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B.E. SEMESTER VIII, ACADEMIC YEAR 2020-2021

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Periodic Progress Reports (PPR)	**Completed**
Business Model Canvas (Image)	**Completed**
Business Model Canvas (Report)	**Completed**
Patent Drafting Exercise (PDE)	**Completed**
Final Plagiarism Report	**Completed**
Final Project Report	**Completed**

Name of Student : Bheda Aasim Sabir

Name of Guide : Mr.Sheth Saurin Mukundbhai

Signature of Student : ____________________

*Signature of Guide : ________________________

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Final Project Report	**Completed**

Name of Student : Darji Vishal Mahendra

Name of Guide : Mr.Sheth Saurin Mukundbhai

Signature of Student :

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Periodic Progress Reports (PPR)	**Completed**
Business Model Canvas (Image)	**Completed**
Business Model Canvas (Report)	**Completed**
Patent Drafting Exercise (PDE)	**Completed**
Final Plagiarism Report	**Completed**
Final Project Report	**Completed**

Name of Student : Pavasiya Darshan Rameshbhai

Name of Guide : Mr.Sheth Saurin Mukundbhai

Signature of Student : ____________________

*Signature of Guide : ________________________

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This is to certify that, ***Momin Abid Hussain*** (Enrolment Number - 170110120063) working on project entitled with ***Implementation Of AGV In Medical Environment*** from ***Mechatronics Engineering*** department of ***G. H. PATEL COLLEGE OF ENGINEERING & TECHNOLOGY, V V NAGAR*** had submitted following details at online project portal.

Periodic Progress Reports (PPR)	**Completed**
Business Model Canvas (Image)	**Completed**
Business Model Canvas (Report)	**Completed**
Patent Drafting Exercise (PDE)	**Completed**
Final Plagiarism Report	**Completed**
Final Project Report	**Completed**

Name of Student : Momin Abid Hussain

Name of Guide : Mr.Sheth Saurin Mukundbhai

Signature of Student : ____________________

*Signature of Guide : ________________________

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CHANDKHEDA, AHMEDABAD

AFFILATED

G. H PATEL COLLEGE OF ENGINEERING & TECHNOLOGY

A Report On-

IMPLEMENTATION OF AGV IN MEDICAL ENVIRONMENT

2182005 : PROJECT - II

B.E , SEMESTER- VIII

MECHATRONICS ENGINEERING

SUBMITTED BY

GROUP: ***124031***

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Head of Department

ACADEMIC YEAR: 2020-21

Gujarat Technological University

Chandkheda, Ahmedabad

The project report on

“IMPLEMENTATION OF AGV IN MEDICAL ENVIRONMENT”

This is to certify that a Design Engineering Report entitled “**IMPLEMENTATION OF AGV IN MEDICAL ENVIRONMENT”** submitted by AASIM BHEDA (170110120002), VISHAL DARJI(170110120005), DARSHAN PAVASIYA (170110120046), MOMIN ABID HUSSAIN(170110120063), towards the partial fulfilment of the degree of **Bachelor of Engineering of GCET Engineering College** is the work carried out under my guidance and supervision. The work submitted, in my opinion, has reached to a level required for being accepted for the examination.

Date of the submission:

Dr. Saurin M. Sheth	**Dr. Falgun Thakkar**
Faculty Guide	**Faculty Co-Guide**

ACKNOWLEDGEMENT

Behind every achievement there lies an unfathomable sea gratitude to those who activated it, without whom it would never ever come into existence. To them, lay the words of gratitude imprinted within.

A report is all-encompassing as this is never the work of one or two people laboring in quiet solitude. It is the product of many hands, and countless hours from many people. We thank to all those who helped us in this report.

We would like to express our sincere gratitude to the head of the Mechatronics Department, GCET **Dr. Sanket Bhavsar** and all faculty members who helped us throughout my studies.

And my deepest and sincere thanks go to my guide **Dr. Saurin M. Sheth & Dr. Falgun Thakkar** for their extensive guidance, encouragement, immense help and cooperation throughout.

Aasim Bheda (170110120002)

Vishal Darji (17011012005)

Darshan Pavasiya (170110120046)

Momin Abid Hussain (170110120063)

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1. INTRODUCTION:

In India starting from February end the cases of *Covid 19* started getting registered, since then there is no downfall in the number of active cases. Starting from the beginning of the pandemic huge amount of population in the various region of the country were exposed to the deadly disease. In the whole country lockdown was imposed and people had to suffer a lot, people migrated to their natives and there was havoc in the whole country, even due to that number of cases were registered patients in mass were admitted to the hospitals and isolation wards in which doctors and medical staff were the main faces who had to deal with such cases and majority of the contraction was observed due to the infection from patients who already were infected. Such cases were numerous and also resulted in a large number of deaths of the patients due to unavailability of the free beds and also doctors were engaged in treatment day and night. There was no alternative for them too, as they were the only hope for the population of the whole country.

1.1 PROBLEM STATEMENT

As the entire world stands united to fight against the wrath of COVID-19, if there is one industry which has blossomed amid this crisis, it is Robotics & Automation. Currently, in the *Covid-19* pandemic situations, lives of medical staff and their patients are at stake. As we all are aware about the steep rise in cases worldwide. While some of the countries are recovering, for country like India still there is a long run, with respect to the population & the medical facilities. For the support of the medical staff and hospitals to deal with hundreds of patients & keeping a track record of all of them at once is quite a challenging task. In a view to that we are aiming to develop an AGV (Automated Guided Vehicles) that could be deployed to assist the hospital staff for various purposes viz. supplying food, medicines and other commodities, that too without any human contact.

Special care is taken that sanitization, waste disposal facilities are embedded in a single AGV that could provide quick & efficient services also in worst infected scenarios.

1.2 PURPOSE

We are planning to make an AGV that could function semi-automatically, there is high time now due to a steep rise in cases of infectious diseases, in a view to that our project will be helpful in the hospitals and the isolation wards where doctors and medical representatives have to risk their lives every time, they visit infected patients.

- There is a huge risk factor involved while checking, by installing various sensors this process can be completed without the requirement of any medical representative.
- The tiredness of the staff, due to the high multiplying rate of such disease it is quite impossible for the staff to cover each patient.
- Stopping the discrimination faced by the patients based on caste, creed, gender, and religion.
- Collection of reliable and legitimate data related to each patient.
- Staff cannot work 24*7, there is a requirement for an assistant to cover up.

1.3 OBJECTIVES

- To develop an Autonomous AGV which could work self-sufficiently.
- To form a path planning technique which could avoid maximum number of obstacles and follow the path fed.
- To develop an image processing algorithm which could help in tracking of patients.
- To monitor the patients infected & keep a track of their health conditions.
- To incorporate various health monitoring device in the system, to perform basic checkups.
- To develop a system/product which could work in a pandemic scenario effectively.
- To reduce the infection rates in the medical fields such as hospitals, isolation wards hotels.

2.0 LITERATURE REVIEW

Currently, in the *Covid-19* pandemic situations, lives of medical staff and their patients are at stake. For the safety of these people, many companies have contributed their part to help them at the hospitals for their protection. This literature survey is about the company products which are in the developing phase and the methodology used by them.

We are proposing Automated Guided Vehicles as a solution in the medical environment for the help of the medical staff during this pandemic situation to extend support further by making the whole process automated including several other activities which can help certainly by automated traversing and map planning techniques which could cut the in transit human requirement, covering 4-5 patients at a time, counselling and other basic checkups could be done without a single human contact which can protect the staff as well. According to our survey the (frontiers) companies working this area are as follow:

1.Alphabot- India

2.Invento Robotics - India

3.Metabiota -China

4.BlueDot- China

5.Dermalog -Germany

We analyzed the solutions proposed by some of these companies which are Alphabot(india), Invento Robotics.

Alphabot(india)

The solution proposed by this company is the robot called MedBot. Currently, Medbot has two variants, one that can be teleported remotely and other is semi-automatic which can traverse on predefined paths.

Features:

- Obstacle avoidance using Ultrasonic sensors
- A joystick mounted on user control interface
- IR sensor array path following navigation system
- Keypad based system to reach to their patients
- Simple, flexible and ergonomic design.

Figure 1 Alphabot Product

Figure 2 Alphabot 3D Design

Invento Robotics(india)

Invento Robotics is a Bangalore based one of India's leading companies and they have proposed robots like Mitra, and Astra are designed to be at the frontline against this war of the covid-19 pandemic situation.

MITRA

Mitra screens patients effectively, without exposing health professionals to the virus.
Features:

- Semi-autonomous
- Face Recognition
- Temperature measurement
- Pulse meter
- Natural language processing

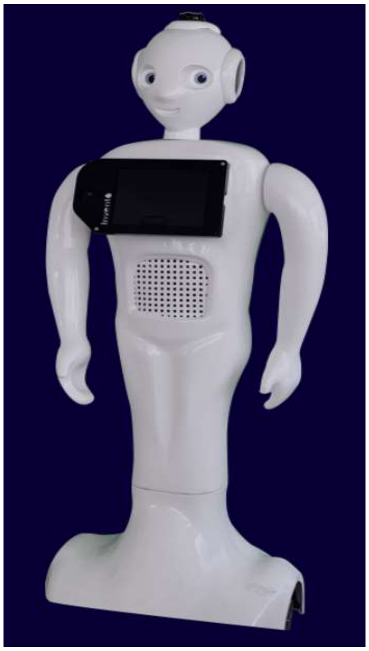


Figure 3 Mitra Robot

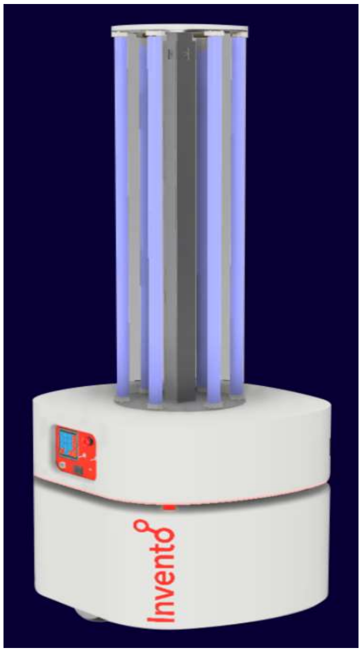


Figure 4 C-ASTRA Robot

C-ASTRA

C-Astra has UV disinfection technologies to reduce the transmission of the virus causing COVID-19. UV disinfection technologies can play a role in this pandemic situation.

Features:

- UV disinfection
- Smart Navigation System
- Human in loop
- Remote access

3.0 DESIGN ITERATIONS

3.1 INITIAL DESIGN STAGES:

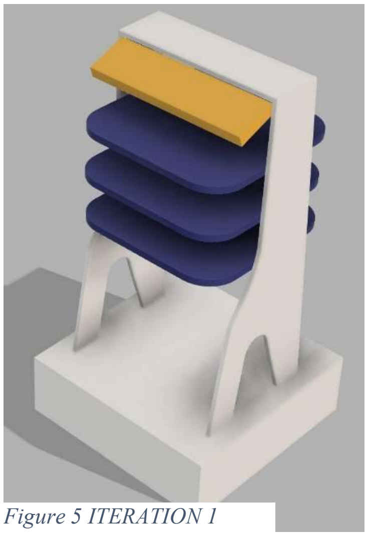


Figure 5 ITERATION 1

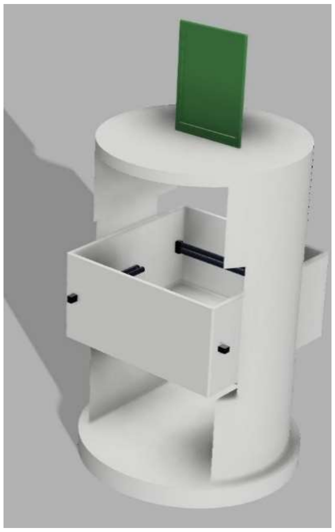


Figure 6 ITERATION 2

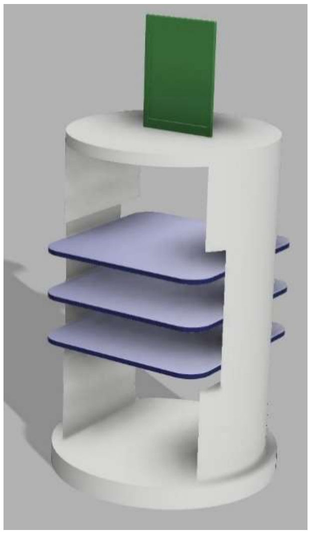
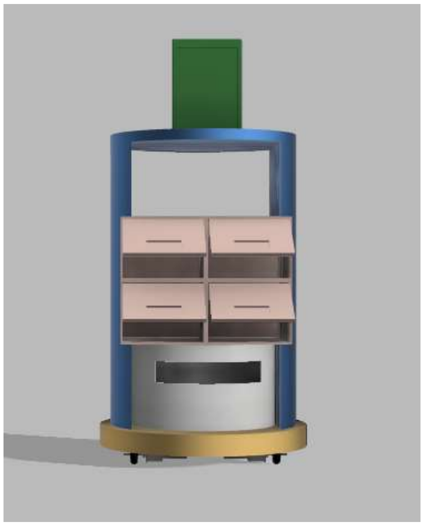
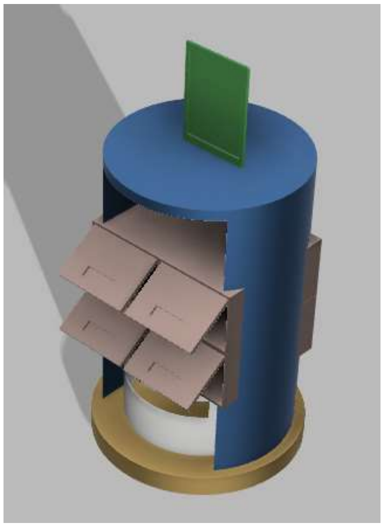


