A Project Report on

Teaching Assistant using Artificial Intelligence

Submitted in partial fulfillment of the requirements for the award
of the degree of

Bachelor of Engineering

in

Computer Engineering Department

by

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Approval Sheet

This Project Report entitled ***Teaching Assistant using Artificial Intelligence*** Submitted by ***Nirish Samant (16102008), Akshay Sumbhe (16102062), Tarakeshwarnath Sahani (16102033)*** is approved for the partial fulfillment of the requirenment for the award of the degree of ***Bachelor of Engineering*** in ***Computer Engineering Department*** from ***University of Mumbai***.

Prof. Sachin Takmare
Guide

Prof. Sachin Malave
Head of Computer Engineering Department

Place : A.P.Shah Institute of Technology, Thane
Date :

CERTIFICATE

This is to certify that the project entitled ***Teaching Assistant using Artificial Intelligence*** submitted by ***Nirish Samant (16102008), Akshay Sumbhe (16102062), Tarakeshwarnath Sahani (16102033)*** for the partial fulfillment of the requirement for award of a degree ***Bachelor of Engineering*** in ***Computer Engineering Department***,to the University of Mumbai,is a bonafide work carried out during academic year 2019-2020.

Prof. Sachin Takmare
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Head of Computer Engineering Department

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External Examiner(s)

1.

2.

Place : A.P.Shah Institute of Technology, Thane
Date:

Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, We have adequately cited and referenced the original sources. We also declare that We have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

_____

(Signature)

_____

Nirish Samant (16102008)
Akshay Sumbhe (16102062)
Tarakeshwarnath Sahani (16102033)

Date :

Contents

List of Abbreviations

ANN :	Artificial Neural Network
CNN :	Convolutional Neural Network
DSP :	Digital Signal Processing
DIP :	Digital Image Processing
DFT :	Discrete Fourier Transform
FFT :	Fast Fourier Transform
API :	Application Programming Interface
AI :	Artificial Intelligence
NLP :	Natural Language Processing
NLTK :	Natural Language Toolkit
FST :	Finite State Transducers
POS :	Parts of Speech Tagging
WSD :	Word Sense Disambiguation
IR :	Information Retrieval
MT :	Machine Translation
NER :	Named Entity Recognition

Chapter 1

Project Conception and Initiation

1.1 Introduction

It's highly unlikely that AI will ever be able to replace teachers, though it has already found its way into the classroom as Teaching Assistant. This way teachers will be relieved to do much more meaningful tasks. The current AI setup does have the potential to relieve teachers of some tedious and time-consuming tasks like grading paper, analyzing student engagement and classroom behavior. Rather than making obsolete, AI will empower teachers to help students the way they've always wanted to.

In the current setup, teachers are often dumped with too many tasks, which is a difficult feat to achieve on a regular basis. A good teacher is expected to handle up to 30 students within a classroom, sometime even more – taking them through lessons, monitoring classroom behavior and academic performance, grade homework, prepare lessons plans and the list goes on! It can get challenging and overwhelming for one person to handle so many things. However, the introduction of AI in the classroom as teaching assistants is on the way to transform teaching and learning as we know it today.

There are a plenty of advantages of AI in education. An AI teaching assistant can help teachers tailor lessons according to an individual student's needs. AI teaching assistants can gather data individual student's learning progress and based on the data, it is able to provide predictions of student's success or failure, identify gaps in learning, highlight strengths and weaknesses and suggest where extra support would be of required.

1.2 Research Paper Search and Finalization

We had searched for IEEE papers related to Artificial Intelligence (AI), Natural Language Processing (NLP), Image Processing (IP) on IEEE Xplore.

After thorough search of IEEE papers and consultation with our guide we decided to take "Teaching Assistant using Artificial Intelligence" as our project topic.

1.3 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 able to give an adequate response to a specific question based on knowledge gathered by an unique algorithm which enables her to recognize context during file and web page content search. After finding the most appropriate answer it seeks for student feedback in order to improve future search.

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.

The whole implementation is rounded off by a learning module which gives the system a learning curve based on users (students) scoring how relevant the output is among other parameters.

1.4 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.

1.5 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) Digital Image Processing by Rafel C. Gonzalez and Richard E. Woods

We read Digital Image Fundamentals, Digital Image Processing System, Sampling and Quantization, Representation of Digital Image, Image File Formats : BMP, TIFF, JPEG, PNG from this book.

2) Digital Image Processing by S. Sridhar

We read about Image Enhancement in Spatial domain, Gray Level Transformations, Zero Memory Point Operations, Histogram Processing, Histogram Stretching, Histogram equalization, Neighborhood Processing, Spatial Filtering, Smoothing and Sharpening Filters, Median Filter from this book.

