ASSIGNMENT-5:ON DEVICE CONTROL

EP23B021
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AIM

To build a video surveillance system using mathematica for detecting intrusion .

problem statement

part1:
Here we need to create a video surveillance system which does the following things:
1)monitors and detect intrusion
2)continuously displays the monitoring region
3)raises a beep sound and displays intrusion if there is a large disturbance in the image.
4)plots a graph of the value monitored.
part 2:
It is a code which alerts if a new faces enters a frame or a old face leaves a frame.
plots a graph of number of face in a frame.

code organisation

part1:
1)opening camera
2)defining list for storing values of monitoring and defining plotting graph using dynamic
3)display live monitoring
Inside while loop:
1)capturing two image and finding mean of image difference.
2)checking for intrusion and raising beep
outside while loop:
1)displaying two image where intrusion is found
2)image difference between two images
3)closing of camera

part2:
1)opening of camera and displaying live monitoring
inside while loop:
1)captures two image and identifies the face in it
2)compares no.of face in both and alerts if no.of face changes.
outside the while loop:
displays image before and after no.of face change

computational code

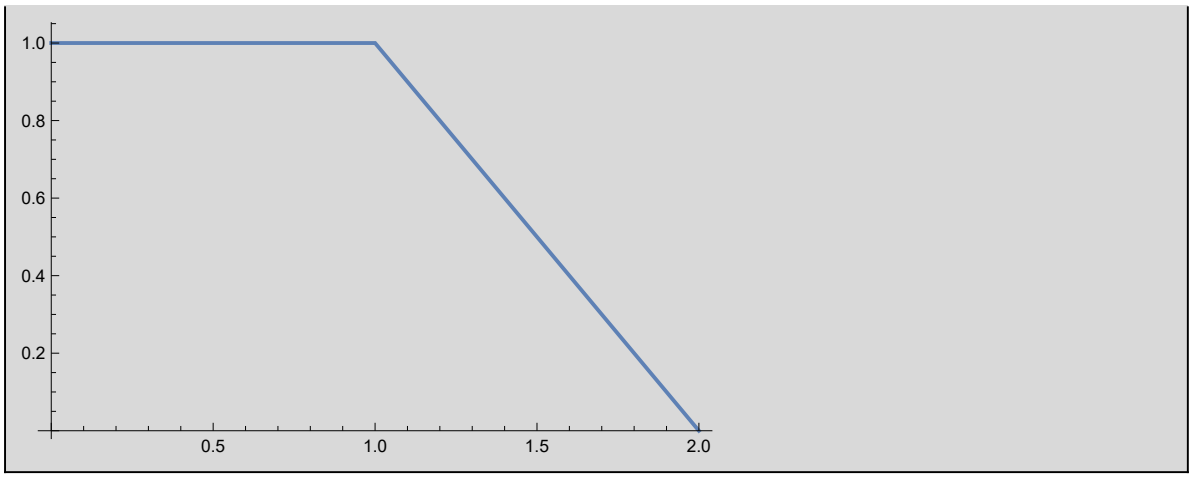
part1

```
dev = DeviceOpen["Camera"]
lst = {};
i = 0;
Dynamic[ListLinePlot[lst]]
spc = SpeechSynthesize["intrusion detected" ];
img = Dynamic[DeviceRead[dev]]
While[True,
 a = DeviceRead[dev];
 Pause[2];
 b = DeviceRead[dev];
 c = ImageDifference[a, b];
 d = Mean[Total[c]];
 lst = AppendTo[lst, {i, d}];
 i++;
 If[d ≥ 10000, EmitSound[spc]];
 If[d ≥ 10000, Break[]];
]
Print["first image"]
a
Print["second image"]
b
Print["detected intrusion"]
c

DeviceClose[dev]
```

Out[•]=

DeviceObject[Class: Camera ID: 1
Status: Not connected (HP Wide Vision HD Camera)]

Out[•]=



Out[•]=

```
$Failed
```

first image

Out[•]=

second image

Out[•]=

detected intrusion

Out[ ]=

part2:

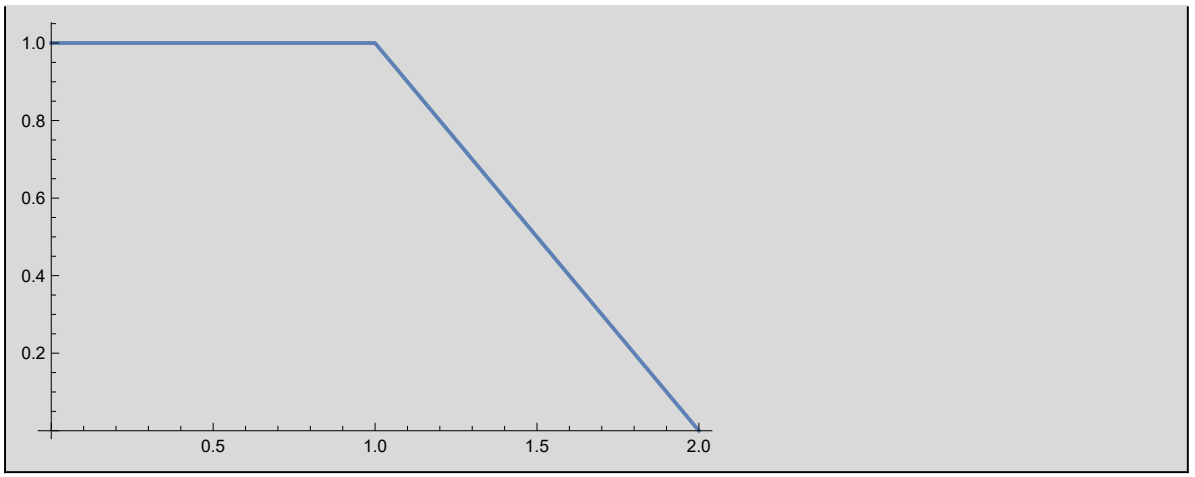
In[60]:=

```
Clear["Global'*"]
dev = DeviceOpen["Camera"]
lst = {};
i = 0;
Dynamic[ListLinePlot[lst]]
spc = SpeechSynthesize["faces in frame changed"];
img = Dynamic[DeviceRead[dev]]

While[True,
 a = DeviceRead[dev];
 c = FindFaces[a];
 Pause[4];
 b = DeviceRead[dev];
 d = FindFaces[b];

 lst = AppendTo[lst, {i, Length[d]}];
 i++;
 If[Length[d] ≠ Length[c], EmitSound[spc]];
 If[Length[d] ≠ Length[c], Break[]];
]
Print["first image"]
a
Print["second image"]
b
```

Out[61]=

DeviceObject[Class: Camera ID: 1
Status: Not connected (HP Wide Vision HD Camera)]

Out[64]=



Out[66]=

first image

Out[69]=

second image

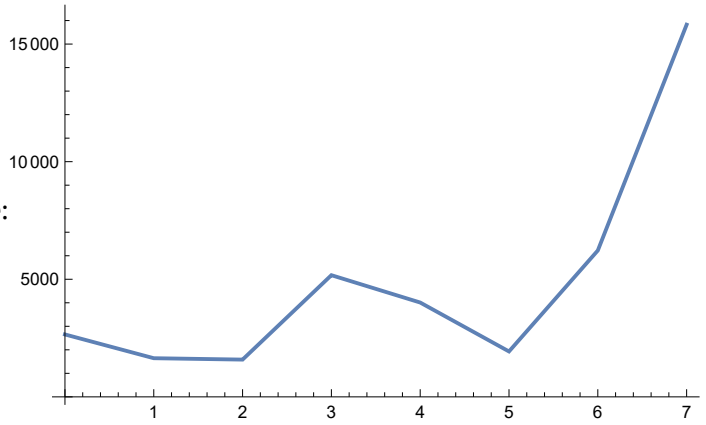
Out[71]=

In[72]:=
```
DeviceClose[dev]
```

Result

part1:

graph of monitored value:



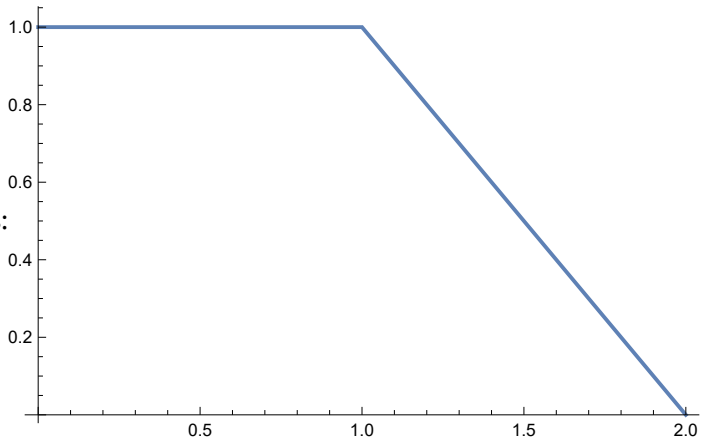
first image:

second image:

detected intrusion:

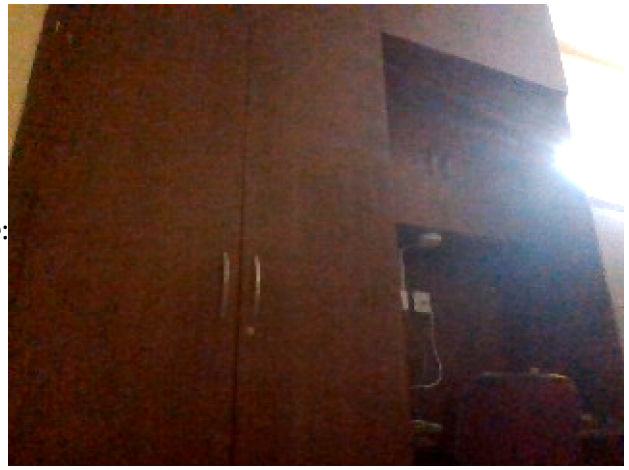
part2

graph of no.of faces:



before change:

after change:



comment and discussions

Through this assignment i learnt how to use device controls and use camera to monitor a region. I also learnt how to synthesise audio signals. The above program can find intrusions if the person the frame moves out or inside the frame. This assignment will be helpful in taking input from outside and producing a output. I have also written a code in part2 which can alert if a person leaves the frame or a new person enters the frame by counting no.of faces in a frame. This can be useful in monitoring people.

references

1)mathematicastackexchange
2)mathematica documentation