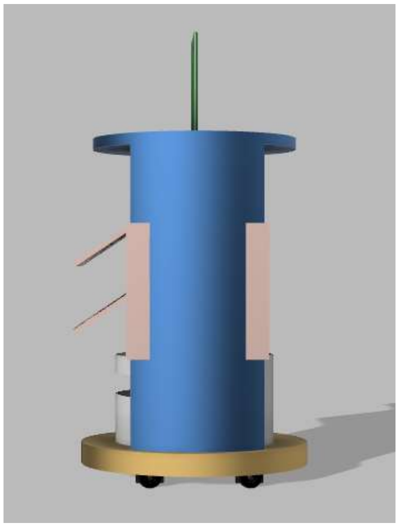
Figure 7 ITERATION 3

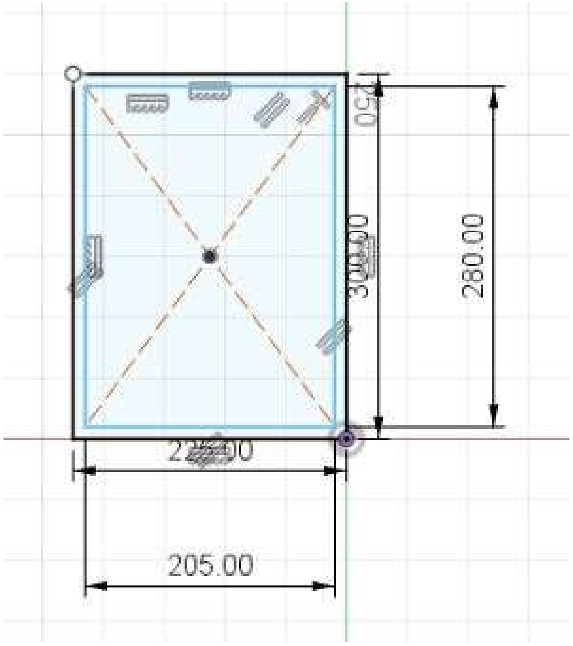
We have made a few design iterations for the proposed project in which we have thought of making a bot which could traverse automatically in a prefixes region and cover a number of patients and performing several activities along with the traversal. Also collects the waste and reduce the3 infection to the doctors and other several medical practitioners. Resulting in the reduces number of infections to others.

3.2 FINAL DESIGN:





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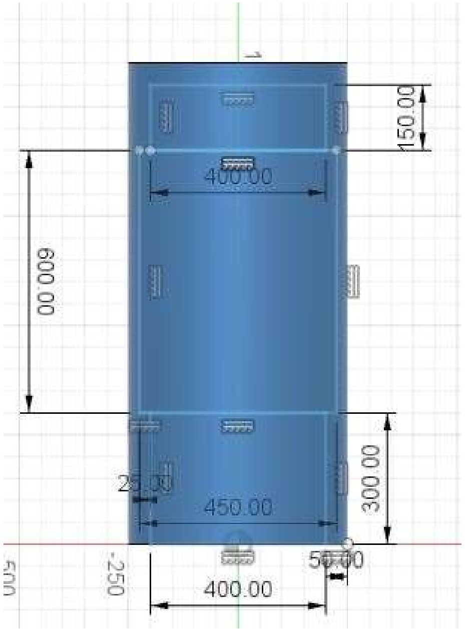
205.00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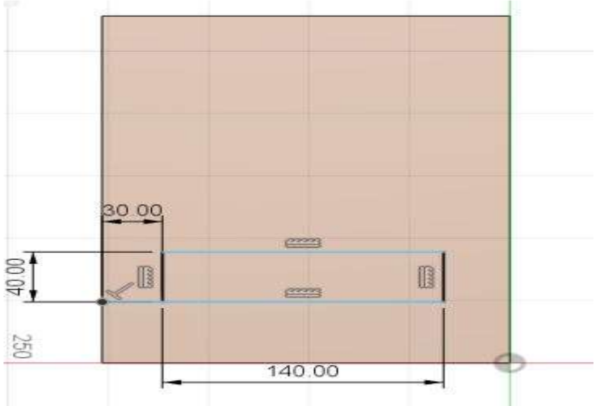
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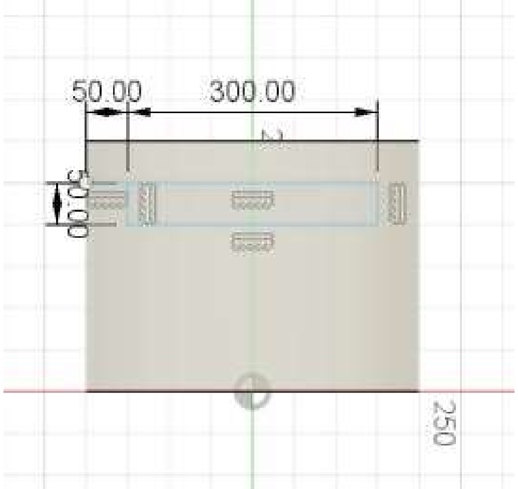
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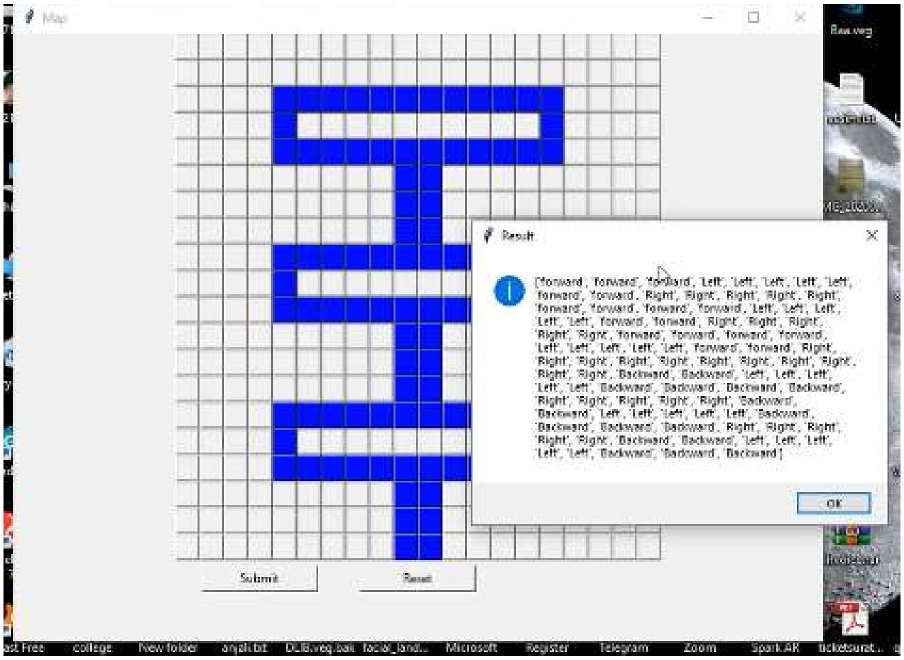
3.3 PATH PLANNING SOFTWARE USING PYTHON



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'Left', 'Left', 'Backward', 'Backward', 'Backward']
```

We have used Python programming to develop a program which could be used to input the map to the AGV, for traversing using *Tkinter* library for the whole area which the AGV needs to cover. This program would be then fed to the microcontroller serially and it will traverse autonomously.

Script for the program:

```
import tkinter as tk
from tkinter import messagebox
root=tk.Tk()
root.geometry('800x600')
root.title('Map')
frame = tk.Frame(root)
frame.pack()
global path,direction,indication
path=[]
direction=[]
indication=0


def board():
    global path,direction,indication
    def reset():
        global path,direction
        board()
        path=[]
        direction=[]
    def hello(value,button):
        button['bg']="blue"
        if value not in path:
            path.append(value)
        print(path)
    def submit():
        for i in range(len(path)-1):
            if (path[i+1]-path[i])==1:
                direction.append('Right')
            elif (path[i+1]-path[i])==-1:
                direction.append('Left')
            elif (path[i+1]-path[i])==20:
                direction.append('Backward')
            elif(path[i+1]-path[i])==-20:
                direction.append('forward')
            else:
                messagebox.showerror("Error","Give proper Path")
                reset()

        if len(direction)!=0:
            messagebox.showinfo("Result",str(direction))
            #print(direction)
        else:
            reset()
        sub['state']='disabled'