We also read Image Segmentation, Segmentation based on Discontinuities (Point, Line, Edge), Image Edge detection using Robert, Sobel, Previtt masks, Image Edge detection using Laplacian Mask from this book.

3) Artificial Intelligence A Modern Approach , Stuart J. Russell and Peter Norvig

In this book we have read about Artificial Intelligence, Agents, Environments, Problem Solving, Uninformed Search Methods, Informed Search Method, Optimization Problems.

4) Artificial Intelligence and Intelligent Systems , N.P.Padhy

In this book we have read about Artificial Intelligence and Expert System.

5) Artificial Intelligence , Elaine Rich and Kevin Knight

In this book we have read about Artificial Intelligence, Knowledge, Reasoning, First order logic, Planning, Types of Planning etc.

6) Introduction to soft computing , Samir Roy and Chakraborty

We read about Artificial Neural Network, Neural Network Architecture : Perceptron, Single layer Feed Forward ANN, Multilayer Feed Forward ANN from this book.

7) Principles of Soft Computing , S.N.Sivanandam, S.N.Deepa

We read about Artificial Neural Network, Activation functions, Supervised Learning : Delta learning rule, Back Propagation algorithm, Un-Supervised Learning algorithm : Self Organizing Maps from this book.

8) Neural Networks, Fuzzy Logic and Genetic Algorithms , S.Rajasekaran and G.A. Pai

We read about Artificial Neural Network and Fuzzy Logic from this book.

9) Fuzzy Set Theory and its Applications , Zimmermann

We read this book to know more about fuzzy logic.

10) Digital Signal Processing John G. Proakis, Dimitris and G.Manolakis

We read about Discrete Fourier Transform (DFT), Properties of DFT, Fast Fourier Transform (FFT) from this book.

11) Digital Signal Processing , A. Anand Kumar

We read about Convolution, Discrete Fourier Transform (DFT), Fast Fourier Transform (FFT) which are used in voice processing from this book.

12) Management Information Systems , Kelly Rainer, Brad Prince

We read about Information Systems (IS), Data and Knowledge Management etc from this book.

13) Machine Learning In Action by Peter Harrington

We read about Machine Learning, Types of Machine Learning, Issues in Machine Learning, Application of Machine Learning, Steps in developing a Machine Learning Application.

We also read about Dimensionality Reduction, Dimensionality Reduction Techniques, Principal Component Analysis, Independent Component Analysis, Single value decomposition from this book.

14) Machine Learning by Tom M.Mitchell

From this book we read about Neural Network, Activation functions, McCulloch-Pitts Model, Neural Network architecture.

15) Data Mining Concepts and Techniques by Han Kamber

We read about Regression, Decision Trees, Classification Algorithms and Clustering Algorithms from this book.

16) Machine Learning An Algorithmic Perspective by Stephen Marsland

We read about Hidden Markov Models from this book.

17) Machine Learning by Kevin P. Murphy

We read about various Machine Learning Algorithms from this book.

18) Data Mining Introductory and Advanced Topics by Margaret H Dunham

We read about various Data Mining and Machine Learning Algorithms from this book.

19) Speech and Language Processing by Daniel Jurafsky and James H. Martin

We read about spelling correction, text summarization, machine translation, information retrieval, question answer system, named entity recognition from this book.

20) Foundations of Statistical Natural Language Processing by Christopher D. Manning

and Hinrich

We read about n-grams, sentiment analysis from this book.

21) Natural Language Processing and Information Retrieval by Siddiqui and Tiwary

This book helped us to know various applications of natural language processing.

22) Natural Language Processing with Python by Steven Bird and Ewan Klein

We read about Natural Language Toolkit (NLTK) from this book.

Some of the papers are :

1) Scarlet - Artificial Teaching Assistant

This paper helped us to know about various methods we can use to help teachers and students in the learning process.

2) Artificial Intelligence as an Effective Classroom Assistant

This paper helped us to know the application of Artificial Intelligence in Teaching.

1.6 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 the program promises an itermediate trade off between flexibility and performance.

1.7 Technology Stack

- Python

  Python is an interpreted, high-level, general-purpose programming language. Created by Guido van Rossum and first released in 1991, Python's design philosophy emphasizes code readability with its notable use of significant whitespace. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects.

- Colab

Colab Notebooks : Colaboratory is a Google research project created to help disseminate machine learning education and research. It's a Jupyter notebook environment that requires no setup to use and runs entirely in the cloud.

