



# CHAPTER 1

## PROBLEM IDENTIFICATION

The problems that this project solves are:

### 1. Sound as a Barrier

The problem is sound may become a barrier sometimes, which causes vocal communication to falter. This project enables communication in such scenarios. In places with excessive noise or restriction to employ vocal means to communicate are such examples. E.g. From a helicopter to ground crew in remote areas, A piazza, etc.

### 2. Noise Pollution due to Loudspeakers

The problem is loudspeakers in public areas to dispatch information in all directions at one time with lots of noise pollution. This is the cause behind many health and environment issues.

### 3. Forcing of information to general public

Another problem that is solved by this project is that only those who are meant to receive the message will be receiving it. Thus no-one has to put up with information being forced on them. The process this project uses can be modified to encrypt messages into codes and thus can be used to share un-crack able coded information from one person to another.

The proposed project begins to solve these issue by transmitting information through light which does not produce any noise, unlike the common means. It utilizes Morse code as language.



# CHAPTER 2

## FEATURE FINALISATION

The limitations of the project are:

### **1. Brightness Effect**

The project detects signal fine unless something causes background brightness.

### **2. Distortion**

The message is almost always undistorted but is observed to have slight distortion at times.

The capabilities of the project is

### **1. Detection of Brightness change**

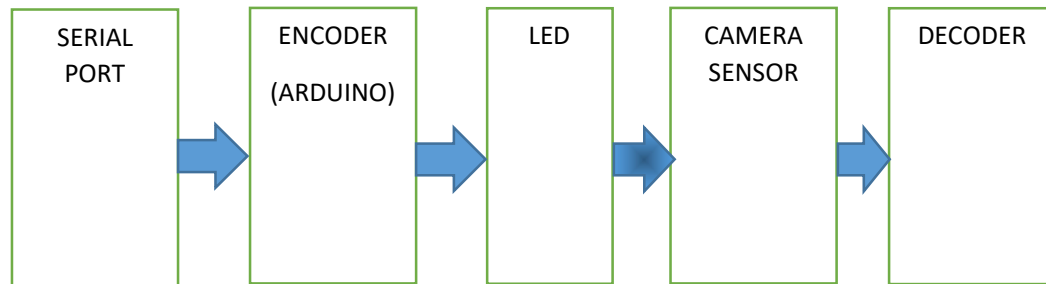
The project detects brightness variation at the point of focus chosen by the user.



## CHAPTER 3

### Design Flow

#### Block Diagram



#### Materials

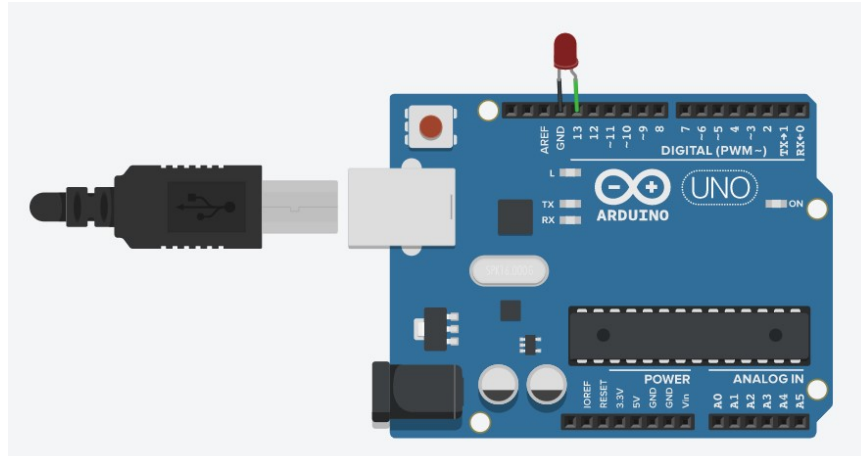
1. Arduino Board (01)  
For manipulating LED.
2. PC (02)
  01. For Serial port input.
  02. For working of software.
3. LED (01)  
For transmitting the data.
4. Camera Sensor (01)  
To detect the transmitted signal.



