TEXT TO HANDWRITTEN CHARACTER

A PROJECT REPORT

Submitted by

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KAVARAIPETTAI - 601206

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BONAFIDE CERTIFICATE

Certified that this project report titled *"***TEXT TO HANWRITTEN CHARACTER***"*, is a bonafide work of **SABARIVASAN M (111519104117) , SACHIN S (111519104118)** who carried out the work under my supervision

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VIVA-VOCE EXAMINATION

The V i v a - Voce Examination of the following students who have submitted this project work held on……

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INTERNAL EXAMINER **EXTERNAL EXAMINER**

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I take this opportunity to put to record my sincere thanks to all who enlightened my path towards the successful completion of this project. At the very outset, I thank the almighty for his abundant blessing on me.

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ABSTRACT

Handwriting recognition has been an active and challenging area of research. Handwriting recognition system plays a very important role in today's world. This is very popular and computationally expensive work. At present time it is very difficult to find correct meaning of handwritten documents. There are many areas where we need to recognize the words, alphabets and digit. There are many application postal addresses, bank cheque where we need to recognize handwriting. This project is concentrated in finding the handwritten content in the document and converting it into digital form.

Handwriting recognition system can be used to solve many complex problems and can make human's work easy. There are many applications where we need hand writing recognition system like bank cheque, postal addresses, and form documents, In all the techniques main stage is feature extraction. This project may be used in all the other fields and can be helpful in converting handwritten text into typed format.

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CHAPTER - 1

HANDWRITING RECOGNITION

1.1 RECOGNITION

Handwriting recognition is the proficiency and ability of the system which receives the data in the handwritten format and coverts it into the digital form. The system may receive the data input from the handwritten documents such as papers, handwritten receipts or bills, old handwritten files, post letters and applies various concepts of machine learning such as deep learning, neural networks upon the data gathered and converts it into digital format.

Though there is a vast choice for technological writing tools, most of the people still choose to take their notes in the traditional way which is nothing but in handwritten format with the help of pen and paper. Though this method helps the people in storing the necessary information, it also has many disadvantages, it is very difficult to store large volume of handwritten documents and access it whenever we need it, it is very much time consuming and stressful task to search for a required file and to share that file with others

Most of important information may fail to get inspected or it may get lost and it is very difficult to share the handwritten document with others, so this project aims in converting the handwritten documents into digitalized text format so that the handwritten information can be used in more effective manner and can be stored and accessed easily.

This can also be used in many fields such as verifying the handwritten

postal address, analysing the documents and for bank check verification and processing this project can also be used to identify the unrecognizable text written in any documents just by scanning or taking the picture of that unrecognizable document and passing it to the software it can also be used by the lecturers to send the softcopy of the handwritten notes to the students by using this system rather than typing the entire notes from the scratch, this will also help in recognizing the prescriptions given by the doctors if it is difficult to recognize .

1.2 INTRODUCTION

OBJECTIVE

Although we have large number of technologies for typing and writing people still use pen and paper to store the information which they gather suchinformation which is gathered in the form of handwritten format is very difficult to store and access and to share the information with other , this project helps in converting the handwritten data into the text format so that it can be stored in any physical device or in the cloud in small amount of time and can be accessed whenever is needed and the information can be easily shared with others, it will also can be used in various fields such as verification of bank details, scanning the hardcopy of the notes and sending the softcopy of it to the students etc.

The main objective of this proposed project is to develop a software that read the handwritten content, recognize it, converts it into the text and displays in typed format.

This involves in gathering the handwritten data from the user in the form of image and pre-processing the gathered image by binarizing it , by removing all the stains in the image and then the system recognizes the image by using various machine learning techniques and converts it into text and displays in the typed format.

CHAPTER – 2

SYSTEM ANALYSIS

2.1 EXISTING SYSTEM

There is an application called text scanner which is a mobile application which will convert the text into digitalized text format. But main disadvantage of this application is it only convert text that is typed text into digital format not the handwritten texts, it will easily convert the text on the paper to digital text format but whenever it finds handwritten content such as handwritten words or numbers it fails to convert the same to typed digital format. There are also other applications which will convert the handwritten text to typed format but they will only convert individual alphabets ratherwhole words.

There are some applications text fairy, ocr scanner which converts the text in the paper to digital text very quickly but when it comes to recognizing handwritten text these apps undergo crash, they are unable to efficiently recognize the handwritten content which is given the input and give the expected output.

Disadvantages:

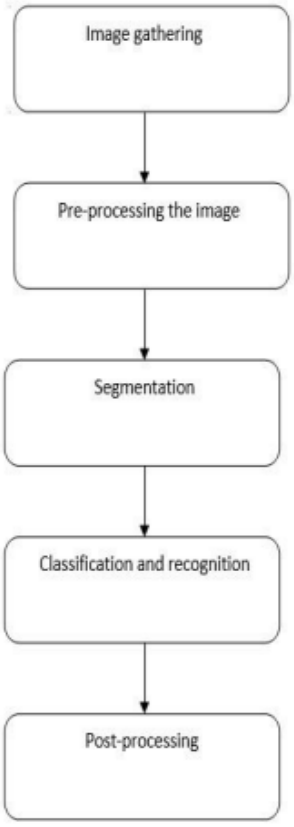
- One of the drawbacks of the existing system is it will only convert typed texts inthe paper to digital text format.
- The application text scanner fails to recognize the handwritten contents.
- Time consuming.
- Some applications convert individual alphabets but they fail to convert handwritten words and sentences to typed format.

2.2 PROPOSED SYSTEM

The main aim is to develop a software that read the handwritten content , recognize it, converts it into the text and displays in typed format. It has included more than 40 fonts as no other included this much fonts.

In the proposed System the software takes the handwritten data in the form of pictures as an input and applies various concept of machine learning and artificial intelligence such as deep learning, neural networks to identify and recognize the data from the user input and convert it into digitalized text.

2.2.1 FLOW CHART FOR PROPOSED SYSTEM



2.3 REQUIREMENTS:

HARDWARE REQUIREMENTS	SOFTWARE REQIREMENTS
• Laptop/Desktop with Processor 2.8 GHz and above • RAM 512MB and above	• Chrome(new version) • Vscode/ text editor-(sublime text)recommended • Programming Language as , HTML, CSS, javascript

2.4 SYSTEM ARCHITECTURE

The system should be developed in such a format that it should be able to get the handwritten input in the form of picture, this picture input can be in any format irrespective of jpg,jpeg or png. After this pre-processing of the image takes place in which the entire picture is divided into small subpictures where each picture handles individual characters and reduces the noise of the picture and converts it into its ascii values.

Next step involves in reorganization and classification of handwritten contents with the help of various machine learning techniques such as deep learning neural networks etc so that accurate identification of the handwritten input is done and the last step involves in displaying the converted handwritten input in digital text format.

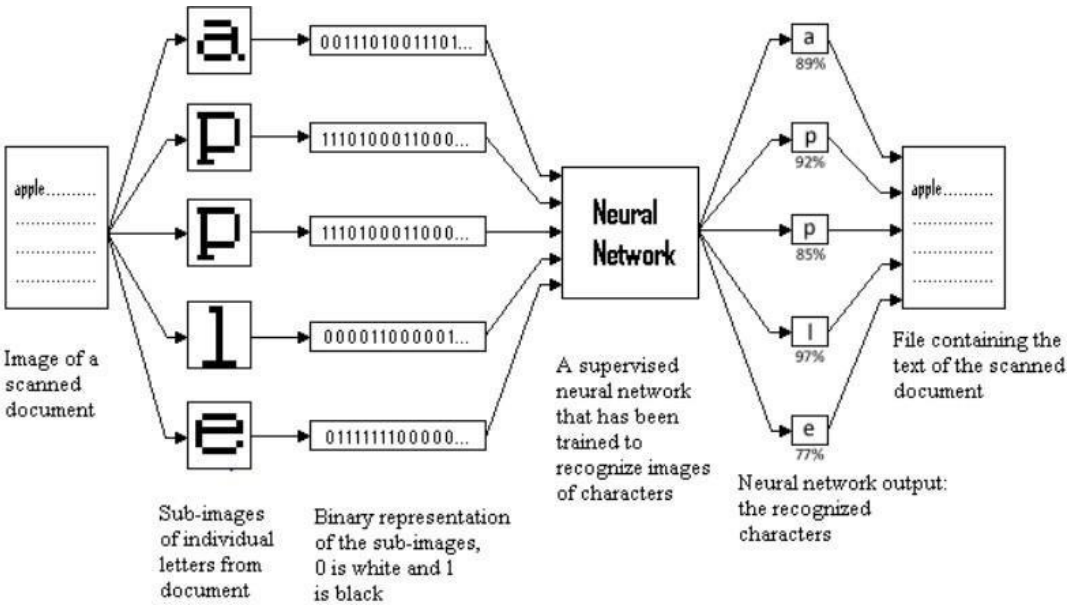


Fig 2.4 System architecture

CHAPTER – 3

SYSTEM DESIGN

Software design sits at the technical kernel of the software engineering process and is applied regardless of the development paradigm and area of application. Design is the first step in the development phase for any engineered product or system. The designer's goal is to produce a model or representation of an entity that will later be built. Beginning, once system requirement has been specified and analyzed, system design is the first of the three technical activities -design, code and test that is required to build and verify software.

The importance can be stated with a single word "Quality". Design is the place where quality is fostered in software development. Design provides us with representations of software that can assess for quality. Design is the only way

that we can accurately translate a customer's view into a finished software product or system. Software design serves as a foundation for all the software engineering steps that follow. Without a strong design we risk building an unstable system – one that will be difficult to test, one whose quality cannot be assessed until the last stage.

During design, progressive refinement of data structure, program structure, and procedural details are developed reviewed and documented. System design can be viewed from either technical or project management perspective. From the technical point of view, design is comprised of four activities – architectural design, data structure design

3.1 FUNCTIONAL REQUIREMENTS AND NONFUNCTIONAL REQUIREMENTS

3.1.1 FUNCTIONAL REQUIREMENTS

In software engineering, the functional requirements characterize an element or a function of a software framework or its part. A function is portrayed as an arrangement of sources of info, inputs and outputs the conduct, and yields. These functional requirements might be counts, specialized points of interest, data and information control and handling and other explicit usefulness that characterize what a system should achieve. Behavioural requirements portraying every one of the situations where the framework utilizes the functional requirements are caught being used cases.

