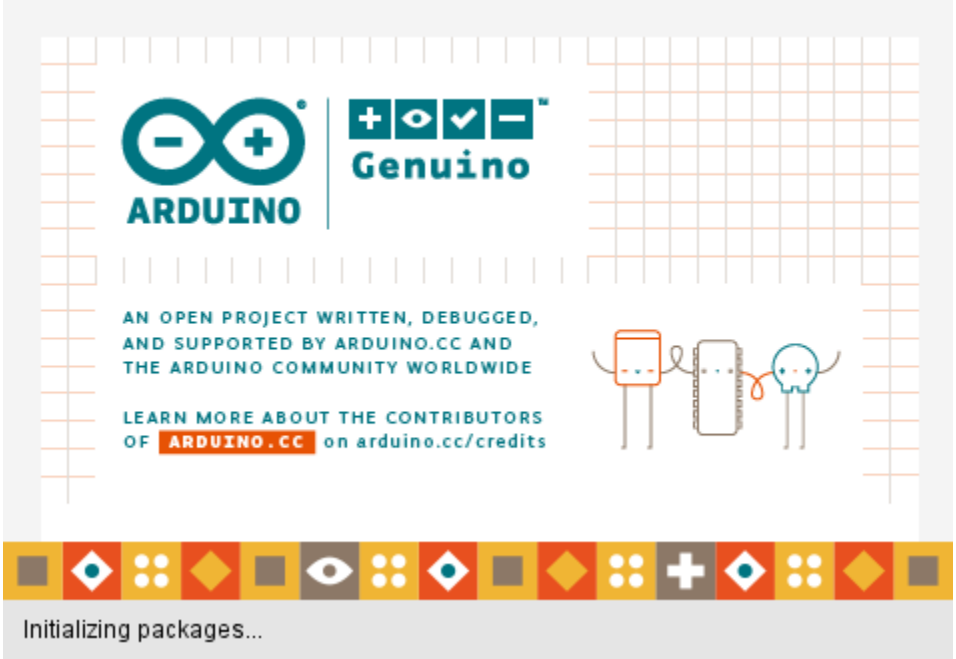


Fig. 4.6 Displaying Blynk Application

4.1.1. ARDUINO IDE

The **Arduino** integrated development environment (**IDE**) is a cross-platform application (for Windows, macOS, Linux) that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures.



CHAPTER 05

DETAILS OF DESIGNS, WORKING AND PROCESSES

5.1. Circuit Diagram using ESP8266 for Laser Security

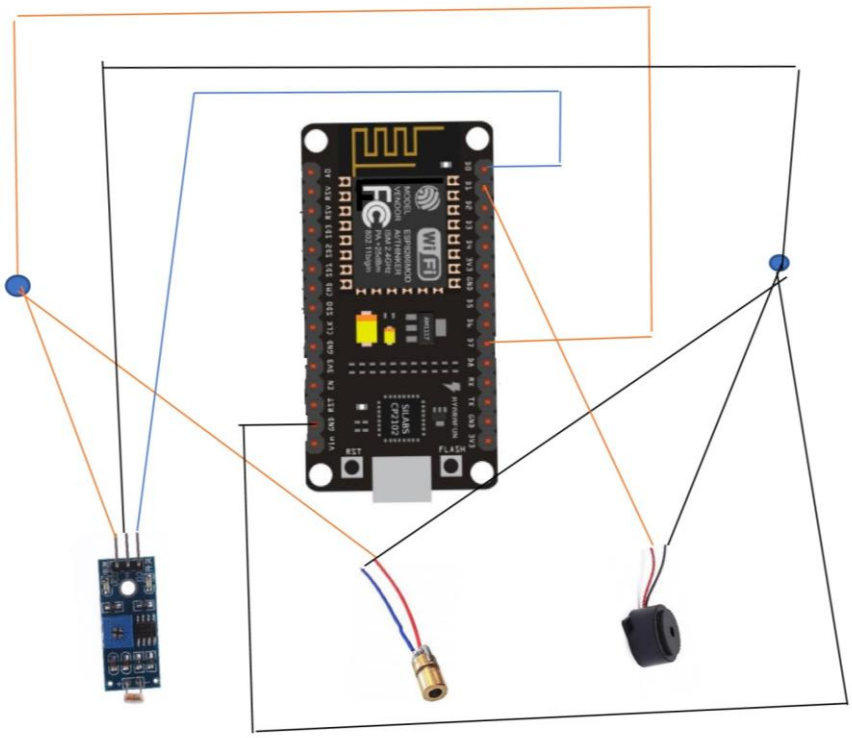


Fig. 5.1 Circuit diagram

The project basically works on the principle of interruption. If by any means the LASER light is interrupted the alarm will start ringing. The laser is a concentrated light source that puts out a straight beam of light of a single colour. The LDR is sensitive to light and puts out a voltage when the laser light hits it. When the laser beam is interrupted and can't reach LDR, its voltage output changes, and eventually the alarm will ring.

