Self-Defensive Drone

Student: N SANTOSH

Supervisor: Dr. Kamal Kishore Jha

May 03, 2018

Indian Institute of Information Technology, Vadodara.

Overview

Problem statement

1. In some states of our country the police department uses the quadcopters to monitor the city outcuts to find some illegal activities, this includes sexual harassments, rapes, alcohol consumption and other such activities
2. The goal of the project is to design a quadcopter that detects the dynamic object coming towards the quadcopter and avoid collision.

Introduction

1. A **UAV** quadcopter is an unmanned aerial vehicle with four rotating motors/rotors used for lift, movement and video recording.

Introduction

1. A **UAV** quadcopter is an unmanned aerial vehicle with four rotating motors/rotors used for lift, movement and video recording.
2. It uses an electronic control system and electronic sensors to help stabilize itself. I demonstrate this project using Simulator and Drone API.

Introduction

1. A **UAV** quadcopter is an unmanned aerial vehicle with four rotating motors/rotors used for lift, movement and video recording.
2. It uses an electronic control system and electronic sensors to help stabilize itself. I demonstrate this project using Simulator and Drone API.
3. The Quadcopter has four propellers, two of them rotates in clockwise and other two rotates in anti-clockwise, makes the total angular momentum zero to stebilize itself.

Proposed system

1. The proposed system captures the motion based information of a moving object and forms a contour around the moving object.

Proposed system

1. The proposed system captures the motion based information of a moving object and forms a contour around the moving object.
2. and if the contour area is greater than certain threshold the quadcopter compensates its global position into a object free region to avoid collision.

Algorithm Flow

Video Capture

- First of all we need to capture the video frame.

```
1.cap = cv2.VideoCapture(0)
```

Algorithm Flow

Video Capture

- First of all we need to capture the video frame.

```
1.cap = cv2.VideoCapture(0)
```

Remove Background

- Removeing background makes easier to capture the moving object.

```
2.fgbg = cv2.createBackgroundSubtractorMOG2()
3.fgmask = fgbg.apply(frame)
4.fgmask = cv2.morphologyEx(fgmask, cv2.MORPH_OPEN, kernel)
```

Algorithm Flow

Gaussian blur

- Gaussian blurring is actually removes the high frequency content for eg,. noise, edges from the image.

```
5. cv2.GaussianBlur()
6. blurred_frame = cv2.GaussianBlur(fgmask, (3,3), 3)
```

Algorithm Flow

Gaussian blur

- Gaussian blurring is actually removes the high frequency content for eg,. noise, edges from the image.

```
5.cv2.GaussianBlur()
6.blurred_frame = cv2.GaussianBlur(fgmask, (3,3), 3)
```

Find Contours

- Contours are the boundaries of the shape of same strength and it stores the x,y coordinates of the boundary of a shape.

```
7._, contours, _ = cv2.findContours(fgmask, cv2.RETR_TREE,
cv2.CHAIN_APPROX_NONE)
```

Algorithm Flow

Draw Contours

- To draw the contours, cv2.drawContours function is used.

```
8.cv2.drawContours(frame,contours, -1 , (0,255 ,0), 2)
```

Algorithm Flow

Draw Contours

- To draw the contours, cv2.drawContours function is used.

```
8.cv2.drawContours(frame,contours, -1 , (0,255 ,0), 2)
```

Find Contour area

- Calculate the contour area.

```
9.area = cv2.contourArea(contour)
```

Algorithm Flow

- If the Contour area is greater than some threshold then, send signal to the Simulator.

```
10.conn = MavlinkConnection( 'tcp:127.0.0.1:5760',
11.threaded= True )
12.drone = Drone(conn)
13.drone.start()
14.rone.take_control()
15.drone.arm()
16.drone.takeoff(12)
```

Conclusion

- This article discusses the necessary options, inspiration, results from the early researchers, and the algorithm flowchart of the current system. The results produced from this investigation or prototype demonstrates that it is possible to construct such intelligent machines to achieve real time object detection and avoidance.

Questions

?

Thank You.