Colab is a Google internal research tool for data science. They have released the tool sometime earlier to the general public with a noble goal of dissemination of machine learning education and research. Although it's been for quite a while there is a new feature that will interest a lot of people.

- Open CV

  OpenCV (Open source computer vision) is a library of programming functions mainly aimed at real time computer vision. Originally developed by Intel, it was later supported by Willow Garage then Itseez (which was later acquired by Intel). The library is cross-platform and free for use under the open source BSD license.

- Tensor Flow

  TensorFlow allows developers to create dataflow graphs—structures that describe how data moves through a graph, or a series of processing nodes. ... TensorFlow applications can be run on most any target that's convenient: a local machine, a cluster in the cloud, iOS and Android devices, CPUs or GPUs.

  It is an open source artificial intelligence library, using data flow graphs to build models. It allows developers to create large-scale neural networks with many layers. TensorFlow is mainly used for: Classification, Perception, Understanding, Discovering, Prediction and Creation.

- Natural Language Toolkit (NLTK)

  The Natural Language Toolkit, or more commonly NLTK, is a suite of libraries and programs for symbolic and statistical natural language processing for English written in the Python programming language. NLTK is a leading platform for building Python programs to work with human language data.

  NLTK provides easy to use interfaces to over 50 corpora and lexical resources such as WordNet, along with a suite of text processing libraries for classification, tokenization, stemming, tagging, parsing, and semantic reasoning and an active discussion forum.

  NLTK is suitable for linguists, engineers, students, educators, researchers, and industry users alike. NLTK is available for Windows, Mac OS X, and Linux. Best of all, NLTK is a free, open source, community driven project.

  NLTK has been called "a wonderful tool for teaching, and working in, computational linguistics using Python," and "an amazing library to play with natural language."

1.8 Benefits for Environment

Thanks to the advancement of modern software, hardware, and Internet networking, the paperless office trend is growing in popularity.

Doing away with paperwork does sound enticing, especially for colleges that are more environmentally conscious. It also cuts down overhead expenses.

Advantages :
1) Reduced Carbon Footprint
2) Access to Documents from Everywhere
3) Keeps Things Simple
4) Increased Accessibility
5) Security
6) Reduced Costs

1.9 Benefits for Society

1) Increased output and productivity
2) Increased quality
3) Capture and dissemination of scarce expertise
4) Accessibility to knowledge and help desks
5) Automate various functions
6) Reliability

