CS308 Project Tracktor

Team members

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INTRODUCTION

System having a holder for objects like mobile and capable of tracking a person

We call it **Tracktor** as in Tracking Rotor

Suppose you are video calling and you want to move around or do other household work, you need your hands to be free from the mobile/tablet

Tracktor allows people to parallelize their household work with video calls or watching movies etc.

PROBLEM STATEMENT

The aim of the project is to design a system that tracks a user present in its view and orient itself towards them

The user should also be able to mount their own device such as mobile phone tablet on the system

REQUIREMENTS

Functional Requirements

The system should take input in the form of video feed or images at regular intervals

Using the input it should locate the user

It should allow user to mount his own device, such as a phone, on the system

The system should rotate the device towards the user

REQUIREMENTS

Non-functional Requirements

Correctness - The system should correctly track the user and rotate the device

Portability - It should be small and lightweight

Scalability - It should be able to hold any size of the device ranging from phone to tablets

Response time - the system should be quick

Price - it should be affordable

REQUIREMENTS

Hardware Requirements

1. Raspberry Pi

2. USB Camera

3. Servo motor

4. Power source - 5V adapters for both Rpi and the servo motor

REQUIREMENTS

Software Requirements

1. Raspbian OS

2. Python 2.7

3. OpenCV 2.4.5

SYSTEM DESIGN

Functional components of the system are

1. **RPi** - performs face detection and sends the signal to the servo motor

2. **Camera** - Sends continuous frames to the RPi

3. **Motor** - Rotates the system based on the input from RPi

4. **Holder** - Allows keeping mobiles firmly attached to the system
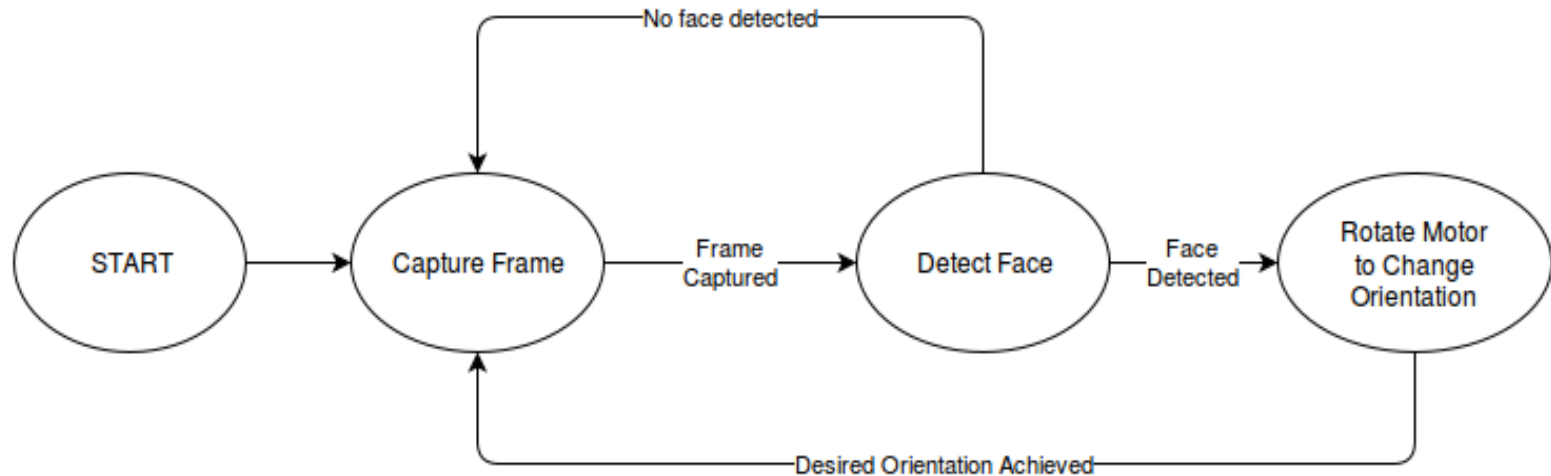
SYSTEM DESIGN
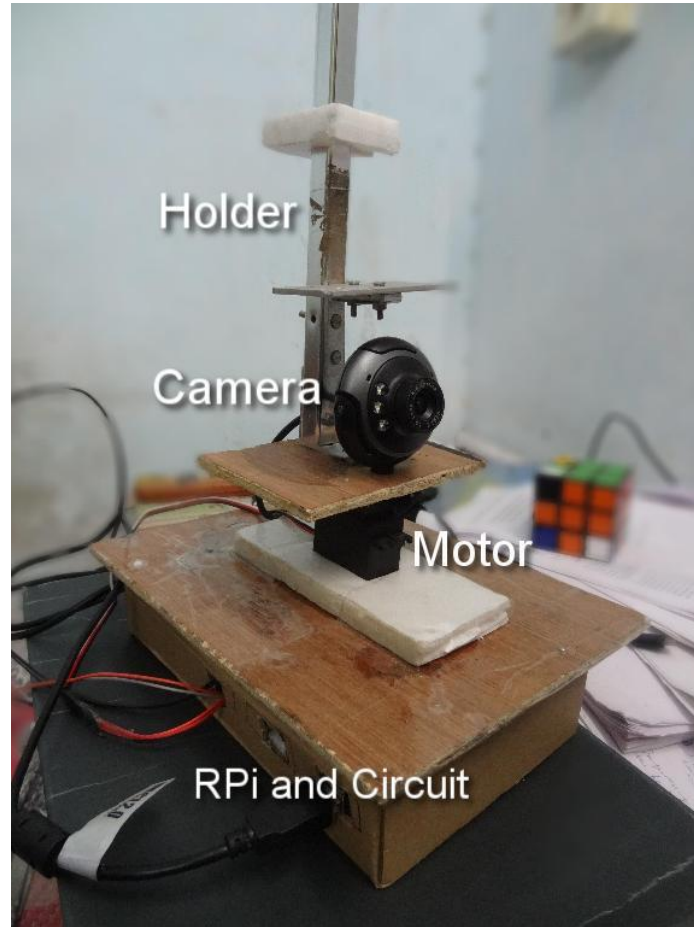
Interaction among components
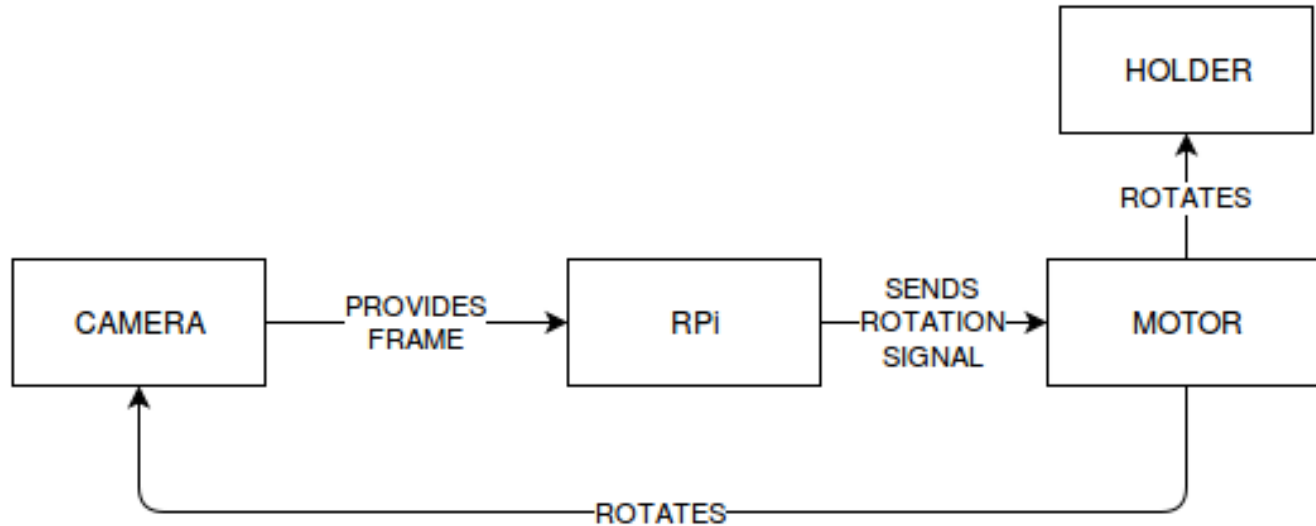
SYSTEM DESIGN