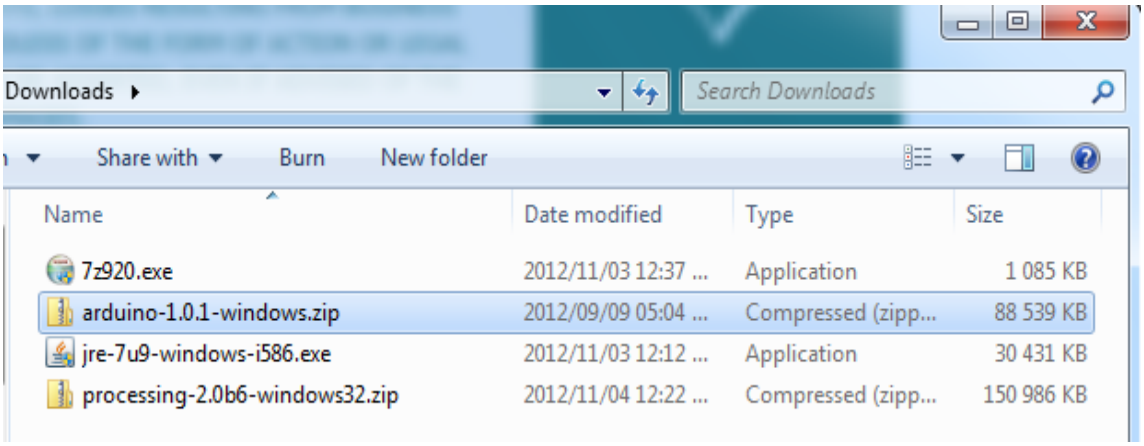
5.1. How to install Arduino IDE

1. Download

Go to the Arduino website and click the download link to go to the download page. On the download page, click the Windows link to download the Arduino software for Windows

2. Install

After downloading, locate the downloaded file on the computer and extract the folder from the downloaded zipped file. Copy the folder to a suitable place such as your desktop.



5.2. Install ESP8266 Windows Drivers

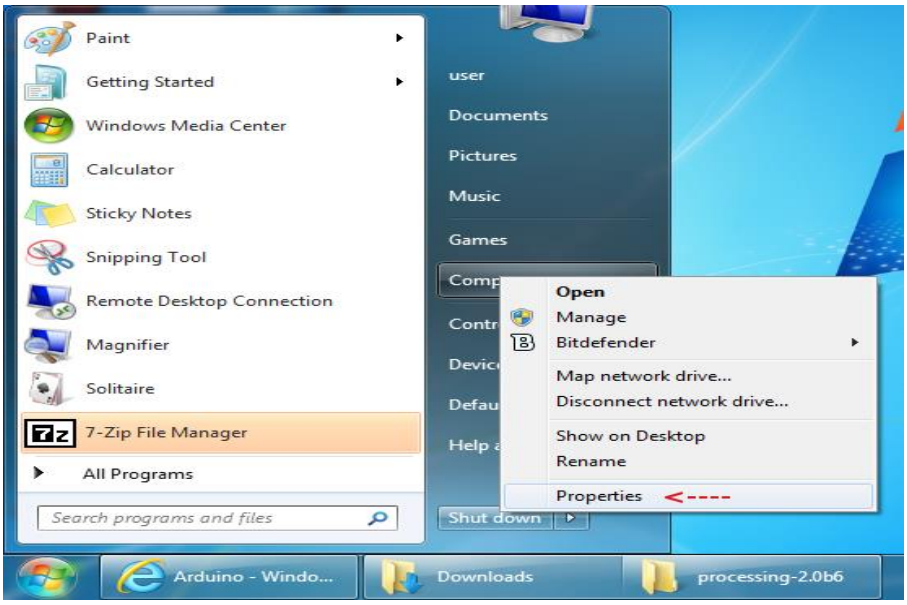
1. Plug the Arduino into the PC

Plug the Arduino board into the PC. Windows will try to install drivers, but will fail.

2. Start the Windows Device Manager

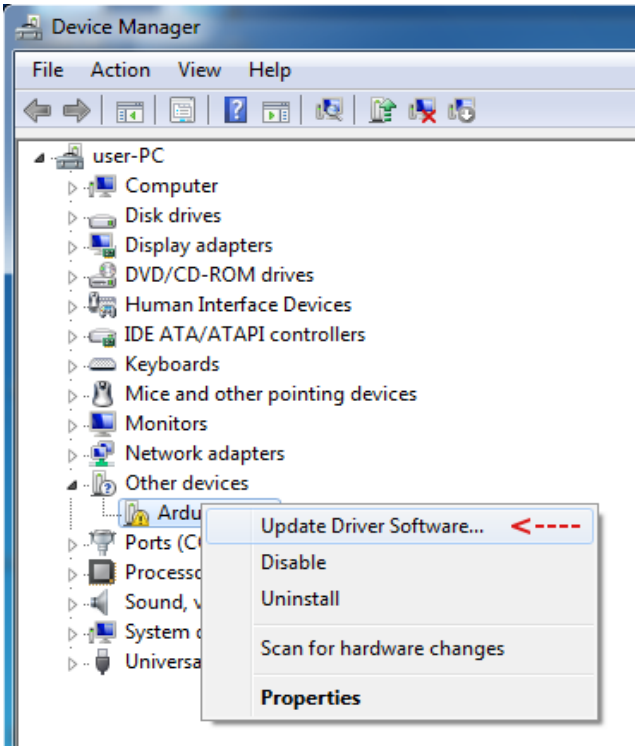
Click the Windows Start menu button.