    button11 =
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```

```
    button318 =
tk.Button(frame,height=1,width=2,command=lambda:hello(58,b
utton318))
    button319 =
tk.Button(frame,height=1,width=2,command=lambda:hello(59,b
utton319))
    button320 =
tk.Button(frame,height=1,width=2,command=lambda:hello(60,b
utton320))
    button41 =
tk.Button(frame,height=1,width=2,command=lambda:hello(61,b
utton41))
    button42 =
tk.Button(frame,height=1,width=2,command=lambda:hello(62,b
utton42))
    button43 =
tk.Button(frame,height=1,width=2,command=lambda:hello(63,b
utton43))
    button44 =
tk.Button(frame,height=1,width=2,command=lambda:hello(64,b
utton44))
    button45 =
tk.Button(frame,height=1,width=2,command=lambda:hello(65,b
utton45))
    button46 =
tk.Button(frame,height=1,width=2,command=lambda:hello(66,b
utton46))
    button47 =
tk.Button(frame,height=1,width=2,command=lambda:hello(67,b
utton47))
    button48 =
tk.Button(frame,height=1,width=2,command=lambda:hello(68,b
utton48))
    button49 =
tk.Button(frame,height=1,width=2,command=lambda:hello(69,b
utton49))
    button410 =
tk.Button(frame,height=1,width=2,command=lambda:hello(70,b
utton410))
    button411 =
tk.Button(frame,height=1,width=2,command=lambda:hello(71,b
utton411))
    button412 =
tk.Button(frame,height=1,width=2,command=lambda:hello(72,b
utton412))
    button413 =
tk.Button(frame,height=1,width=2,command=lambda:hello(73,b
utton413))
    button414 =
tk.Button(frame,height=1,width=2,command=lambda:hello(74,b
utton414))
    button415 =
tk.Button(frame,height=1,width=2,command=lambda:hello(75,b
utton415))
    button416 =
tk.Button(frame,height=1,width=2,command=lambda:hello(76,b
utton416))
    button417 =
tk.Button(frame,height=1,width=2,command=lambda:hello(77,b
utton417))
    button418 =
tk.Button(frame,height=1,width=2,command=lambda:hello(78,b
utton418))
    button419 =
tk.Button(frame,height=1,width=2,command=lambda:hello(79,b
utton419))
    button420 =
tk.Button(frame,height=1,width=2,command=lambda:hello(80,b
utton420))
    button51 =
tk.Button(frame,height=1,width=2,command=lambda:hello(81,b
utton51))
    button52 =
tk.Button(frame,height=1,width=2,command=lambda:hello(82,b
utton52))
    button53 =
tk.Button(frame,height=1,width=2,command=lambda:hello(83,b
utton53))
```

```
    button54 =
tk.Button(frame,height=1,width=2,command=lambda:hello(84,b
utton54))
    button55 =
tk.Button(frame,height=1,width=2,command=lambda:hello(85,b
utton55))
    button56 =
tk.Button(frame,height=1,width=2,command=lambda:hello(86,b
utton56))
    button57 =
tk.Button(frame,height=1,width=2,command=lambda:hello(87,b
utton57))
    button58 =
tk.Button(frame,height=1,width=2,command=lambda:hello(88,b
utton58))
    button59 =
tk.Button(frame,height=1,width=2,command=lambda:hello(89,b
utton59))
    button510 =
tk.Button(frame,height=1,width=2,command=lambda:hello(90,b
utton510))
    button511 =
tk.Button(frame,height=1,width=2,command=lambda:hello(91,b
utton511))
    button512 =
tk.Button(frame,height=1,width=2,command=lambda:hello(92,b
utton512))
    button513 =
tk.Button(frame,height=1,width=2,command=lambda:hello(93,b
utton513))
    button514 =
tk.Button(frame,height=1,width=2,command=lambda:hello(94,b
utton514))
    button515 =
tk.Button(frame,height=1,width=2,command=lambda:hello(95,b
utton515))
    button516 =
tk.Button(frame,height=1,width=2,command=lambda:hello(96,b
utton516))
    button517 =
tk.Button(frame,height=1,width=2,command=lambda:hello(97,b
utton517))
    button518 =
tk.Button(frame,height=1,width=2,command=lambda:hello(98,b
utton518))
    button519 =
tk.Button(frame,height=1,width=2,command=lambda:hello(99,b
utton519))
    button520 =
tk.Button(frame,height=1,width=2,command=lambda:hello(100,
button520))
    button61 =
tk.Button(frame,height=1,width=2,command=lambda:hello(101,
button61))
    button62 =
tk.Button(frame,height=1,width=2,command=lambda:hello(102,
button62))
    button63 =
tk.Button(frame,height=1,width=2,command=lambda:hello(103,
button63))
    button64 =
tk.Button(frame,height=1,width=2,command=lambda:hello(104,
button64))
    button65 =
tk.Button(frame,height=1,width=2,command=lambda:hello(105,
button65))
    button66 =
tk.Button(frame,height=1,width=2,command=lambda:hello(106,
button66))
    button67 =
tk.Button(frame,height=1,width=2,command=lambda:hello(107,
button67))
    button68 =
tk.Button(frame,height=1,width=2,command=lambda:hello(108,
button68))
    button69 =
tk.Button(frame,height=1,width=2,command=lambda:hello(109,
button69))
```

```
    button610 =
tk.Button(frame,height=1,width=2,command=lambda:hello(110,
button610))
    button611 =
tk.Button(frame,height=1,width=2,command=lambda:hello(111,
button611))
    button612 =
tk.Button(frame,height=1,width=2,command=lambda:hello(112,
button612))
    button613 =
tk.Button(frame,height=1,width=2,command=lambda:hello(113,
button613))
    button614 =
tk.Button(frame,height=1,width=2,command=lambda:hello(114,
button614))
    button615 =
tk.Button(frame,height=1,width=2,command=lambda:hello(115,
button615))
    button616 =
tk.Button(frame,height=1,width=2,command=lambda:hello(116,
button616))
    button617 =
tk.Button(frame,height=1,width=2,command=lambda:hello(117,
button617))
    button618 =
tk.Button(frame,height=1,width=2,command=lambda:hello(118,
button618))
    button619 =
tk.Button(frame,height=1,width=2,command=lambda:hello(119,
button619))
    button620 =
tk.Button(frame,height=1,width=2,command=lambda:hello(120,
button620))
    button71 =
tk.Button(frame,height=1,width=2,command=lambda:hello(121,
button71))
    button72 =
tk.Button(frame,height=1,width=2,command=lambda:hello(122,
button72))
    button73 =
tk.Button(frame,height=1,width=2,command=lambda:hello(123,
button73))
    button74 =
tk.Button(frame,height=1,width=2,command=lambda:hello(124,
button74))
    button75 =
tk.Button(frame,height=1,width=2,command=lambda:hello(125,
button75))
    button76 =
tk.Button(frame,height=1,width=2,command=lambda:hello(126,
button76))
    button77 =
tk.Button(frame,height=1,width=2,command=lambda:hello(127,
button77))
    button78 =
tk.Button(frame,height=1,width=2,command=lambda:hello(128,
button78))
    button79 =
tk.Button(frame,height=1,width=2,command=lambda:hello(129,
button79))
    button710 =
tk.Button(frame,height=1,width=2,command=lambda:hello(130,
button710))
    button711 =
tk.Button(frame,height=1,width=2,command=lambda:hello(131,
button711))
    button712 =
tk.Button(frame,height=1,width=2,command=lambda:hello(132,
button712))
    button713 =
tk.Button(frame,height=1,width=2,command=lambda:hello(133,
button713))
    button714 =
tk.Button(frame,height=1,width=2,command=lambda:hello(134,
button714))
    button715 =
tk.Button(frame,height=1,width=2,command=lambda:hello(135,
button715))
    button716 =
tk.Button(frame,height=1,width=2,command=lambda:hello(136,
button716))
    button717 =
tk.Button(frame,height=1,width=2,command=lambda:hello(137,
button717))
    button718 =
tk.Button(frame,height=1,width=2,command=lambda:hello(138,
button718))
    button719 =
tk.Button(frame,height=1,width=2,command=lambda:hello(139,
button719))
    button720 =
tk.Button(frame,height=1,width=2,command=lambda:hello(140,
button720))
    button81 =
tk.Button(frame,height=1,width=2,command=lambda:hello(141,
button81))
    button82 =
tk.Button(frame,height=1,width=2,command=lambda:hello(142,
button82))
    button83 =
tk.Button(frame,height=1,width=2,command=lambda:hello(143,
button83))
    button84 =
tk.Button(frame,height=1,width=2,command=lambda:hello(144,
button84))
    button85 =
tk.Button(frame,height=1,width=2,command=lambda:hello(145,
button85))
    button86 =
tk.Button(frame,height=1,width=2,command=lambda:hello(146,
button86))
    button87 =
tk.Button(frame,height=1,width=2,command=lambda:hello(147,
button87))
    button88 =
tk.Button(frame,height=1,width=2,command=lambda:hello(148,
button88))
    button89 =
tk.Button(frame,height=1,width=2,command=lambda:hello(149,
button89))
    button810 =
tk.Button(frame,height=1,width=2,command=lambda:hello(150,
button810))
    button811 =
tk.Button(frame,height=1,width=2,command=lambda:hello(151,
button811))
    button812 =
tk.Button(frame,height=1,width=2,command=lambda:hello(152,
button812))
    button813 =
tk.Button(frame,height=1,width=2,command=lambda:hello(153,
button813))
    button814 =
tk.Button(frame,height=1,width=2,command=lambda:hello(154,
button814))
    button815 =
tk.Button(frame,height=1,width=2,command=lambda:hello(155,
button815))
    button816 =
tk.Button(frame,height=1,width=2,command=lambda:hello(156,
button816))
    button817 =
tk.Button(frame,height=1,width=2,command=lambda:hello(157,
button817))
    button818 =
tk.Button(frame,height=1,width=2,command=lambda:hello(158,
button818))
    button819 =
tk.Button(frame,height=1,width=2,command=lambda:hello(159,
button819))
    button820 =
tk.Button(frame,height=1,width=2,command=lambda:hello(160,
button820))
    button91 =
tk.Button(frame,height=1,width=2,command=lambda:hello(161,
button91))
```

```
    button92 =
tk.Button(frame,height=1,width=2,command=lambda:hello(162,
button92))
    button93 =
tk.Button(frame,height=1,width=2,command=lambda:hello(163,
button93))
    button94 =
tk.Button(frame,height=1,width=2,command=lambda:hello(164,
button94))
    button95 =
tk.Button(frame,height=1,width=2,command=lambda:hello(165,
button95))
    button96 =
tk.Button(frame,height=1,width=2,command=lambda:hello(166,
button96))
    button97 =
tk.Button(frame,height=1,width=2,command=lambda:hello(167,
button97))
    button98 =
tk.Button(frame,height=1,width=2,command=lambda:hello(168,
button98))
    button99 =
tk.Button(frame,height=1,width=2,command=lambda:hello(169,
button99))
    button910 =
tk.Button(frame,height=1,width=2,command=lambda:hello(170,
button910))
    button911 =
tk.Button(frame,height=1,width=2,command=lambda:hello(171,
button911))
    button912 =
tk.Button(frame,height=1,width=2,command=lambda:hello(172,
button912))
    button913 =
tk.Button(frame,height=1,width=2,command=lambda:hello(173,
button913))
    button914 =
tk.Button(frame,height=1,width=2,command=lambda:hello(174,
button914))
    button915 =
tk.Button(frame,height=1,width=2,command=lambda:hello(175,
button915))
    button916 =
tk.Button(frame,height=1,width=2,command=lambda:hello(176,
button916))
    button917 =
tk.Button(frame,height=1,width=2,command=lambda:hello(177,
button917))
    button918 =
tk.Button(frame,height=1,width=2,command=lambda:hello(178,
button918))
    button919 =
tk.Button(frame,height=1,width=2,command=lambda:hello(179,
button919))
    button920 =
tk.Button(frame,height=1,width=2,command=lambda:hello(180,
button920))
    button101 =
tk.Button(frame,height=1,width=2,command=lambda:hello(181,
button101))
    button102 =
tk.Button(frame,height=1,width=2,command=lambda:hello(182,
button102))
    button103 =
tk.Button(frame,height=1,width=2,command=lambda:hello(183,
button103))
    button104 =
tk.Button(frame,height=1,width=2,command=lambda:hello(184,
button104))
    button105 =
tk.Button(frame,height=1,width=2,command=lambda:hello(185,
button105))
    button106 =
tk.Button(frame,height=1,width=2,command=lambda:hello(186,
button106))
    button107 =
tk.Button(frame,height=1,width=2,command=lambda:hello(187,
button107))
    button108 =
tk.Button(frame,height=1,width=2,command=lambda:hello(188,
button108))
    button109 =
tk.Button(frame,height=1,width=2,command=lambda:hello(189,
button109))
    button1010 =
tk.Button(frame,height=1,width=2,command=lambda:hello(190,
button1010))
    button1011 =
tk.Button(frame,height=1,width=2,command=lambda:hello(191,
button1011))
    button1012 =
tk.Button(frame,height=1,width=2,command=lambda:hello(192,
button1012))
    button1013 =
tk.Button(frame,height=1,width=2,command=lambda:hello(193,
button1013))
    button1014 =
tk.Button(frame,height=1,width=2,command=lambda:hello(194,
button1014))
    button1015 =
tk.Button(frame,height=1,width=2,command=lambda:hello(195,
button1015))
    button1016 =
tk.Button(frame,height=1,width=2,command=lambda:hello(196,
button1016))
    button1017 =
tk.Button(frame,height=1,width=2,command=lambda:hello(197,
button1017))
    button1018 =
tk.Button(frame,height=1,width=2,command=lambda:hello(198,
button1018))
    button1019 =
tk.Button(frame,height=1,width=2,command=lambda:hello(199,
button1019))
    button1020 =
tk.Button(frame,height=1,width=2,command=lambda:hello(200,
button1020))
    button111 =
tk.Button(frame,height=1,width=2,command=lambda:hello(201,
button111))
    button112 =
tk.Button(frame,height=1,width=2,command=lambda:hello(202,
button112))
    button113 =
tk.Button(frame,height=1,width=2,command=lambda:hello(203,
button113))
    button114 =
tk.Button(frame,height=1,width=2,command=lambda:hello(204,
button114))
    button115 =
tk.Button(frame,height=1,width=2,command=lambda:hello(205,
button115))
    button116 =
tk.Button(frame,height=1,width=2,command=lambda:hello(206,
button116))
    button117 =
tk.Button(frame,height=1,width=2,command=lambda:hello(207,
button117))
    button118 =
tk.Button(frame,height=1,width=2,command=lambda:hello(208,
button118))
    button119 =
tk.Button(frame,height=1,width=2,command=lambda:hello(209,
button119))
    button1110 =
tk.Button(frame,height=1,width=2,command=lambda:hello(210,
button1110))
    button1111 =
tk.Button(frame,height=1,width=2,command=lambda:hello(211,
button1111))
    button1112 =
tk.Button(frame,height=1,width=2,command=lambda:hello(212,
button1112))
    button1113 =
tk.Button(frame,height=1,width=2,command=lambda:hello(213,
button1113))
```

```
    button1114 =
tk.Button(frame,height=1,width=2,command=lambda:hello(214,
button1114))
    button1115 =
tk.Button(frame,height=1,width=2,command=lambda:hello(215,
button1115))
    button1116 =
tk.Button(frame,height=1,width=2,command=lambda:hello(216,
button1116))
    button1117 =
tk.Button(frame,height=1,width=2,command=lambda:hello(217,
button1117))
    button1118 =