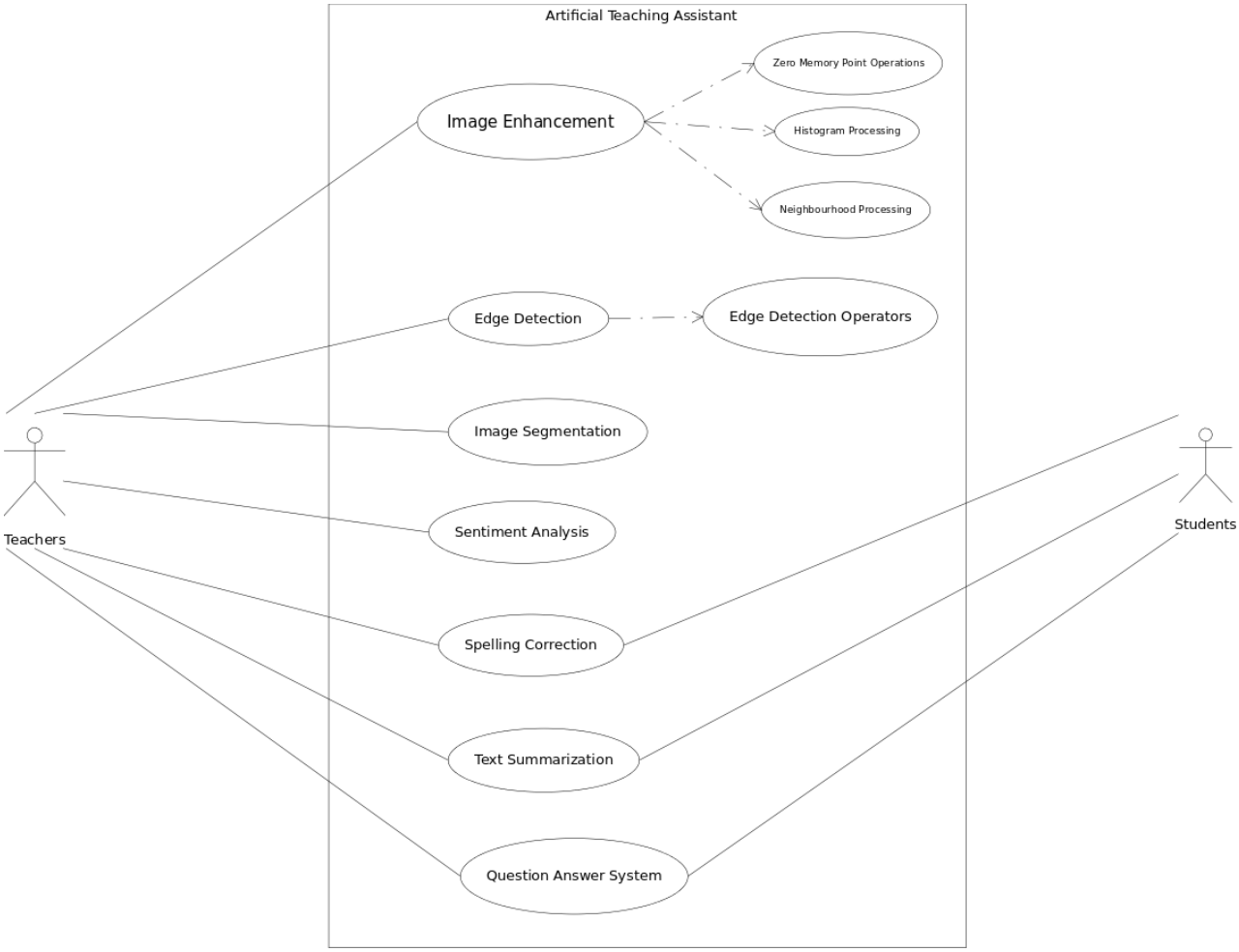
1.10 Applications

1) Image Enhancement
2) Image Segmentaion
3) Face Detection using Artificial Neural Networks.
4) Spelling Correction
5) Text Summarization
6) Machine Translation
7) Information Retrieval
8) Question Answer System
9) Grammar Correction
10) Sentiment Analysis
11) Text Categorization
12) Named Entity Recognition

Chapter 2

Project Design

2.1 Use Case Diagramn



Chapter 3

Image Enhancement in Spatial Domain

3.1 Zero Memory Point Operations

3.1.1 Digital Negative / Inversion

In digital negative / inversion transformation, each value of the input image is subtracted from the L-1 (highest gray level) and mapped onto the output image.

For binary image 0 become 1 and 1 become 0.

3.1.2 Contrast Stretching

Contrast stretching is a linear mapping function.It is used to modify contrast of an image.

Low-contrast images can result from poor illumination, lack of dynamic range in the imaging sensor, or even the wrong setting of a lens aperture during image acquisition.
Contrast stretching is a process that expands the range of intensity levels in an image so that it spans the full intensity range of the recording medium or display device.

3.1.3 Thresholding

From a grayscale image, thresholding can be used to create binary images.

The simplest thresholding methods replace each pixel in an image with a black pixel if the image intensity is less than some fixed constant T , or a white pixel if the image intensity is greater than that constant T.

3.1.4 Intensity Level Slicing With Background

It highlights the region of interest (ROI) in the image. It makes the ROI (L-1) i.e. the highest grayscale level and keeps the background as it is.

3.1.5 Intensity Level Slicing Without Background

It highlights the Region of Interest (ROI) and removes the background. It makes the background graylevel 0.

3.1.6 Bit Plane Slicing

Bit plane slicing is a method of representing an image with one or more bits of the byte used for each pixel. One can use only MSB to represent the pixel, which reduces the original gray level to a binary image.

Bit plane slicing can be used to represent an image with fewer bits, convert the image to a smaller size, enhance the image by focussing.

3.1.7 Log Transformation

During log transformation, the dark pixels in an image are expanded as compare to the higher pixel values. The higher pixel values are kind of compressed in log transformation. This result in following image enhancement

3.1.8 Gamma Correction

Gamma correction function is used to correct image's luminance.

Different camera or video recorder devices do not correctly capture luminance. Different display devices (monitor, phone screen, TV) do not display luminance correctly neither. So, one needs to correct them, therefore the gamma correction function.

Gamma refers to the brightness of a monitor or computer display. It is a setting that determines how bright the output of the display will be. Therefore, "gamma correction" is used to alter the output levels of a monitor.

3.2 Histogram Processing

Histogram is a graphical representation of the intensity distribution of an image. In simple terms, it represents the number of pixels for each intensity value considered.

3.2.1 Histogram Stretching

A point process that involves the application of an appropriate transformation function to every pixel of a digital image in order to redistribute the information of the histogram toward the extremes of a grey level range.