Right-click **Computer** on the menu and then click **Properties** from the pop-up menu:



3. Install the Device Driver

In the Device Manager Window, right-click the Arduino board and then click **Update Driver Software...** on the pop-up menu:

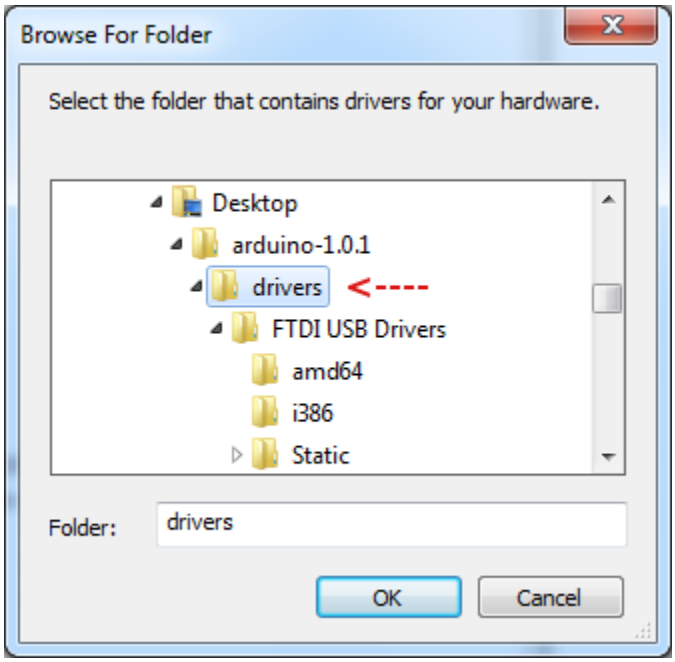


The **Update Driver Software** dialog box will pop up. Click **Browse my computer for driver software**

Next, click the **Browse...** button

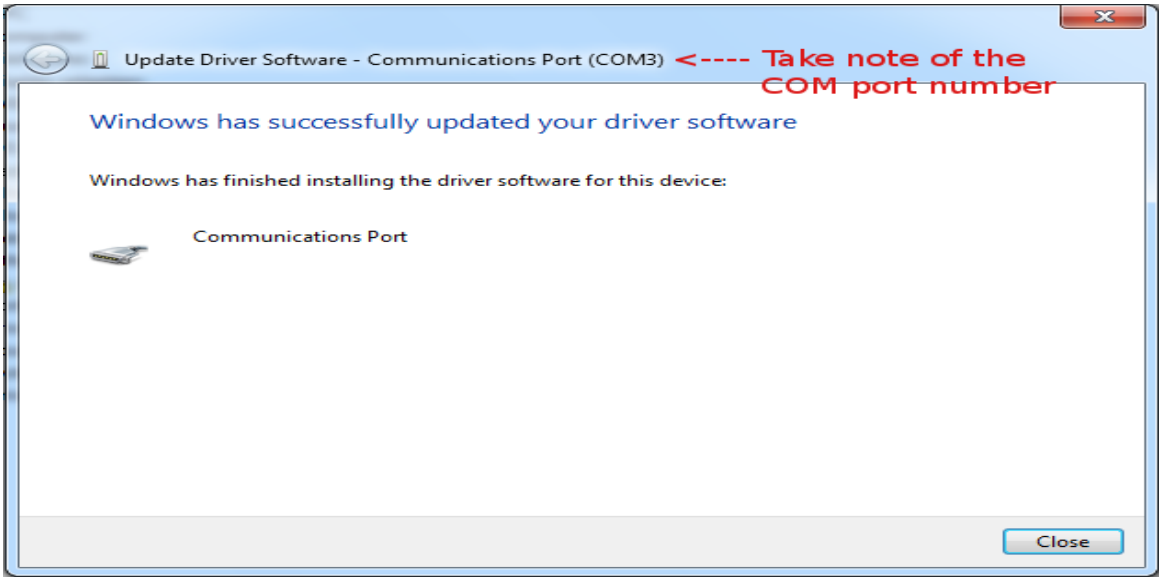
Navigate to the **driver's** folder in the Arduino folder that you downloaded:

After selecting the driver folder, click the **Next** button.



In the dialog box that pops up, click **Install this driver software anyway.**

After some time, the driver installation will finish and you will see the following dialog box. Take note of the port that the Arduino was configured as. In this case it was **COM3**.