tk.Button(frame,height=1,width=2,command=lambda:hello(218,
button1118))
    button1119 =
tk.Button(frame,height=1,width=2,command=lambda:hello(219,
button1119))
    button1120 =
tk.Button(frame,height=1,width=2,command=lambda:hello(220,
button1120))
    button121 =
tk.Button(frame,height=1,width=2,command=lambda:hello(221,
button121))
    button122 =
tk.Button(frame,height=1,width=2,command=lambda:hello(222,
button122))
    button123 =
tk.Button(frame,height=1,width=2,command=lambda:hello(223,
button123))
    button124 =
tk.Button(frame,height=1,width=2,command=lambda:hello(224,
button124))
    button125 =
tk.Button(frame,height=1,width=2,command=lambda:hello(225,
button125))
    button126 =
tk.Button(frame,height=1,width=2,command=lambda:hello(226,
button126))
    button127 =
tk.Button(frame,height=1,width=2,command=lambda:hello(227,
button127))
    button128 =
tk.Button(frame,height=1,width=2,command=lambda:hello(228,
button128))
    button129 =
tk.Button(frame,height=1,width=2,command=lambda:hello(229,
button129))
    button1210 =
tk.Button(frame,height=1,width=2,command=lambda:hello(230,
button1210))
    button1211 =
tk.Button(frame,height=1,width=2,command=lambda:hello(231,
button1211))
    button1212 =
tk.Button(frame,height=1,width=2,command=lambda:hello(232,
button1212))
    button1213 =
tk.Button(frame,height=1,width=2,command=lambda:hello(233,
button1213))
    button1214 =
tk.Button(frame,height=1,width=2,command=lambda:hello(234,
button1214))
    button1215 =
tk.Button(frame,height=1,width=2,command=lambda:hello(235,
button1215))
    button1216 =
tk.Button(frame,height=1,width=2,command=lambda:hello(236,
button1216))
    button1217 =
tk.Button(frame,height=1,width=2,command=lambda:hello(237,
button1217))
    button1218 =
tk.Button(frame,height=1,width=2,command=lambda:hello(238,
button1218))
    button1219 =
tk.Button(frame,height=1,width=2,command=lambda:hello(239,
button1219))
    button1220 =
tk.Button(frame,height=1,width=2,command=lambda:hello(240,
button1220))
    button131 =
tk.Button(frame,height=1,width=2,command=lambda:hello(241,
button131))
    button132 =
tk.Button(frame,height=1,width=2,command=lambda:hello(242,
button132))
    button133 =
tk.Button(frame,height=1,width=2,command=lambda:hello(243,
button133))
    button134 =
tk.Button(frame,height=1,width=2,command=lambda:hello(244,
button134))
    button135 =
tk.Button(frame,height=1,width=2,command=lambda:hello(245,
button135))
    button136 =
tk.Button(frame,height=1,width=2,command=lambda:hello(246,
button136))
    button137 =
tk.Button(frame,height=1,width=2,command=lambda:hello(247,
button137))
    button138 =
tk.Button(frame,height=1,width=2,command=lambda:hello(248,
button138))
    button139 =
tk.Button(frame,height=1,width=2,command=lambda:hello(249,
button139))
    button1310 =
tk.Button(frame,height=1,width=2,command=lambda:hello(250,
button1310))
    button1311 =
tk.Button(frame,height=1,width=2,command=lambda:hello(251,
button1311))
    button1312 =
tk.Button(frame,height=1,width=2,command=lambda:hello(252,
button1312))
    button1313 =
tk.Button(frame,height=1,width=2,command=lambda:hello(253,
button1313))
    button1314 =
tk.Button(frame,height=1,width=2,command=lambda:hello(254,
button1314))
    button1315 =
tk.Button(frame,height=1,width=2,command=lambda:hello(255,
button1315))
    button1316 =
tk.Button(frame,height=1,width=2,command=lambda:hello(256,
button1316))
    button1317 =
tk.Button(frame,height=1,width=2,command=lambda:hello(257,
button1317))
    button1318 =
tk.Button(frame,height=1,width=2,command=lambda:hello(258,
button1318))
    button1319 =
tk.Button(frame,height=1,width=2,command=lambda:hello(259,
button1319))
    button1320 =
tk.Button(frame,height=1,width=2,command=lambda:hello(260,
button1320))
    button141 =
tk.Button(frame,height=1,width=2,command=lambda:hello(261,
button141))
    button142 =
tk.Button(frame,height=1,width=2,command=lambda:hello(262,
button142))
    button143 =
tk.Button(frame,height=1,width=2,command=lambda:hello(263,
button143))
    button144 =
tk.Button(frame,height=1,width=2,command=lambda:hello(264,
button144))
    button145 =
tk.Button(frame,height=1,width=2,command=lambda:hello(265,
button145))
```

```
    button146 =
tk.Button(frame,height=1,width=2,command=lambda:hello(266,
button146))
    button147 =
tk.Button(frame,height=1,width=2,command=lambda:hello(267,
button147))
    button148 =
tk.Button(frame,height=1,width=2,command=lambda:hello(268,
button148))
    button149 =
tk.Button(frame,height=1,width=2,command=lambda:hello(269,
button149))
    button1410 =
tk.Button(frame,height=1,width=2,command=lambda:hello(270,
button1410))
    button1411 =
tk.Button(frame,height=1,width=2,command=lambda:hello(271,
button1411))
    button1412 =
tk.Button(frame,height=1,width=2,command=lambda:hello(272,
button1412))
    button1413 =
tk.Button(frame,height=1,width=2,command=lambda:hello(273,
button1413))
    button1414 =
tk.Button(frame,height=1,width=2,command=lambda:hello(274,
button1414))
    button1415 =
tk.Button(frame,height=1,width=2,command=lambda:hello(275,
button1415))
    button1416 =
tk.Button(frame,height=1,width=2,command=lambda:hello(276,
button1416))
    button1417 =
tk.Button(frame,height=1,width=2,command=lambda:hello(277,
button1417))
    button1418 =
tk.Button(frame,height=1,width=2,command=lambda:hello(278,
button1418))
    button1419 =
tk.Button(frame,height=1,width=2,command=lambda:hello(279,
button1419))
    button1420 =
tk.Button(frame,height=1,width=2,command=lambda:hello(280,
button1420))
    button151 =
tk.Button(frame,height=1,width=2,command=lambda:hello(281,
button151))
    button152 =
tk.Button(frame,height=1,width=2,command=lambda:hello(282,
button152))
    button153 =
tk.Button(frame,height=1,width=2,command=lambda:hello(283,
button153))
    button154 =
tk.Button(frame,height=1,width=2,command=lambda:hello(284,
button154))
    button155 =
tk.Button(frame,height=1,width=2,command=lambda:hello(285,
button155))
    button156 =
tk.Button(frame,height=1,width=2,command=lambda:hello(286,
button156))
    button157 =
tk.Button(frame,height=1,width=2,command=lambda:hello(287,
button157))
    button158 =
tk.Button(frame,height=1,width=2,command=lambda:hello(288,
button158))
    button159 =
tk.Button(frame,height=1,width=2,command=lambda:hello(289,
button159))
    button1510 =
tk.Button(frame,height=1,width=2,command=lambda:hello(290,
button1510))
    button1511 =
tk.Button(frame,height=1,width=2,command=lambda:hello(291,
button1511))
    button1512 =
tk.Button(frame,height=1,width=2,command=lambda:hello(292,
button1512))
    button1513 =
tk.Button(frame,height=1,width=2,command=lambda:hello(293,
button1513))
    button1514 =
tk.Button(frame,height=1,width=2,command=lambda:hello(294,
button1514))
    button1515 =
tk.Button(frame,height=1,width=2,command=lambda:hello(295,
button1515))
    button1516 =
tk.Button(frame,height=1,width=2,command=lambda:hello(296,
button1516))
    button1517 =
tk.Button(frame,height=1,width=2,command=lambda:hello(297,
button1517))
    button1518 =
tk.Button(frame,height=1,width=2,command=lambda:hello(298,
button1518))
    button1519 =
tk.Button(frame,height=1,width=2,command=lambda:hello(299,
button1519))
    button1520 =
tk.Button(frame,height=1,width=2,command=lambda:hello(300,
button1520))
    button161 =
tk.Button(frame,height=1,width=2,command=lambda:hello(301,
button161))
    button162 =
tk.Button(frame,height=1,width=2,command=lambda:hello(302,
button162))
    button163 =
tk.Button(frame,height=1,width=2,command=lambda:hello(303,
button163))
    button164 =
tk.Button(frame,height=1,width=2,command=lambda:hello(304,
button164))
    button165 =
tk.Button(frame,height=1,width=2,command=lambda:hello(305,
button165))
    button166 =
tk.Button(frame,height=1,width=2,command=lambda:hello(306,
button166))
    button167 =
tk.Button(frame,height=1,width=2,command=lambda:hello(307,
button167))
    button168 =
tk.Button(frame,height=1,width=2,command=lambda:hello(308,
button168))
    button169 =
tk.Button(frame,height=1,width=2,command=lambda:hello(309,
button169))
    button1610 =
tk.Button(frame,height=1,width=2,command=lambda:hello(310,
button1610))
    button1611 =
tk.Button(frame,height=1,width=2,command=lambda:hello(311,
button1611))
    button1612 =
tk.Button(frame,height=1,width=2,command=lambda:hello(312,
button1612))
    button1613 =
tk.Button(frame,height=1,width=2,command=lambda:hello(313,
button1613))
    button1614 =
tk.Button(frame,height=1,width=2,command=lambda:hello(314,
button1614))
    button1615 =
tk.Button(frame,height=1,width=2,command=lambda:hello(315,
button1615))
    button1616 =
tk.Button(frame,height=1,width=2,command=lambda:hello(316,
button1616))
    button1617 =
tk.Button(frame,height=1,width=2,command=lambda:hello(317,
button1617))
```

```
    button1618 =
tk.Button(frame,height=1,width=2,command=lambda:hello(318,
button1618))
    button1619 =
tk.Button(frame,height=1,width=2,command=lambda:hello(319,
button1619))
    button1620 =
tk.Button(frame,height=1,width=2,command=lambda:hello(320,
button1620))
    button171 =
tk.Button(frame,height=1,width=2,command=lambda:hello(321,
button171))
    button172 =
tk.Button(frame,height=1,width=2,command=lambda:hello(322,
button172))
    button173 =
tk.Button(frame,height=1,width=2,command=lambda:hello(323,
button173))
    button174 =
tk.Button(frame,height=1,width=2,command=lambda:hello(324,
button174))
    button175 =
tk.Button(frame,height=1,width=2,command=lambda:hello(325,
button175))
    button176 =
tk.Button(frame,height=1,width=2,command=lambda:hello(326,
button176))
    button177 =
tk.Button(frame,height=1,width=2,command=lambda:hello(327,
button177))
    button178 =
tk.Button(frame,height=1,width=2,command=lambda:hello(328,
button178))
    button179 =
tk.Button(frame,height=1,width=2,command=lambda:hello(329,
button179))
    button1710 =
tk.Button(frame,height=1,width=2,command=lambda:hello(330,
button1710))
    button1711 =
tk.Button(frame,height=1,width=2,command=lambda:hello(331,
button1711))
    button1712 =
tk.Button(frame,height=1,width=2,command=lambda:hello(332,
button1712))
    button1713 =
tk.Button(frame,height=1,width=2,command=lambda:hello(333,
button1713))
    button1714 =
tk.Button(frame,height=1,width=2,command=lambda:hello(334,
button1714))
    button1715 =
tk.Button(frame,height=1,width=2,command=lambda:hello(335,
button1715))
    button1716 =
tk.Button(frame,height=1,width=2,command=lambda:hello(336,
button1716))
    button1717 =
tk.Button(frame,height=1,width=2,command=lambda:hello(337,
button1717))
    button1718 =
tk.Button(frame,height=1,width=2,command=lambda:hello(338,
button1718))
    button1719 =
tk.Button(frame,height=1,width=2,command=lambda:hello(339,
button1719))
    button1720 =
tk.Button(frame,height=1,width=2,command=lambda:hello(340,
button1720))
    button181 =
tk.Button(frame,height=1,width=2,command=lambda:hello(341,
button181))
    button182 =
tk.Button(frame,height=1,width=2,command=lambda:hello(342,
button182))
    button183 =
tk.Button(frame,height=1,width=2,command=lambda:hello(343,
button183))
    button184 =
tk.Button(frame,height=1,width=2,command=lambda:hello(344,
button184))
    button185 =
tk.Button(frame,height=1,width=2,command=lambda:hello(345,
button185))
    button186 =
tk.Button(frame,height=1,width=2,command=lambda:hello(346,
button186))
    button187 =
tk.Button(frame,height=1,width=2,command=lambda:hello(347,
button187))
    button188 =
tk.Button(frame,height=1,width=2,command=lambda:hello(348,
button188))
    button189 =
tk.Button(frame,height=1,width=2,command=lambda:hello(349,
button189))
    button1810 =
tk.Button(frame,height=1,width=2,command=lambda:hello(350,
button1810))
    button1811 =
tk.Button(frame,height=1,width=2,command=lambda:hello(351,
button1811))
    button1812 =
tk.Button(frame,height=1,width=2,command=lambda:hello(352,
button1812))
    button1813 =
tk.Button(frame,height=1,width=2,command=lambda:hello(353,
button1813))
    button1814 =
tk.Button(frame,height=1,width=2,command=lambda:hello(354,
button1814))
    button1815 =
tk.Button(frame,height=1,width=2,command=lambda:hello(355,
button1815))
    button1816 =
tk.Button(frame,height=1,width=2,command=lambda:hello(356,
button1816))
    button1817 =
tk.Button(frame,height=1,width=2,command=lambda:hello(357,
button1817))
    button1818 =
tk.Button(frame,height=1,width=2,command=lambda:hello(358,
button1818))
    button1819 =
tk.Button(frame,height=1,width=2,command=lambda:hello(359,
button1819))
    button1820 =
tk.Button(frame,height=1,width=2,command=lambda:hello(360,
button1820))
    button191 =
tk.Button(frame,height=1,width=2,command=lambda:hello(361,
button191))
    button192 =
tk.Button(frame,height=1,width=2,command=lambda:hello(362,
button192))
    button193 =
tk.Button(frame,height=1,width=2,command=lambda:hello(363,
button193))
    button194 =
tk.Button(frame,height=1,width=2,command=lambda:hello(364,
button194))
    button195 =
tk.Button(frame,height=1,width=2,command=lambda:hello(365,
button195))
    button196 =
tk.Button(frame,height=1,width=2,command=lambda:hello(366,
button196))
    button197 =
tk.Button(frame,height=1,width=2,command=lambda:hello(367,
button197))
    button198 =
tk.Button(frame,height=1,width=2,command=lambda:hello(368,
button198))
    button199 =
tk.Button(frame,height=1,width=2,command=lambda:hello(369,
button199))
```

```
    button1910 =
tk.Button(frame,height=1,width=2,command=lambda:hello(370,
button1910))
    button1911 =
tk.Button(frame,height=1,width=2,command=lambda:hello(371,
button1911))
    button1912 =
tk.Button(frame,height=1,width=2,command=lambda:hello(372,
button1912))
    button1913 =
tk.Button(frame,height=1,width=2,command=lambda:hello(373,
button1913))
    button1914 =
tk.Button(frame,height=1,width=2,command=lambda:hello(374,
button1914))
    button1915 =
tk.Button(frame,height=1,width=2,command=lambda:hello(375,
button1915))
    button1916 =
