PROJECT TITLE (font 16 bold UPPERCASE)

Done by: (font 12)

Student names (font 12 bold)

Supervised by:(font 12)

Supervisor's name (font 12 bold)

Presented to the Department of Computer Engineering

At Al-Balqa'a Applied University

Month, Year

ABSTRACT (font 14 bold UPPERCASE)

The abstract of your work is written here. Throughout your documentation the font used is Time New Roman size 12, with line spacing 1.5. The Page margins are as follows:Top, bottom and right = 2.54 cm, while the left margin is set to 3 cm.

PROJECT TITLE (font 16 bold UPPERCASE)

By:

Student names (Font 14 bold)

Approved by:

Supervisor:

ACKNOWLEDGMENTS (font 14 bold UPPERCASE)

Write acknowledgements that you like here. For example:

I very warmly thank my thesis supervisor Professor …… for the support during this work, ….

I acknowledge the efforts from all the faculty members who have taught me in the Faculty of Engineering Technology …

Finally, I am grateful to my colleagues in FET: names of your colleagues

DEDECATION

Write a brief dedication for your work.

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CHAPTER 1: INTRODUCTION

1.1 Overview

Vision allows humans to perceive and understand the world surrounding them. The ability of humans to perceive and understand raw sensory inputs and combine them in order to form a perceptual whole has fascinated the science community for hundreds of years. Figure 1.1 show a picture of a lady and a cat on a table, by observing the picture one can easily recognize that it is composed of a woman, a cat and a table. However in order for a machine to perform this task, rigorous algorithms and techniques are required.

Figure 1.1: A Woman Stroking a Cat

Computer vision aims to duplicate the effect of human vision by trying to electronically perceive and understand an image. Computer vision is defined as the science that develops

the theoretical and algorithmic basis from which useful information about the real world can be automatically obtained and analyzed (HaralickShaphiro, 1992).

Object tracking is one of the most important applications of computer vision, were it has a lot of implementation in robotic movement and control, video conference applications, traffic control, surveillance and even in sports. The fruits of computer vision can be seen everywhere, from the robotic vacuum cleaner to the cameras covering a football match, but still there is a hug gap between the computer intelligence and the human brain, if we take a simple example, a black square on the chess table, for a computer to recognize that this is a black square not a hole in the surface it must do a lot of calculations and it needs long processing time.

1.2 Problem Statement

This project concentrate on tracking objects, since the inspiration for scientists is to create a robot that can take decisions independently, and the basic requirements for robots is movement, since no one wants a static robot, for robots to move they need to avoid obstacles and to follow certain objects. From this point raises the importance of object identification and tracking.

Tracking objects depends on the features of the object; the machine will extract, compare and track objects using their features, objects features are extracted from each incoming frame. Now objects status (features) are described by some physical variables such as position, velocity, acceleration, shape, color and so on, and they are application dependent, some application will use light intensity to track objects other will use the contour of the object as the parameter for tracking, etc.

The methods of tracking can be divided in to two major categories depending on the physical information used to track the objects (T. Zhang; D. Freedom (2002)):

- Using geometrical information such as edges, boundaries or shape

- Using both geometrical and photometric (such as color, shade, or brightness) in the tracking.

The most efficient way of tracking uses both geometric and photometric information for tracking objects. Of course all object tracking applications require working in real time, (i.e. process the incoming frames as they reach to the system and give the output as fast as possible). To work in real time a special hardware setup is required, such as a high speed dedicated single purpose processors (most of the time at least two processors are required one for image processing and the other for controlling the movement of camera), a high resolution video camera and a high response motors. Also special software architecture is required.

From this point rises the problem of using general purpose equipment to do object tracking, and to get an algorithm that will be able to identify and track objects as fast as possible.

Table 1.1: Example Of a Table Caption

1.3 Aims and Objectives

An object tracking system will be implemented and will use a general purpose processor as a processing unit , a webcam as the video input device(fixed on the top of the vehicle), a vehicle as the tracking device and a general purpose software architecture (MatLab) as the processing software. The tracking system will be based on the geometric features of objects, these features are extracted from the image after the image undergoes pre-processing part

changes the colored image to a logical image. After that the displacement of the object is calculated to recognize the movement of the vehicle ,if the object has really move the vehicle move in order to put the object in the center of video frame . Figure 1.2 shows a block diagram of the tracking system.

1.4 Documentation Layout

This project is organized as follows, in the second chapter will discuss the previous work done on tracking, and some methods used for tracking.

The third chapter will give an emphasis for the hardware setup used in the tracking system, and will give the mathematical equations for the system. The fourth chapter will elaborate the software design steps and a detailed description of the control system part. Chapter five will show the experiments and results done on the tracking system and will discuss these results. Finally chapter six will give a conclusion of the work.

CHAPTER 2: RELATED WORK

Related work brief introduction….

2.1 SUB TITLE

There is ….

It is quite hard to fairly compare the performance of these approaches for the following reasons:

- Reason 1.
- Reason 2.

2.1.1 Reason 1

……..

2.1.2 Reason 2

……..

2.2 SUB TILE 2

CHAPTER 3: TITLE OF CHAPTER 3

Describes and presents your work…….

Pseudocode is written as follows:

```
Begin:
    Generate a random population of N solutions (particles),
    each solution is a vector of M features;
    For each individual solution N: calculate its fitness;
    Initialize the weight factor, w;
      For each particle;
         Set pBest as the best position of solution i;
         If fitness of solution i (fitness(i))is better than
         pBest then pBest(i)=fitness(i);
      End;
      Set gBest as the best fitness of all solutions;
      For each solution;
        Calculate solution velocity[1];
        Update particle position[2];
      End;
      Update the weight factor, w;
    Check if termination=true;
End;
```

[1] Velocity of each solution is estimated by some fitness equation to evaluate the goodness of the selected features.

[2] The position of each particle is updated according to its velocity to decide the required features in the next renewal, i.e., the features that will survive in the next iteration.

Chapter 4: Implementation and results

Implementation, experimental results, insights, and analysis of results.

CHAPTER 5: CONCLUSIONS AND FUTURE WORK

Introduces conclusions and presents ideas for future work

REFERENCES

You can follow the bellow link for either Harvard style or IEEE style references

Harvard style Link: http://www.staffs.ac.uk/assets/harvard_quick_guide_tcm44-47797.pdf

IEEE style link :http://www.ieee.org/documents/ieeecitationref.pdf