

Implemented Image Processing operations using Python

M.Tech. Scholar Rajat Verma

Department of Computer Science & Engineering
Amity School of Engineering & Technology
Amity University, Lucknow
Uttar Pradesh, India
rajatverma310795@gmail.com

Abstract –In today’s modern world, many programming as well as scripting languages are present. Python is one of them which has made its dimension particularly clear that it will rule the scenario of computer science. Many popular websites like Google, YouTube and Yahoo all uses the scripting language python. Python is high level language which is closer to the user rather than the machine. The concepts of Object Oriented Programming is clearly mentioned in this paper. Hand Tracking, Eye tracking and face blurring is also mentioned in this paper. Edge detection in Video and image cartooning is also mentioned in this paper. Calibrating and estimating Output is also mentioned in this paper. Maze solver is also there in this paper. This all will definitely contribute to research sector in some extent.

Keywords –Python, Object Oriented, Tracking, Hand, Eye, Face Blurring.

I.INTRODUCTION

It was formulated in the 1980s. It was named after a comedy group known as ‘Monty Python’ [1] that illustrated its entertainment prospective. It comes in many versions such as 1.0, 2.0 and 3.0. 1.0 was liberated in the year 1994, 2.0 in 2000 and 3.0 in the year 2008. It was initially implemented in the year 1989 by Guido van Rossum [2]. It is a unique scripting language. It supports multiple programming patterns. It has high level built in structures. Its logo is depicted in Fig.1.



Fig.1. Python logo

Its code is not very large that means it is closely packed. It is portable in nature across different Operating System Platforms [3]. The latest version of python is 3.7.0. It is for windows. An enormous number of libraries are available for the sake of developers. It aims on three major objectives such as readability, coherence and simplicity. According to me also, python is simple when compared to other complex structured languages. Some popular users of python that the whole world knows are-

- Google
- Yahoo

- YouTube

- Drop Box

Some conventional uses of python are as follows:

- Embedded Scripting
- Artificial Intelligence (AI)
- Image Processing
- Graphical User Interface
- Automation
- Database Programming
- Internet Scripting
- System Administration

Python is based on Object Oriented Programming [4] commonly abbreviated as OOP. It is High Level Language, Interpreted, Dynamic and Multipurpose Programming Language.

II.RESEARCH BACKGROUND

1. Object Oriented Programming Concepts

Python follows Object Oriented Scenario. It can be depicted with the illustration given below as Fig.2.

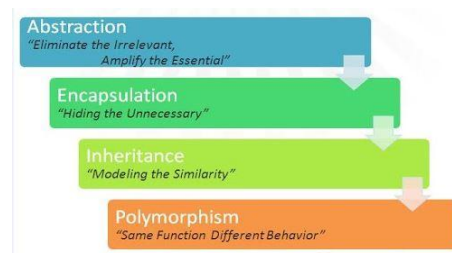


Fig.2 Concepts of Object Oriented Programming.

- **Data Abstraction** – In this, the background details are concealed and only the essential details are mentioned.
- **Encapsulation** – The wrapping up of data and functions into a single unit is termed as encapsulation.

An Example of it could be depicted as- In a company there are many departments for example accounts, sales, manufacturing etc. Now a person in the manufacturing department wants to meet a person in the sales department, so directly he cannot meet him, he must be issued with a memo.

- **Inheritance** – It is a concept in the concern to the Object Oriented programming, in which properties are inherited. Let's take an example, bike is a vehicle and vehicle come in the category of automobiles. That means bike inherit the properties of vehicles and vehicles inherit the properties of automobiles. Various kinds of inheritance are Single Inheritance, Multiple Inheritance, Multi-Level inheritance, Hybrid Inheritance and so on.
 - **Polymorphism**- It comprises of 2 words. One is poly that means many and morphism means methods. The combined word is many methods. Function Overloading is a very fine example of Polymorphism.
2. **Other Concepts**
- **High Level Language:** A High level language [5] is a language in which it is closer to the user rather than the machine.
 - **Interpreted:** In the comparison field of compiler, interpreter is used. Interpreter [6] does the work line by line and compiler [7] does it in one go.

III.HAND TRACKING IN PYTHON

Tracking can be done with the help of python language. It will be depicted in Fig.3. When the calibration is done. In the calibration aspect [8] when the hand is above the green rectangle, then at that point we have to press spacebar.

Then phase 2 will be done that is clearly depicted in Fig.4. In Fig.4 the output of the hand tracking is done. Many other techniques such as eye tracking, face blurring, face localization is also possible in this aspect. deals with the conversion of all process discussed above into reality.



Fig.3 Calibration of hand tracking.

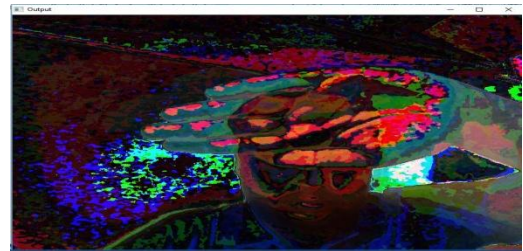


Fig.4 Output of hand tracking.

IV.EYE TRACKING AND FACE BLURRING

Tracking of eye [9] and face blurring can also be depicted in Fig.5 and Fig.6.

In fig.5 the yellow rectangle is tracking the face, dark blue covers the left eye and indigo color covers the right eye with green and red dots. In Fig.6 Blurring of face [10] is done and both of the faces are under the green rectangle.

