

**POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH**

**PROPOSAL :  
LASER TRIPWIRE SAFETY SYSTEM**

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**JABATAN KEJURUTERAAN MEKANIKAL**

**SESI 1 : 2021/2022**

## **DECLARATION OF ORIGINALITY AND COPYRIGHT**

## **ACKNOWLEDGEMENT**

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Also we would like to thank our family and friends for our support. Without that support we couldn't have succeeded in completing this project. They also understood our situation at this time and they didn't interrupt us, and also helped for us without expecting anything.

At last but not in least, we would like to thank everyone who helped and motivated us to work on this project.

## **ABSTRACT**

Project 1 is the final year project, FYP for all the Mechanical Diploma students. There should be three or two students in every group. Members of our group for Project 1 are **KAVIN A/L ELANGO VAN** and **RIKINESH A/L APPU**. The title that we decided for our group is **LASER SAFETY SYSTEM**. The objective of our project is to get decrease the theft cases in our country by installing our security alarm system. We found that most theft cases happened that because of no or less security system in the house. Most of valuable things are stolen by the thieves. Some of them are caught by the police and the valuable things are got back. Many of them are didn't. So this security system help to protect our family members and belongings.

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## CHAPTER 1: INTRODUCTION

### 1.1.INTRODUCTION

(KAVIN A/L ELANGO VAN)

For the project 1 we are instructed to form a group to carry out the all the works related to project till the end of the semester. Objective of this project is to figure out and solve the problems of packaging. Also through this project, we can get more futuristic, innovative and sustainability ideas from students as we can applied the effective ideas in future.

Project that our group decided to do is 'Laser Safety System'. Safety and security issues are one of the most emphasized aspects of the day to day living. This is based on the fact that the issues are prerequisite around home, work, and other environments. Each and every place no matter at home, workplace or anywhere else safety and security is playing a most important role in our life.

For example every workplace needs to ensure the safety and security meets the proper health and safety regulations. Having organizational safety and security process can help manage and prevent injuries, thefts, and damage in the workplace.

### 1.2 BACKGROUND OF THE PROJECT

Our group had decided this project after did some research and read an article at online in the website of thestar.com.my. That article is about three arrested over snatch theft cases on Tuesday, 21st July 2020. After that we did a research and found there are plenty of cases are happening day by day.





(Diagram 1.1 : Latest News article)

Especially during the pandemic time many people are lost their work and income. So many of them were choose a wrong way. Based on a report theft cases are increasing day by day. According to Malaysia burglary report every 13 seconds a home burglary take places, 4 burglary a minute, 240 an hour and nearly 6000 a day.

From this out group are decided to do a lazer tripwire alarm. This alarm will detect the movement and present of the people. By using this lazer tripwire alarm we can cover our house with an array of light beams. If anyone crossed It sets off the alarm. It can be a standalone alarm or it can be integrated into a longer security system.

### 1.3.PROBLEM STATEMENT

1. From observation, most of the theft cases are happened because of no or less security system at our place even though we may have security guards in our housing areas, we still had heard about some theft cases over there. It may Happen because the thieves are too many, or they could carry a weapon, or maybe the security guards negligence. Many valueble things are stolen and some of them were killed or injured by the thieves. Some is them are successfully caught by the police and many of them escaped.

2. Secondly, Malaysian police now days are using their plenty of time in their laptops, handphone or televisions. Specially during this pandemic time many parents are working from home and many children are having online classes. Due to this solutions, they are unable to concentrate on their surroundings. We heard lots of cases like kids cut their hand while playing with the knife at the kitchen or some of them are got kidnapped in front of their house because of family members negligence.

3. Thirdly we found that many security system are very expensive now days specially during this pandemic time everyone have to plan their expenses and they don't have enough money to install any security in their home it also take too much of time to install and to makes people draft really take care of their safety.

#### **1.4.OBJECTIVES OF THE PROJECT**

1. First objective is to increase security system in our house so it will decrease the chances of theft and it makes the cases decrease and people can live peacefully.

2. Second objective is to ensure each and every family members are being safe and avoid people's negligence, so it makes family members can focus more on their work.

3. Lastly, to sell a low cost and good security system that can install by own and fast by everyone

#### **1.5.PROBLEM SCOPE AND LIMITATION**

The scope of the project is more to houses. This project is only suitable and efficient for cover a certain area such as room. We could not cover a whole house in 1 lazer tripwire alarm. It can cover around 28a square feet that is equal to a 17 x 17 room. So if we want to secure our whole house we need to buy many lazer tripwire as we want. This lazer tripwire alarm also are not suitable for workplace because workplace are usually very big and sometimes noisy that makes alarm did not efficient.

## **1.6.SUMMARY**

Now days chances of being a victim for theft cases are increasing day by day. FBI Burglary rates of home state that 1 in 3 homes without security system will fall victim to a burglary as compared to 1 in 250 homes to have security system. Generally this adopter is discussing and explaining about introduction, problem background, problem statement, objective of the project, scope and limitation, and the summary of the project. In conclusion these doctors are very important to decide and do a project successfully.

## CHAPTER 2 : LITERATURE REVIEW

### 2.1.INTRODUCTION

(RIKINESH A/L APPU)

In this chapter, we will show you some information regarding about the differences between handmade and factory made laser safety system. Factory made products are made by machines, while the other one is made by hand. This infographic explores the economic impact of making this by hand versus making them by machine. First just to be clear, factory – made laser safety system is a unit that has been made by a machine, that has been specifically programmed, monitored and carried out all the work via a type of design print whereas handmade laser safety system are made by hand using only tools and manual labour.

Apart from professionalism, many of the consumers will go for handmade laser safety system to use it to guard their home from invasion of intruders because it is worth it in a long term. A homemade laser safety system is most likely being made and assembled by ourselves. Anyways, it can last a lifetime if maintained correctly, and we can repair and fix any issues regarding the safety laser system in the future whereas factory made laser safety system are usually way too complicated to be tampered with, and once they face any system failure not only we have to pay for the extra labour work done for the repairing, we also most likely must pay for the parts also which costs more than our handmade safety system. When factory made safety system have reached the end of the road, they are good for the bin. Unlike the homemade laser safety system we can replace the parts that we need from salvages and also can use used product parts because it does not need too much of parts to be dealt with in the beginning anyways. Therefore, we can rest assured from the aspects of cost regarding our handmade laser safety system because from aspects of maintenance and parts it does not cost too much. This fact is more than enough to convince consumers to choose handmade laser safety system.