tk.Button(frame,height=1,width=2,command=lambda:hello(376,
button1916))
    button1917 =
tk.Button(frame,height=1,width=2,command=lambda:hello(377,
button1917))
    button1918 =
tk.Button(frame,height=1,width=2,command=lambda:hello(378,
button1918))
    button1919 =
tk.Button(frame,height=1,width=2,command=lambda:hello(379,
button1919))
    button1920 =
tk.Button(frame,height=1,width=2,command=lambda:hello(380,
button1920))
    button201 =
tk.Button(frame,height=1,width=2,command=lambda:hello(381,
button201))
    button202 =
tk.Button(frame,height=1,width=2,command=lambda:hello(382,
button202))
    button203 =
tk.Button(frame,height=1,width=2,command=lambda:hello(383,
button203))
    button204 =
tk.Button(frame,height=1,width=2,command=lambda:hello(384,
button204))
    button205 =
tk.Button(frame,height=1,width=2,command=lambda:hello(385,
button205))
    button206 =
tk.Button(frame,height=1,width=2,command=lambda:hello(386,
button206))
    button207 =
tk.Button(frame,height=1,width=2,command=lambda:hello(387,
button207))
    button208 =
tk.Button(frame,height=1,width=2,command=lambda:hello(388,
button208))
    button209 =
tk.Button(frame,height=1,width=2,command=lambda:hello(389,
button209))
    button2010 =
tk.Button(frame,height=1,width=2,command=lambda:hello(390,
button2010))
    button2011 =
tk.Button(frame,height=1,width=2,command=lambda:hello(391,
button2011))
    button2012 =
tk.Button(frame,height=1,width=2,command=lambda:hello(392,
button2012))
    button2013 =
tk.Button(frame,height=1,width=2,command=lambda:hello(393,
button2013))
    button2014 =
tk.Button(frame,height=1,width=2,command=lambda:hello(394,
button2014))
    button2015 =
tk.Button(frame,height=1,width=2,command=lambda:hello(395,
button2015))
    button2016 =
tk.Button(frame,height=1,width=2,command=lambda:hello(396,
button2016))
    button2017 =
tk.Button(frame,height=1,width=2,command=lambda:hello(397,
button2017))
    button2018 =
tk.Button(frame,height=1,width=2,command=lambda:hello(398,
button2018))
    button2019 =
tk.Button(frame,height=1,width=2,command=lambda:hello(399,
button2019))
    button2020 =
tk.Button(frame,height=1,width=2,command=lambda:hello(400,
button2020))
    button11.grid(row=1,column=1)
    button12.grid(row=1,column=2)
    button13.grid(row=1,column=3)
    button14.grid(row=1,column=4)
    button15.grid(row=1,column=5)
    button16.grid(row=1,column=6)
    button17.grid(row=1,column=7)
    button18.grid(row=1,column=8)
    button19.grid(row=1,column=9)
    button110.grid(row=1,column=10)
    button0111.grid(row=1,column=11)
    button0112.grid(row=1,column=12)
    button0113.grid(row=1,column=13)
    button0114.grid(row=1,column=14)
    button0115.grid(row=1,column=15)
    button0116.grid(row=1,column=16)
    button0117.grid(row=1,column=17)
    button0118.grid(row=1,column=18)
    button0119.grid(row=1,column=19)
    button120.grid(row=1,column=20)
    button21.grid(row=2,column=1)
    button22.grid(row=2,column=2)
    button23.grid(row=2,column=3)
    button24.grid(row=2,column=4)
    button25.grid(row=2,column=5)
    button26.grid(row=2,column=6)
    button27.grid(row=2,column=7)
    button28.grid(row=2,column=8)
    button29.grid(row=2,column=9)
    button210.grid(row=2,column=10)
    button211.grid(row=2,column=11)
    button212.grid(row=2,column=12)
    button213.grid(row=2,column=13)
    button214.grid(row=2,column=14)
    button215.grid(row=2,column=15)
    button216.grid(row=2,column=16)
    button217.grid(row=2,column=17)
    button218.grid(row=2,column=18)
    button219.grid(row=2,column=19)
    button220.grid(row=2,column=20)
    button31.grid(row=3,column=1)
    button32.grid(row=3,column=2)
    button33.grid(row=3,column=3)
    button34.grid(row=3,column=4)
    button35.grid(row=3,column=5)
    button36.grid(row=3,column=6)
    button37.grid(row=3,column=7)
    button38.grid(row=3,column=8)
    button39.grid(row=3,column=9)
    button310.grid(row=3,column=10)
    button311.grid(row=3,column=11)
    button312.grid(row=3,column=12)
    button313.grid(row=3,column=13)
    button314.grid(row=3,column=14)
    button315.grid(row=3,column=15)
    button316.grid(row=3,column=16)
    button317.grid(row=3,column=17)
    button318.grid(row=3,column=18)
    button319.grid(row=3,column=19)
    button320.grid(row=3,column=20)
    button41.grid(row=4,column=1)
    button42.grid(row=4,column=2)
    button43.grid(row=4,column=3)
    button44.grid(row=4,column=4)
```

```
button45.grid(row=4,column=5)
button46.grid(row=4,column=6)
button47.grid(row=4,column=7)
button48.grid(row=4,column=8)
button49.grid(row=4,column=9)
button410.grid(row=4,column=10)
button411.grid(row=4,column=11)
button412.grid(row=4,column=12)
button413.grid(row=4,column=13)
button414.grid(row=4,column=14)
button415.grid(row=4,column=15)
button416.grid(row=4,column=16)
button417.grid(row=4,column=17)
button418.grid(row=4,column=18)
button419.grid(row=4,column=19)
button420.grid(row=4,column=20)
button51.grid(row=5,column=1)
button52.grid(row=5,column=2)
button53.grid(row=5,column=3)
button54.grid(row=5,column=4)
button55.grid(row=5,column=5)
button56.grid(row=5,column=6)
button57.grid(row=5,column=7)
button58.grid(row=5,column=8)
button59.grid(row=5,column=9)
button510.grid(row=5,column=10)
button511.grid(row=5,column=11)
button512.grid(row=5,column=12)
button513.grid(row=5,column=13)
button514.grid(row=5,column=14)
button515.grid(row=5,column=15)
button516.grid(row=5,column=16)
button517.grid(row=5,column=17)
button518.grid(row=5,column=18)
button519.grid(row=5,column=19)
button520.grid(row=5,column=20)
button61.grid(row=6,column=1)
button62.grid(row=6,column=2)
button63.grid(row=6,column=3)
button64.grid(row=6,column=4)
button65.grid(row=6,column=5)
button66.grid(row=6,column=6)
button67.grid(row=6,column=7)
button68.grid(row=6,column=8)
button69.grid(row=6,column=9)
button610.grid(row=6,column=10)
button611.grid(row=6,column=11)
button612.grid(row=6,column=12)
button613.grid(row=6,column=13)
button614.grid(row=6,column=14)
button615.grid(row=6,column=15)
button616.grid(row=6,column=16)
button617.grid(row=6,column=17)
button618.grid(row=6,column=18)
button619.grid(row=6,column=19)
button620.grid(row=6,column=20)
button71.grid(row=7,column=1)
button72.grid(row=7,column=2)
button73.grid(row=7,column=3)
button74.grid(row=7,column=4)
button75.grid(row=7,column=5)
button76.grid(row=7,column=6)
button77.grid(row=7,column=7)
button78.grid(row=7,column=8)
button79.grid(row=7,column=9)
button710.grid(row=7,column=10)
button711.grid(row=7,column=11)
button712.grid(row=7,column=12)
button713.grid(row=7,column=13)
button714.grid(row=7,column=14)
button715.grid(row=7,column=15)
button716.grid(row=7,column=16)
button717.grid(row=7,column=17)
button718.grid(row=7,column=18)
button719.grid(row=7,column=19)
button720.grid(row=7,column=20)
button81.grid(row=8,column=1)
button82.grid(row=8,column=2)
button83.grid(row=8,column=3)
```

```
button84.grid(row=8,column=4)
button85.grid(row=8,column=5)
button86.grid(row=8,column=6)
button87.grid(row=8,column=7)
button88.grid(row=8,column=8)
button89.grid(row=8,column=9)
button810.grid(row=8,column=10)
button811.grid(row=8,column=11)
button812.grid(row=8,column=12)
button813.grid(row=8,column=13)
button814.grid(row=8,column=14)
button815.grid(row=8,column=15)
button816.grid(row=8,column=16)
button817.grid(row=8,column=17)
button818.grid(row=8,column=18)
button819.grid(row=8,column=19)
button820.grid(row=8,column=20)
button91.grid(row=9,column=1)
button92.grid(row=9,column=2)
button93.grid(row=9,column=3)
button94.grid(row=9,column=4)
button95.grid(row=9,column=5)
button96.grid(row=9,column=6)
button97.grid(row=9,column=7)
button98.grid(row=9,column=8)
button99.grid(row=9,column=9)
button910.grid(row=9,column=10)
button911.grid(row=9,column=11)
button912.grid(row=9,column=12)
button913.grid(row=9,column=13)
button914.grid(row=9,column=14)
button915.grid(row=9,column=15)
button916.grid(row=9,column=16)
button917.grid(row=9,column=17)
button918.grid(row=9,column=18)
button919.grid(row=9,column=19)
button920.grid(row=9,column=20)
button101.grid(row=10,column=1)
button102.grid(row=10,column=2)
button103.grid(row=10,column=3)
button104.grid(row=10,column=4)
button105.grid(row=10,column=5)
button106.grid(row=10,column=6)
button107.grid(row=10,column=7)
button108.grid(row=10,column=8)
button109.grid(row=10,column=9)
button1010.grid(row=10,column=10)
button1011.grid(row=10,column=11)
button1012.grid(row=10,column=12)
button1013.grid(row=10,column=13)
button1014.grid(row=10,column=14)
button1015.grid(row=10,column=15)
button1016.grid(row=10,column=16)
button1017.grid(row=10,column=17)
button1018.grid(row=10,column=18)
button1019.grid(row=10,column=19)
button1020.grid(row=10,column=20)
button111.grid(row=11,column=1)
button112.grid(row=11,column=2)
button113.grid(row=11,column=3)
button114.grid(row=11,column=4)
button115.grid(row=11,column=5)
button116.grid(row=11,column=6)
button117.grid(row=11,column=7)
button118.grid(row=11,column=8)
button119.grid(row=11,column=9)
button1110.grid(row=11,column=10)
button1111.grid(row=11,column=11)
button1112.grid(row=11,column=12)
button1113.grid(row=11,column=13)
button1114.grid(row=11,column=14)
button1115.grid(row=11,column=15)
button1116.grid(row=11,column=16)
button1117.grid(row=11,column=17)
button1118.grid(row=11,column=18)
button1119.grid(row=11,column=19)
button1120.grid(row=11,column=20)
button121.grid(row=12,column=1)
button122.grid(row=12,column=2)
```

```
button123.grid(row=12,column=3)
button124.grid(row=12,column=4)
button125.grid(row=12,column=5)
button126.grid(row=12,column=6)
button127.grid(row=12,column=7)
button128.grid(row=12,column=8)
button129.grid(row=12,column=9)
button1210.grid(row=12,column=10)
button1211.grid(row=12,column=11)
button1212.grid(row=12,column=12)
button1213.grid(row=12,column=13)
button1214.grid(row=12,column=14)
button1215.grid(row=12,column=15)
button1216.grid(row=12,column=16)
button1217.grid(row=12,column=17)
button1218.grid(row=12,column=18)
button1219.grid(row=12,column=19)
button1220.grid(row=12,column=20)
button131.grid(row=13,column=1)
button132.grid(row=13,column=2)
button133.grid(row=13,column=3)
button134.grid(row=13,column=4)
button135.grid(row=13,column=5)
button136.grid(row=13,column=6)
button137.grid(row=13,column=7)
button138.grid(row=13,column=8)
button139.grid(row=13,column=9)
button1310.grid(row=13,column=10)
button1311.grid(row=13,column=11)
button1312.grid(row=13,column=12)
button1313.grid(row=13,column=13)
button1314.grid(row=13,column=14)
button1315.grid(row=13,column=15)
button1316.grid(row=13,column=16)
button1317.grid(row=13,column=17)
button1318.grid(row=13,column=18)
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button143.grid(row=14,column=3)
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button147.grid(row=14,column=7)
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button1412.grid(row=14,column=12)
button1413.grid(row=14,column=13)
button1414.grid(row=14,column=14)
button1415.grid(row=14,column=15)
button1416.grid(row=14,column=16)
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button1418.grid(row=14,column=18)
button1419.grid(row=14,column=19)
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button151.grid(row=15,column=1)
button152.grid(row=15,column=2)
button153.grid(row=15,column=3)
button154.grid(row=15,column=4)
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button156.grid(row=15,column=6)
button157.grid(row=15,column=7)
button158.grid(row=15,column=8)
button159.grid(row=15,column=9)
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button1512.grid(row=15,column=12)
button1513.grid(row=15,column=13)
button1514.grid(row=15,column=14)
button1515.grid(row=15,column=15)
button1516.grid(row=15,column=16)
button1517.grid(row=15,column=17)
button1518.grid(row=15,column=18)
button1519.grid(row=15,column=19)
button1520.grid(row=15,column=20)
button161.grid(row=16,column=1)
```

```
button162.grid(row=16,column=2)
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button164.grid(row=16,column=4)
button165.grid(row=16,column=5)
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button1610.grid(row=16,column=10)
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button1612.grid(row=16,column=12)
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button1619.grid(row=16,column=19)
button1620.grid(row=16,column=20)
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button188.grid(row=18,column=8)
button189.grid(row=18,column=9)
button1810.grid(row=18,column=10)
button1811.grid(row=18,column=11)
button1812.grid(row=18,column=12)
button1813.grid(row=18,column=13)
button1814.grid(row=18,column=14)
button1815.grid(row=18,column=15)
button1816.grid(row=18,column=16)
button1817.grid(row=18,column=17)
button1818.grid(row=18,column=18)
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button1820.grid(row=18,column=20)
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button198.grid(row=19,column=8)
button199.grid(row=19,column=9)
button1910.grid(row=19,column=10)
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button1913.grid(row=19,column=13)
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button1919.grid(row=19,column=19)
button1920.grid(row=19,column=20)
```

```
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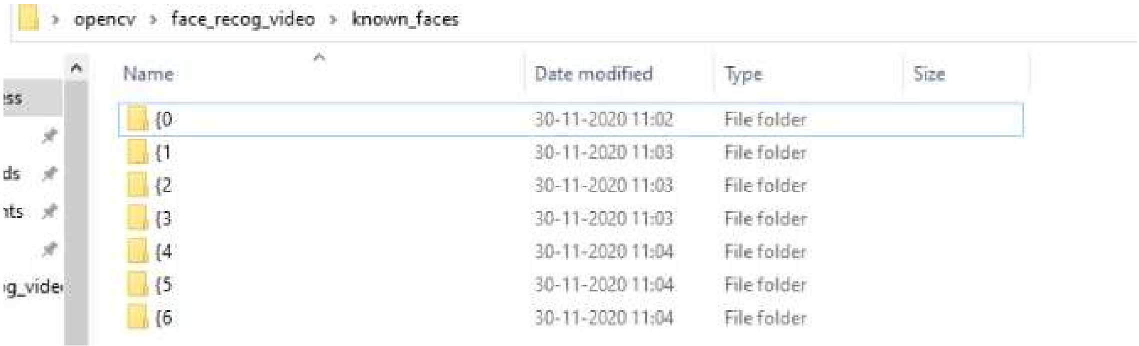
button2011.grid(row=20,column=11)
button2012.grid(row=20,column=12)
button2013.grid(row=20,column=13)
button2014.grid(row=20,column=14)
    button2015.grid(row=20,column=15)
    button2016.grid(row=20,column=16)
    button2017.grid(row=20,column=17)
    button2018.grid(row=20,column=18)
    button2019.grid(row=20,column=19)
    button2020.grid(row=20,column=20)

sub=tk.Button(frame,width=15,text='Submit',command=lambda
:submit())
    sub.grid(row=21,columnspan=8,pady=5,padx=5)
    clear=tk.Button(frame,width=15,text='Reset',command=reset)
    clear.grid(row=21,column=8,columnspan=6,pady=5,padx=5)
board()
root.mainloop()
```