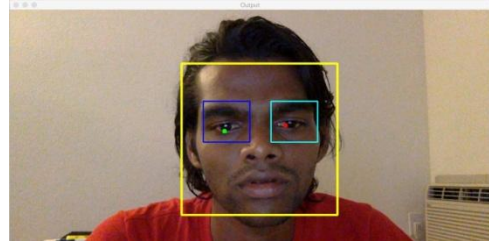


Fig.5 Eye Tracking.

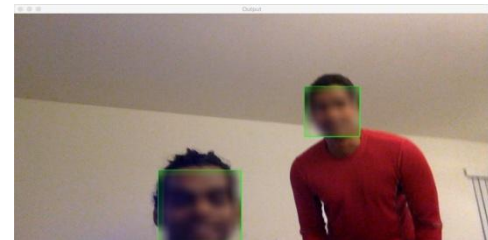


Fig.6 Face Blurring.

V.EDGE DETECTION IN VIDEO

This can be depicted in Fig.7 where the head and fingers are covered with a black line indicating the detection of edges.

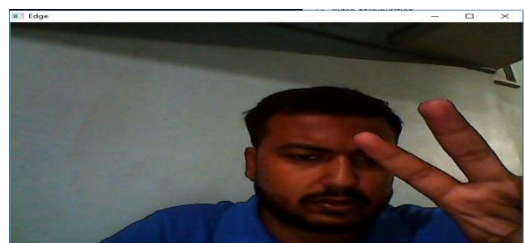


Fig.7 Detection of Edges.

VI. IMAGE CARTOONING

This can be depicted in Fig.8 and Fig.9 where the difference is allotted between the real image and cartoon image.



Fig.8 Original Picture.



Fig.9 Cartoon Picture.

VII.CALIBRATING AND LOCALIZATION SCREEN

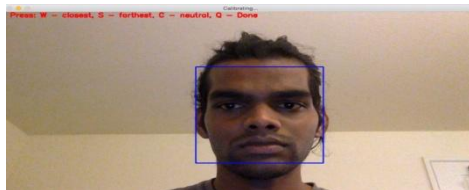


Fig.10 Calibrating.



Fig.11 Estimating Output.

VIII.MAZE SOLVER

This is clearly depicted in this Fig.12. Green line is the correct way to solve the riddle.

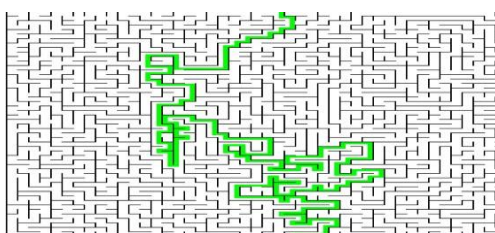


Fig.12 Maze Solver.

IX.CONCLUSION

From my point of view, this image processing techniques are very important. They are useful in many ways. Object oriented programming, which is a base of C++ [11] as well as python is clearly depicted in this paper. The tracking of the hand as well as eye is also mentioned in this paper. The face blurring is also depicted in this paper. Edge detection as well as image cartooning is also depicted in this paper. Calibrating and localizing screen is also mentioned in this paper. Maze solver is also presented in this paper which is also an application of image processing. All this will definitely contribute in the research sector and certainly bring some growth in many dimensions [12].

ACKNOWLEDGEMENT

I would like to thank my family and friends for kept supporting me in this research domain.

REFERENCES

- [1]. Python, M., Chapman, G., Cleese, J., Gilliam, T., Jones, T., Idle, E., & Palin, M. (2000). the Holy Grail. EMI Records.
- [2]. Mullender, S. J., Van Rossum, G., Tananbaum, A. S., Van Renesse, R., & Van Staveren, H. (1990). Amoeba: A distributed operating system for the 1990s. *Computer*, 23(5), 44-53.
- [3]. Bhatti, S., Carlson, J., Dai, H., Deng, J., Rose, J., Sheth, A., ... & Han, R. (2005). MANTIS OS: An embedded multithreaded operating system for wireless micro sensor platforms. *Mobile Networks and Applications*, 10(4), 563-579.
- [4]. Coad, P., & Nicola, J. (1993). *Object-oriented programming* (p. 582). Englewood Cliffs: Yourdon Press.
- [5]. Fetterly, Y. Y. M. I. D., Budiu, M., Erlingsson, Ú., & Currey, P. K. G. J. (2009). DryadLINQ: A system for general-purpose distributed data-parallel computing using a high-level language. *Proc. LSDS-IR*, 8.
- [6]. Gile, D. (2009). *Basic concepts and models for interpreter and translator training* (Vol. 8). John Benjamins Publishing.
- [7]. Gries, D. (1971). *Compiler construction for digital computers*(Vol. 24). New York: Wiley.
- [8]. Zhang, Z. (2000). A flexible new technique for camera calibration. *IEEE Transactions on pattern analysis and machine intelligence*, 22.
- [9]. Tian, Y. L., Kanade, T., & Cohn, J. F. (2000). Dual-state parametric eye tracking. In *Automatic Face and Gesture Recognition, 2000. Proceedings. Fourth IEEE International Conference on* (pp. 110-115). IEEE.
- [10]. Michrowski, G., Shabtay, G., Cohen, N., Ben-Eliezer, E., & Goldenberg, E. (2014). U.S. Patent No. 8,723,912. Washington, DC: U.S. Patent and Trademark Office.

- [11]. Stroustrup, B. (2000). The C++ programming language. Pearson Education India.
- [12]. Griliches, Z. (1979). Issues in assessing the contribution of research and development to productivity growth. The bell journal of economics, 92-116.

AUTHOR PROFILE



Rajat Verma

I am pursuing Master of Technology in Computer Science & Engineering from Amity University, Lucknow, Uttarpradesh ,India

Contact No: +91-8808223952

Email Id: rajatverma310795@gmail.com