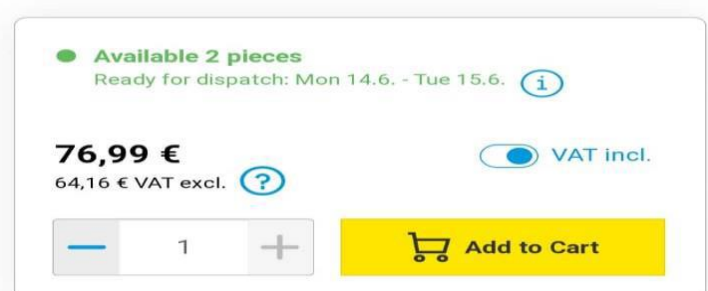
Speaking of all these house safety systems reminds me of a book that I read named “House Security Guide”, written by Bizmove Service Center. This book features 320 powerful tips to protect our house from burglary and theft. This book amazes everybody with

their 500 plus years of combined security experience and advice through the author's connections with world-class experts in criminology. Besides that, this book mainly emphasizes the effectiveness of laser tripwire safety system in countering home invasion. In short, laser tripwire safety system is an essential need in countering house theft as it has the highest success rate among the rest safety system with the highest level of sensitivity and persistency.

## **2.2. PREVIOUS RESEARCHES / REVIEWS** (RIKINESH A/L APPU)

All in all, both type of laser safety system products has the same function and each other have their own differences in this matter. Parenthetically, recently handmade goods have been making a comeback. The average consumer is looking for something more personal and meaningful than factory made products. When you buy something handmade, you are choosing custom designs, unique furniture and ethically-produced and environmentally-friendly products. However, as 'MERIT HOMES' points out, one of the main downsides to handmade laser safety system is that "with the exception of a handful well-known designers, you cannot be sure of the quality of the furniture until you inspect it". Mass-produced laser safety products, on the other hand, has to comply with safety and quality standards. Overall, both homemade and factory-made products have their own pros and cons and it depends on the consumers perspective on choosing.

## MINI IR SECURITY SYSTEM - 7 M



**DIAGRAM 2.1 : FACTORY- MADE SAFETY SYSTEM**

Furthermore, on the diagram above we can see a factory-made laser safety system that costs around RM 350. During this modern era, where people still struggle to hold a solid footing towards their finance; it is a not matter of question but rather a matter of choice. Should everybody spend a vastly amount of money to make sure they are safe. Is the value of the money they are spending on such a thing reliable? Will it really protect us from danger? Is it relocatable? Will it be safe keeping it outside? What if somebody stole this expensive laser safety system instead of the goods in the house? It is still a win-win situation for the robber anyway. Based on 'Salary Explorer', an average person working in Malaysia has a lowest of RM 1670 as their salary and not only they need to spend for their living expenses, house monthly payments and vehicle expenses; they might not even consider of buying such a high-priced product.



**DIAGRAM 2.1 : HOMEMADE LASER SAFETY SYSTEM**

On the contrary, we have this homemade laser safety system that is shown on the diagram above those costs less than RM5. Let me remind you again that it is Rm5. In this case, it is most likely around 70% reduction in cost. Each part of this costs from RM 0.20 to Rm 0.50. It practically solves every question that is risen upon factory made laser safety system. It is low in price, reliable, relocatable and won't be eye catching enough to be stolen by others and it is extremely profitable for the consumer since it contains various advantages. Besides that, the consumer is also given the freedom to freely manipulate the design of the product according to his taste. We can relate this situation with car company brand "LAMBHORGHINI" where they provide their consumers the freedom to choose and pick their choice of fabric for their car. While a multi-million dollar company can provide such services why can't we do it? By choosing homemade laser safety system products consumers can design it according to their taste.

## **2.3. SUMMARY**

(RIKINESH A/L APPU)

To summarize, although factory made laser safety systems are specifically programmed and monitored it still lacks on the aspect of price, availability, reliability and eye-catching factor that gives a homemade laser safety system a huge step ahead of it. Nonetheless, these laser security systems provide round-the-clock protection against burglars and break-ins. Anyways, the choice is on the consumer's hands. Wealthy people can choose factory made products to put their money in good use while the middle-class people can choose homemade laser safety system and save them to put in good use in the future.