The target of this operation consists of enhancing the contrast of digital images.

3.2.2 Histogram Equalization

Histogram Equalization is a computer image processing technique used to improve contrast in images.

It accomplishes this by effectively spreading out the most frequent intensity values, i.e. stretching out the intensity range of the image. This method usually increases the global contrast of images when its usable data is represented by close contrast values. This allows for areas of lower local contrast to gain a higher contrast.

3.3 Neighborhood Processing

3.3.1 Image Smoothing

These algorithms are applied in order to reduce noise and/or to prepare images for further processing such as segmentation.

Smoothing is often used to reduce noise within an image or to produce a less pixelated image. Most smoothing methods are based on low pass filters

It can remove Gaussian noise. Smoothing can be acheived by using averaging filter. Discontinuous values are made more continuous.

3.3.2 Image Sharpening

Sharpening an image increases the contrast between bright and dark regions to bring out features. The sharpening process is basically the application of a high pass filter to an image.

Most image sharpening software tools work by applying something called an "unsharp mask," which despite its name, actually acts to sharpen an image.

There are three main reasons to sharpen your image : to overcome blurring introduced by camera equipment, to draw attention to certain areas and to increase legibility.

3.3.3 Median Filter

The Median Filter is a non linear digital filtering technique, often used to remove noise from an image or signal.

Such noise reduction is a typical pre processing step to improve the results of later processing. It is used to remove salt and paper noise.

Chapter 4

Image Segmentation

4.1 Point Detection

Point detection mask is used to detect points in an image.

1	1	1
1	−8	1
1	1	1

4.2 Line Detection

The line detection masks are used to detect lines in an image.

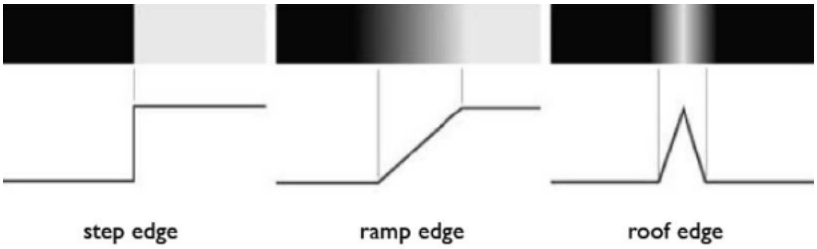
−1	−1	−1	2	−1	−1	−1	2	−1	−1	−1	2
2	2	2	−1	2	−1	−1	2	−1	−1	2	−1
−1	−1	−1	−1	−1	2	−1	2	−1	2	−1	−1
Horizontal			+45°			Vertical			−45°		

4.3 Edge Detection

Edge detection is an image processing technique for finding the boundaries of objects within images. Edge detection is used for image segmentation and data extraction in areas such as image processing, computer vision, and machine vision.

We can say sudden changes of discontinuities in an image are called as edges.

Most of the shape information of an image is enclosed in edges. So first we detect these edges in an image and by using these filters and then by enhancing those areas of image which contains edges, sharpness of the image will increase and image will become clearer.



Common edge detection algorithms include Sobel, Canny, Prewitt, Roberts, and fuzzy logic methods.

4.3.1 Robert Operator

The Roberts cross operator is used in image processing and computer vision for edge detection.

It was one of the first edge detectors and was initially proposed by Lawrence Roberts in 1963.

−1	0
0	1

0	−1
1	0

4.3.2 Prewitt Operator

Prewitt operator is used for edge detection in an image.

Image is also a signal so changes in a signal can only be calculated using differentiation. So that's why these operators are also called as derivative operators or derivative masks.

Prewitt operator provides us two masks one for detecting edges in horizontal direction and another for detecting edges in an vertical direction.

-1	-1	-1
0	0	0
1	1	1

-1	0	1
-1	0	1
-1	0	1

4.3.3 Sobel Operator

The Sobel operator, sometimes called the Sobel–Feldman operator or Sobel filter, is used in image processing and computer vision, particularly within edge detection algorithms where it creates an image emphasising edges.

The sobel operator is very similar to Prewitt operator. Sobel operator gives more weightage to neighbouring pixels.

-1	-2	-1
0	0	0
1	2	1

-1	0	1
-2	0	2
-1	0	1

4.3.4 Laplacian Edge Detector

Laplacian operator is second derivative operator.

Unlike the Sobel edge detector, the Laplacian edge detector uses only one kernel. It calculates second order derivatives in a single pass.

The Laplacian of an image highlights regions of rapid intensity change and is therefore often used for edge detection.