Here, in this project the system has to execute these tasks:

- Must be able to take the handwritten inputs in the form of the images.
- Must be able to pre-process the image and should reduce the noise of the image
- Must be able to perform classification and identification algorithms

and shouldrecognize the handwritten input.

- Must be able to display the accurate output in text format.

3.1.2 NON-FUNCTIONAL REQUIREMENTS

In system engineering a non-useful or non-functional requirement is a necessity that indicates criteria that can be utilized to pass judgment on the activity of a system. This should be diverged from functional necessities that characterize explicit conduct or functions. The arrangement for executing functional necessities or requirement is point by point explained in the system structure or the system design and architecture. In order to achieve goal of the project developer should give equal importance to both functional and non-functional requirements. Some of the n0n-functional requirements are accessibility portability ,security, scalability etc.

Some of the quality attributes are as follows:

1. **ACCESSIBILITY:**

Accessibility is the general term which specifies how the developed service or the software is accessible for the end user.

In this project any end user who has the handwritten input data and who wants it to bein the text format can have access of the project.

2. **MAINTAINABILITY:**

Maintainability is nothing but how the system which is developed can update itself with respect to time how the system corrects the defects and bugs which occurred after deployment and how it will meet users new requirements.

Since the program is developed using python it is easy to detect and correct the errors which occur during the execution. New functionalities can be added to the project based on the user requirement just by adding required files or APIs for the existing software.

3. SCALABILITY:

This will give the idea about how the system acts or how the system gives its throughput when the load of the input data is changed.

System can work normally under any amount of inputted handwritten data.

4. PORTABILITY:

Portability is one of the important features of non-functional requirements, it will give the idea about whether the software need to be rewritten when software moves from one device to another.

Project uses python so the project can be easily installed and can be used in anyother platforms

CHAPTER - 4

DESIGN

4.1 DESIGN GOALS

To enable a secured and efficient data transmission between input and output the developer need to follow set of guidelines as listed below.

INPUT/OUTPUT PRIVACY

No sensitive information of the user should be stored by the developer and developer should warn the user not to upload their private details so as to protect the loss of user's personal data because of cyber theft. The user should be given clear cut idea about not to post their personal information

and they should me made aware of malware attacks , hacking and cyberthefts. The user input must be secured from all kind of thefts.

EFFICIENCY AND CONSISTENCY

The software developed should efficiently take the handwritten input from the user in the form of the image and it should systematically perform the pre-processing task which involves binarization, noise reduction. System should also segment the input into individual images and perform machine learning algorithms and neural network concepts on the input and should recognize the input correctly all the steps should go as planned there should not be any jump from one step to another or between the steps by leaving the intermediate steps .all the steps should execute as organized in order to get the expected output.

4.2 USE CASE DIAGRAM:

A Use case is a description of set of sequence of actions. Graphically it is rendered as an ellipse with solid line including only its name. Use case diagram is a behavioral diagram that shows a set of use cases and actors and their relationship. It is an association between the use cases and actors. An actor represents a real-world object. Primary Actor – Sender , Secondary Actor Receiver.

USE CASE DIAGRAM :

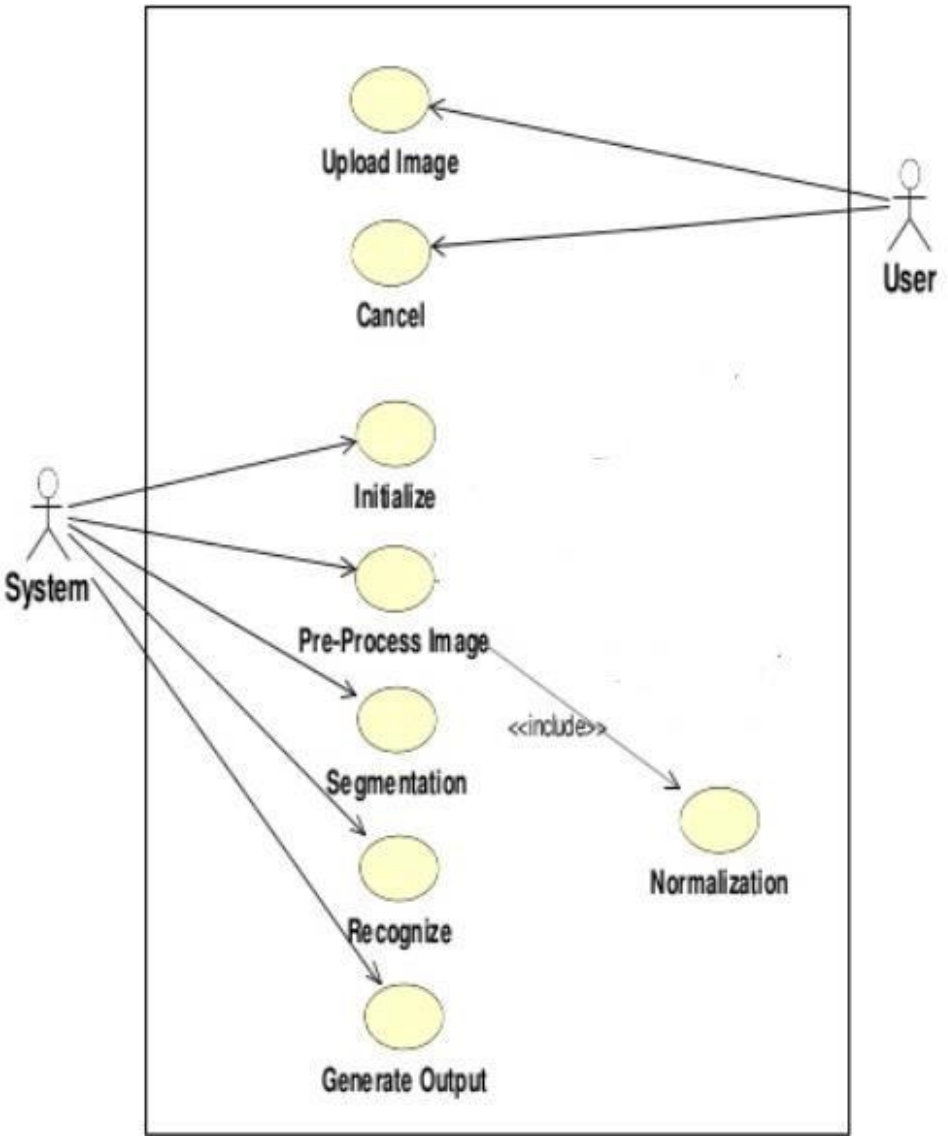


Fig 4.2 : use case diagram

SEQUENCE DIAGRAM

A Sequence Diagram is a connection diagram that accentuation the time requesting of messages; a joint effort diagram is an association diagram that underlines the basic association of the items that send and get messages. Succession diagrams and joint effort diagrams are isomorphic, implying that you can take one and change it into the other.

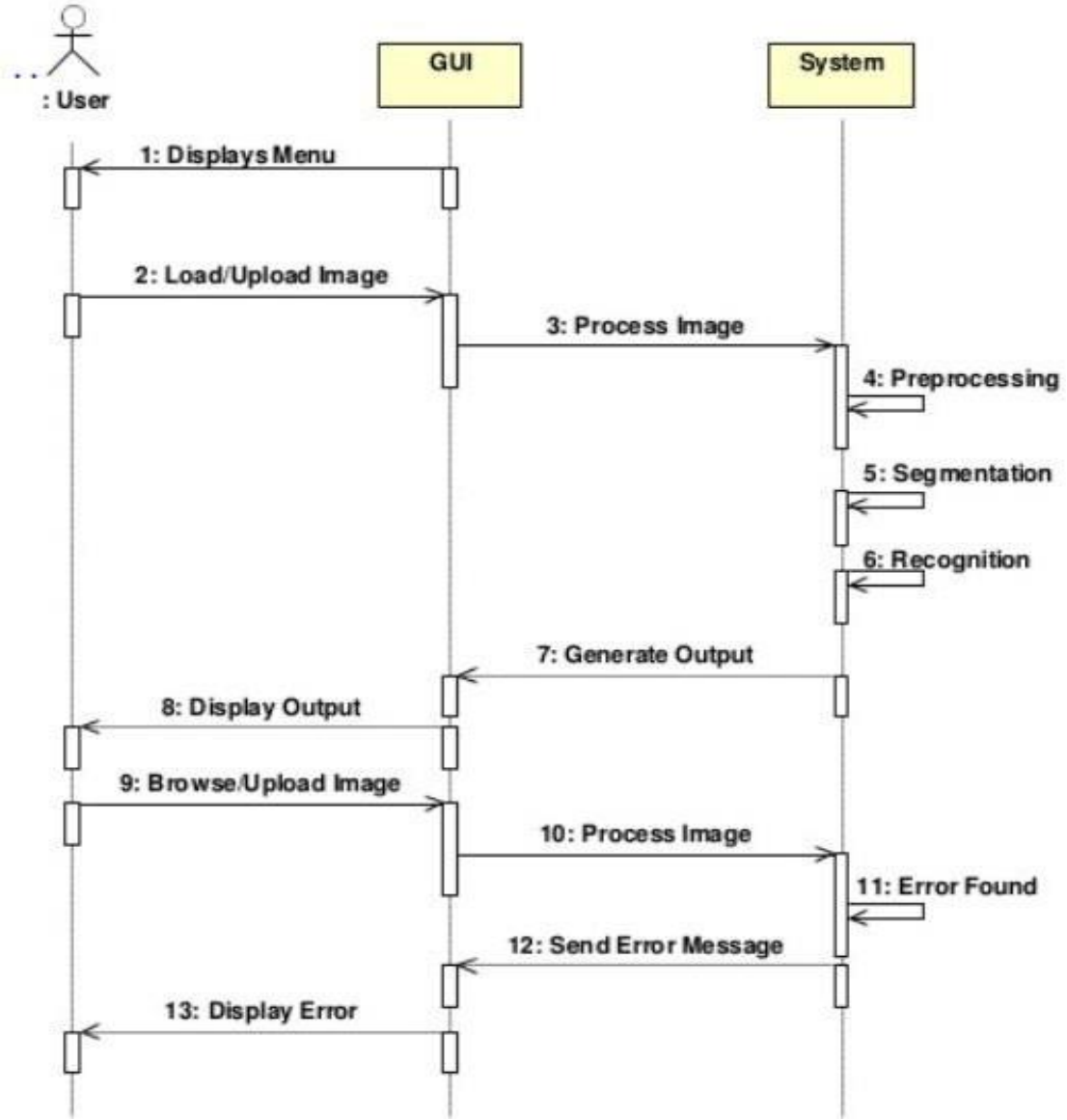


Fig : Sequence diagram of the process .