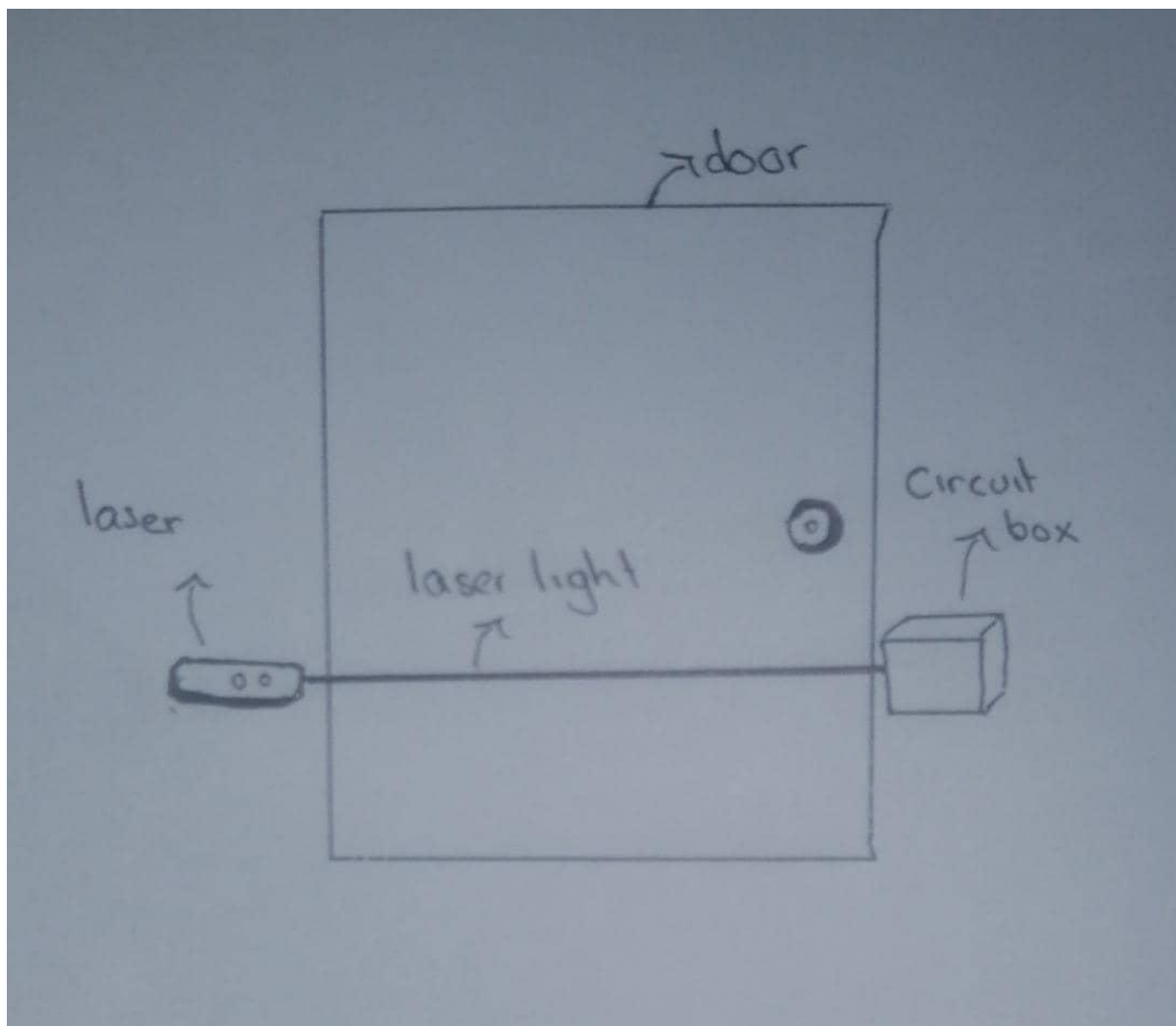
## CHAPTER 3 : METHODOLOGY

### 3.1.INTRODUCTION

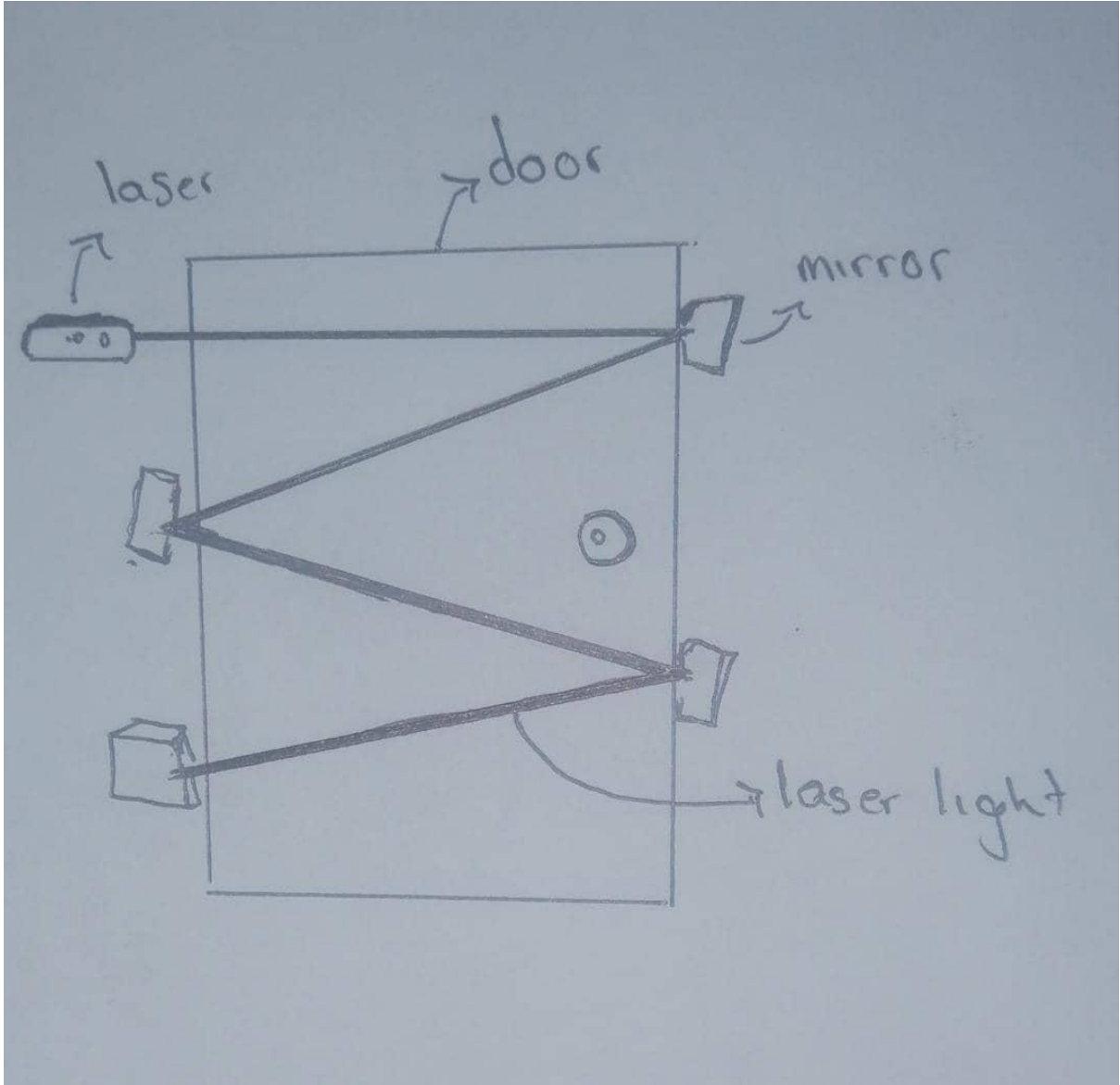
(KAVIN A/L ELANGO VAN)

Creating laser Tripwire alarm is just simple and easy stuff. We just need to know correct way of soldering and how to connect the wires with the components. We must more concentrate on soldering because it may affect the circuit board and make our alarm doesn't work. We also must use correctly components and a good working laser. It will take around 3 to 4 hours to fix it. After soldering with these components we must cover the circuit board with a box to avoid damage to our soldering or to our circuit board. Finally, we must test it was working well or not.