0	−1	0
−1	4	−1
0	−1	0

−1	−1	−1
−1	8	−1
−1	−1	−1

Chapter 5

Natural Language Processing

5.1 Machine Translation

Machine Translation (MT) is the use of computers to automate the process of translating from one language to another.

Translation, in its full generality, is a difficult, fascinating, and intensely human endeavor, as rich as any other area of human creativity. Translation clearly requires a deep and rich understanding of the source language and the input text, and a sophisticated, poetic, and creative command of the target language.

The problem of automatically performing high quality literary translation between languages is thus far too hard to automate completely. The differences between languages are referred to as translation divergences and an understanding of what causes them will help us in building models that overcome the differences. Even when languages differ, these differences often have systematic structure. The study of systematic cross linguistic similarities and differences is called typology.

Another important dimension of typological variation has to do with argument structure and linking of predicates with their arguments, such as the difference between head marking and dependent marking languages. Many structural divergences between languages are based on typological differences. Lexical divergences also cause huge difficulties in translation.

In direct translation, we proceed word-by-word through the source language text, translating each word as we go.

Languages differ systematically in structural ways. Another strategy for doing MT is to translate by a process of overcoming these differences, altering the structure of the input to make it conform to the rules of the target language. This can be done by applying contrastive knowledge, that is, knowledge about the differences between the two languages. Systems that use this strategy are said to be based on the transfer model.

One problem with the transfer model is that it requires a distinct set of transfer rules for each pair of languages. This suggests a different perspective on the nature of translation. Instead

of directly transforming the words of the source language sentence into the target language, the interlingua intuition is to treat translation as a process of extracting the meaning of the input and then expressing that meaning in the target language.

5.2 Question Answer System

Question answering is the task of returning a particular piece of information to the user in response to a question. There are many situations where the user wants a particular piece of information rather than an entire document or document set.

We call the task factoid question answering if the information is a simple fact, and particularly if this fact has to do with a named entity like a person, organization, or location. The task of a factoid question answering system is thus to answer questions by finding, either from the Web or some other collection of documents, short text segments that are likely to contain answers to questions, reformatting them, and presenting them to the user.

The three phases of a modern factoid question answering system are :
1) Question processing
2) Passage retrieval and ranking
3) Answer processing

5.3 Text Summarization

Text summarization is the process of distilling the most important information from a text to produce an abridged version for a particular task and user.

Important kinds of summaries that are the focus of current research include :
1) Outlines of any document
2) Abstracts of a scientific article
3) Headlines of a news article
4) Summaries of email threads
5) Action items or other summaries of a (spoken) business meeting
6) Snippets summarizing a web page on a search engine results page
7) Compressed sentences for producing simplified or compressed text
8) Answers to complex questions, constructed by summarizing multiple documents

A generic summary is one in which we don't consider a particular user or a particular information need; the summary simply gives the important information in the document. By contrast, in query focused summarization, also called focused summarization, topic based summarization and user focused summarization, the summary is produced in response to a user query.

One crucial architectural dimension for text summarizers is whether they are producing an abstract or an extract. The simplest kind of summary, an extract, is formed by selecting (extracting) phrases or sentences from the document to be summarized and pasting them together. By contrast, an abstract uses different words to describe the contents of the doc-

ument.

In this proposed approach, we are using extractive method to get summary of given input.

Considering the task of building an extractive summary for a single document, the three summarization stages are :
1) Content Selection
2) Information Ordering
3) Sentence Realization

5.4 Sentiment Analysis

Sentiment Analysis is a text categorization task. It is the extraction of sentiment i.e. the positive or negative orientation that a writer expresses toward some object.

A review of a lecture, book, or product on the web expresses the student's sentiment toward the product.

Naive Bayes text classification can work well for sentiment analysis. We train naive Bayes classifiers using all words in the training set to estimate positive and negative sentiment.

5.5 Spelling Correction

Spelling Correction is a process of detecting and providing suggestions for incorrectly spelled words in a text. Spell Checker is an application program that flags words in a document that may not be spelled correctly.

When some text is given as an input to spell checker, it list outs the incorrect words separately by checking their availability in the dictionary. Finally it provides the suggestions for the incorrect words from the dictionary.

In the fields of computational linguistics and probability, an n-gram is a contiguous sequence of n items from a given sample of text or speech. An N-gram means a sequence of N words. An N-gram model predicts the occurrence of a word based on the occurrence of its N-1 previous words. It assigns probabilities to sentences and sequences of words.

Using Latin numerical prefixes, an n-gram of size 1 is referred to as a "unigram", size 2 is a "bigram", size 3 is a "trigram". English cardinal numbers are sometimes used, e.g., "four gram", "five gram", and so on.

