Sir Syed University of Engineering & Technology (SSUET)
Software Engineering Department

Course Name: Artificial Intelligence (SWE-314)

Semester: 5th
Batch: 2018
Section: "C"

PROJECT REPORT

Project Title: Object, Shape and Color Detection

Submitted To:
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Submitted By:

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TEAM PROFILE

1. **SYED WAQAR ALI** **(2018-SE-154)**
   Leading Programmer, Researcher and Analyst.

2. **HAFIZ M. UMER** **(2018-SE-127)**
   UI Designer and Library Implementer

3. **M. MISHAAL KHAN** **(2018-SE-106)**
   Programmer and Structure Designer

4. **AHMED ILYAS** **(2018-SE-142)**
   Ass. Researcher and Quality Advisor

1. PROBLEM DOMAIN

The developed project refers to the ability of software system to detect and recognize Objects, Shapes and Colors in different digital images. Image classification involves activities such as predicting the class of one object, or identifying the shapes drawn in it or labeling the color it contains as selected in an image.

Recognition is a computer vision task used in variety of domains i.e. Face Lock and Digital Signatures. We need to develop these systems to enhance or to groom a machine's ability so it can reduce human efforts. The development of this system emerges and reduces the efforts of disabled person who are not able to visualize Objects, Shapes and Colors.

We have put our efforts to accomplish the following objectives:

1. The system must be able to classify different objects, identify shapes and predict colors in a digital image given as an input.
2. Output of every process must be given through voice.
3. The system must take input from camera at runtime, so users can input random images.

2. PROPOSED TREATMENT

Generic object detection aims at locating and classifying existing objects in any one image, and labeling them with rectangular bounding boxes to show the confidences of existence.

We can develop a desktop application to overcome the arisen problem, to develop such application we are using different libraries, trained models in python and created some drivers in order to execute and provide flawless integrity among different components of the system and to perform required detections and recognitions in real-time.

An AI based system is developed with the following characteristics:

- Computer Vision Algorithms and Trained Models for recognition.
- Driver files for every algorithm in order to perform interaction between system components.
- Mobile phone camera is connected through internet.
- Text-to-speech is used to generate output in voice.

3. PLAN OF WORK

The plan of work that we have carried out through out the project is described by the following table, the tasks are divided and assigned to each group members accordingly.

Tasks	Sub Activities	Responsible	Milestone
Research	Knowledge Development	Ahmed Ilyas	To know about how can we achieve our objectives.
	Tools and Libraries	Syed Waqar	Extracting most appropriate tools and libraries for out system in python and how to use them.
Analyzing	Requirements	Mishaal Khan	Functionality and performance measures of the system.
	System Components	Syed Waqar Hafiz Umer	In how many components the system would divide, how they interact and their description.
System Structure Design	UI Structure	Hafiz Umer	How the GUI will look like.
	Algorithms Integrity	Ahmed Ilyas Syed Waqar	How different algorithms will interact and perform a task mutually.
Development	UI Designing	Hafiz Umer	Implement the UI structure.
	Programming and Implementation	Syed Waqar Mishaal Khan	Implementation of drivers, Algorithms and Logical processes.
Testing	Quality Checking	Ahmed Ilyas	The system must produce the desired outcome and free of bugs.
	Overall System Testing	Syed Waqar	All the objectives have been fulfilled.