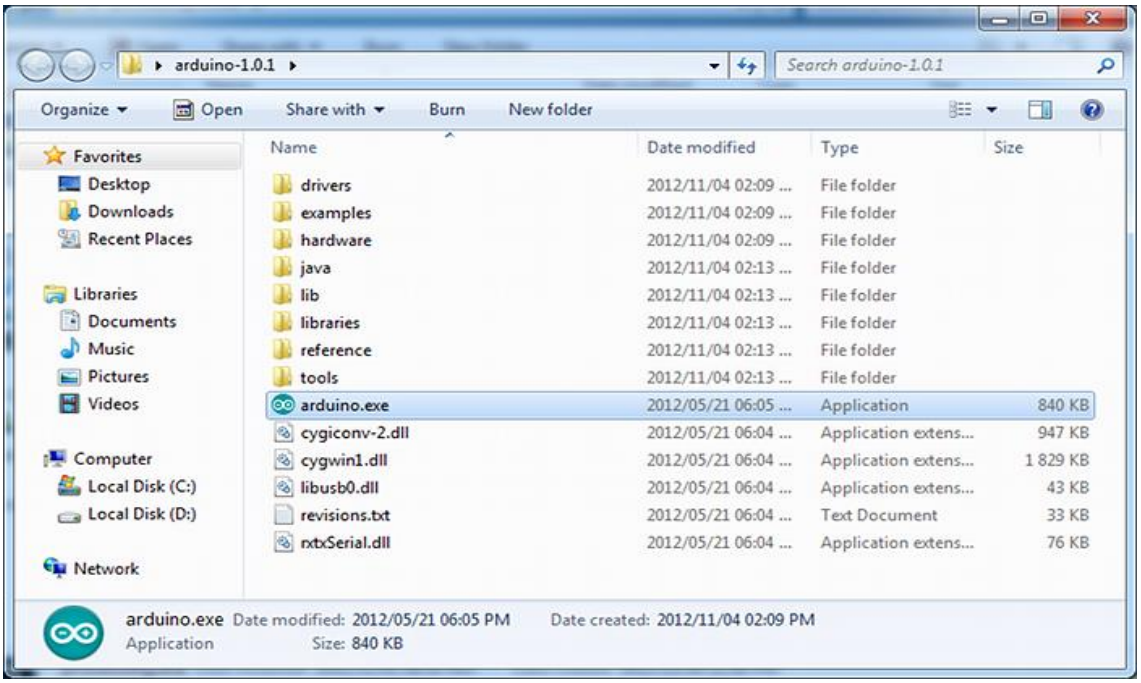


Installation completed.

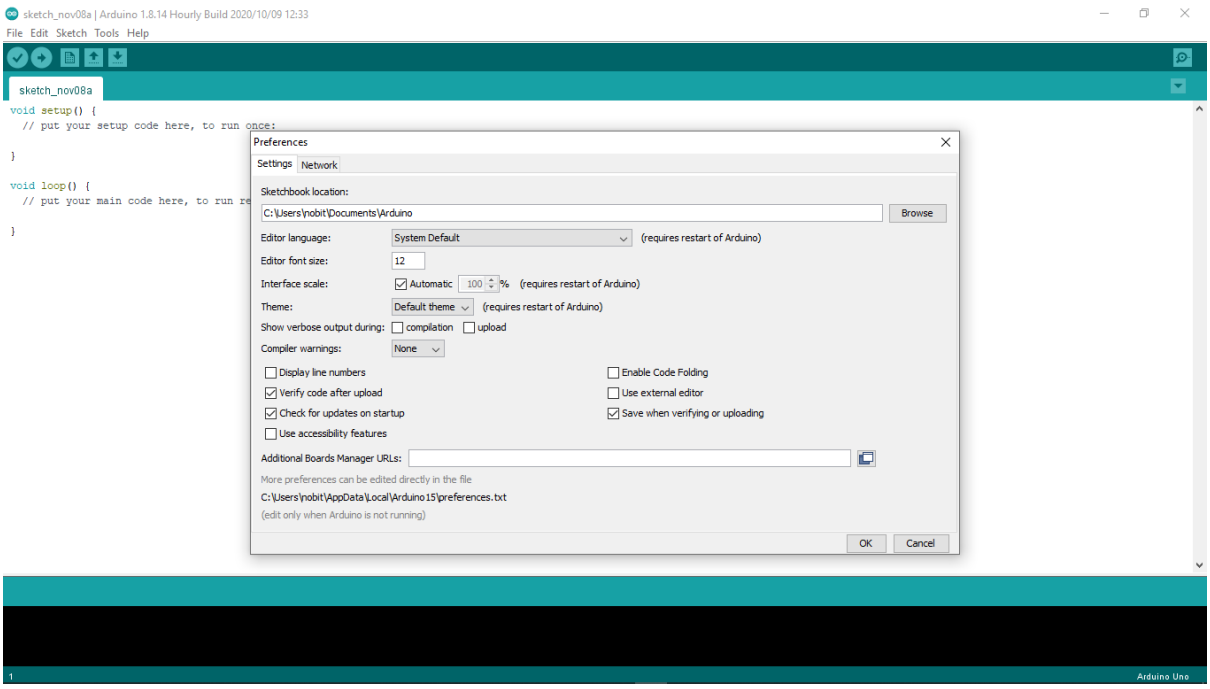
4. Setting up the Arduino Software

The setup will only need to be done once, unless you change the board type or port that the Arduino is connected to.

