

Computer Engineering Department

A.P. Shah Institute of Technology

— G.B.Road, Kasarvadavli, Thane(W), Mumbai-400615 UNIVERSITY OF MUMBAI Academic Year 2019-2020

A Project Report on

Artificial Teaching Assistant

Submitted in partial fulfillment of the degree of Bachelor of Engineering(Sem-7)

in

Computer Engineering

By

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Under the Guidance of Prof.Sachin Takmare

1. Project Conception and Initiation

1.1 Abstract

- It is an Artificial Teaching Assistant that has been developed with main aim to assist students in their learning process by ensuring fast and efficiently search of documents and learning materials.
- It is designed to work for english spoken language although it might work on some better than other depending on the nature of the language, the structure, grammar and semantics.
- The method uses this metric to derive context from data and then queries the data source looking for the best match.

1.2 Objectives

- As educational AI progresses and becomes more sophisticated, it's essential to include teachers in the process. In an ideal world, teachers and AI will create an immersive learning experience for students, together.
- To provide flexibility to an students to ask questions until they have a full understanding of the concepts without taking up teacher time.
- To fill the gaps for slower learning students.

1.3 Literature Review

We refered various books and papers to understand various concepts related to Artificial Intelligence, Image Processing, Signal Processing, Machine Learning etc

Some of the books are:

- 1) Artificial Intelligence A Modern Approach, Stuart J. Russell and Peter Norvig
- 2) Artificial Intelligence and Intelligent Systems , N.P.Padhy
- 3) Artificial Intelligence, Elaine Rich and Kevin Knight
- 4) Introduction to soft computing, Samir Roy and Chakraborty
- 5) Principles of Soft Computing, S.N.Sivanandam, S.N.Deepa
- 6) Neural Networks, Fuzzy Logic and Genetic Algorithms, S.Rajasekaran and G.A. Pai
- 7) Fuzzy Set Theory and its Applications, Zimmermann
- 8) Digital Image Processing by Rafel C. Gonzalez and Richard E. Woods
- 9) Digital Image Processing by S. Sridhar
- 10) Digital Signal Processing John G. Proakis, Dimitris and G.Manolakis
- 11) Digital Signal Processing, A. Anand Kumar
- 12) Management Information Systems , Kelly Rainer, Brad Prince

1.5 Scope

- The performance requirements of the application have continuously increased the computing power of implementation platforms, especially when they are executed under real time constraints.
- The real time applications may consist of different standards, or different algorithms used at different stages of the processing chain.
- The computing paradigm using reconfigurable architectures promises an itermediate trade-off between flexibility and performance.

1.6 Technology stack

Python

Python is an interpreted, high-level, general-purpose programming language. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects.

Open CV

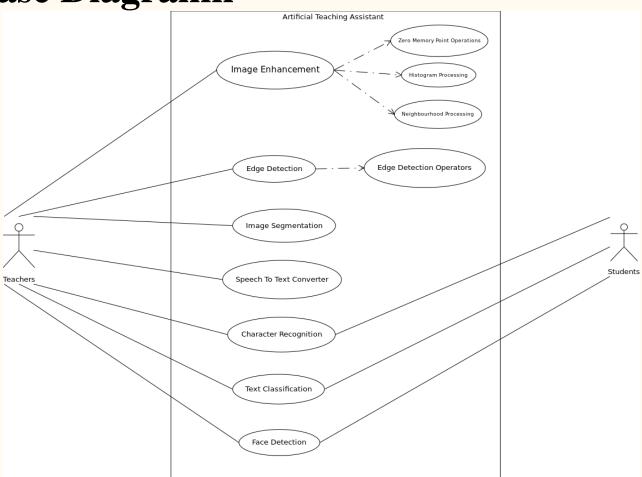
OpenCV (Open source computer vision) is a library of programming functions mainly aimed at real time computer vision. The library is cross-platform and free for use under the open source BSD license.