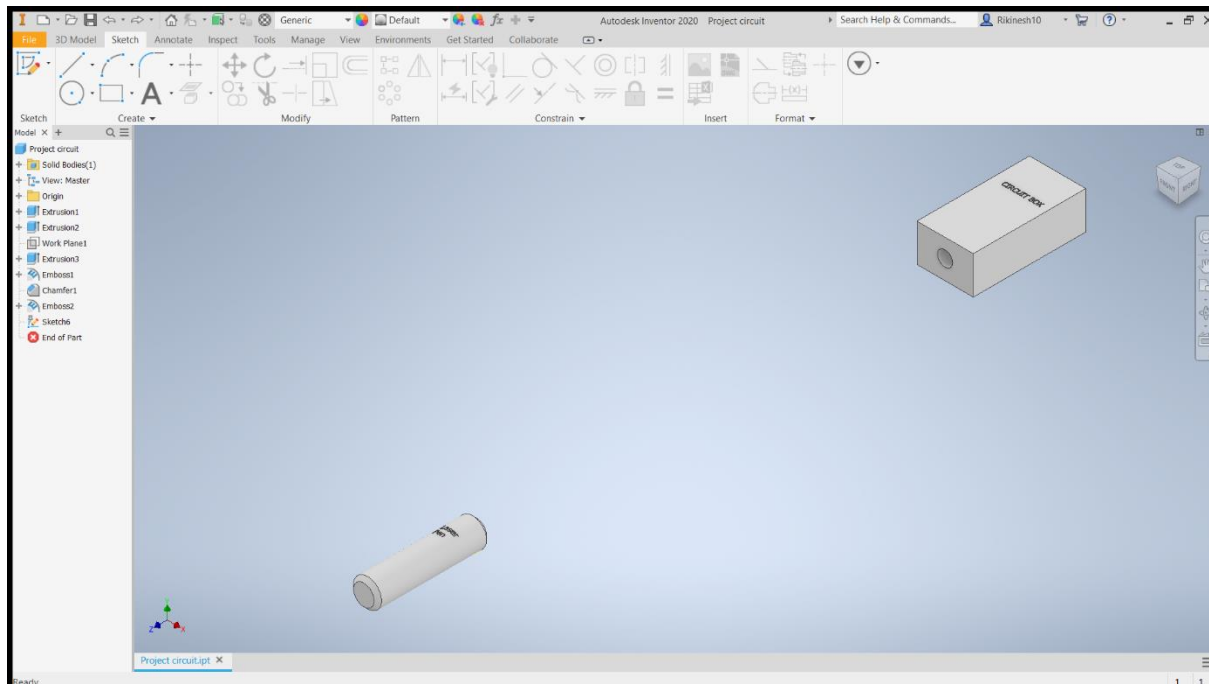
### 3.2 PROJECT DESIGN



(DIAGRAM 3.1 LASER TRIPWIRE SYSTEM VIEW)

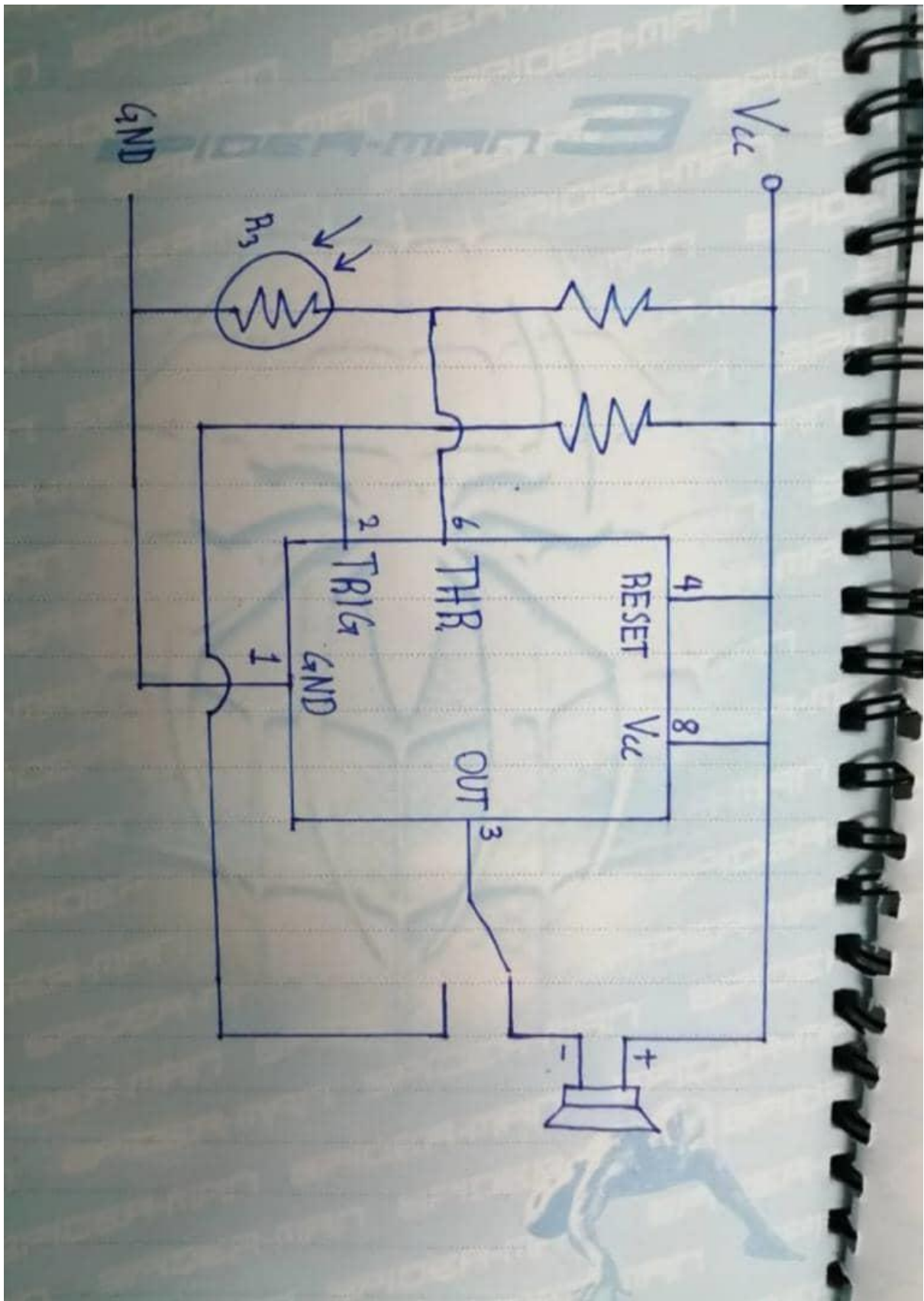


(DIAGRAM 3.2 LASER SYSTEM HOUSE PLAN VIEW)



**(DIAGRAM 3.3 INVENTOR PLAN)**

This is how our project will be placed like shown above on diagram 3.1. We also can make it bigger by placing mirrors around the room like showed on diagram 3.22



(DIAGRAM 3.4 SHOWS AN ELECTRICAL DIAGRAM OF THE LASER TRIPWIRE ALARM)

### 3.2.1.PROCEDURES

There are 9 steps to create this laser Tripwire alarm.

#### STEP 1: SAFETY NOTE: WORKING WITH LASERS

Cheap laser pointers that you find in most stores are generally restricted to 5mW or less. These are generally considered safe. However, it is still possible to damage your eyes if you are not careful. When working with lasers, it is a good idea to wear the appropriate eye protection. Avoid looking directly at the laser diode.

#### STEP 2: PREPARE THE PARTS

Here are the parts that you will need for this project:

- Laser Pointer
- Printed Circuit Board
- 555 Timer IC
- IC Socket (optional)
- 3-12 Volt Buzzer
- Switch
- CdS Photoresistor
- resistors
- AA Batteries
- AA Battery holders
- Jumper Wires
- Heat Shrink Tubing

#### STEP 3: HOW THE CIRCUIT WORKS

This alarm circuit is yet another way to use a 555 timer IC.