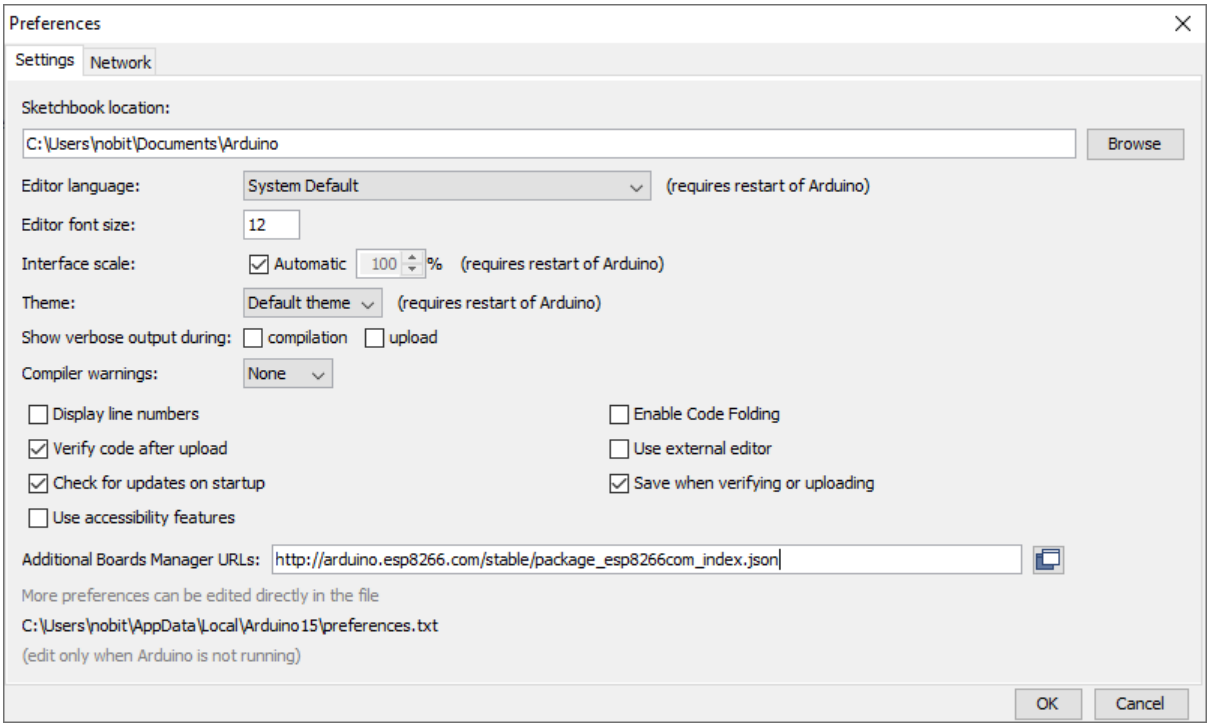
Navigate to the folder that you downloaded and start the Arduino software IDE by double-clicking the Arduino application:



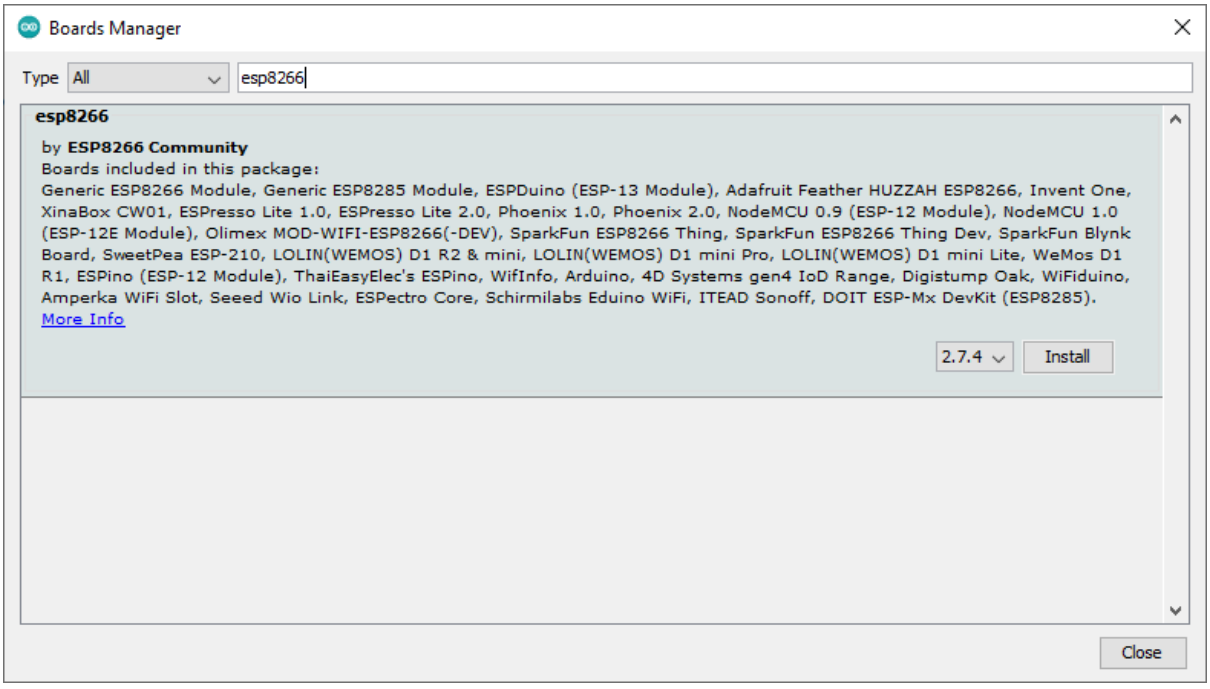
5. Go to File > Preferences



6. Paste the URL http://arduino.esp8266.com/stable/package_esp8266com_index.json into the Additional Board Manager URLs field.