1.7 Benefits for environment & Society

- Reduced Carbon Footprint
- Access to Documents from Everywhere
- Keeps Things Simple
- Reduced Costs
- Increased output and productivity
- Increased quality
- Reliability

2. Project Design

Use Case Diagramn



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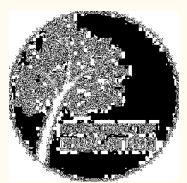
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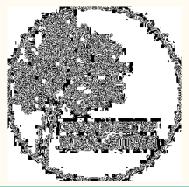
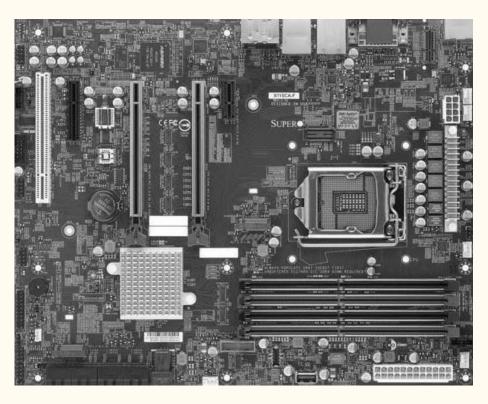


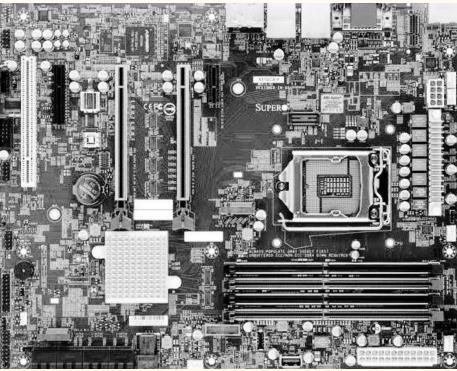
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Histogram Equalization





Histogram Equalization





Histogram Equalization





Image Smoothing

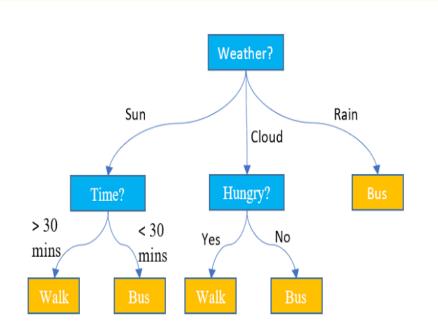
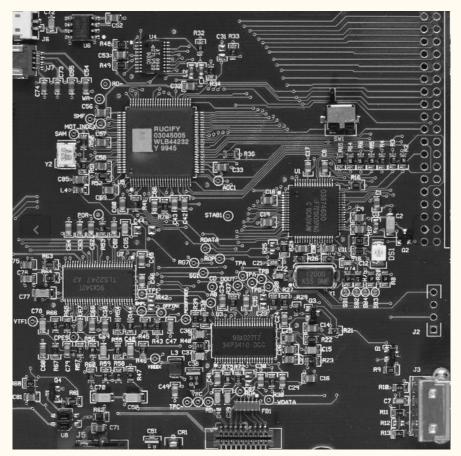




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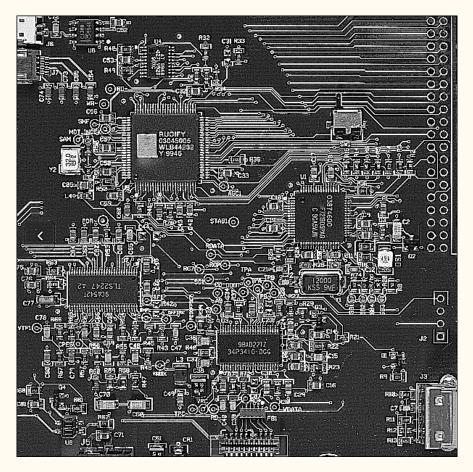


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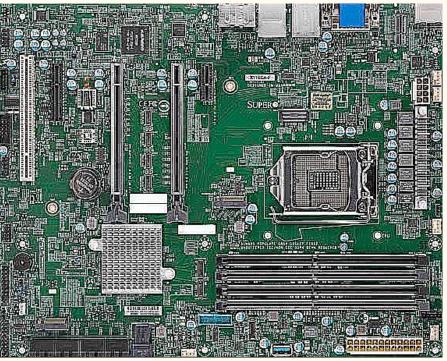
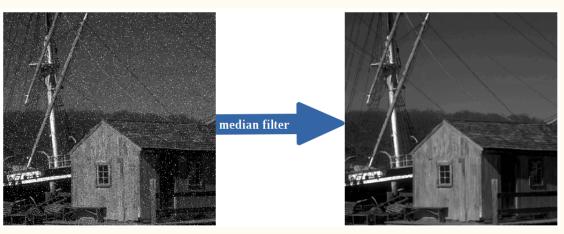