ACTIVITY DIAGRAM

The action diagram demonstrates the conditions of an item and speaks to exercises as bolts interfacing the states. The Activity Diagram features the exercises. Every action is spoken to by an adjusted square shape smaller and more oval-moulded than the state symbol. A bolt speaks to the change from the one action to the following. The action diagram has a beginning stage spoken to by filled-in circle, and an end point spoken to by bulls eye.

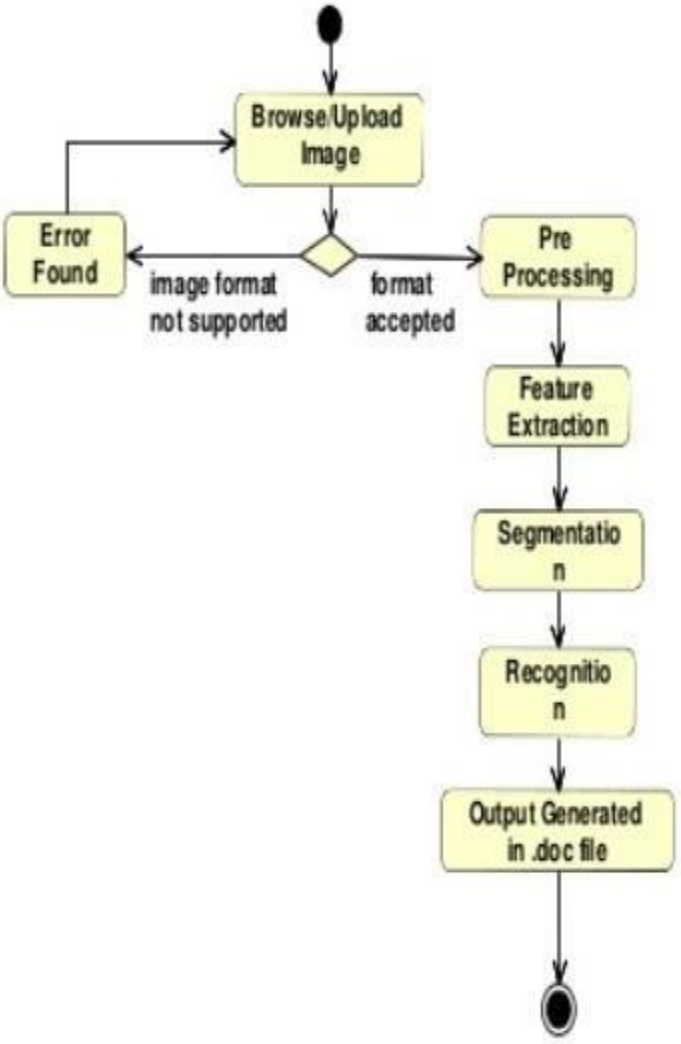


Fig 4.4 Activity diagram of the process.

4.3 E-R DIAGRAM:

- The relation upon the system is structure through a conceptual ER-Diagram, which not only specifics the existential entities but also the standard relations through which the system exists and the cardinalities that are necessary for the system state to continue.
- The entity Relationship Diagram (ERD) depicts the relationship between the data objects. The ERD is the notation that is used to conduct the date modeling activity the attributes of each data object noted is the ERD can be described resign a data object description.
- The set of primary components that are identified by the ERD are
  - Data object
  - Relationships
  - Attributes
  - Various types of indicators.
- The primary purpose of the ERD is to represent data objects and their relationships

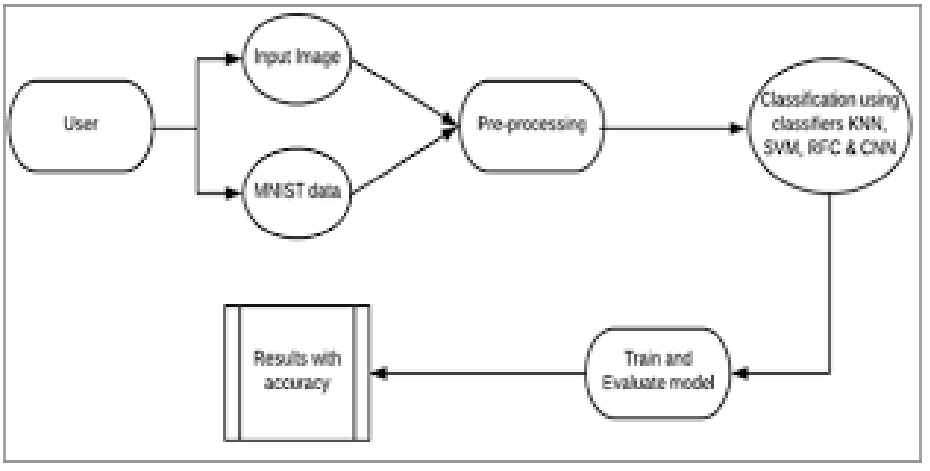


Figure 4.3 E-R Diagram

4.4 DATABASE DESIGN

A database is a collection of interrelated data stored with minimum redundancy to serve many users quickly and efficiently. The general objective is to make database access easy, quick, inexpensive and flexible for the user. Relationships are established between the data items and unnecessary data items are removed. Normalization is done to get an internal consistency of data and to have minimum redundancy and maximum stability. This ensures minimizing data storage required, minimizing chances of data inconsistencies and optimizing for updates. The MS Access database has been chosen for developing the relevant databases.

CHAPTER – 5

IMPLEMNTATION

5.1 IMAGE GATHERING AND PRE-PROCESSING

The code snippet listed above shows how the image stored in the device can be accessed by the program , after accessing the image from the location where the image file is stored the next phase executes that is the pre-processing phase.

In the pre-processing step first, the image is checked whether its damaged or not. If the image is damaged then the black image is used as default next the target image is created with help of copying sample image and removing the noise present in the sample image the new image formed will be magnified to the new size of respective width and height and will be passed on to the next phase.

5.2 PROCESSING

This phase mainly uses the concept of neural networks the input grey scale image will be magnified to a size of 128 *32 , and each pixels in the image will be considered to one neuron and will be given with unique grey scale value of each pixels these values will be fed in to further layers of neural network and weights will be assigned to each neurons and will be sent to the next layer.

It consists of five convolution neural network layers and two ctc layer, layers with 256 units spread data through the grouping and guide the arrangement to a framework of size 32x80. Every grid component speaks to a score for one of the 80 characters at one of the 32 time-steps. Ctc layer mainly calculates the loss value of the matrix and it decodes the matrix to the final text with the help of beam search decoding algorithm.

5.3 DISPLAYING THE OUTPUT

In the last phase the output will be displayed along with the accuracy or the correctness of the word which was given as the pictorial input. This code snippet shows how to calculate probability.

CHAPTER 6

TESTING

The motivation behind testing is to find mistakes. Testing is the way toward attempting to find each possible deficiency or shortcoming in a work item. It gives an approach to check the usefulness of parts, sub congregations, gatherings and additionally a completed item it is the way toward practicing programming with the goal of guaranteeing that the Software framework lives up to its prerequisites and user desires and does

not bomb in an unsuitable way. There are different kinds of test. Each test type tends to a particular testing necessity.

TYPES OF TESTS

6.1 UNIT TESTING

Unit testing includes the structure of experiments that approve that the inside program rationale is working appropriately, and that program inputs produce legitimate yields. All choice branches and inner code stream ought to be approved. It is the trying of individual programming units of the application .it is done after the fruition of an individual unit before joining. This is an auxiliary testing, that depends on information of its development and is obtrusive. Unit tests perform essential tests at segment level and test a particular business procedure, application, and additionally framework design. Unit tests guarantee that every one of a kind way of a business procedure performs precisely to the archived details and contains plainly characterized sources of info and anticipated outcomes.

6.2 INTEGRATION TESTING

Integration tests are intended to test incorporated programming segments to decide whether they really keep running as one program. Testing is occasion driven and is progressively worried about the fundamental result of screens or fields. Reconciliation tests exhibit that despite the fact that the segments were separately fulfillment, as appeared by effectively unit testing, the blend of segments is right and reliable. Mix testing is explicitly gone for uncovering the issues that emerge from the mix of parts.

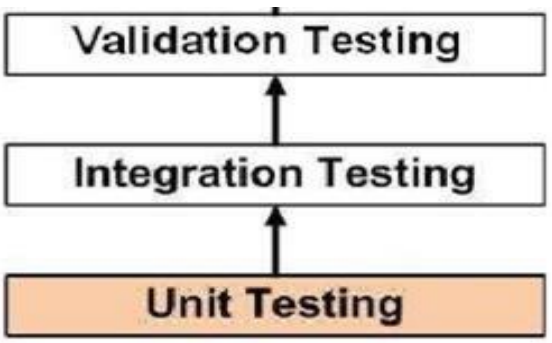
6.3 VALIDATION TESTING

A validation test (EVT) is performed on first designing models, to guarantee that the fundamental unit performs to plan objectives and details. It is imperative in distinguishing plan issues, and comprehending them as right off the bat in the structure cycle as would be prudent, is the way to keeping ventures on schedule and inside spending plan. Over and over again, item plan and execution issues are not identified until late in the item advancement cycle — when the item is prepared to be delivered. The familiar aphorism remains constant: It costs a penny to roll out an improvement in building, a dime underway and a dollar after an item is in the field.

Confirmation is a Quality control process that is used to assess whether an item, administration, or framework follows guidelines, details, or conditions forced toward the beginning of an improvement stage. Check can be being developed, scale-up, or generation. This is frequently an inner procedure.