7. Go to Tools > Board > Board Manager and search for ‘esp8266’. Select the newest version, and click install.

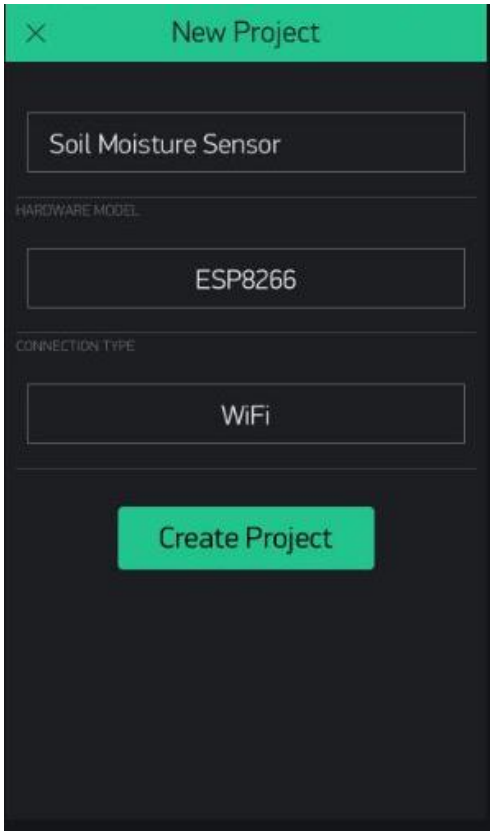


8. That's it! You have successfully installed the ESP8266 Drivers.

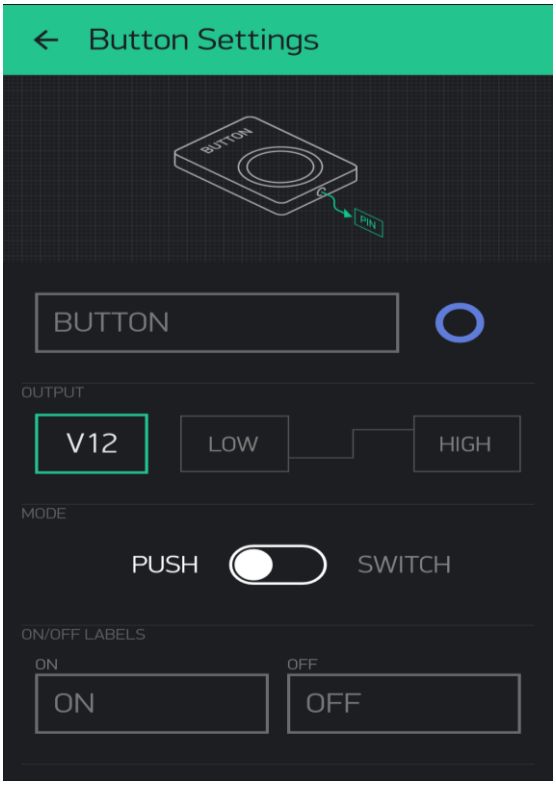
5.3. Create and interface using app to publish or remotely access the data on internet

1. In this project we are using Blynk app to interact with the Arduino Uno. Blynk is a hardware-agnostic IoT platform with white-label mobile apps, private clouds, device management, data analytics, and machine learning. You need 3 basic things to setup Blynk. A Smartphone, IoT hardware, and an Internet connection.

2. Click on new project and assign a name to the project. Also insert hardware model ESP8266 and connection model (WIFI) to it.



3. Blynk App contains Button, Slider, vertical slider, Timer, Joystick control are added to interact with your project. Blynk app is used to retrieve data from sensors. In Blynk app you get the data for every second.



CHAPTER 06

RESULTS AND APPLICATIONS

6.1. Results

In our project Laser and LDR is the core of the laser security system. The circuit is all about when the laser beam falling over the LDR continuously is interrupted by the object in the field of laser net. Hence the LDR develops an output voltage and the alarm rings showing the sign of any intruders.

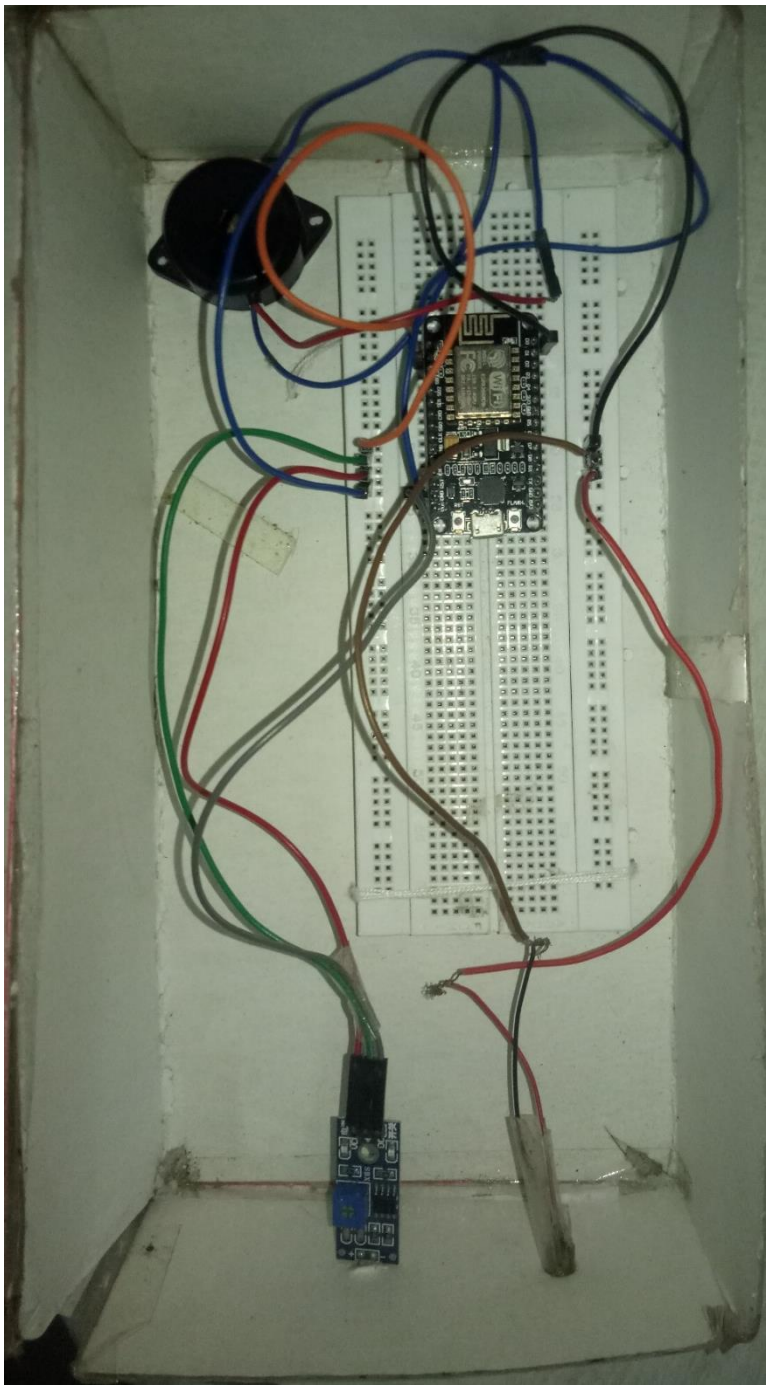
In this way it can reduce the problem of thefts and intruders in our day to day life and it also helps in reducing manual works as this circuit is automatically operating one.