5.6 Named Entity Recognition (NER)

The process of named entity recognition refers to the combined task of finding spans of text that constitute proper names and then classifying the entities being referred to according to

their type. By named entity, we simply mean anything that can be referred to with a proper name. The starting point for most information extraction applications is the detection and classification of the named entities in a text.

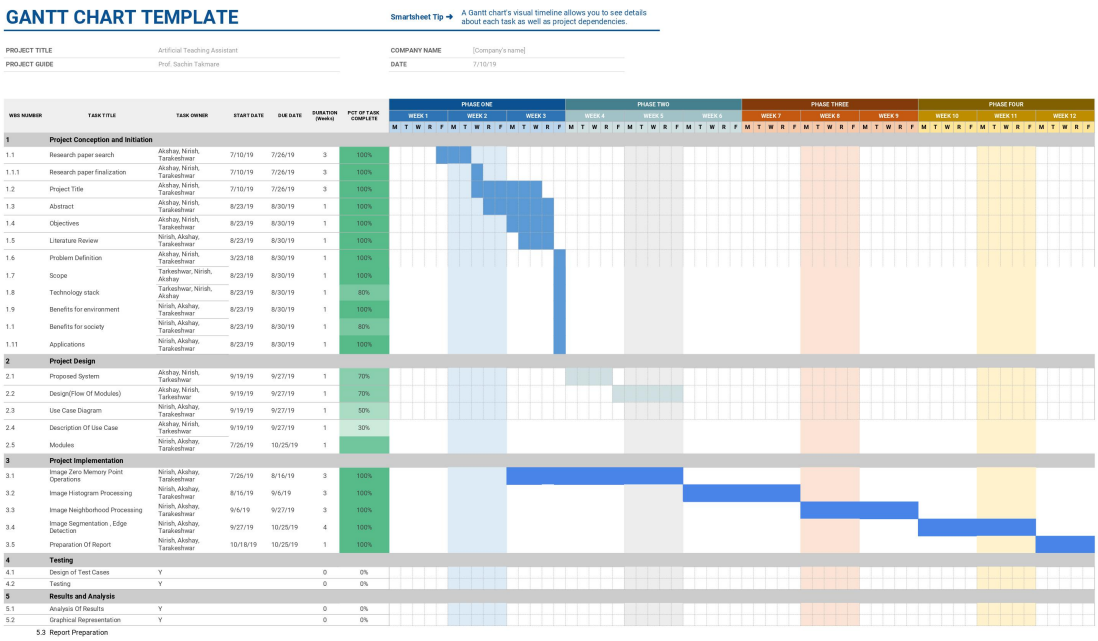
Named Entity Recognition (NER) systems focus on the detection of things like people, places, and organizations. Specialized applications may be concerned with many other types of entities, including commercial products, weapons, works of art etc. What these applications all share is a concern with proper names, the characteristic ways that such names are signaled in a given language or genre, and a fixed set of categories of entities from a domain of interest.

By the way that names are signaled, we simply mean that names are denoted in a way that sets them apart from ordinary text. For example, if we're dealing with standard English text, then two adjacent capitalized words in the middle of a text are likely to constitute a name. Further, if they are preceded by a Dr. or followed by an MD, then it is likely that we're dealing with a person. In contrast, if they are preceded by arrived in or followed by NY then we're probably dealing with a location. Note that these signals include facts about the proper names as well as their surrounding contexts.

Chapter 6

Annexure

6.1 Gnatt Chart



GANTT CHART TEMPLATE

Smartsheet Tip → A Gantt chart's visual timeline allows you to see details about each task as well as project dependencies.

PROJECT TITLE	Artificial Teaching Assistant	COMPANY NAME	[Company's name]
PROJECT GUIDE	Prof. Sachin Takmare	DATE	7/10/19