The light sensor that detects the laser is a CdS photoresistor (R3). This is wired in series with standard fixed resistor (R2). These two resistors form a voltage divider that is used to activate the IC. The value of R2 should be approximately the same as the resistance of the photoresistor when you are shining the laser pointer directly at the light sensitive face. Because the output characteristics of photoresistors varies considerably from one to the next, you need to measure it with a multimeter.

So connect photoresistor to the multimeter and shine the laser pointer directly at it. In my case, its resistance was about 100 ohms. So I used a 100 ohm fixed resistor for R2.

When the light beam is interrupted, the resistance of the photoresistor increases dramatically. As result, the voltage at pin 6 also increases and goes above the reference threshold. This causes the output pin 3 to go LOW and activates the alarm.

To turn off the alarm and reset the system, a (single pole double throw) switch disconnects the speaker and sends the LOW signal from the output pin 3 to the trigger pin 2. The system is now deactivated. To reactivate it, flip the switch back to the original position. The alarm will remain off until the next time that the light beam is interrupted.

The supply voltage can be anything from 4.5V to 18V. I chose to use 4.5V (three AA batteries) because this is the same voltage that is used by the laser pointer. This gives you the option of powering the laser pointer with the same battery pack as the alarm circuit.

The resistor R1 acts as a pull-up resistor for pin 2. It helps to prevent false triggering from static electricity. This can be any value. In many cases it can be left off without causing any problems.

The alarm that I am using is a piezo buzzer. Any buzzer can work as long as it is rated to operate at the appropriate voltage.

#### **STEP 4: ASSEMBLE THE CIRCUIT**

First assemble the circuit on a breadboard to test it. Set the switch to connect the buzzer. Without the laser shining on the photoresistor, the alarm should sound. Flipping the switch the other way should turn off the alarm. Now shine the laser pointer on the photoresistor and flip the switch one more time to reactivate it. As long as the laser is centered on the photoresistor, the alarm shouldn't sound. But when you move the laser away, the alarm should go off again.

If everything is working properly, solder it all together on a printed circuit board. The board that I used is a general purpose IC board. These are really convenient for circuits that are built around small ICs like the 555 timer. I also used an IC socket to attach the IC. This makes it easy to change out the IC but it is not necessary.

The batteries are mounted in individual AA battery holders. The three battery holders are soldered together in series and the end leads are soldered to the circuit board.

When attaching the photoresistor, I mounted it with the leads sticking out about one inch from the board. This makes it easy to make small adjustments to the position of the photoresistor after it has been mounted in place.

Once the whole circuit is soldered to the board, test it again to make sure that everything is working properly.

### **STEP 5: SECURE THE LOOSE PARTS TO THE BOARD WITH HOT GLUE**

The switch and the batteries are connected to the board with wires. I used hot glue to secure them to the circuit board. This helps to keep the whole circuit neatly together. If the wires from the battery holders are too long, you can tie them down with either tape or a rubber band.

### **STEP 6: MOUNT THE LASER POINTER AND THE ALARM CIRCUIT TO FORM A SINGLE BEAM TRIPWIRE**

The simplest way to set up your alarm is as a single beam tripwire. In this configuration the laser pointer is mounted to one side of the walk way and the alarm circuit is mounted to the other. For the tripwire to work, the laser pointer needs to be constantly on. The easiest way to accomplish this is by tightly wrapping a piece of tape around the button.

To secure the two pieces in place, you can use tape or a temporary adhesive putty such as Sticky Tack. First mount the alarm circuit in place. Then mount the laser pointer to the opposite side. Carefully adjust the position of the laser pointer so that it is pointed directly at the photoresistor.

Once you have the light from the laser pointer centered on the photoresistor, you are ready to arm the alarm. Flip the switch to connect the buzzer and activate the alarm. Whenever someone walks through the beam, the alarm will go off.

### **STEP 7: USE MIRRORS TO MAKE A MULTIBEAM TRIPWIRE**

A single tripwire beam works but with the addition of a few mirrors, you can have the laser crisscrossing all over the room making it impossible for someone to avoid detection.

To accomplish this, you will need a lot of mirrors. There are a number of places where you can get small cheap mirrors. One place is the auto section of your favorite big box store. They often sell plastic sheet mirrors that are designed to replace car mirrors. The major advantage of these is that you can easily cut them to any size and shape that you want. Another good source for mirrors is a craft store. Many craft supplies have a mirror finish. However, the surface is not perfectly uniform. So you won't be able to get as many reflections before the beam starts to disperse.

To set up a multibeam tripwire, start by mounting the laser pointer. Then at the point where the beam hits the opposite wall, mount a mirror. You can use tape or a self adhesive putty. Position the mirror at a slight angle so that it reflects the beam in a different direction. Continue this process adding more

mirrors until you are satisfied with the number of beams or the light beam is starting to disperse too much. The last mirror should direct the light to the alarm circuit.

Because this system is using one continuous laser, if any of the beams are interrupted, it will cause the alarm to go off.

### **STEP 8: OPTIONAL: POWER THE LASER POINTER WITH THE ALARM CIRCUIT'S BATTERY PACK**

Most laser pointers also run on 4.5V (three button cell batteries). If your alarm circuit is powered by 4.5 volts (three AA batteries), then it is possible to power the laser pointer from this battery pack as well. All you have to do is connect the terminals of the laser pointer to the batteries of the alarm circuit.

One terminal of the laser pointer is a spring that sticks out of the internal circuit board. The other terminal of the laser pointer is connected to the inside of the metal barrel. You can easily connect to both of these with a pair of alligator clips. The alligator clips can be connected to the positive and negative lines on the circuit board, or you can connect them directly to the terminals of the battery pack.

By connecting the laser pointer to the larger battery pack you can extend the battery life and you only need to worry about changing one set of batteries.

### **STEP 9: OPTIONAL: CONNECT YOUR LASER TRIPWIRE TO A LARGER SECURITY SYSTEM**

The buzzer on the alarm works to alert you if you are nearby. But you can also connect the tripwire to a larger security system. As part of a whole house security system, you have more options in how the system alerts you. It also lets you confirm the alert with other sensors.

To connect your laser tripwire to another circuit, connect the grounds of both circuits. Then connect the wire that was attached to the negative terminal of the buzzer to the signal input of the second circuit. Set your monitoring circuit to look for a LOW signal. For example, if you are using an Arduino, wire it to a digital input pin and use the `digitalRead` function to monitor the wire. When it detects a LOW signal, have it activate the alarms.