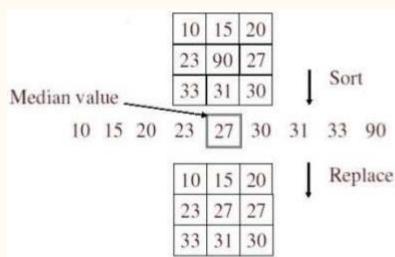
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Median Filter



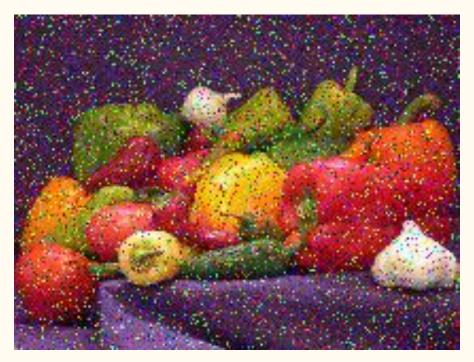


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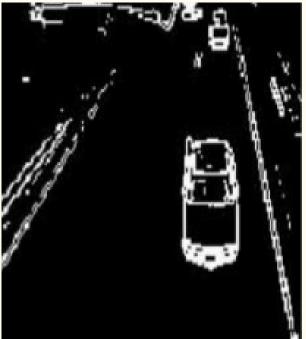
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Edge Detection



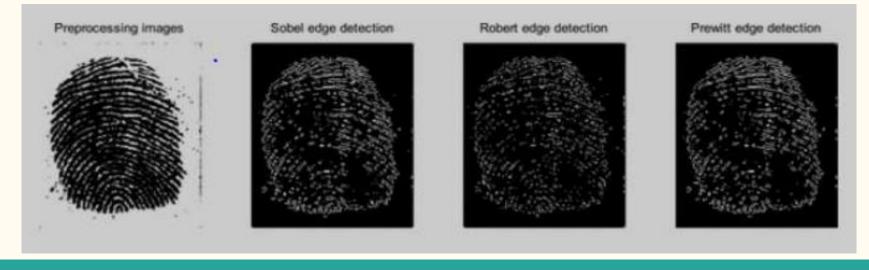




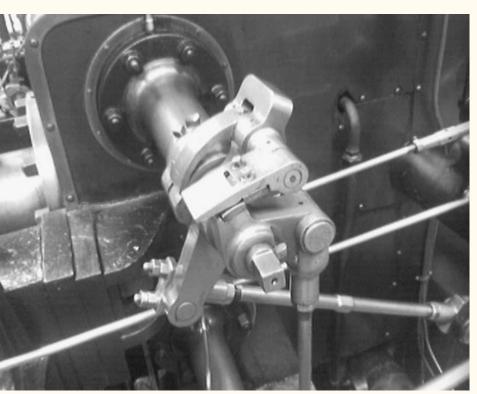
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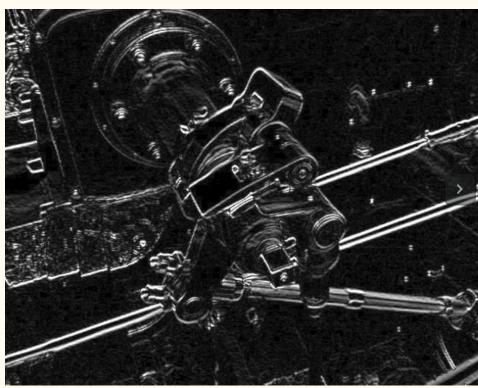






Edge Detection





2.7 References

- 1) Digital Image Processing by Rafel C. Gonzalez and Richard E. Woods
- 2) Digital Image Processing" by S. Sridhar
- 3) Digital Signal Processing by John G. Proakis, Dimitris and G.Manolakis
- 4) Digital Signal Processing by A. Anand Kumar
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- 6) Stephen Marsland, "Machine Learning An Algorithmic Perspective" CRC Press
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- 10) Neural Networks, Fuzzy Logic and Genetic Algorithms, S.Rajasekaran and G.A. Pai
- 11) Fuzzy Set Theory and its Applications, Zimmermann
- 12) Introduction to soft computing, Samir Roy and Chakraborty
- 13) Principles of Soft Computing, S.N.Sivanandam, S.N.Deepa

3. Planning for next semester

Planning

Implement the remaining functions in the software.

Thank You