Validation is a Quality confirmation procedure of setting up proof that gives a high level of affirmation that an item, administration, or framework achieves its expected necessities. This regularly includes acknowledgment of readiness for reason with end users and other item

The testing procedure diagram is as per the following:



6.4 SYSTEM TESTING

System testing of programming or equipment is trying led on a total, coordinated framework to assess the framework's consistence with its predetermined necessities. This testing falls inside the extent of discovery testing, and thusly, ought to require no learning of the inward plan of the code or rationale.

When in doubt, system testing takes, as its information, the majority of the "integrated" programming parts that have effectively passed reconciliation testing and furthermore the product framework itself coordinated with any pertinent equipment system(s).

System testing is a progressively constrained kind of testing; it looks to distinguish abandons both inside the "between arrays" and furthermore inside the framework all in all. System testing is performed on the whole framework with regardsto a Functional Requirement Specification(s) (FRS) or potentially a System Requirement Specification (SRS).

system testing tests the plan, yet in addition the conduct and even the trusted desires for the client. It is likewise proposed to test up to and past the limits characterized in the product/equipment necessities specification(s).

CHAPTER - 7

CODING

INDEX FILE - HTML:

```
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8" />
    <meta http-equiv="X-UA-Compatible" content="IE=edge" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <meta name="theme-color" content="rgba(252, 70, 107, 1)" />
    <link rel="apple-touch-icon" sizes="180x180" href="favicon_io/apple-touch-
icon.png">
    <link rel="icon" type="image/png" sizes="32x32" href="favicon_io/favicon-
32x32.png">
    <link rel="icon" type="image/png" sizes="16x16" href="favicon_io/favicon-
16x16.png">
    <link rel="manifest" href="favicon_io/site.webmanifest">
    <title>Assignment Writer</title>
    <link href="https://unpkg.com/boxicons@2.0.9/css/boxicons.min.css"
rel="stylesheet" />
    <link rel="stylesheet" href="css/style.css" />
    <style>
        @import url("https://fonts.googleapis.com/css2?family=Ubuntu&display=swap");

        :root {
            --font-sans-serif: system-ui, -apple-system, "Segoe UI", Roboto,
                "Helvetica Neue", Arial, "Noto Sans", "Liberation Sans", sans-serif,
                "Apple Color Emoji", "Segoe UI Emoji", "Segoe UI Symbol",
                "Noto Color Emoji";
            --sliderHeight: 25px;
        }

        body {
            font-family: "Ubuntu", sans-serif;
        }
    </style>
</head>

<body>
```

```
    <div class="body">
        <main>
            <nav id="nav">
                <div>
                    <h2 class="cname">Assignment Writer</h2>
                    <i class="bx bx-md bxl-github" style="vertical-align: middle"
id="githubtop" title="Open in Github"
                        onclick="openInGithub()"></i>
                </div>

                <div class="switch">
                    <input type="color" name="color input" id="inputColor"
value="#2424fb" title="Ink color"
                        style="vertical-align: middle" />
                    <i class="bx bx-cog bx-md bx-spin" id="changeMode" title="Change
mode"></i>
                </div>
            </nav>
            <div class="input">
                <textarea name="inputText" id="inputText" placeholder="Enter the text
you want to written in paper ..."
                    title="Write the text here"></textarea>
            </div>
            <div class="options">
                <div class="buttons">
                    <input type="button" value="Upload Page" id="UploadPage" />
                    <input type="button" value="Default Page" id="DefaultPage" />
                    <input type="button" value="Change Font" id="ChangeFont" />
                    <input type="button" value="Upload Font" id="UploadFont" />
                    <input type="button" value="Download Page" id="DownloadPage" />
                </div>
                <div class="rangev1">
                    <div class="itm">
                        <label for="adjustX">Adjust X axis</label>
                        <input type="range" name="adjustX" id="adjustX" value="28"
min="0" max="100" />
                    </div>
                    <div class="itm">
                        <label for="adjustY">Adjust Y axis</label>
                        <input type="range" name="adjustY" id="adjustY" value="44"
min="0" max="100" />
                    </div>
                    <div class="itm">
                        <label for="adjfontSize">Font Size</label>
                        <input type="range" name="fontSize" id="adjfontSize"
value="22" min="12" max="100" />
                    </div>
                    <div class="itm">
```

```
                        <label for="adjustWidth">width</label>
                        <input type="range" name="adjustWidth" id="adjustWidth"
value="720" min="50" max="850"
                            step="0.3" />
                    </div>
                </div>
                <div class="rangev2">
                    <div class="itm">
                        <label for="adjLetterSpacing">letter-spacing</label>
                        <input type="range" name="letter-spacing"
id="adjLetterSpacing" value="0" min="0" max="15"
                            step="0.1" />
                    </div>
                    <div class="itm">
                        <label for="adjWordSpacing">word-spacing</label>
                        <input type="range" name="word-spacing" id="adjWordSpacing"
value="0" min="0" max="20"
                            step="0.1" />
                    </div>
                    <div class="itm">
                        <label for="adjLineHeight">line-height</label>
                        <input type="range" name="line-height" id="adjLineHeight"
value="24" min="16" max="60" />
                    </div>
                </div>
            </div>

            <div id="page">
                <canvas id="canvas" width="793px" height="1123px"></canvas>
            </div>
        </main>
        <footer>
            made with
            <i class="bx bxs-heart bx-flashing" style="
            color: rgba(252, 70, 107, 1);
            font-size: 25px;
            vertical-align: middle;
          "></i>
            by SABARI VASAN , SACHIN
            <i class="bx bx-md bxl-github" style="vertical-align: middle"
id="githubbottom"></i>
        </footer>
    </div>
    <script src="js/script.js"></script>
    <script src="js/controls.js"></script>
    <script src="js/switch.js"></script>
    <script src="js/extend.js"></script>
</body>
```

```
</html>
```

CSS FILE :

```
@media (prefers-color-scheme: light) {
  body {
    background: #fff;
    color: #333;
  }
}
@media (prefers-color-scheme: dark) {
  body {
    background: #333;
    color: #fff;
  }
}

* {
  margin: 0;
  padding: 0;
  box-sizing: border-box;
}
.body {
  display: block;
  overflow: hidden;
  position: relative;
  width: 100%;
}

#nav {
  display: flex;
  justify-content: space-between;
  align-items: center;
  /* text-align: center; */
  padding: 10px 25px;
  margin-bottom: 10px;
}
#nav .cname {
  display: inline-block;
  padding: 5px;
  border-bottom: 3px solid rgb(0, 225, 225);
}
```

```css
.bxl-github {
  cursor: pointer;
}
@media screen and (max-width: 420px) {
  #nav .cname {
    font-size: 18px;
    padding-left: 0;
  }
}
#githubbottom {
  display: none;
}
@media screen and (max-width: 354px) {
  #githubtop {
    display: none;
  }
  #githubbottom {
    display: inline-block;
  }
}
#nav .switch {
  display: flex;
  justify-content: space-between;
  align-items: center;
}
#nav #inputColor {
  margin-right: 25px;
  -webkit-appearance: none;
  /* display: inline-block; */
  height: 30px;
  width: 30px;
  border: 2px solid #fff;
  border-color: tomato;
  outline: none;
  padding: 3px;
  border-radius: 50%;

  /* background-color: rgb(0, 225, 225); */
  background-color: transparent;
}
#inputColor::-webkit-color-swatch-wrapper {
  padding: 0;
}
#inputColor::-webkit-color-swatch {
  border: none;
  border-radius: 50%;
}
```

```css
@media screen and (max-width: 415px) {
  #nav #inputColor {
    margin-right: 10px;
  }
}

#changeMode {
  color: rgba(252, 70, 107, 1);
  user-select: none;
  /* cursor: pointer; */
}
main {
  max-width: 850px;
  /* border: 2px solid black; */
  position: relative;

  margin: auto;
  width: 100%;

  padding: 15px;
  margin-bottom: 15px;
}

footer {
  font-size: 0.8rem;
  font-weight: 700;
  letter-spacing: 0.8px;
  word-spacing: 1.5px;
  text-align: center;
  text-transform: capitalize;
  /* background-color: rgba(252, 70, 107, 1); */
  padding: 3px 0px;
  line-height: 10px;
  background-color: skyblue;
}

#inputText {
  width: 100%;
  height: 375px;
  background-color: transparent;
  color: inherit;
  /* border: 2px solid #d3d3d3; */
  border: 1px solid rgb(149, 149, 149);
  /* border: 2px solid rgb(0, 225, 225); */
  font: 400 1rem var(--font-sans-serif);
  padding: 10px;
  margin-bottom: 7px;
  outline: none;
```

```
  border-radius: 5px;
}
/* #inputText:hover, */
#inputText:focus,
#inputText:active {
  border: 1px solid rgba(252, 70, 107, 1);
}

/* width */
#inputText::-webkit-scrollbar {
  width: 10px;
  background-color: #f5f5f5;
}
/* Track */
#inputText::-webkit-scrollbar-track {
  box-shadow: inset 0 0 6px rgba(0, 0, 0, 0.3);
  border-radius: 10px;
  background-color: #f5f5f5;
}

/* Handle */
#inputText::-webkit-scrollbar-thumb {
  border-radius: 10px;
  box-shadow: inset 0 0 6px rgba(0, 0, 0, 0.3);
  /* box-shadow: inset 0 0 6px rgba(252, 70, 107, 1); */
  background-color: #555;
}

/* Handle on hover */
/* #inputText::-webkit-scrollbar-thumb:hover {
  background-color: rgba(252, 70, 107, 1);
} */

#page {
  display: block;
  position: relative;
  /* overflow: hidden; */
  margin-top: 15px;
}
canvas {
  /* border: 2px solid red; */
  width: 100%;
  height: 100%;
}

.options > .buttons {
  display: flex;
  justify-content: space-between;
```

```
  align-items: center;

  user-select: none;
  width: 100%;
  padding-top: 7px;
  padding-bottom: 7px;
}
@media screen and (max-width: 780px) {
  .options > .buttons {
    flex-direction: column;
  }
}
.options > .buttons input {
  width: 100%;
  margin: 5px 10px;
  background-color: rgba(252, 70, 107, 1);
  border: none;
  padding: 12px 10px;
  text-align: center;
  text-transform: uppercase;
  transition: all 0.5s;
  color: white;
  border-radius: 7px;
  font-weight: 600;
  letter-spacing: 1.2px;
  font-family: "Ubuntu", sans-serif;
}
.options > .buttons input:hover {
  background-color: rgb(0, 225, 225);
  color: #000;
  text-decoration: none;
}

/* rangev1 css */
.options > .rangev1 {
  display: flex;
  justify-content: space-between;
  align-items: center;

  user-select: none;
  width: 100%;
}
@media screen and (max-width: 780px) {
  .options > .rangev1 {
    flex-direction: column;
  }
}
.options > .rangev1 .itm {
```

```
  width: 100%;
  margin: 5px 10px;
  font-weight: 600;
  letter-spacing: 1.5px;
}
.options > .rangev1 .itm > input {
  -webkit-appearance: none;
  width: 100%;
  height: var(--sliderHeight);
  background: #d3d3d3;
  outline: none;
  opacity: 0.7;
  -webkit-transition: 0.2s;
  transition: opacity 0.2s;
  margin-top: 5px;
}
.options > .rangev1 .itm > input:hover {
  opacity: 1;
}
.options > .rangev1 .itm > input::-webkit-slider-thumb {
  -webkit-appearance: none;
  appearance: none;
  width: var(--sliderHeight);
  height: var(--sliderHeight);
  background: rgb(0, 225, 225);
  cursor: pointer;
}
.options > .rangev1 .itm > input::-moz-range-thumb {
  width: var(--sliderHeight);
  height: var(--sliderHeight);
  background: rgb(0, 225, 225);
  cursor: pointer;
}

/* rangev2 css  */

.options > .rangev2 {
  display: flex;
  justify-content: space-evenly;
  align-items: center;

  user-select: none;
  width: 100%;
}
@media screen and (max-width: 780px) {
  .options > .rangev2 {
    flex-direction: column;
  }
```

```
}
.options > .rangev2 .itm {
  width: 100%;
  margin: 5px 10px;
  font-weight: 600;
  padding: 0px 25px;
  letter-spacing: 1.5px;
}
@media screen and (max-width: 780px) {
  .options > .rangev2 .itm {
    padding: 0px;
  }
}
.options > .rangev2 .itm > input {
  -webkit-appearance: none;
  width: 100%;
  height: var(--sliderHeight);
  background: #d3d3d3;
  outline: none;
  opacity: 0.7;
  -webkit-transition: 0.2s;
  transition: opacity 0.2s;
  margin-top: 5px;
}
.options > .rangev2 .itm > input:hover {
  opacity: 1;
}
.options > .rangev2 .itm > input::-webkit-slider-thumb {
  -webkit-appearance: none;
  appearance: none;
  width: var(--sliderHeight);
  height: var(--sliderHeight);
  background: rgba(252, 70, 107, 1);
  cursor: pointer;
}
.options > .rangev2 .itm > input::-moz-range-thumb {
  width: var(--sliderHeight);
  height: var(--sliderHeight);
  background: rgba(252, 70, 107, 1);
  cursor: pointer;
}
/* @media screen and (max-width:576px) {
  :root
  {
    --sliderHeight: 16px;
  }
  .options > .rangev1 {
    width: 80%;
```

```
  }
  .options > .rangev2 {
    width: 80%;
  }
} */
```