### **3.2.2. MATERIALS AND EQUIPMENT**

Laser Pointer

Printed Circuit Board

555 Timer IC

IC Socket (optional)

3-12 Volt Buzzer

Switch

CdS Photoresistor

2 resistors

3 AA Batteries

3 AA Battery holders

Jumper Wires

Heat Shrink Tubing

Hot glue gun

Soldering machine

### **3.2.3. DATA ANALYSIS METHOD**

## CHAPTER 4 : RESULTS OF DATA ANALYSIS AND DISCUSSION

### 4.1 INTRODUCTION

Every ideas & projects that carry over needs and response from the society, to check out whether is this project is acceptable for them or not. By this, we can also get confirmed that this idea is suitable and perfect or not . Another additional advantage we can get from survey is we can also receive many suggestions from the society which can be helpful for our project and some information we may didn't know & problems that we aren't aware from this project.

Our group has conducted the survey through Google Form. We did this survey because, currently the whole world is being affected by the pandemic, called Covid – 19. A virus named Corona is the main reason how this pandemic is getting worse day by day. Huge amount of people are getting sick and are dying around the world daily. Its really dangerous for unhealthy people and old people as their antibody is not as strong as regular people. To prevent we all getting sick, we must stay indoors. That's the point of this survey method.

We conducted this survey through Google Form also because of it can save time & cost. Survey on Google website can be produced by just typing the questions all at computer or mobile phone & after created it, we can just share the link on social media platform like WhatsApp, Facebook, Instagram, Telegram, Twitter & many more. By sharing at these platforms, it can reach to the many people who are active on it. We also don't need to spend time to ask people to state their opinion like going to public places, printing survey forms & asking peoples to fill it. We can just share the link & continue with the other works that need to do. While we are free, we can just check number of response received from Google Form.. Google website having this wonderful service which can be useful for students, office workers & organizations.

## 4.2 PROJECT FINDINGS AND OUTCOMES

In our survey, we had put 1 questions to ask all of them are multiple choice questions. All of them are like that because it wouldn't took long time of period to fill. The survey had responded by 23 people. Tables and diagrams bellow show the question and response for it.

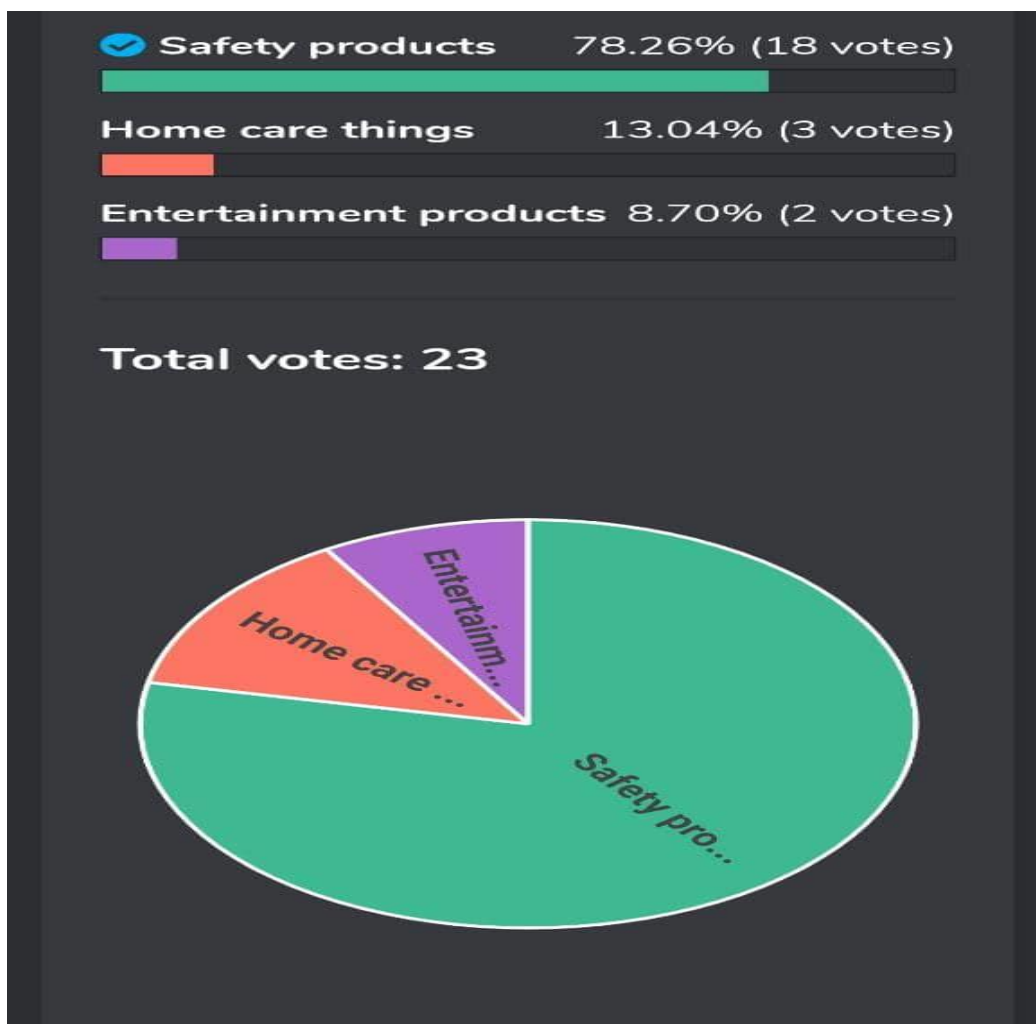
Question : What is the most important thing that each and every house must have?

Choice given: Entertainment products

Home care things

Safety Products

<b>QUESTION</b>	What is the most important thing that each and every house must have?
<b>CHOICES</b>	Entertainment Products
	Home Care Things
	Safety Products



(DIAGRAM 4.2.1.: SURVEY CHART)

### 4.3 DISCUSSION

On our survey, almost 78.26% of respondents knew about the importance of the safety and security, this may be because nearly half of the respondents are working or 35 years old and above and having family. This is why because they must leave their house to go to work. So they would be worried about their family member's safety. Before starting this survey, our group had a deep discussion about what project we were going to do. Because we had three different opinions. So we decided to know what the needs of the society are. By this survey, our group decided to do a project based on safety products. There are some of them who voted for home care things and entertainment products. This may happen because they might already have a security system in their house. Although they are not as many as those who want safety

products. We also knew that if we did this project there will be a big demand for our project because it is very low cost and easy to install and operate.

#### **4.4 SUMMARY**

Using Laser safety system for house safety can provide advantages and disadvantages. The first advantage is it's 'pollution – free'. This one is pollution – free because it does not cause any harm to it's environment in any sort of way. It does not cause smoke which does not concerns air pollution. It only causes alarm sound within the safe measure of sound decibels.