3.4 IMAGE PROCESSING ALGORITHM USING PYTHON



Name	Date modified	Type	Size
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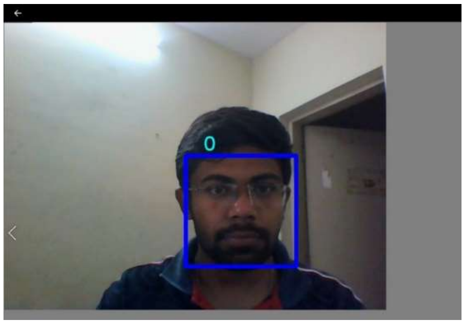
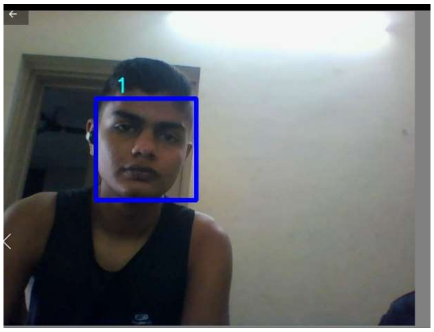
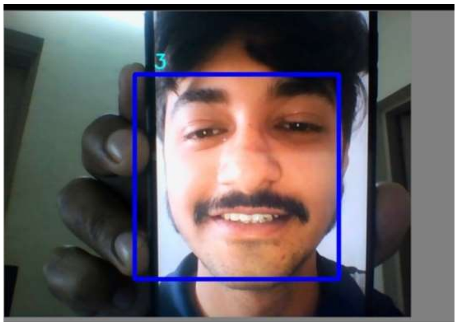
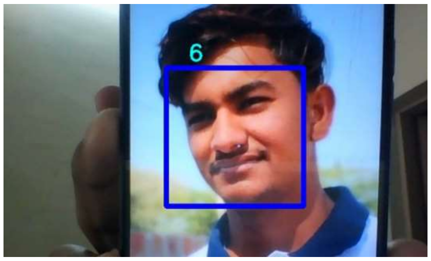
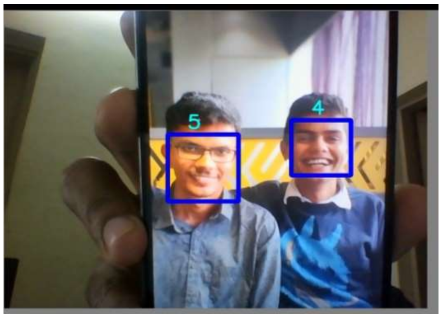
{1	30-11-2020 11:03	File folder	
{2	30-11-2020 11:03	File folder	
{3	30-11-2020 11:03	File folder	
{4	30-11-2020 11:04	File folder	
{5	30-11-2020 11:04	File folder	
{6	30-11-2020 11:04	File folder	

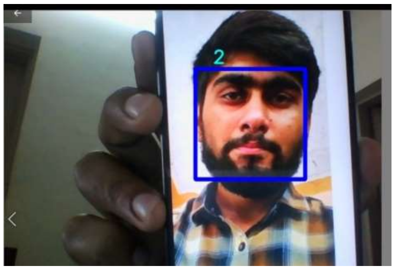






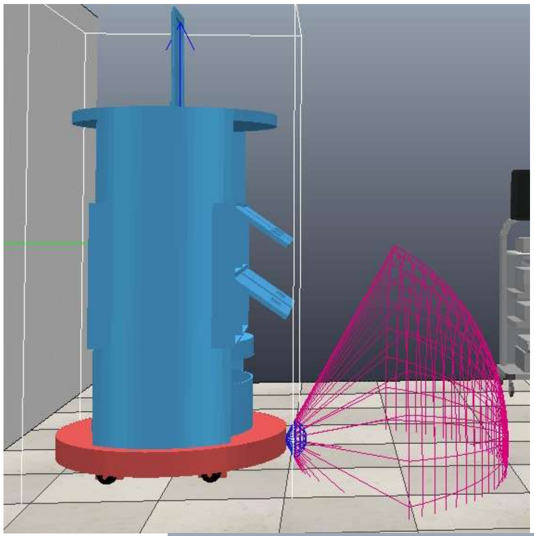


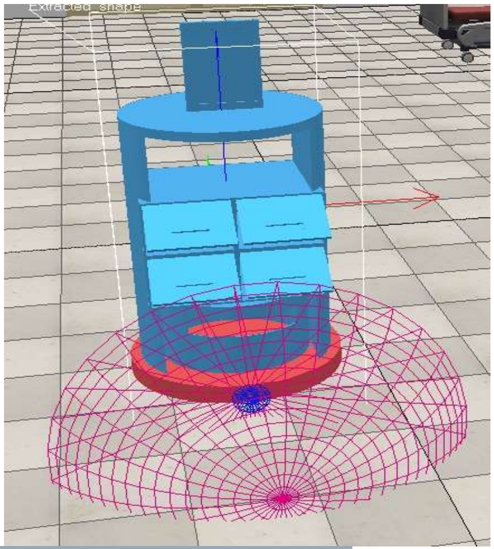


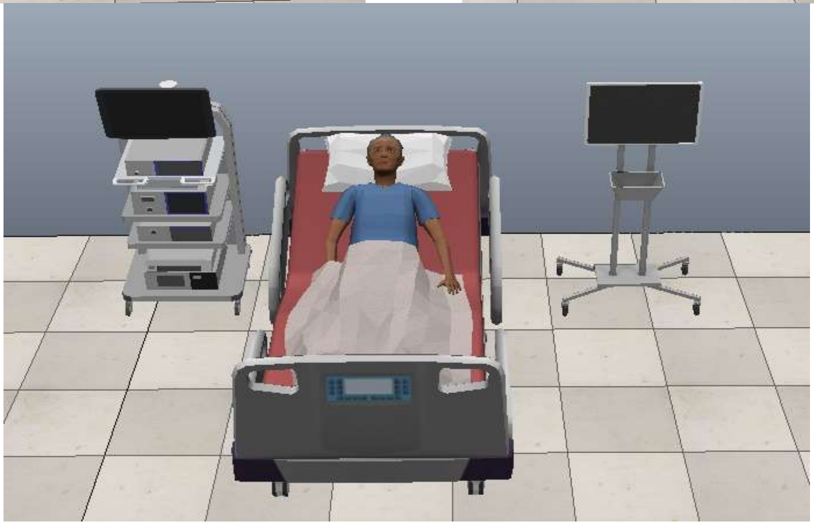


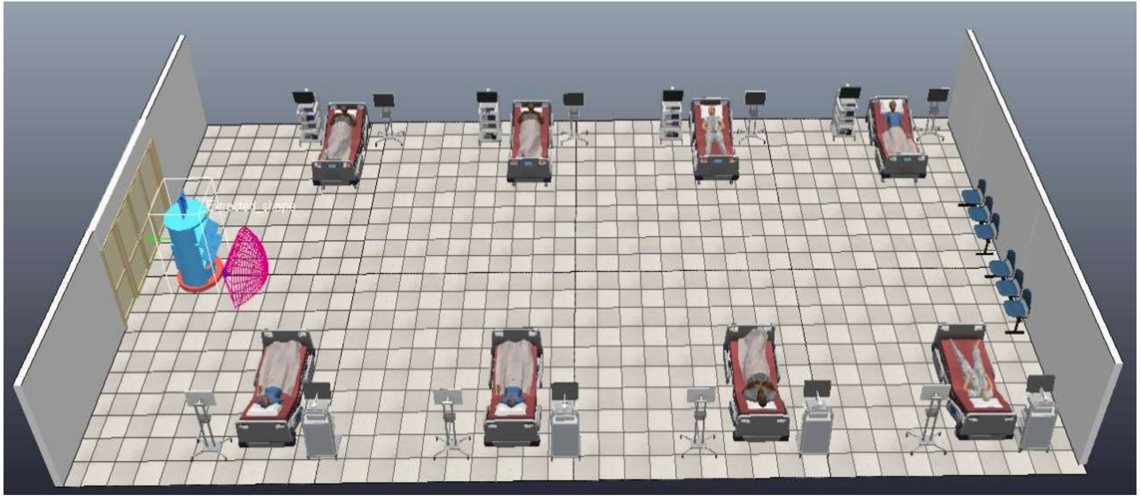
With the help of image processing, we will detect the patients face and it will form a database of the patient, for the complete treatment process. We have used *HEIR CASCADING* method for the detection of the visuals. Also, we can further modify the program and include the list of medications and the period of treatment, complications and many other things.

3.5 SIMULATION USING COPPELIA SIM (V-REP) SOFTWARE









This simulation depicts the overall movement of the robot in the given area, with the help of this we can calculate the important data like the time taken, speed and various other parameters which will be helpful while making the prototype of the project.

Script for simulation:

```
function onSpeedChange(uiHandle, id, newValue)
   speed=newValue*max_speed/100
   move(speed,turn)
end
function onTurnChange(uiHandle, id, newValue)
   turn=newValue*max_turn/100
   move(speed,turn)
end
function move(v,w)
   sim.setJointTargetVelocity(left_forward_wheel,(v-b*w)/wheel_radius)
   sim.setJointTargetVelocity(right_forward_wheel,(v+b*w)/wheel_radius)
   sim.setJointTargetVelocity(left_backward_wheel,(v-b*w)/wheel_radius)
   sim.setJointTargetVelocity(right_backward_wheel,(v+b*w)/wheel_radius)
end
function moveForward()
   sim.setJointTargetVelocity(left_forward_wheel,0.5*max_speed/wheel_radius)
   sim.setJointTargetVelocity(right_forward_wheel,0.5*max_speed/wheel_radius)
   sim.setJointTargetVelocity(left_backward_wheel,0.5*max_speed/wheel_radius)
   sim.setJointTargetVelocity(right_backward_wheel,0.5*max_speed/wheel_radius)
end
function moveBackwards()
   sim.setJointTargetVelocity(left_forward_wheel,-0.5*max_speed/wheel_radius)
   sim.setJointTargetVelocity(right_forward_wheel,-0.5*max_speed/wheel_radius)
   sim.setJointTargetVelocity(left_backward_wheel,-0.5*max_speed/wheel_radius)
   sim.setJointTargetVelocity(right_backward_wheel,-0.5*max_speed/wheel_radius)
end
function turnLeft()
   sim.setJointTargetVelocity(left_forward_wheel,-0.5*max_speed/wheel_radius)
   sim.setJointTargetVelocity(right_forward_wheel,0.5*max_speed/wheel_radius)
   sim.setJointTargetVelocity(left_backward_wheel,-0.5*max_speed/wheel_radius)
   sim.setJointTargetVelocity(right_backward_wheel,0.5*max_speed/wheel_radius)
end
function turnRight()
   sim.setJointTargetVelocity(left_forward_wheel,0.5*max_speed/wheel_radius)
   sim.setJointTargetVelocity(right_forward_wheel,-0.5*max_speed/wheel_radius)
   sim.setJointTargetVelocity(left_backward_wheel,0.5*max_speed/wheel_radius)
   sim.setJointTargetVelocity(right_backward_wheel,-0.5*max_speed/wheel_radius)
end
function stop()
   sim.setJointTargetVelocity(left_forward_wheel,0)
   sim.setJointTargetVelocity(right_forward_wheel,0)
```

```
    sim.setJointTargetVelocity(left_backward_wheel,0)
    sim.setJointTargetVelocity(right_backward_wheel,0)
end
function sysCall_init()
    -- do some initialization here
    left_forward_wheel=sim.getObjectHandle('Revolute_joint0')
    right_forward_wheel=sim.getObjectHandle('Revolute_joint2')
    left_backward_wheel=sim.getObjectHandle('Revolute_joint')
    right_backward_wheel=sim.getObjectHandle('Revolute_joint1')
    wheel_radius=0.04069
    max_speed=0.25
    max_turn=0.09
    speed=0
    turn=0
    b=0.0565
    ui=simUI.create('<ui enabled="true" modal="false" title="MEDBOT" closeable="true"
layout="vbox" placement="relative" position="20,20">' ..
    '<label enabled="true" text="Linear Speed"></label>' ..
    '<hslider enabled="true" minimum="-100" maximum="100" on-
change="onSpeedChange"></hslider>' ..
    '<label enabled="true" text="Angular Speed"></label>' ..
    '<hslider enabled="true" minimum="-100" maximum="100" on-
change="onTurnChange"></hslider>' ..
    '<button enabled="true" text="Forward" on-click="moveForward"></button>' ..
    '<button enabled="true" text="Backwards" on-click="moveBackwards"></button>' ..
    '<button enabled="true" text="Left" on-click="turnLeft"></button>' ..
    '<button enabled="true" text="Right" on-click="turnRight"></button>' ..
    '<button enabled="true" text="Stop" on-click="stop"></button>' ..
    '</ui>')
end
```