FSM Representation

SNAPSHOT

WORKING OF THE SYSTEM

1. USB camera mounted on the rotating platter captures images and sends them to Raspberry pi for detecting faces

2. LBP classifier is used for face detection

3. Using the x-coordinate of the face detected the amount of rotation required for the camera is determined.

4. PWM signal with the calculated duty cycle is sent to the servo motor which then rotates the stand

TESTING

1. To test video input, we displayed the video frames on a computer

2. In the video shown on the computer we highlight the faces detected with a green rectangle, tested with various faces and backgrounds

3. Tried to mount a number of different sized devices on the system

4. The system correctly orients the device towards the user without letting the device fall or without having the weight of the device slow it down

DISCUSSION OF THE SYSTEM

What components worked as per plan

1. Camera
2. Raspberry Pi
3. Servo Motor

Nothing more was added to SRS

The motion detector was not used. Camera is used instead for the continuous feed

The system can only cover ~225° due to limited movement of servo motor

FUTURE WORK

Interfacing multiple cameras to cover 360° view, currently 1 camera covers only 53°

Incorporating motion sensor instead of camera if there is no movement, and using the camera only after movement is detected

Using only motion sensor to detect movement and rotating the motor using its data, this would make the system fast

CONCLUSION

Tracktor helps you parallelize household works with video calling or watching movies etc.

It is a system that tracks a user orients itself towards them

It can hold device with varying sizes and rotate them

Working Demo : https://www.youtube.com/watch?v=S-oK19eegDg

REFERENCES

[OpenCV](#)

[Raspberry Pi](#)

THANK YOU