SITE.WEBMANIFEST():

```
{
    "name": "Assignment Maker",
    "short_name": "Assignment Maker",
    "icons": [
        {
            "src": "android-chrome-192x192.png",
            "sizes": "192x192",
            "type": "image/png"
        },
        {
            "src": "android-chrome-512x512.png",
            "sizes": "512x512",
            "type": "image/png"
        }
    ],
    "theme_color": "#ffffff",
    "background_color": "#ffffff",
    "display": "standalone"
}
```

JAVA SCRIPT:

CONTROL.JS

```
let UploadPage = document.getElementById("UploadPage");
let DefaultPage = document.getElementById("DefaultPage");
let ChangeFont = document.getElementById("ChangeFont");
let UploadFont = document.getElementById("UploadFont");
let DownloadPage = document.getElementById("DownloadPage");

let adjustX = document.getElementById("adjustX");
let adjustY = document.getElementById("adjustY");
```

```
let adjfontSize = document.getElementById("adjfontSize");
let adjustWidth = document.getElementById("adjustWidth");

let adjLetterSpacing = document.getElementById("adjLetterSpacing");
let adjWordSpacing = document.getElementById("adjWordSpacing");
let adjLineHeight = document.getElementById("adjLineHeight");

UploadPage.onclick = () => {
  var uploadPageBtn = document.createElement("input");
  uploadPageBtn.type = "file";
  uploadPageBtn.accept = "image/*";
  // uploadPageBtn.style.display = "none";
  uploadPageBtn.click();
  // input.remove();

  uploadPageBtn.onchange = (evt) => {
    const [file] = uploadPageBtn.files;
    if (file) {
      imgSrc = URL.createObjectURL(file);
      redraw();
    }
  };

  //   uploadPageBtn.onchange = function(event) {
  //     var reader = new FileReader();
  //     reader.onload = function(){
  //       var output = document.getElementById('blah');
  //       output.src = reader.result;
  //       imgSrc = reader.result;
  //       redraw();
  //     };
  //     reader.readAsDataURL(event.target.files[0]);
  //   };
};

DefaultPage.onclick = () => {
  imgSrc = "pages/page (0).jpg";
  redraw();
};

ChangeFont.onclick = () => {
  fontindex < totalfontnum ? fontindex++ : (fontindex = 0);
  loadFonts();
  //   redraw();
};

UploadFont.onclick = () => {
  var uploadFontBtn = document.createElement("input");
```

```
  uploadFontBtn.type = "file";
  // input.accept = "image/*";
  //   input.style.display = "none";
  uploadFontBtn.click();
  // input.remove();

  uploadFontBtn.onchange = (evt) => {
    const file = uploadFontBtn.files[0];
    const reader = new FileReader();
    reader.addEventListener(
      "load",
      async function () {
        const font = new FontFace("myfont", "url(" + reader.result + ")");
        // wait for font to be loaded
        await font.load();
        // add font to document
        document.fonts.add(font);
        // enable font with CSS class
        // document.body.classList.add("fonts-loaded");
        ctx.font = dfont;
        ctx.fillStyle = "#00f";
        redraw();
      },
      false
    );

    if (file) {
      reader.readAsDataURL(file);
    }
  };
};

DownloadPage.onclick = () => {
  var link = document.createElement("a");
  link.download = "page.png";
  link.href = canvas.toDataURL("Image/png", 1.0);
  link.click();
  link.remove();
};

adjustX.oninput = () => {
  x = parseInt(adjustX.value);
  redraw();
};

adjustY.oninput = () => {
  y = parseInt(adjustY.value);
  redraw();
```

```
};

adjfontSize.oninput = () => {
  // var fs = parseInt(adjfontSize.value);
  var fs = adjfontSize.value;
  dfont = fs + "px myfont";
  ctx.font = dfont;
  redraw();
};

adjustWidth.oninput = () => {
  maxWidth = parseFloat(adjustWidth.value);
  redraw();
};

adjLetterSpacing.oninput = () => {
  canvas.style.letterSpacing = adjLetterSpacing.value + "px";
  ctx = canvas.getContext("2d");
  ctx.font = dfont;
  redraw();
};

adjWordSpacing.oninput = () => {
  canvas.style.wordSpacing = adjWordSpacing.value + "px";
  ctx = canvas.getContext("2d");
  ctx.font = dfont;
  redraw();
};

adjLineHeight.oninput = () => {
  lineHeight = parseFloat(adjLineHeight.value);
  redraw();
};
```

EXTEND.JS

```
function openInGithub()
{
    var a = document.createElement("a");
    a.href = "https://github.com/sabarivasan24";
    a.target = "_blank";
    a.click();
    a.remove();
}
```

SCRIPT.JS

```
let canvas = document.getElementById("canvas");
var ctx = canvas.getContext("2d");
var inkColor = "Blue";
var imgSrc = "pages/page (0).jpg";
var dfont = "22px myfont";
var mydata =
  "hi enter your text here...";
var maxWidth = 720;
var lineHeight = 24;
var x = 28;
var y = 22 + 22;
var fontindex = 0;
var totalfontnum = 42;
window.onload = draw();

let text_input = document.getElementById("inputText");
text_input.addEventListener("input", () => {
  //   console.log(text_input.value);
  mydata = text_input.value;
  redraw();
});

function draw() {
  imageObj = loadimg();
  imageObj.onload = function () {
    ctx.drawImage(imageObj, 0, 0, canvas.width, canvas.height);
    defaultFontload();
  };
}
function redraw() {
  imageObj = loadimg();
  imageObj.onload = function () {
    ctx.drawImage(imageObj, 0, 0, canvas.width, canvas.height);
    drawText(ctx, mydata, x, y, maxWidth, lineHeight);
  };
}
function loadimg() {
  var imageObj = new Image();
  imageObj.src = imgSrc;
  return imageObj;
}

function drawText(context, text, x, y, line_width, line_height) {
  var line = "";
```

```
  var paragraphs = text.split("\n");
  for (var i = 0; i < paragraphs.length; i++) {
    var words = paragraphs[i].split(" ");
    for (var n = 0; n < words.length; n++) {
      var testLine = line + words[n] + " ";
      var metrics = context.measureText(testLine);
      var testWidth = metrics.width;
      if (testWidth > line_width && n > 0) {
        context.fillText(line, x, y);
        line = words[n] + " ";
        y += line_height;
      } else {
        line = testLine;
      }
    }
    context.fillText(line, x, y);
    y += line_height;
    line = "";
  }
}

async function loadFonts() {
  const font = new FontFace(
    "myfont",
    "url('fonts/font (" + fontindex + ").ttf')"
  );
  // wait for font to be loaded
  await font.load();
  // add font to document
  document.fonts.add(font);
  // enable font with CSS class
  // document.body.classList.add("fonts-loaded");
  ctx.font = dfont;
  ctx.fillStyle = inkColor;
  //   drawText(ctx, mydata, x, y, maxWidth, lineHeight);
  redraw();

  //   console.log(i);
}
async function defaultFontload() {
  const font = new FontFace("myfont", "url('fonts/font (0).ttf')");
  // wait for font to be loaded
  await font.load();
  // add font to document
  document.fonts.add(font);
  // enable font with CSS class
  // document.body.classList.add("fonts-loaded");
  ctx.font = dfont;
```

```
  ctx.fillStyle = inkColor;
  drawText(ctx, mydata, x, y, maxWidth, lineHeight);

  // console.log("default font loaded");
}
```