CALCULATIONS

BOT DIMENSIONS:

- Vertical height of bot: 1.1 m
- Maximum Diameter: 0.6 m
- Compartment Diameters: 225mm x 280mm
- Dustbin Diameter: 0.4m

SIMULATION CALCULATIONS:

- Area of the room: 150 m^2
- Time Required to move from one patient to other: **1min 4sec (As of Software)**
- Turn Time: **6 sec**
- Tire Radius: 40.96 mm

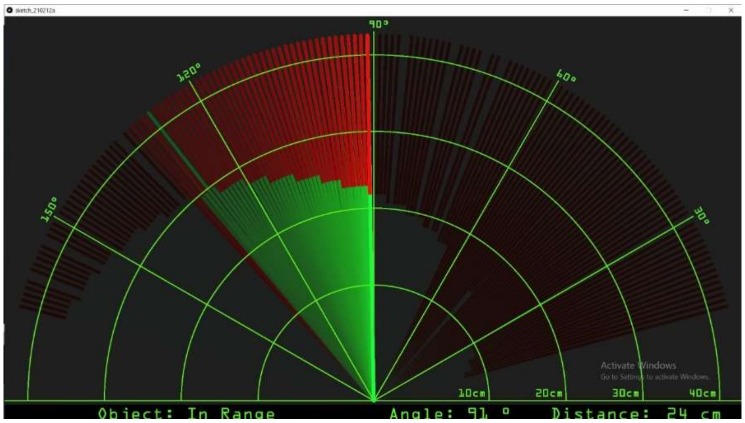
3.5 HARDWARE REQUIREMENTS

3.5.1 LIST OF COMPONENTS REQUIRED (TENTATIVE)

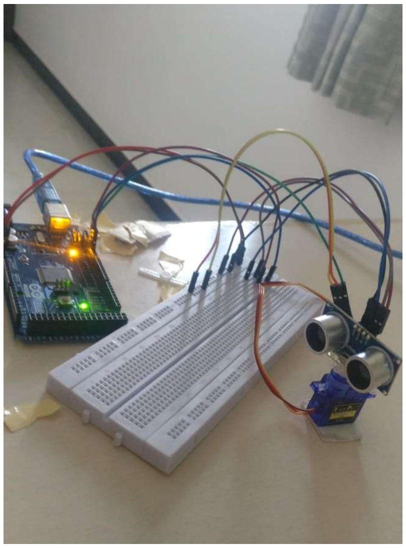
• VOLTAGE REGULATORS
• WHEELS
• MOTOR DRIVERS
• DC MOTORS
• WHEELS
• BLUETOOTH
• XBEE
• RASPBERRY PI
• SERVO MOTORS
• ATMEGA MICROCONTROLLER
• CAMERA
• PROXIMITY SENSOR
• GYROSCOPIC SENSOR
• BATTERIES
• ESP 32
• MAX 30100
• ESP 32 CAMERA
• DS18B20 TEMPERATURE SENSOR

4.0 HARDWARE TESTING

4.1 OBSTACLE AVOIDANCE USING ULTRASONIC SENSOR

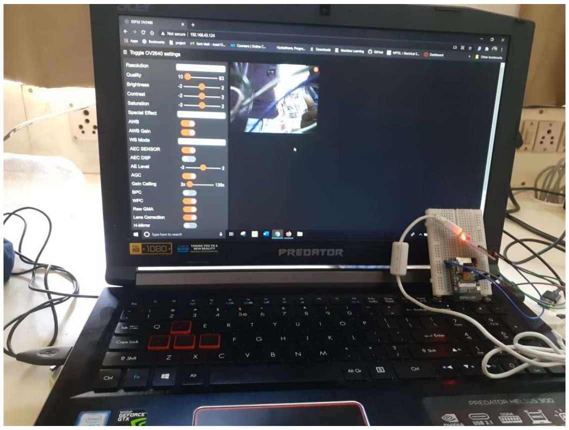


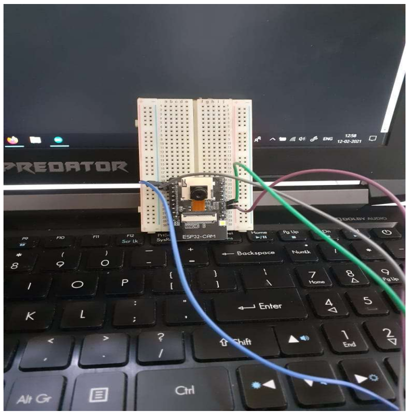
```
Object: In Range          Angle: 91 °    Distance: 24 cm
```



In this component testing we have tried demonstrating the obstacle avoidance with the help of ultrasonic sensor and Processing Software. Ultrasonic sensor is mounted on servo motor which is continuously rotating 180- Degrees with which the sensor detects the foreign objects which are coming in its way, many sensors can be connected to the base of the AGV for better obstacle avoidance. If any foreign object is detected the software will send signal to microprocessor and by which the movement of the tires will stop and until the object is removed it will find an alternative way to re program its path to the location. And follow the same path until the desired location is reached.

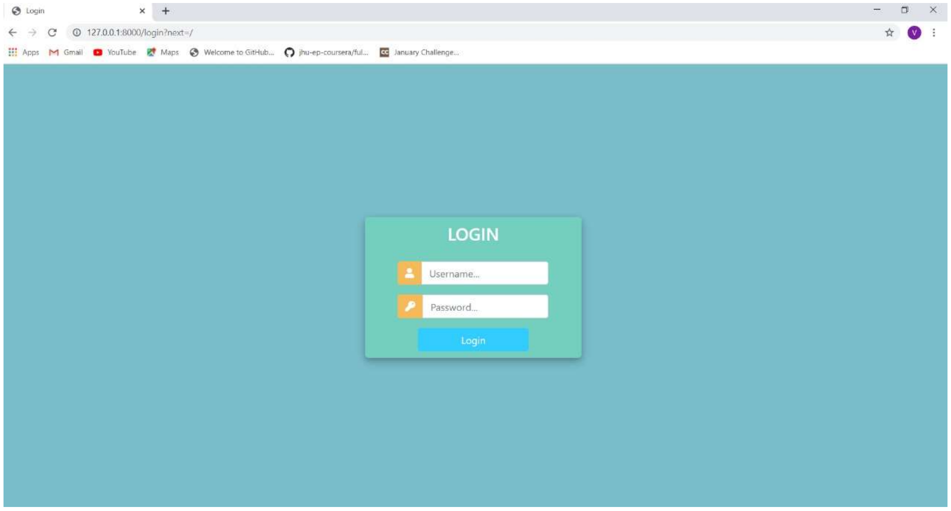
4.2 ESP CAMERA TESTING FOR VIDEO PROCESSING

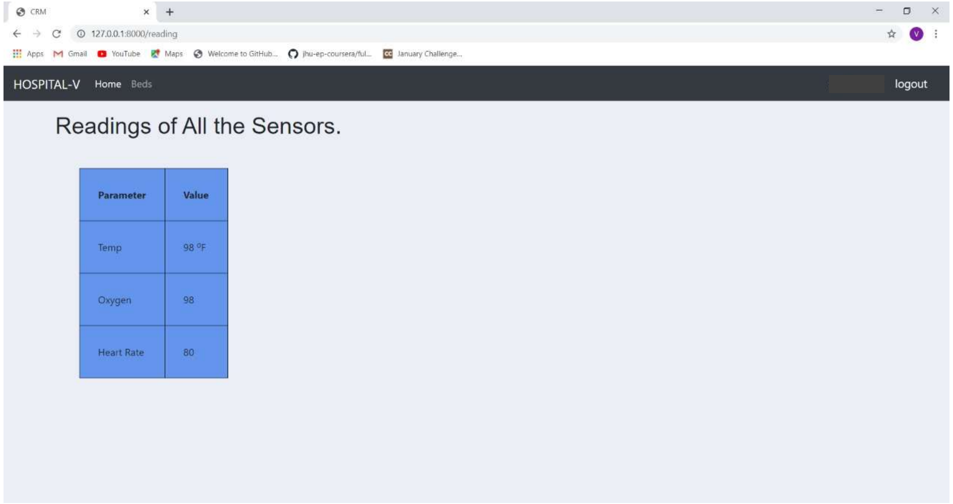




Here, ESP camera module is connected to microprocessor to detect patients face with the help of image processing and each patient separate database will be made on the platform, with which quick monitoring and observation of the patient can be done. Also, with this we can do doctors consultation with patient, so that proper guidance can be provided.

4.3 DATA COLLECTION PORTAL



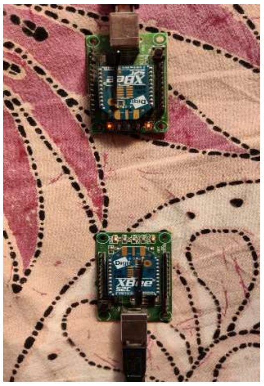


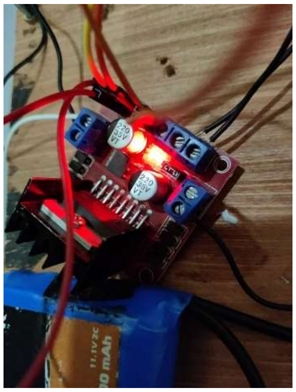
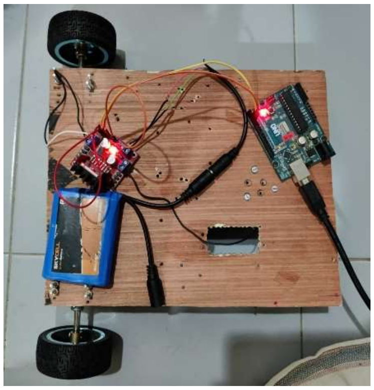
Readings of All the Sensors.

Parameter	Value
Temp	98 °F
Oxygen	98
Heart Rate	80

The data collection portal is a dashboard which facilitate collection & display of data like temperature, oxygen level & heart rate of the patient measured by sensors. The data for each patient will be saved in different files which can be accessed later. This portal uses google firebase database management system for storing and managing data and front-end is made using HTML,CSS,BootStrap & Django framework.

4.4 BOT TRIAL TESTING



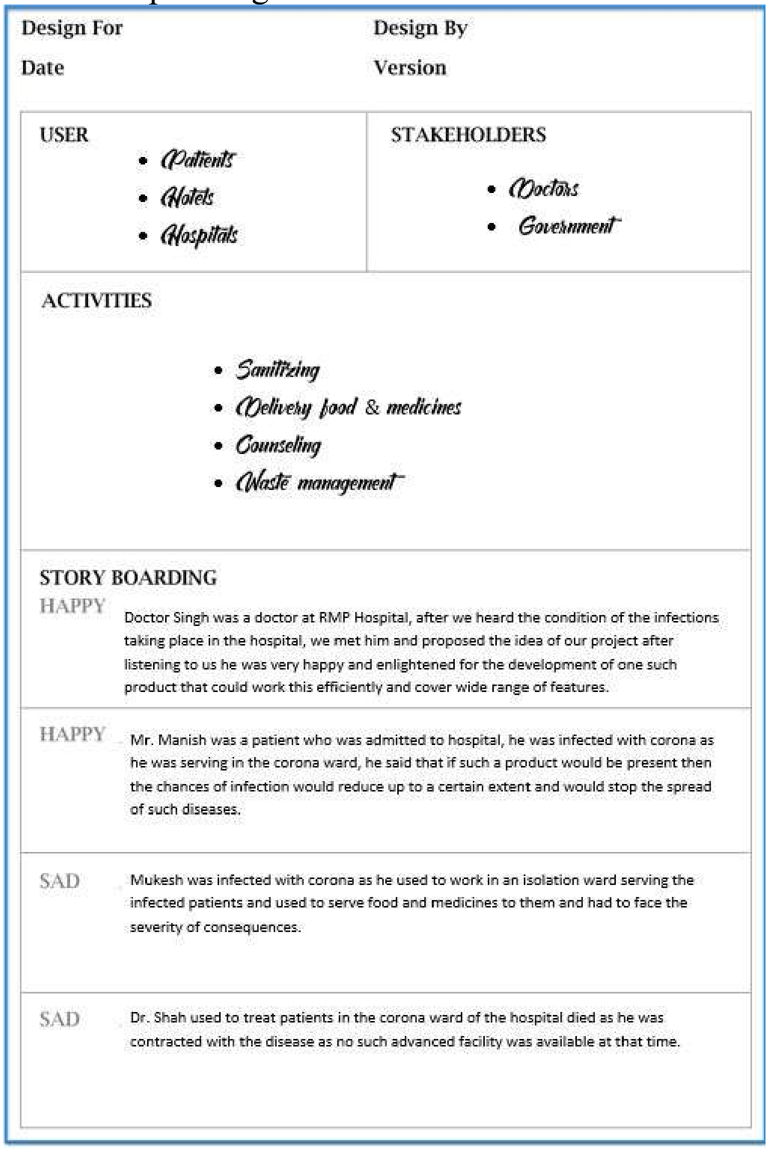



In this testing we tried testing of the motors along with tires connected with the motor driver and microcontroller. Micro controller was connected with the Xbee i.e wireless communication unit. The data is sent serially with software and received at the bot end which sends the signal to microprocessor which moves the motors hence in this way the movement of the robot takes place. The bot traverse would be according with the map planning provided the outline of area that is to be traversed.