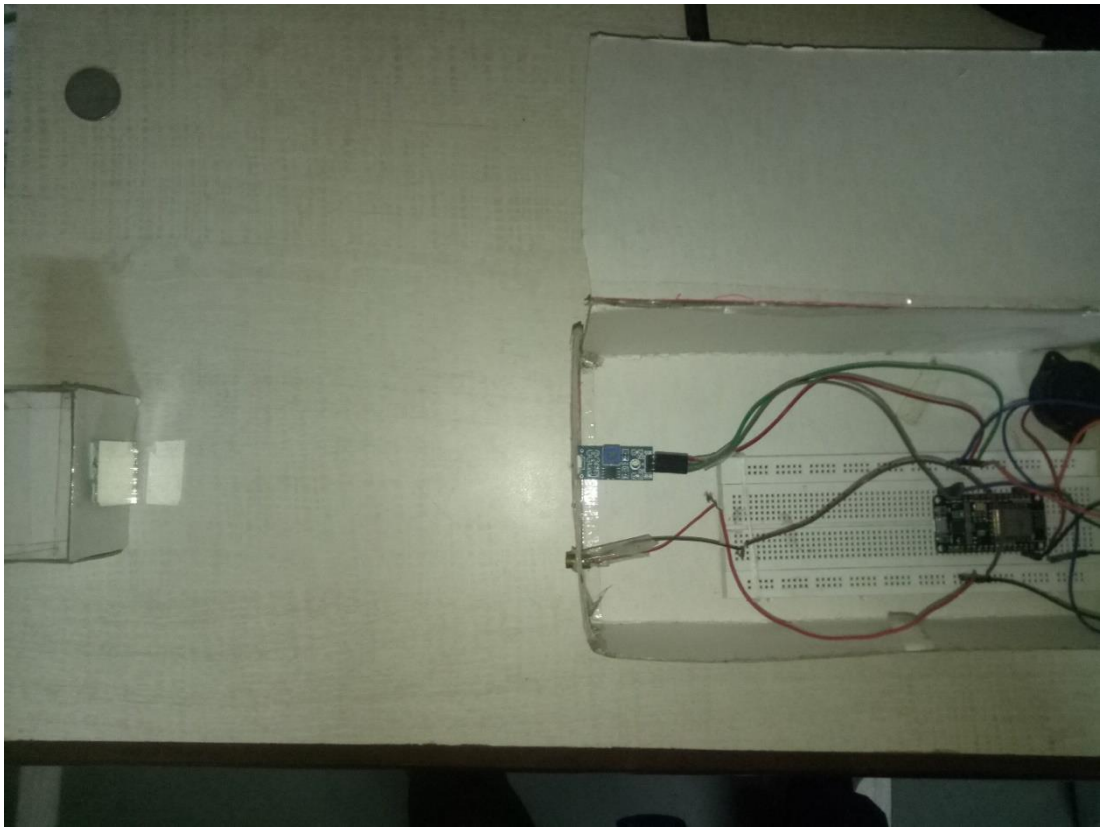
The Laser Security System has been successfully designed and developed. The buzzer is turned on as the laser beam falling on the LDR is interrupted. The experimental model was made according to the circuit diagram and the result were as expected.