WBS NUMBER	TASK TITLE	TASK OWNER	START DATE	DUE DATE	DURATION (Weeks)	PCT OF TASK COMPLETE
1	**Project Conception and Initiation**					
1.1	Research paper search	Akshay, Nirish, Tarakeshwar	7/10/19	7/26/19	3	100%
1.1.1	Research paper finalization	Akshay, Nirish, Tarakeshwar	7/10/19	7/26/19	3	100%
1.2	Project Title	Akshay, Nirish, Tarakeshwar	7/10/19	7/26/19	3	100%
1.3	Abstract	Akshay, Nirish, Tarakeshwar	8/23/19	8/30/19	1	100%
1.4	Objectives	Akshay, Nirish, Tarakeshwar	8/23/19	8/30/19	1	100%
1.5	Literature Review	Nirish, Akshay, Tarakeshwar	8/23/19	8/30/19	1	100%
1.6	Problem Definition	Akshay, Nirish, Tarakeshwar	3/23/18	8/30/19	1	100%
1.7	Scope	Tarkeshwar, Nirish, Akshay	8/23/19	8/30/19	1	100%
1.8	Technology stack	Tarkeshwar, Nirish, Akshay	8/23/19	8/30/19	1	80%
1.9	Benefits for environment	Nirish, Akshay, Tarakeshwar	8/23/19	8/30/19	1	100%
1.1	Benefits for society	Nirish, Akshay, Tarakeshwar	8/23/19	8/30/19	1	80%
1.11	Applications	Nirish, Akshay, Tarakeshwar	8/23/19	8/30/19	1	100%
2	**Project Design**					
2.1	Proposed System	Akshay, Nirish, Tarkeshwar	9/19/19	9/27/19	1	70%
2.2	Design(Flow Of Modules)	Akshay, Nirish, Tarkeshwar	9/19/19	9/27/19	1	70%
2.3	Use Case Diagram	Nirish, Akshay, Tarakeshwar	9/19/19	9/27/19	1	50%
2.4	Description Of Use Case	Akshay, Nirish, Tarkeshwar	9/19/19	9/27/19	1	30%
2.5	Modules	Nirish, Akshay, Tarakeshwar	7/26/19	10/25/19	1	
3	**Project Implementation**					
3.1	Image Zero Memory Point Operations	Nirish, Akshay, Tarakeshwar	7/26/19	8/16/19	3	100%
3.2	Image Histogram Processing	Nirish, Akshay, Tarakeshwar	8/16/19	9/6/19	3	100%
3.3	Image Neighborhood Processing	Nirish, Akshay, Tarakeshwar	9/6/19	9/27/19	3	100%
3.4	Image Segmentation , Edge Detection	Nirish, Akshay, Tarakeshwar	9/27/19	10/25/19	4	100%
3.5	Preparation Of Report	Nirish, Akshay, Tarakeshwar	10/18/19	10/25/19	1	100%
4	**Testing**					
4.1	Design of Test Cases	Y			0	0%
4.2	Testing	Y			0	0%
5	**Results and Analysis**					
5.1	Analysis Of Results	Y			0	0%
5.2	Graphical Representation	Y			0	0%
	5.3 Report Preparation					

Chapter 7

Result

We are enhancing digital images so that the images are more suitable for display or further image analysis. We are able to improve quality of images.

We have currently able to brighten an image, smooth, sharpen, remove noise from images making it easier to identify key features.

We are able to detect edges in an image.

Our project can perform various natural language processing tasks like spelling correction, text summarization, machine translation, question answering, information retrieval, grammar correction, text categorization, sentiment analysis, named entity recognition etc, all of which can help in education and teaching sector.

The user can correct his/her spelling mistakes in document using spell checker. Text summarization can be used to get a summary of the user's document. Machine translation can convert language of one document to another. Named entity recognition can detect named entities like name of a person, organisation, location, date etc from a document. Information retrieval can be used to get a particular information from the document. Grammar correction can be used to correct the grammar mistakes of a document. Sentiment analysis can be used by teachers to get feedback of lectures, notes etc from the student.

Chapter 8

Conclusions and Future Scope

System is fully automatic and has the capability to work with images. Our system can be used in Digital Cameras where in the image is captured.

Our system is able to detect edges in images which has a lot of applications in real life.

Our system can perform various natural language processing tasks like spelling correction, text summarization, machine translation, question answering, information retrieval, grammar correction, text categorization, sentiment analysis, named entity recognition etc, all of which can help in education and teaching sector.

There are a plenty of advantages of AI in education. An AI teaching assistant can help teachers tailor lessons according to an individual student's needs. AI teaching assistants can gather data individual student's learning progress and based on the data, it is able to provide predictions of student's success or failure, identify gaps in learning, highlight strengths and weaknesses and suggest where extra support would be of required.

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Appendices

8.0.1 Python

To follow all of the examples in this project, you're going to need Python 2.7, NumPy, Tkinter Matplotlib. The easiest way to get these modules is through package installers.

8.0.2 Open CV (Open Source Computer Vision)

OpenCV is a library of programming functions mainly aimed at real time computer vision.

OpenCV is used for reading the input image and saving it after processing.

8.0.3 Natural Language Toolkit (NLTK)

NLTK is available for Windows, Mac OS X, and Linux. Best of all, NLTK is a free, open source, community driven project.

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