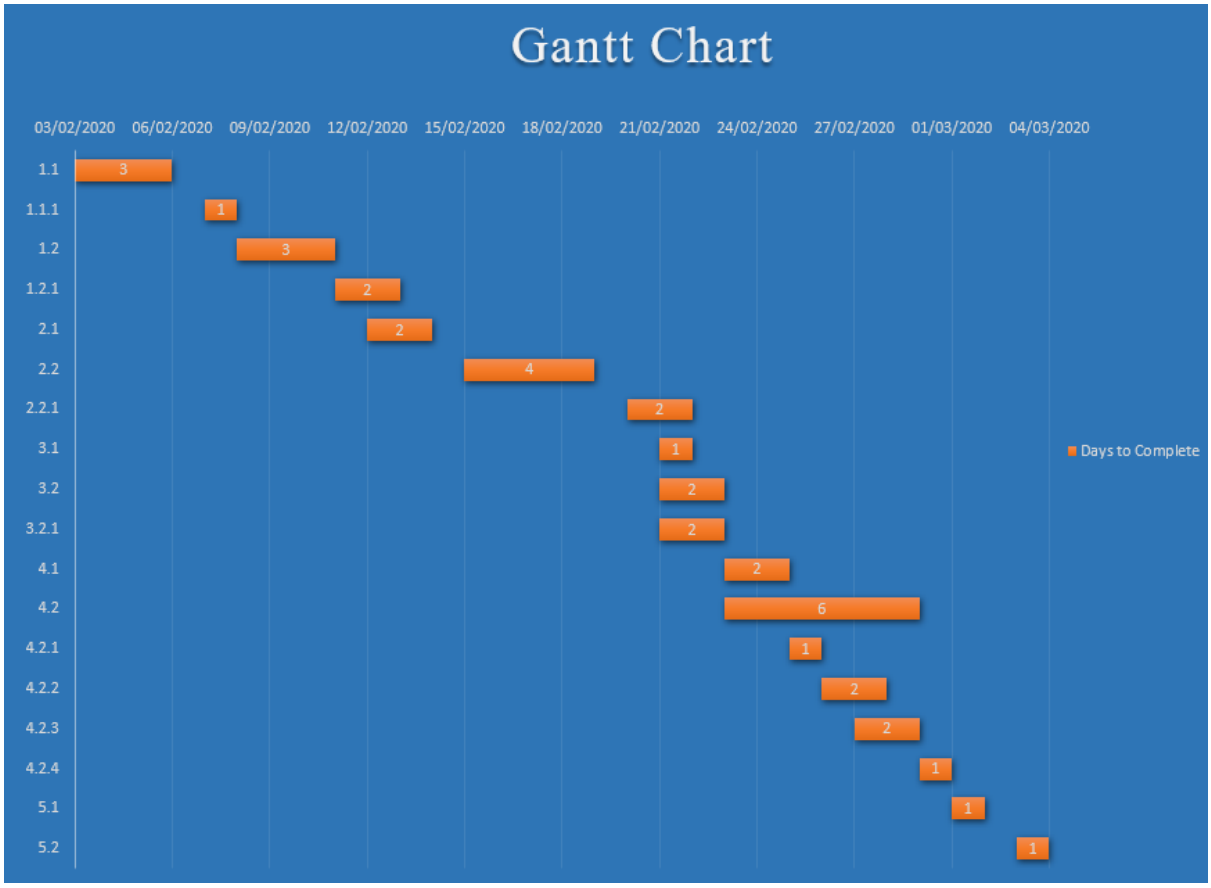
4. PROJECT SCHEDULING

Object, Shape and Color Detection

Artificial Intelligence

Project Start Date: 2nd February 2020
Expected End Date: 5th March 2020

S. no.	Task	Assigned to	Start Date	End Date	Days
1	Research				
1.1	Knowledge Development	Ahmed Ilyas	03/02/2020	06/02/2020	3
1.1.1	Explanation to Members	Ahmed Ilyas	07/02/2020	08/02/2020	1
1.2	Tools and Libraries	Syed Waqar	08/02/2020	11/02/2020	3
1.2.1	Gathering Required Packages	Syed Waqar	11/02/2020	13/02/2020	2
2	Analysing				
2.1	Requirements	Mishaal Khan	12/02/2020	14/02/2020	2
2.2	System Components	Syed Waqar	15/02/2020	19/02/2020	4
2.2.1	Components Mangement	Hafiz Umer	20/02/2020	22/02/2020	2
3	System Structure Design				
3.1	UI Structure	Hafiz Umer	21/02/2020	22/02/2020	1
3.2	Algorithms Integrity	Ahmed Ilyas	21/02/2020	23/02/2020	2