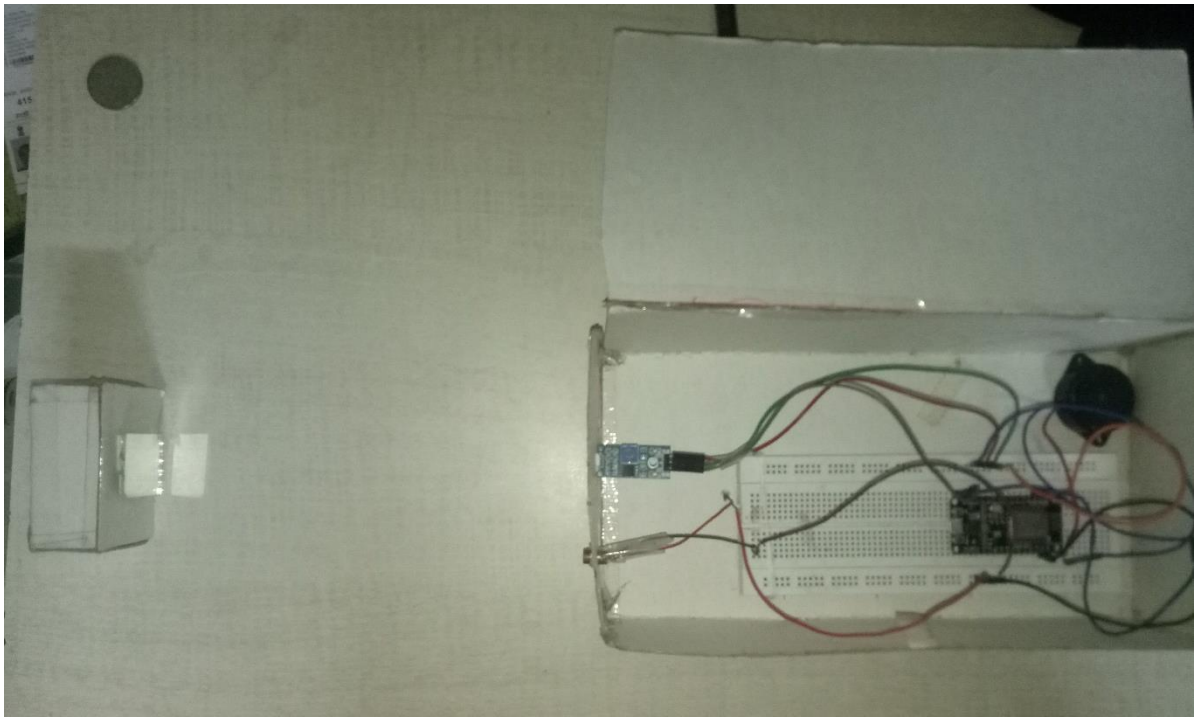
The LDR has to be placed in dark place or inside a case so that the other sources of light except the laser beam doesn't affect the LDR. This helps the circuit to work faster and properly.

During the operation the laser beam is allowed to reflect through mirror to mirror as shown in block diagram to create crisscross rays of laser beams. This is beneficial for the advanced protection over a very small object.

The circuit consumes lots of energy to work and thus implanting this system with AC connection using transformer and rectifier circuit would give better performance. Also using of infrared laser could make the laser net invisible to human eye. Use of microcontroller could give better result for the laser security system.







6.2. Applications

- Laser Security System can be used in safety lockers in our homes, where even if the locker's code is hacked, it acts as an additional layer of security.
- Apart from security systems, this laser-based setup can also be used to check if pets or babies crossed a certain boundary.
- A laser security alarm is a system designed to detect intrusion – unauthorized entry – into a building or area. They are also called security alarms, security systems, alarm systems, intrusion detection systems, perimeter detection systems, and similar terms.
- Laser security alarm are used in residential, commercial, industrial, and military properties for protection against burglary (theft) or property damage, as well as personal protection against intruders.

CHAPTER 07

CONCLUSIONS AND FUTURE SCOPE

7.1. Conclusion

Laser security system provides us the security against any crime, theft in our day to day life and so people are installing them in order to stay safe, secure and sound. Various electronic security systems can be used at home and other important working places for security and safety purposes. It is a great opportunity and source of saving man power contributing no wastage of electricity. The "Laser Security System" is an important helping system. Using this system robbery, thefts & crime can be avoided to large extend. Avoiding thieves' results in the safety of our financial assets and thereby this system provides us protection against all.

The Laser & LDR system is highly sensitive with a great range of working. The system senses the light emitted by the Laser falling over the LDR connected with the circuit. Whenever the beam of light is interrupted by any means, it triggers the alarm or siren. This highly reactive approach has low computational requirement; therefore, it is well suited to surveillance, industrial application and smart environments.

7.2. FUTURE SCOPE

Future progress of this work can be identified in the areas summarized below –

- We will try to upgrade this system to an advanced level by using invisible laser or infrared light.
- We can also use microcontroller or some timer IC circuit to make the performance of this system better.
- Also, with the help of sound sensing transducer, photo footage can be captured using secret camera as soon as the alarm rings.

CHAPTER 08

REFERENCES AND BIBLIOGRAPHY

8.1. References

- Internet of Things: A Hands-on Approach
- Laser Security System

8.2. Bibliography

- https://wikipedia.org
- https://slideshare.org
- https://hackster.io
- https://sciencejournals.com
- https://encyclopedia.com
- https://ieeexplore.ieee/org
- https://www.google.com/search?q=diagram+of+laser+security+system+using+arduino&rlz=1C1CHBD_enIN881IN881&sxsrf=ALeKk02NyrCgiai0xWvmHB62ZeyHZejH5w:1582728090162&tbm=isch&source=iu&ictx=1&fir=q6dEcb69ArtS0M%253A%252CGVhIYPfVU8D0LM%252C_&vet=1&usg=AI4_-kSd3zaeSdrAT3sgTlHjH4PgX2_g7A&sa=X&ved=2ahUKEwjf9NvMue_nAhUwxjgGHa2ZCFIQ9QEwFHoECAUQFA#imgrc=nlwiNISfK6ASVM
- http://en.wikipedia.org/wiki/Main_Page
- http://facebook.com/groups/428951677186998/
- http://science.opposingviews.com/laser-security-systems-work-1631.html
- http://www.circuitsgallery.com/2012/09/home-security-alarm.html
- http://www.ehow.com/how-does_5001517_laser-security-systems-work.html