Besides that, the Laser safety system costs less than average factory made laser safety system products out there in the market. The parts of this product costs around only Rm 50. Therefore, users do not need to spend a vast amount of money on purchasing this product which does not cost much for it's maintenance.

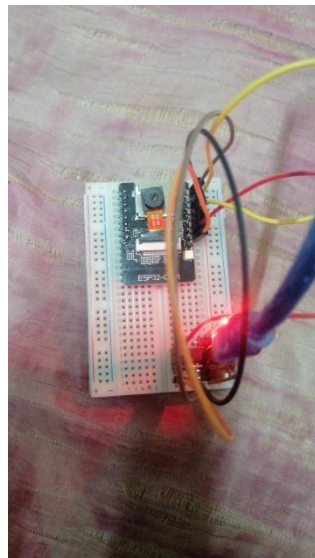
The only disadvantage of utilizing the Laser safety system is because of it's market and social exposure. At this 21'st century, they are even people who care less to know and acquire these safety system products. Especially, people who live in the rural areas who have less exposure to these kind of modern safety system, prefer to use old traditional methods that most likely provide a 100% success rate. This is the reason for Laser safety system to be less known among the people.

## CHAPTER 5 : CONCLUSION AND SUGGESTIONS

### CHAPTER 5 : CONCLUSION AND SUGGESTIONS (RIKINESH A/L APPU)

#### 5.1.INTRODUCTION

From this project, our group has learned more about the importance of a house security safety system towards the habitants of the home and the ways to conduct an efficient laser tripwire safety system at the house. We have been progressing this project since the start of study week 2. We have done numerous researches since then in order to perfect our circuit system which is the main factor of our laser tripwire safety system. Besides that, we also have learned a way lot of things since the beginning of this project. For example we get to know the real cost and service provided behind factory-made laser trip safety system that many may not know. Besides, not many people realize the fact that they can build this laser tripwire system at their own homes at a much less cost. However, after getting to know about this homemade laser safety system, we will try our best to spread the information to the people around us. Like this information, our group gets to learn about so many unknown facts like this.



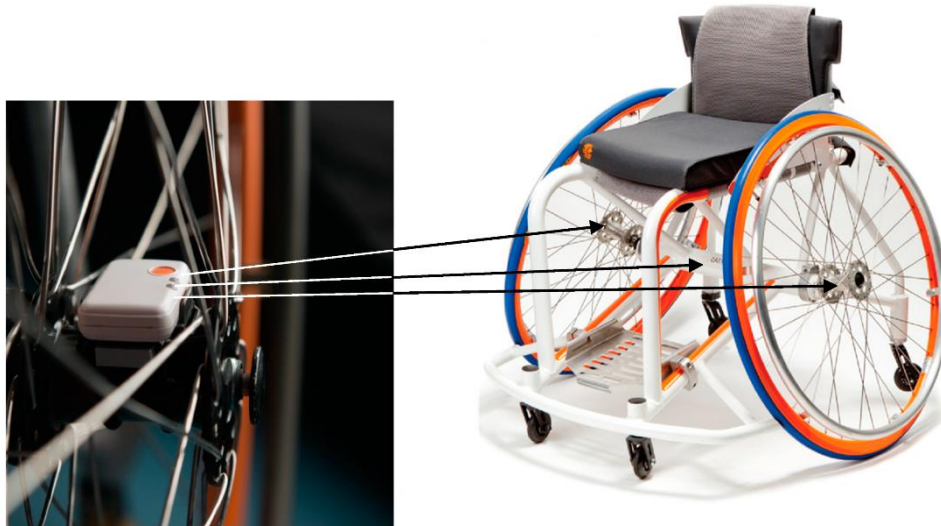
(DIAGRAM 4.1 : LASER SAFETY SYSTEM WIRING SAMPLE)

## **5.2. CONCLUSIONS**

Throughout this project, we believe that homemade laser tripwire safety system can be made by more people in upcoming years as the world is getting modern day by day. While doing our research for this project, we had found many interesting and multifunctional uses for our invention on the internet. We also have seen many solutions being made to solve the problems that we are facing every single day. So, just imagine the varieties of the ideas there could be in the future. By this we are 100% sure that we can see many inventions and solutions to improve our invention.

## **5.3. SUGGESTIONS**

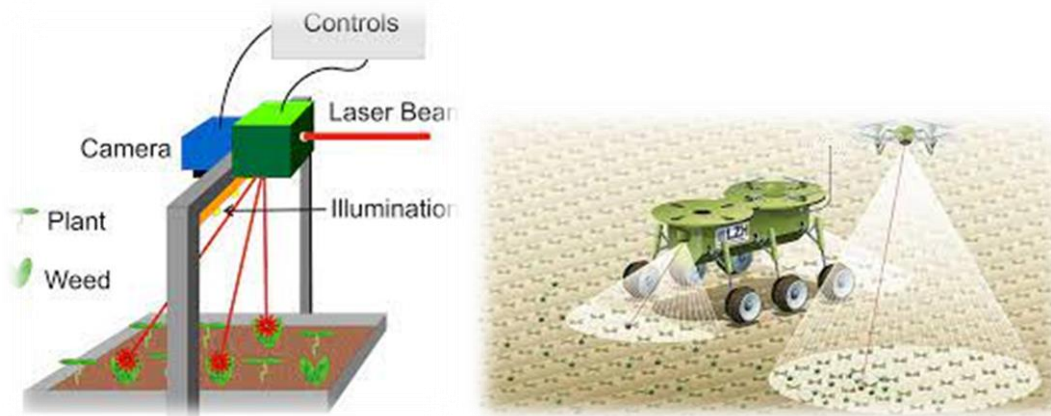
Laser tripwire can be used not only for house safety purposes but rather for other things also. Firstly, we can provide aid towards disabled people (OKU) through our laser tripwire system. We can setup a mini laser detecting sensor mechanism on the side of a wheel on the wheelchair to detect the movement of the wheelchair. This is extremely important for the disabled person because due to his inability to move, we can easily monitor them using the sound coming from the sensor in emergency cases. For example, in our home when they are sitting on the wheelchair while we go to do our work; and suddenly something trigger the movement of the wheelchair like kids bumping around, we can be alerted instantly and come to their aid. This type of wheelchair is extremely beneficial for both sides.