3.2.1	Selecting Algorithm	Syed Waqar	21/02/2020	23/02/2020	2
4	Implementation				
4.1	UI Designing	Hafiz Umer	23/02/2020	25/02/2020	2
4.2	Development	Syed Waqar	23/02/2020	29/02/2020	6
4.2.1	Developing System Modules	Mishaal Khan	25/02/2020	26/02/2020	1
4.2.2	Writing Driver Code	Mishaal Khan	26/02/2020	28/02/2020	2
4.2.3	Integrating System Modules	Syed Waqar	27/02/2020	29/02/2020	2
4.2.4	Initial Testing	Ahmed Ilyas	29/02/2020	01/03/2020	1
5	Testing				
5.1	Quality Checking	Ahmed Ilyas	01/03/2020	02/03/2020	1
5.2	Overall System Testing	Syed Waqar	03/03/2020	04/03/2020	1


Gantt Chart
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Days to Complete

5. SOFTWARE AND HARDWARE SPECIFICATIONS

Tools and Software:

- Python 3.8
- PyCharm Community Addition
- IP Webcam (Android Application)

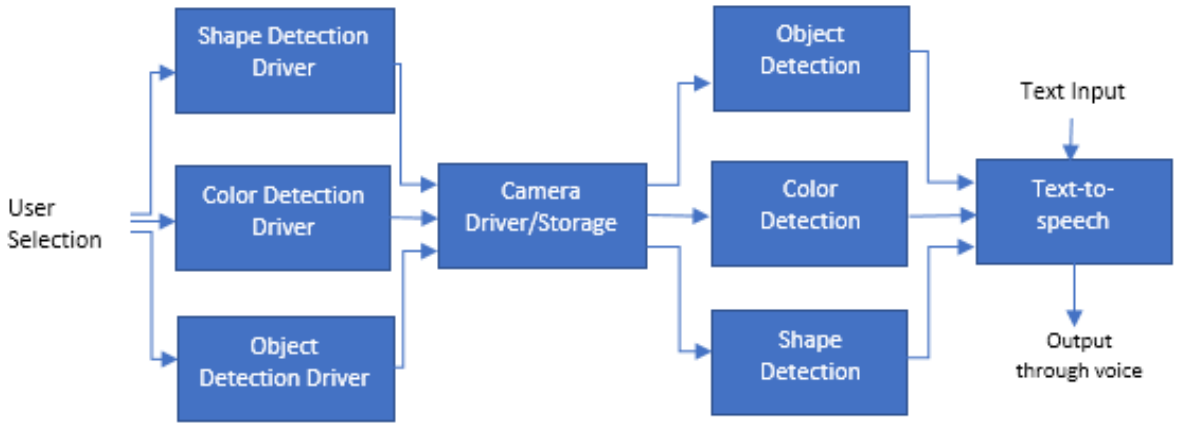
Software Specification:

- Windows 7 or above.
- Internet Connection
- IP webcam for Android

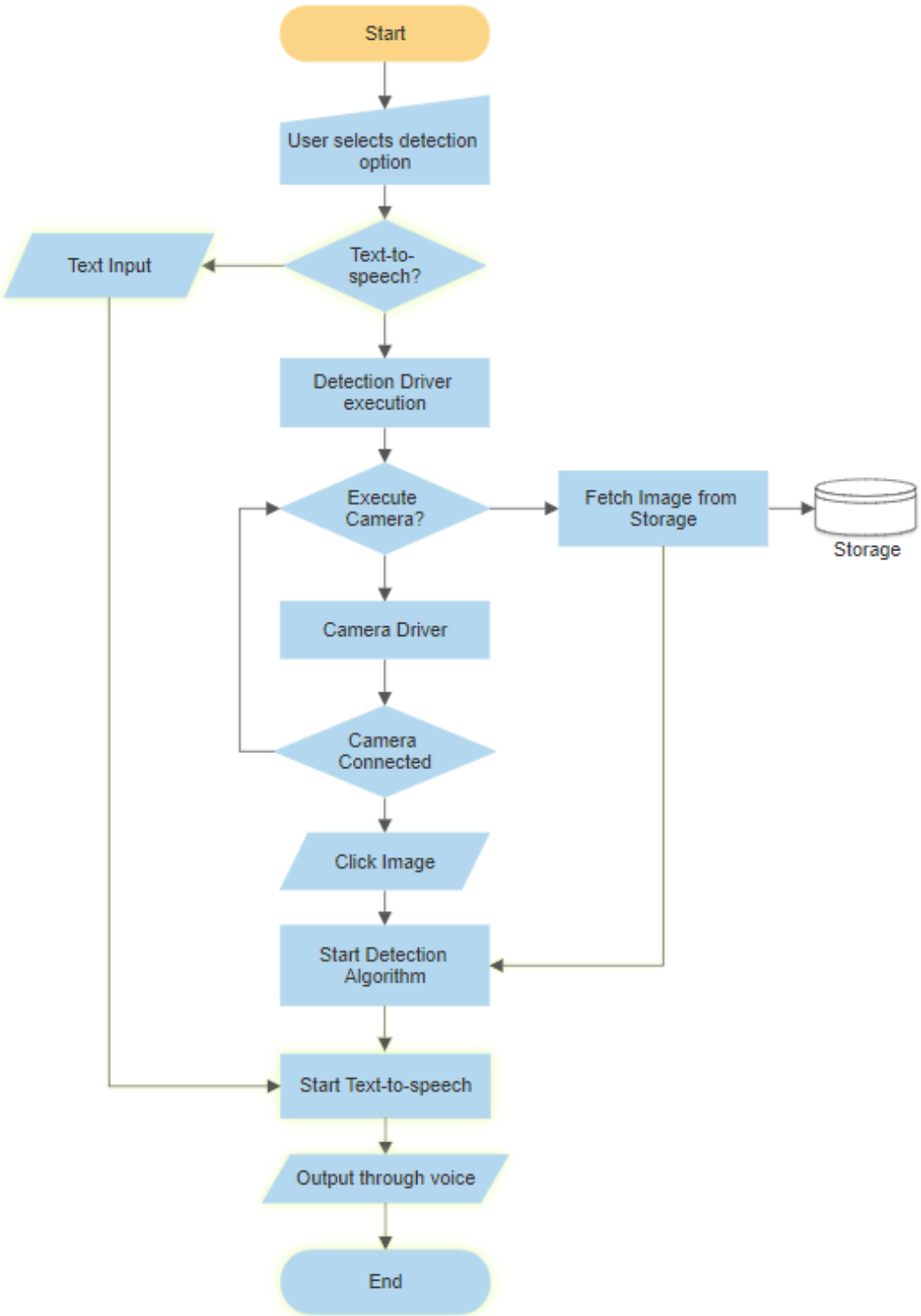
Hardware Specification:

- Dual Core Processor
- 2 GB RAM
- 120 GB Hard Drive

6. BLOCK DIAGRAM



7. SYSTEM FLOW DIAGRAM



8. USER GUIDE

Explain through screenshots, how the end users will interact with your developed project. Describe the whole process step by step.

REFERENCES

RESEARCH PAPERS:

1. **Object Detection with Deep Learning: A Review** by Zhong-Qiu Zhao, Member, IEEE and Xindong Wu, Fellow, IEEE
2. **Real Time Color Recognition** by D. Senthamaraikannan, S. Shriram, Dr. J. William

WEBSITE REFERENCES:

1. https://www.pyimagesearch.com/2018/11/12/yolo-object-detection-with-opencv/ , Article by **Adrian Rosebrock**.
2. https://pypi.org/project/gTTS/
   Description by **Pierre Nicolas Durette.**