5. CANVASES

5.1 EMPATHY MAPPING:

Our domain is monitoring system, as we know there are a number of various systems available. So that, we started list out the activities which are required for making system efficient. As we need focus on domain, we wrote happy and sad story which help us to get more attached with users.



Design For

Design By

Date

Version

USER

- Patients
- Hotels
- Hospitals

STAKEHOLDERS

- Doctors
- Government

ACTIVITIES

- Sanitizing
- Delivery food & medicines
- Counseling
- Waste management

STORY BOARDING

HAPPY Doctor Singh was a doctor at RMP Hospital, after we heard the condition of the infections taking place in the hospital, we met him and proposed the idea of our project after listening to us he was very happy and enlightened for the development of one such product that could work this efficiently and cover wide range of features.

HAPPY Mr. Manish was a patient who was admitted to hospital, he was infected with corona as he was serving in the corona ward, he said that if such a product would be present then the chances of infection would reduce up to a certain extent and would stop the spread of such diseases.

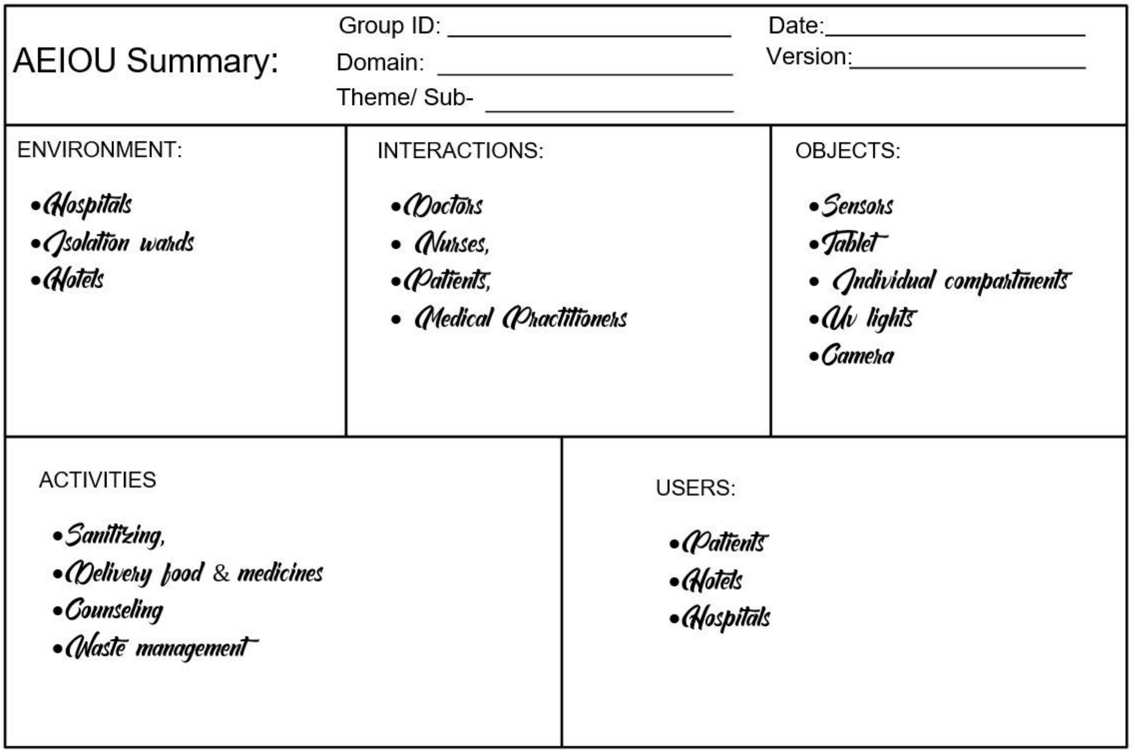
SAD Mukesh was infected with corona as he used to work in an isolation ward serving the infected patients and used to serve food and medicines to them and had to face the severity of consequences.

SAD Dr. Shah used to treat patients in the corona ward of the hospital died as he was contracted with the disease as no such advanced facility was available at that time.

Story Boarding:

Story boarding is important element of any learning developing project, and in more ways than one, story boarding lowers the production risk. A story boarding is a written representation of the all of the elements that will be included in a story.

5.2 AIEOU SUMMARY CANVAS



AEIOU Summary:

Group ID: ____________________
Domain: ____________________
Theme/ Sub- ____________________

Date:____________________
Version:____________________

ENVIRONMENT:

- Hospitals
- Isolation wards
- Hotels

INTERACTIONS:

- Doctors
- Nurses,
- Patients,
- Medical Practitioners

OBJECTS:

- Sensors
- Tablet
- Individual compartments
- Uv lights
- Camera

ACTIVITIES

- Sanitizing,
- Delivery food & medicines
- Counseling
- Waste management

USERS:

- Patients
- Hotels
- Hospitals

Users:

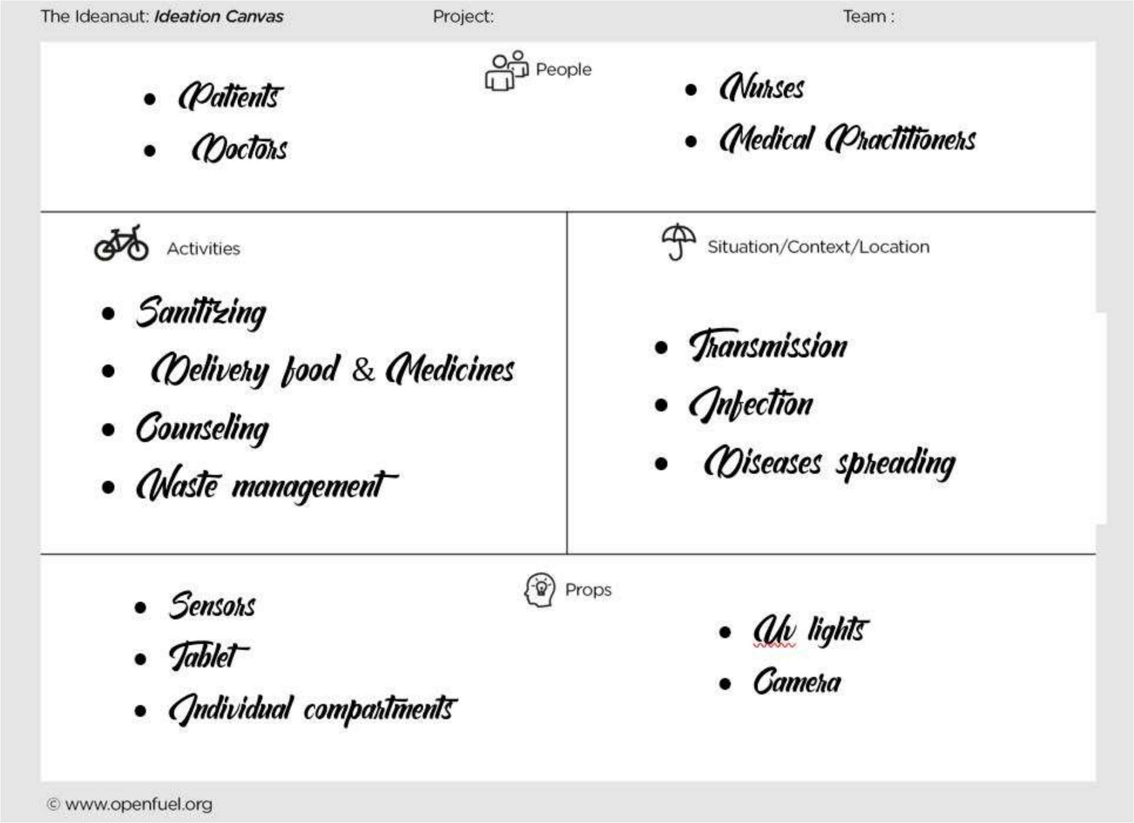
For our project, we listed out the users like patient, hotels, hospitals.

Activities:

Here, activities are functions, processes, workings. How the users in involved, what actually is going on included activities like sanitizing, waste management, counselling.

5.3 IDEATION CANVAS:

Ideation canvas helped to identify new users other than the users in empathy canvas example, entrepreneurs. Also, the situations or problems the users or solution. We also listed out the possible solutions to it. We explored various approaches to innovative thinking and techniques for idea generation from arrange of sources.



The Ideanaut: *Ideation Canvas* Project: Team :

People

- Patients
- Doctors
- Nurses
- Medical Practitioners

Activities

- Sanitizing
- Delivery food & Medicines
- Counseling
- Waste management

Situation/Context/Location

- Transmission
- Infection
- Diseases spreading

Props

- Sensors
- Tablet
- Individual compartments
- Uv lights
- Camera

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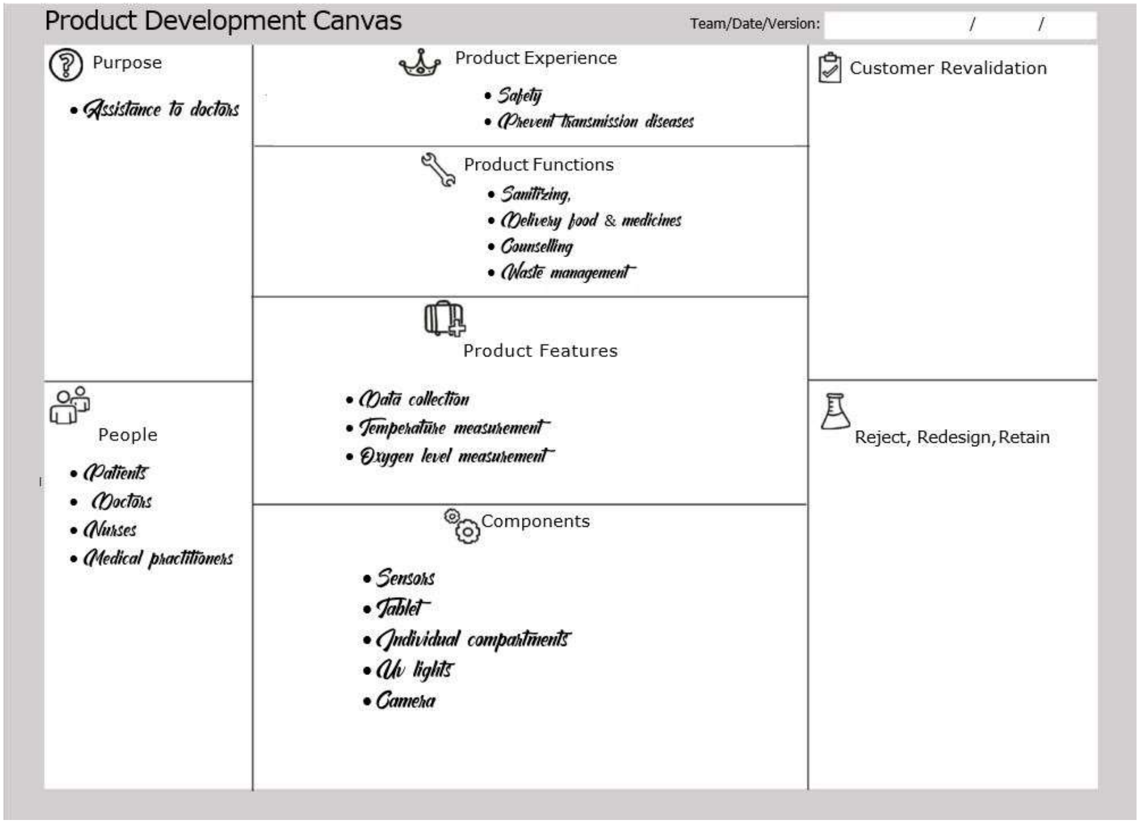
5.4 PRODUCT DEVELOPMENT CANVAS:

In this canvas, we could define the purpose of our application, how the application will be beneficial to the users, how the application will function, its features, the components used and certain features that should be resigned and retained. We developed the idea of failure-when designed to occur early and cheaply-can be a rich source of learning that often reveals new options and nearly always leads to be better final easy outcome.



Product Development Canvas

Team/Date/Version: / /

Purpose
- Assistance to doctors

Product Experience
- Safety
- Prevent transmission diseases

Product Functions
- Sanitizing,
- Delivery food & medicines
- Counselling
- Waste management

Product Features
- Data collection
- Temperature measurement
- Oxygen level measurement

People
- Patients
- Doctors
- Nurses
- Medical practitioners

Components
- Sensors
- Tablet
- Individual compartments
- Uv lights
- Camera

Customer Revalidation

Reject, Redesign, Retain

FUTURE SCOPE:

After the completion of all the necessary initial stages of the project we will add more smart features to the projects viz. temperature measurement, gesture control, oxygen level measurement, patient data storage to the main computer, dosages of the medicines to be given, track record of the patients and many more features can be incorporated to make our project more advanced.

CONCLUSION:

In this project we tried to develop an AGV which could function multiple activities and reduce the infection chances to the medical practitioners and doctors in the hospitals and isolation centers. As it would be covering a greater number of patients at one go it would be easy for the hospital staff. It would also include basic facilities like temperature monitoring, oxygen levels and heart rate monitoring which would be highly beneficial for the patients as well as medical practitioners. This would decrease severely the rate of rising cases.

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