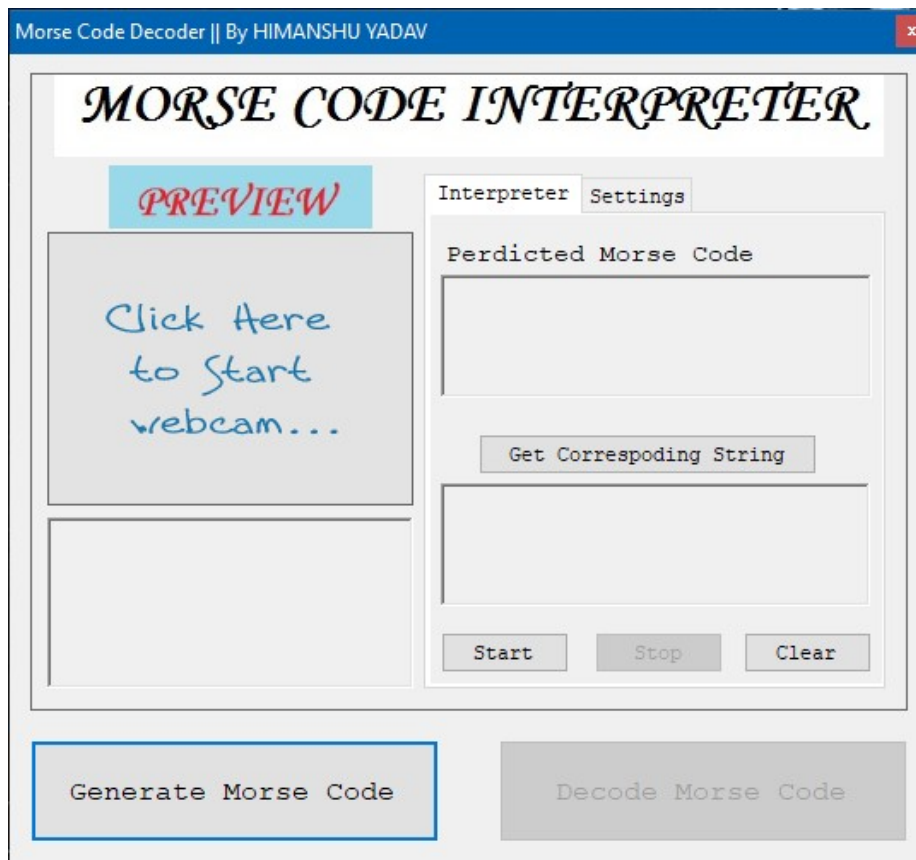
# CHAPTER 4

## SIMULATION AND OUTCOME

### Circuit diagram



Decoder:





# International Morse Code

1. The length of a dot is one unit.
2. A dash is three units.
3. The space between parts of the same letter is one unit.
4. The space between letters is three units.
5. The space between words is seven units.

A	● —	U	● ● —
B	— ● ● ●	V	● ● ● —
C	— ● — ●	W	● — —
D	— ● ●	X	— ● ● —
E	●	Y	— ● — —
F	● ● — ●	Z	— — ● ●
G	— — ●		
H	● ● ● ●		
I	● ●		
J	● — — —		
K	— ● —	1	● — — — —
L	● — ● ●	2	● ● — — —
M	— —	3	● ● ● — —
N	— ●	4	● ● ● ● —
O	— — —	5	● ● ● ● ●
P	● — — ●	6	— ● ● ● ●
Q	— — ● —	7	— — ● ● ●
R	● — ●	8	— — — ● ●
S	● ● ●	9	— — — — ●
T	—	0	— — — — —

The project uses Morse code as the mediator language. This language is preferable because of the following reasons:

1. It has two types of characters (ON state and OFF state)
  - 2 of ON type and 2 of OFF type with time constraints which make it good for the current setup.
2. It has been optimized in such a way that the message relayed is done efficiently,
 

The characters which are often used are relatively short which makes this the optimum form of binary.



## CHAPTER 5

# CONCLUSION AND FUTURE SCOPE

This project is capable but isn't optimized to its best form yet. If following things are implemented then it will become a great utility tool in various fields.

It is concluded that if the speed of the blinking is made faster, that is, the duration for the characters is reduced, the data transfer rate might become much better.

The project works nicely with slight distortion in message sometimes.

An ALGORITHM needs to be developed that'll choose the best case for three times message relayed, so that no distortion can occur.

Also the camera of a laptop isn't as advanced as the cameras nowadays in use (Smartphone Cameras), which make it all the more feasible to upgrade the blink rate.

The project can be used for many applications (after slight alteration) such as :

1. Helicopter to Ground comm.

This can be done after making the blink faster and app with more stabilized camera input.

2. Plaza information sharing module.

This to achieve at night is no big deal, but to achieve this at daytime, the led would need to be red and essentially brighter. The app would also need to be more point specific and area specific so that it picks the info even if some shiny object is near it.

NOTE : The app would need to be updated so that it takes the input thrice and then displays the information, so that the right information is received.

This will consume more time to reduce which we can update the blink rate and to some extent the camera fps and other qualities as well.



## References

1. <https://stackoverflow.com/>
2. <https://www.codeproject.com/>
3. <https://www.google.com/>
4. <https://www.geeksforgeeks.org>