**(DIAGRAM 4.2: LASER SYSTEM ON WHEELCHAIR)**

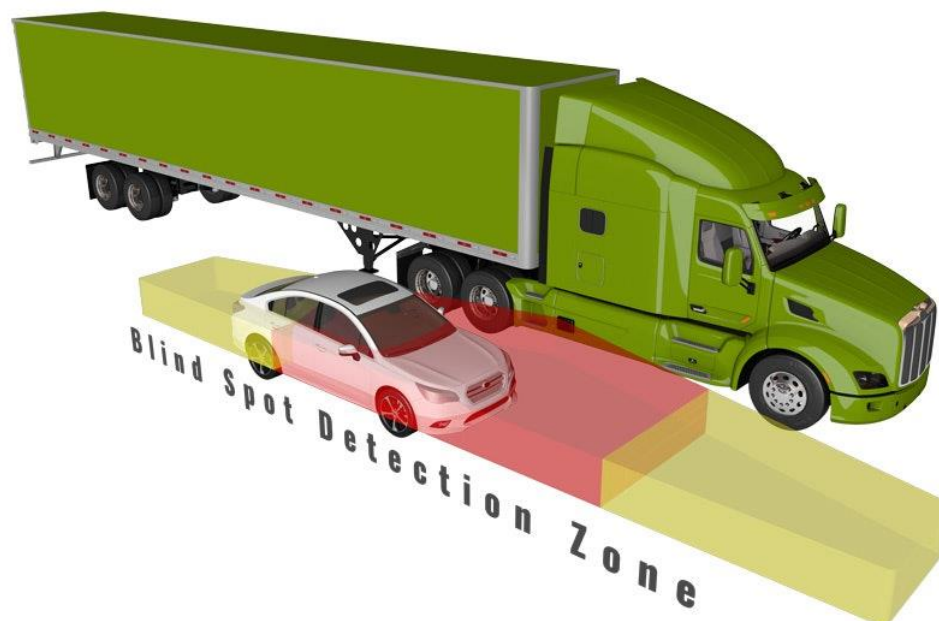
Besides that, laser tripwire system also can be used for agriculture purposes also. For example, Scientists at the Laser Center in Hanover (LZH) are currently using a technology that should reduce the enormous amount of plant toxins in use. Lasers will weaken weeds to the extent that they are no longer in competition with crops. In the “Non-chemical weed control with laser radiation in plant production “(NUBELA) project, the LZH, together with IPG Laser GmbH and LASER on demand GmbH, are developing a robust module designed for agricultural purposes that distinguishes weeds from crops, using an imaging process, and weakens them in their growth centre with the help of short, high-energy laser pulses. As a market launch scenario, the scientists imagine use in the cultivation of high-quality vegetables, where their lasers will zero in only on weeds directly next to the plants. If the weeds are shrunk by laser at an early stage, there is more chance that the crops will overcome the weeds. For effective, poison-free weed control, the scientists imagine that in the future laser systems mounted on robots or drones will circle the fields and destroy weeds that they detect optically in the four-leaf stage.





**(DIAGRAM 4.3 : LASER SYSTEM ON AGRICULTURE)**

Furthermore, laser tripwire system can also be used for to reduce the blind spot of a lorry driver. According to statistics, Malaysia has the highest road fatality risk (per 100,000 population) among the ASEAN countries and more than 50% of the road accident fatalities involve lorries. However, to counter this issue we can use laser sensor detectors on the side of the lorries to remind the drivers about the situation outside the lorry. We can install cameras along with mini alarms in trucks to alert the driver of his surroundings. By doing so, we can reduce the accident rate of lorries and save plenty of lives.



**(DIAGRAM 4.4 : LORRY BLIND SPOT DETECTION VIEW)**



**(DIAGRAM 4.5 : LASER SYSTEM APPLICATION ON NOWDAYS LORRY)(LEFT)**

**(DIAGRAM 4.6 : LASER SYSTEM APPLICATION ON MODERN LORRY)(RIGHT)**

Besides that, this laser tripwire system plays an important in ensuring shop safety, especially jewellery shops. Laser sensors can be placed on the shop entrance and on the top of the jewellery display. This not only identifies people but if there is a thief trying to steal the jewellery, they can immediately report it to the police.



**(DIAGRAM 4.7 : LASER SYSTEM ON JEWELLERY SHOP)**

## 5.4. SUMMARY

Laser safety system plays a large role not only in ensuring our house safety but also at various ways at our environment. When there are plenty of people making a good use of this system, we should also be brave enough to take part in it. Homemade laser tripwire safety system has proven its worth in aspects of price, reliability and relativity time to time. People should realize this sooner and should start to get involved in this matter. As time flows, we can evolve laser tripwire safety system to a bigger scale. To conclude, it all depends on the hands of the consumers, you can choose homemade laser tripwire safety system and protect your family.

## **REFERENCE**

IS A LASER SECURITY SYSTEM THE BEST WAY TO PROTECT MY HOME?

<https://staysafe.org/is-a-laser-security-system-the-best-way-to-protect-my-home/>

ADVANTAGES AND DISADVANTAGES OF INSTALLING ALARM SECURITY SYSTEMS

<https://www.gps-securitygroup.com/advantages-disadvantages-installing-alarm-systems/>

HANDMADE VS MACHINE MADE

<https://bleckarchitects.com/handmade-vs-machine-made/>

## ATTACHMENTS

ATTACHMENT A: Questionnaire

ATTACHMENT B: List of Respondents

## ATTACHMENT A : QUESTIONNAIRE

1)What is the most important thing each and every house must have?

We need to decide which kind of project want to do based on people's opinion.

Choose one answer:

- Safety products
- Home care things
- Entertainment products

In this poll you must enter your name to vote

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## ATTACHMENT B: LIST OF RESPONDENTS

Who Voted For What			
Name	Safety products	Home care things	Entertainment products
<b>22 voters</b>	<b>17</b>	<b>3</b>	<b>2</b>
Kavin	✓ <input type="checkbox"/>		
Rikinesh Appu	✓ <input type="checkbox"/>		
Divyaashine	✓ <input type="checkbox"/>		
Muhd Nur Izuddin		✓ <input type="checkbox"/>	
Mohamad Hilmi	✓ <input type="checkbox"/>		
Jamil	✓ <input type="checkbox"/>		
Muhidin			✓ <input type="checkbox"/>
Thiveyen			✓ <input type="checkbox"/>
Makkal Selvan		✓ <input type="checkbox"/>	
Daarsywin	✓ <input type="checkbox"/>		
MUNISHWAR		✓ <input type="checkbox"/>	
Kogulan	✓ <input type="checkbox"/>		
Varma	✓ <input type="checkbox"/>		
Sashivarma	✓ <input type="checkbox"/>		
Pavii	✓ <input type="checkbox"/>		
Keerttika Baskaran	✓ <input type="checkbox"/>		
Selva	✓ <input type="checkbox"/>		
R. Kathika Laxmi	✓ <input type="checkbox"/>		
Vaizhnavi Gunalan	✓ <input type="checkbox"/>		
Raakesh	✓ <input type="checkbox"/>		
Yoga	✓ <input type="checkbox"/>		
Yudesh	✓ <input type="checkbox"/>		