Fast and Real Life Object Detection System Using Simple Webcam

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Abstract — The project is designed to detect a real-life object using a simple webcam. The image captured by the webcam is to be enhanced and magnified and then is compared with similar type of image in our database to detect the type of image. The data being compared is binary string, a unique attribute is compared which has been acquired by feature extraction. The following technology can be used in face recognition system, defence system, production line or removal of defective product. We are using MATLAB to develop our project. The experiments conducted in accordance with proposed methods which are suitable for real-time surveillance system [1].

Keywords — Fast Object, Moving Object, Real-life Detection, Web Cam, MATLAB, Image Processing

I. INTRODUCTION
This document will propose all features and procedures to develop the system. Our project will help computer to detect an object of different basic shapes on initial level. Next level will be to detect object having complex shape with the help of feature points. Further level will be to detect a particular object in an image having clustered objects or having group of objects. Detecting object in a streaming video.

The tests are taken to develop the project in the labs of Aliah University for the preparation of this paper. Section I contains the introduction; Section II contains the perspective, function of the product and characteristics of users; Section III contains minimum hardware and software requirements to carry out the project; section IV contains the schematic diagram and its module description; section V contains the architecture and essential data-flow-diagram and explain the methodology with class diagram and describes result with snapshots; Section VI tells about futuristic approaches and its limitation; Section VII concludes research work; Section VIII is our thanks and regards towards our mentor and supporters and Section IX contains the bibliography.

SCOPE:

- Fast and Real-Life Object Detection is designed for Govt. and Private Organization (like Airport, Malls, etc.) [2].
- The system handles all the operations and generates reports as soon as the test is finish.

II. GENERAL DESCRIPTION

2.1) PRODUCT PERSPECTIVE:
The system will be developed using the following technology:
1) MATLAB [3][4]
2) C [5]

2.2) PRODUCT FUNCTION:
1) Provide motion detection [6]
2) Provide Object detection
3) Provide Noise reduction [7]

2.3) USER CHARACTERISTICS:
a. Educational level: Users should be comfortable with the English language.
b. Experience: Users should have prior information about MATLAB and C.
c. Skills: Users should have basic knowledge and should be comfortable using general purpose applications on computer.

2.4) ASSUMPTIONS
1. The system will run on most known operating system (like
XP, windows 7, windows 8, windows server 2008, etc) platform where MATLAB is installed.
2. The processor must be at least 2 GHz with 2GB RAM and 1GB GPU.
3. The hardware for the client must be provided by the client.

III. SYSTEM REQUIREMENTS SPECIFICATIONS

3.1) HARDWARE REQ:
1. PC should be sufficiently fast with adequate memory of at least 2GHz with 2GB RAM and 1GB GP, 4 GB hard disk space is required to run this application.
2. Screen resolution of at least 800*600 required to properly view the screen.

3.2) SOFTWARE REQ:
1. Most windows operating system would work.
2. The MATLAB must be installed.

IV. MODULE DESCRIPTION

Schematic Diagram

4.1) WEBCAM MODULE
It will capture raw images using the webcam and the hexadecimal data is stored into a matrix.

4.2) ENHANCE RAW IMAGE MODULE
This process requires us to use DCT (Discrete Cosine Transformation) to convert the hexadecimal value to spatial value and store it into a 8x8 or 4x4 matrix.

4.3) FEATURE EXTRACTION MODULE
In this module we simplify the amount of resource required to describe a large set of data accurately. This data of target Image is compared with the feature data already stored in our database.

4.4) APPROXIMATION MODULE
When trying to detect an object there can be percentage difference in features extracted from target data, and the features of Source data. This difference is normalized in this module.

V. SYSTEM DESIGN

DATA FLOW DIAGRAM:

Figure 1. LEVEL 1 DFD (LEARNING PHASE)

Figure 2. LEVEL 1 DFD (PREDICTING PHASE)

CLASS DIAGRAM:
Figure 3. CLASS DIAGRAM

SNAP SHOT:

Detection trial 1 snap shots:
Detection trial 2 snap shots:
VI. FUTURE SCOPES & LIMITATIONS

FUTURE IMPLEMENTATION:

- Face Detection will be our future implementation [8].
- Different Species detection so that we can detect different species like human beings, dogs, elephants, fish.
- In production factories to check specific shape of the object.
- Car number plate detection and enhancing.
- Traffic density detection.

VII. CONCLUSION

- We would like to conclude by saying that this particular project of ours is set to revolutionize the way the computer or any electronic device having camera percepts the real-life objects.
- A step forward in computer vision and robotic vision.

Application of proper image processing and enhancing algorithm for efficient and fast object detection.
VIII. ACKNOWLEDGEMENT
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IX. REFERENCES
[1]. Li Fang, School of Computer Science Nanyang Technological University, Singapore and Zhang Meng, Dunman High School Claire Chen Qian Hui River Valley High School, Singapore. "Smart Motion Detection Surveillance System". Published by IEEE on 21 July 2009.

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