SWITCH.JS

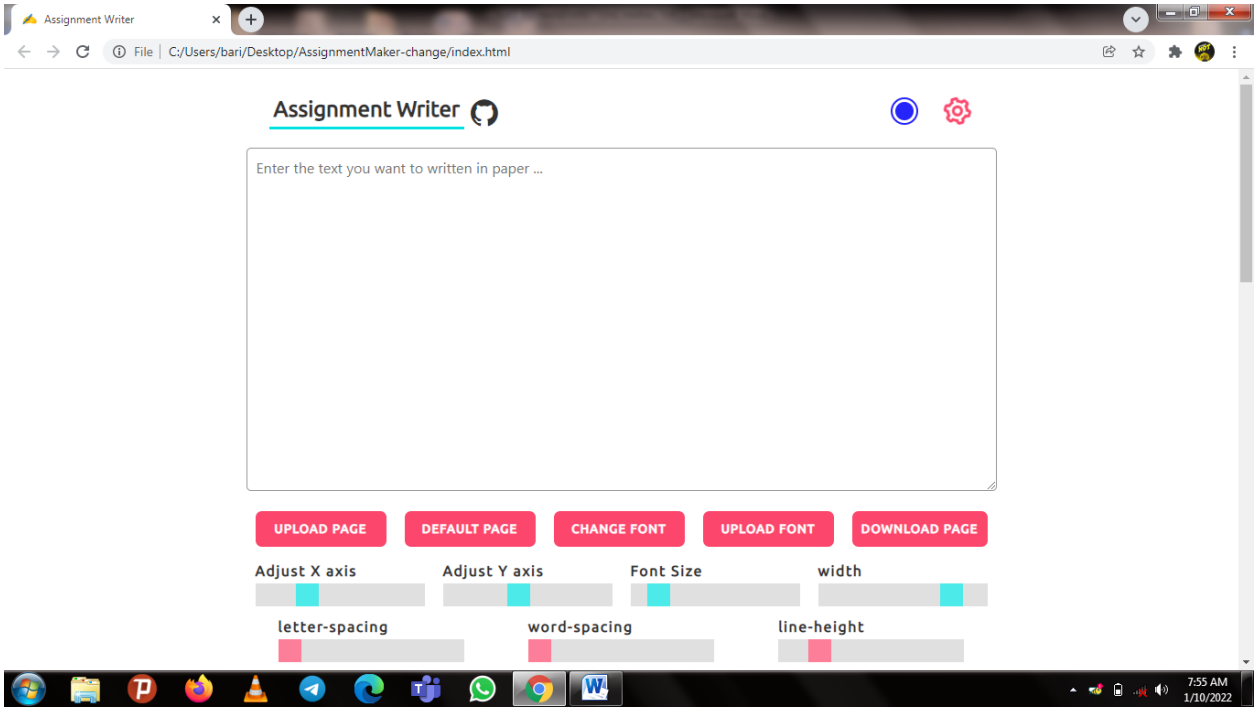
```
var darkThemeMq = window.matchMedia("(prefers-color-scheme: dark)");
var darkmode = Boolean(darkThemeMq.matches);

// let change = document.getElementById("change");
let changeMode = document.getElementById("changeMode");
changeMode.onclick = () => {
  if (darkmode) {
    darkmode = false;
    document.body.style.cssText = "background: #FFF;color: #333;";
    // changeMode.classList.replace("bx-cog","bxs-cog");
    changeMode.style.color = "rgb(0, 225, 225)";
  } else {
    darkmode = true;
    document.body.style.cssText = "background: #333;color: #FFF;";
    // changeMode.classList.replace("bxs-cog","bx-cog");
    changeMode.style.color = "rgba(252, 70, 107, 1)";
  }
};

var inputColor = document.getElementById("inputColor");
// inputColor.value="#383b3e";
inputColor.style.borderColor = inputColor.value;
inputColor.oninput = () => {
  inputColor.style.borderColor = inputColor.value;
  inkColor = inputColor.value;
  console.log(inputColor.value);
  ctx.fillStyle = inkColor;
  redraw();
};
// function getRandomRGBValue() {
//     return Math.min(Math.floor(Math.random() * 255 + 1), 255);
// }

// function getRandomColor() {
//     var r = getRandomRGBValue(),
//         g = getRandomRGBValue(),
```

```
//         b = getRandomRGBValue();
//     return "#" + (((1 << 24) + (r << 16) + (g << 8) + b).toString(16).slice(1));
// }

// function changeThemeColor() {
//     var metaThemeColor = document.querySelector("meta[name=theme-color]");
//     metaThemeColor.setAttribute("content", getRandomColor());
//     setTimeout(function() {
//         changeThemeColor();
//     }, 3000);
//     console.log("run");
// }

// changeThemeColor();
```

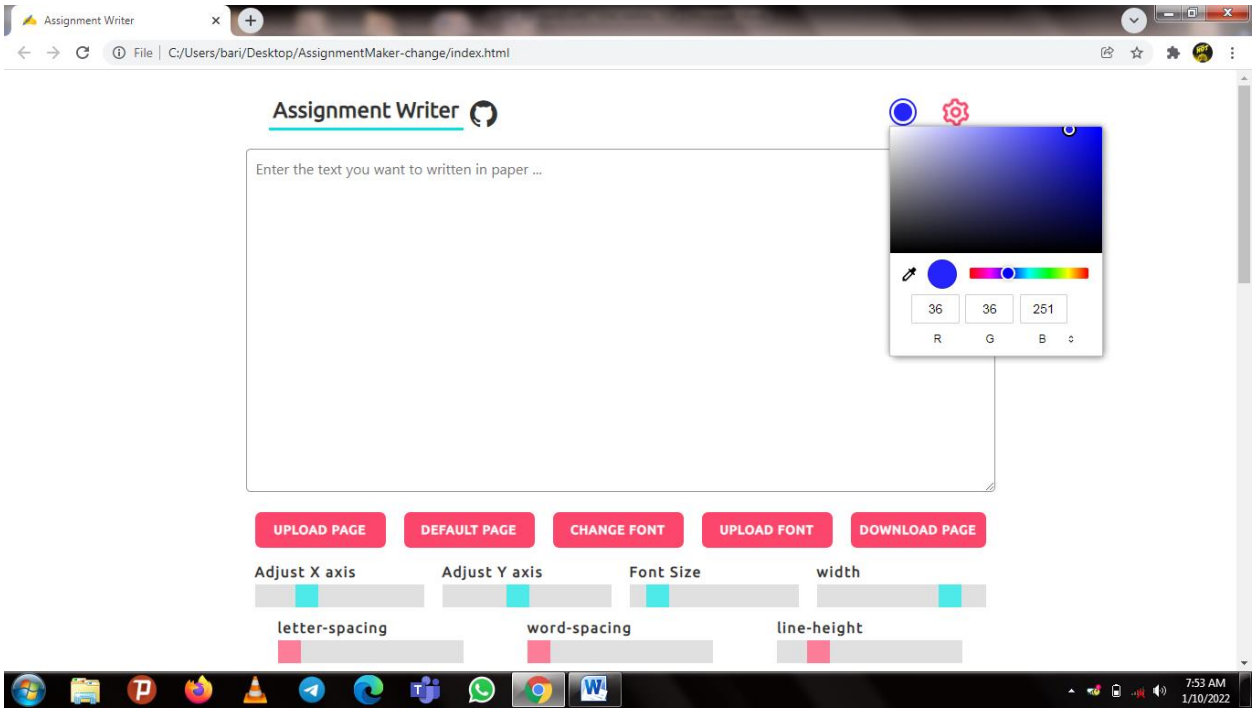
CHAPTER -8

OUTPUT SCREENSHOTS

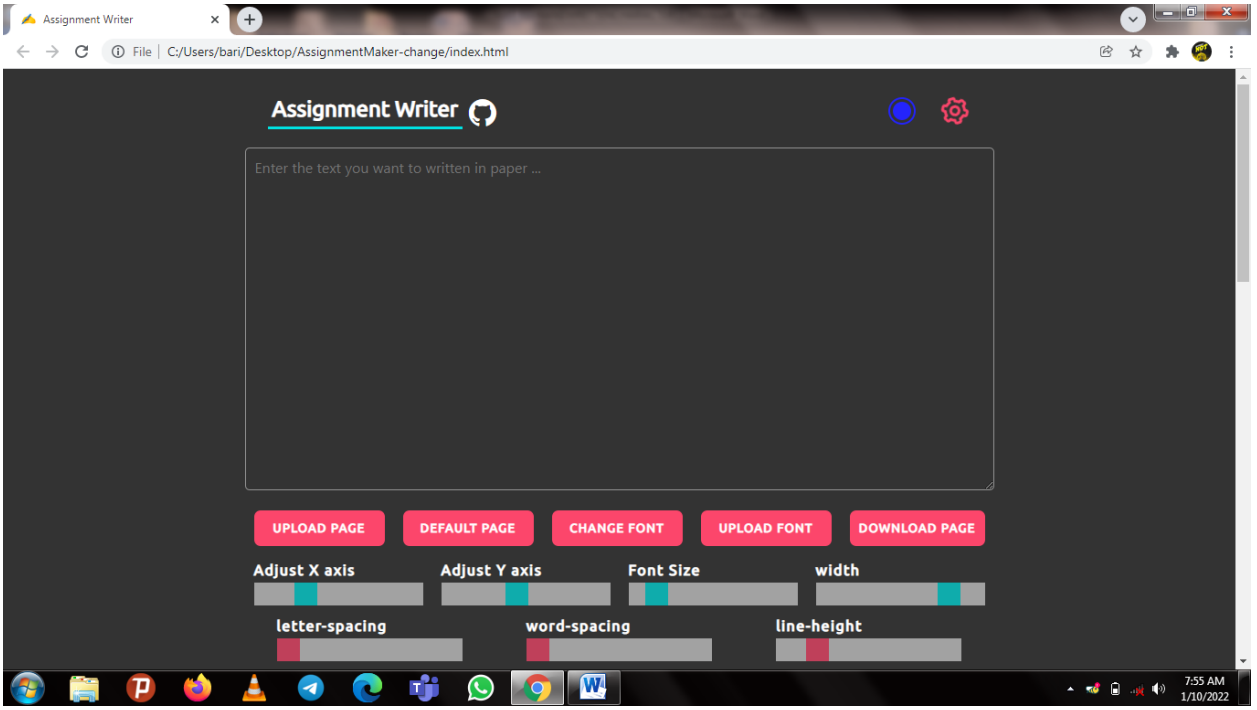
8.1 MAIN PAGE:



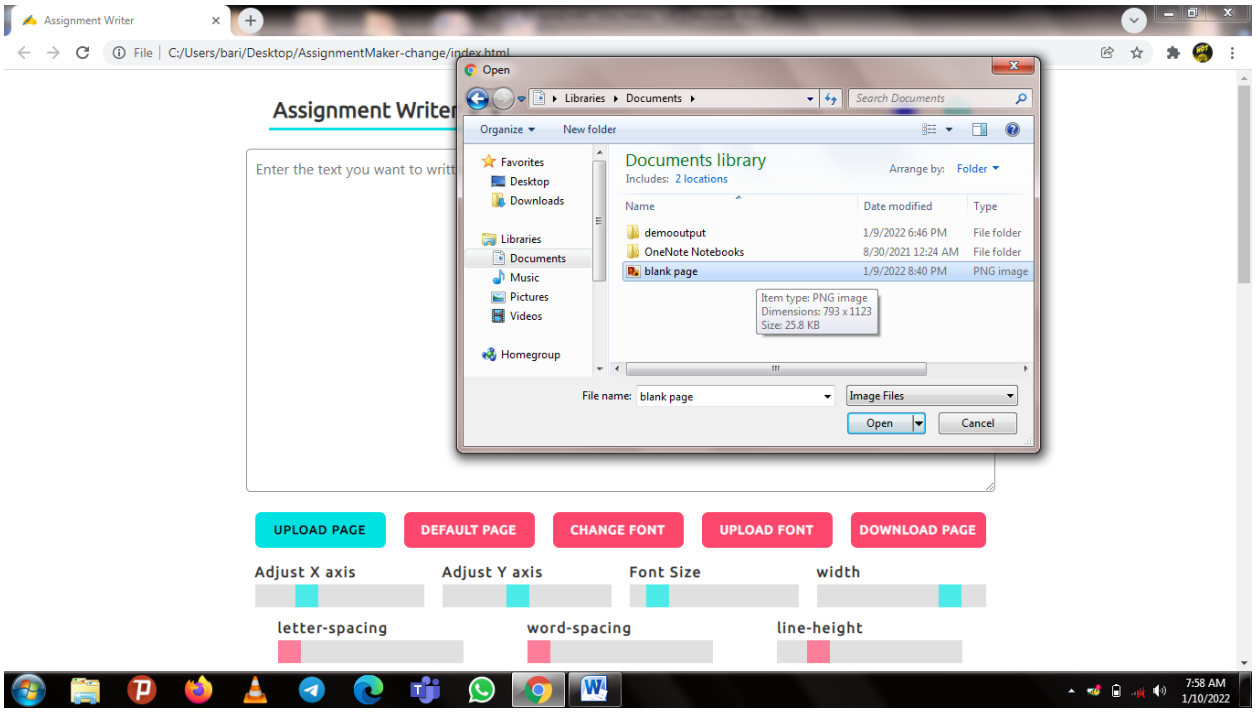
8.2 R-G-B COLOR:



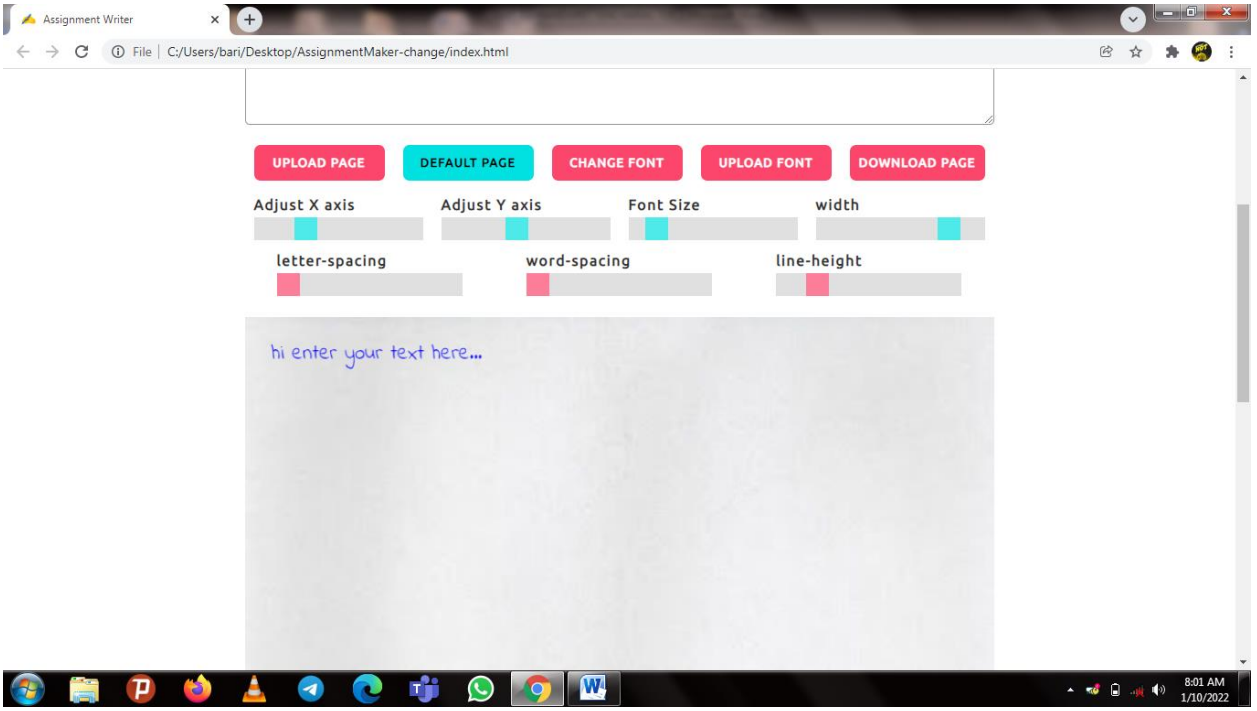
8.3 DARK MODE



8.4 UPLOAD PAGE

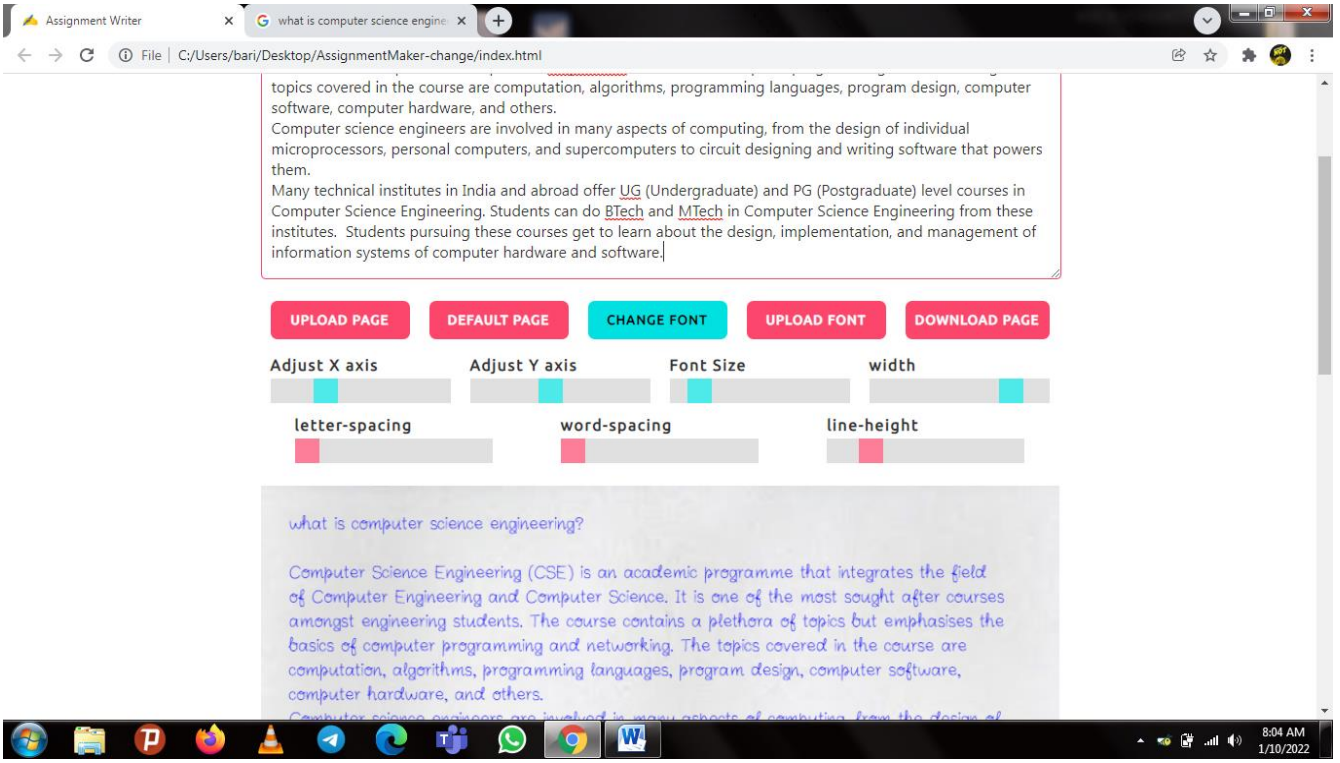


8.5 DEFAULT PAGE

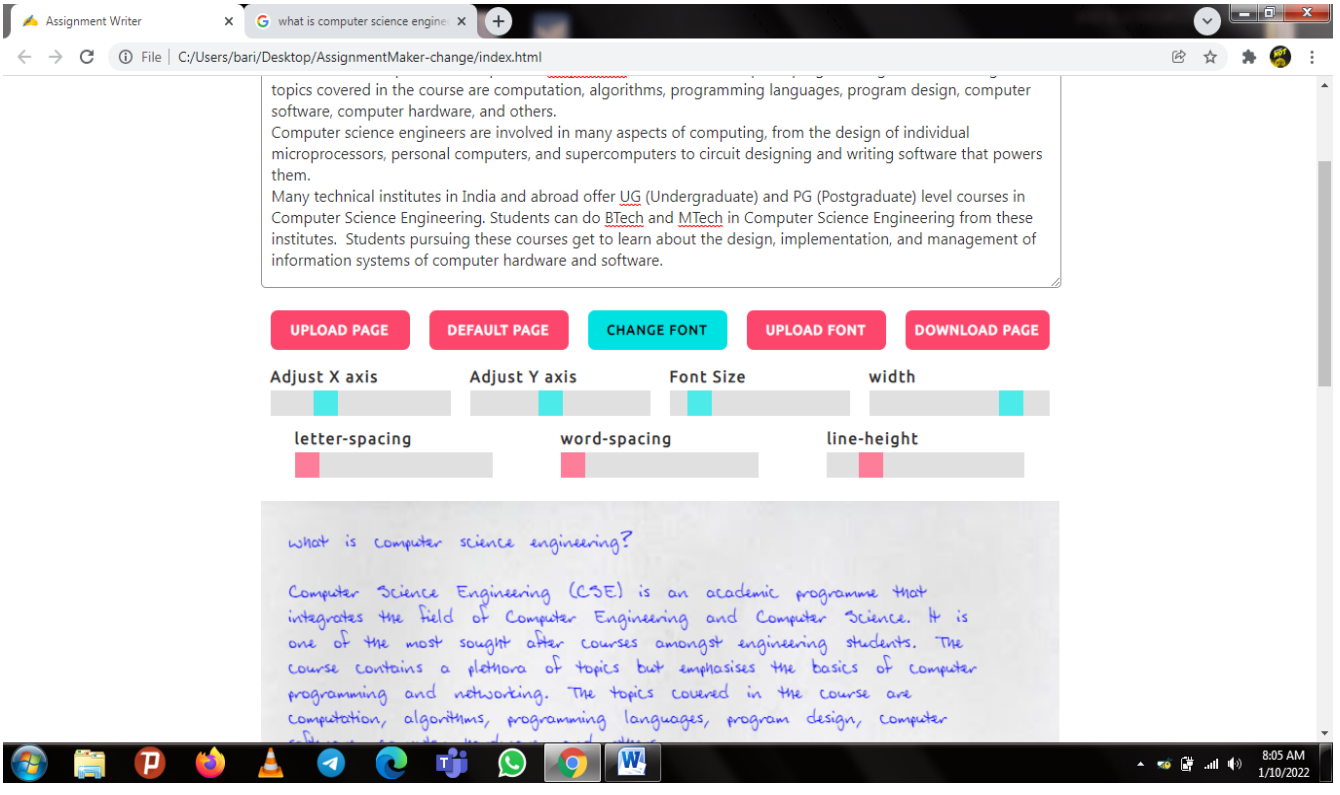


8.6 CHANGE FONT

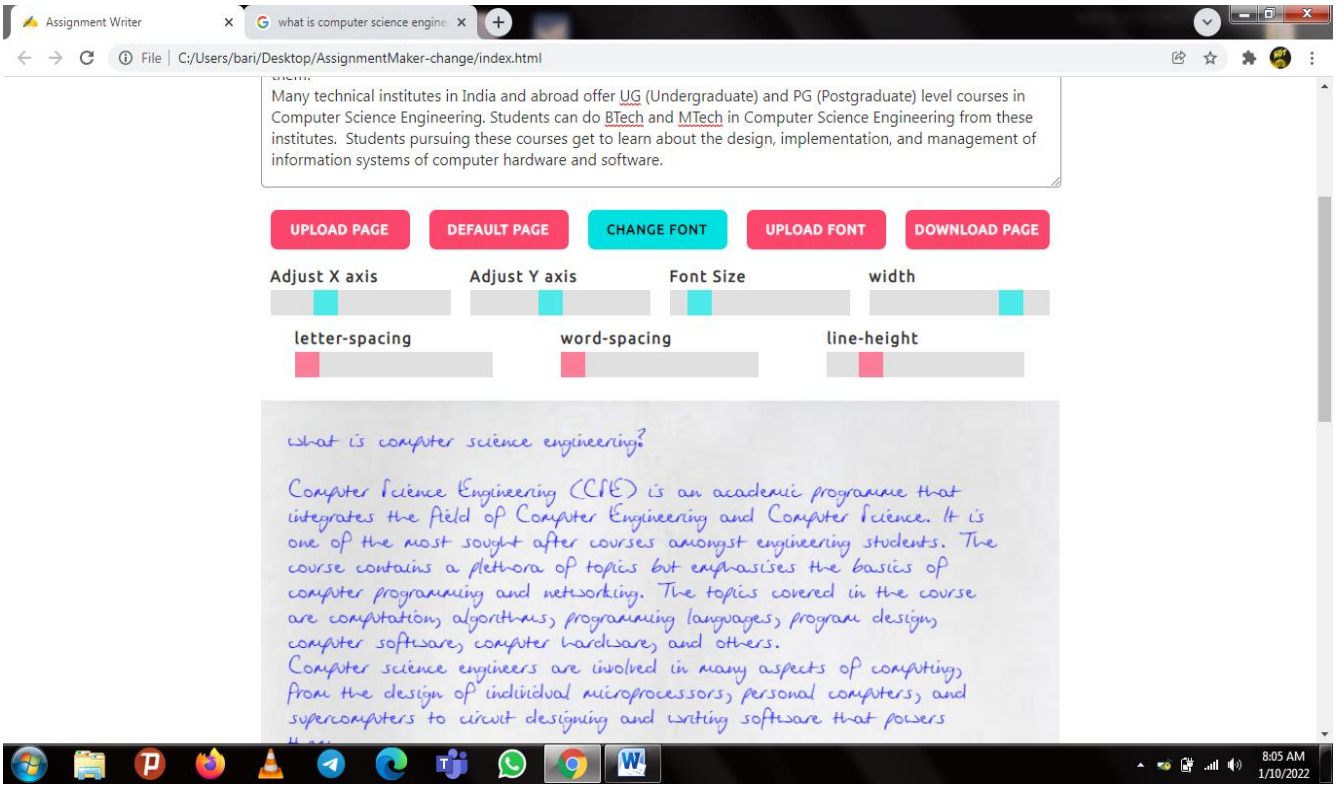
SAMPLE FONT-1



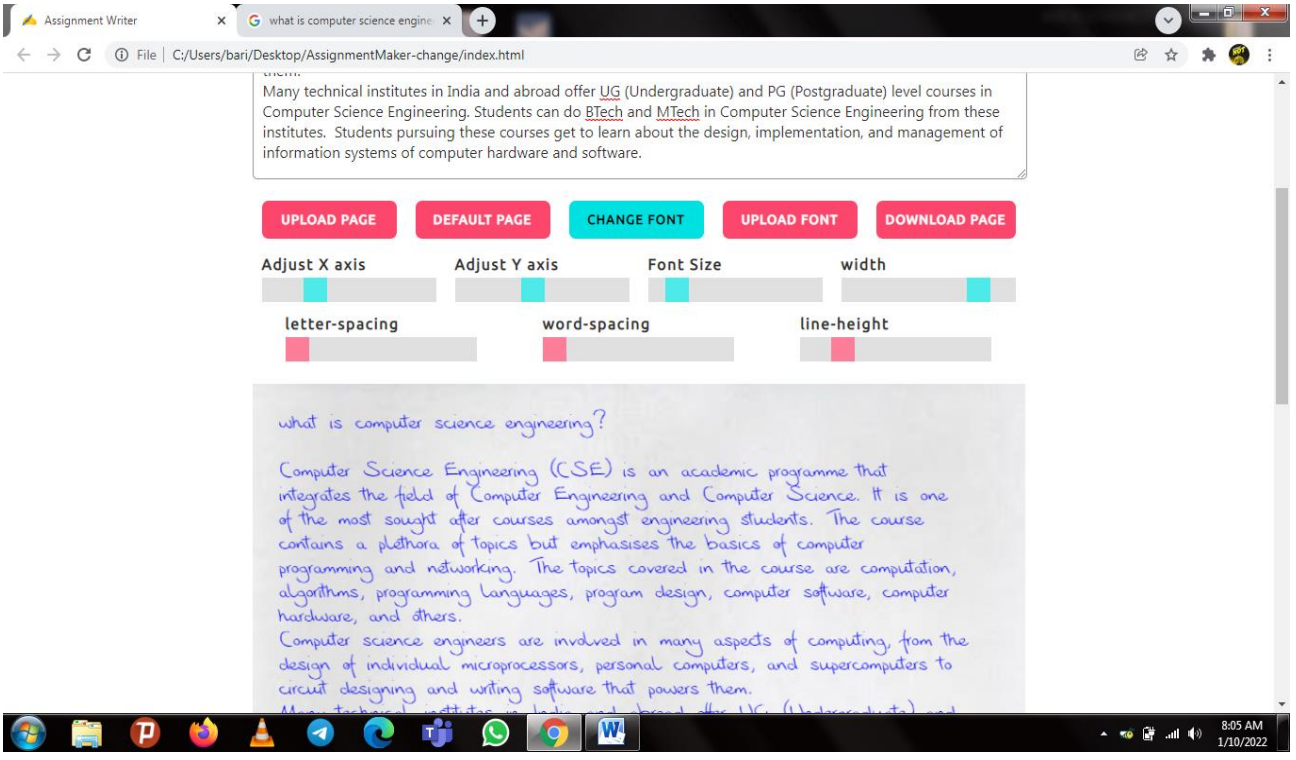
SAMPLE FONT-2



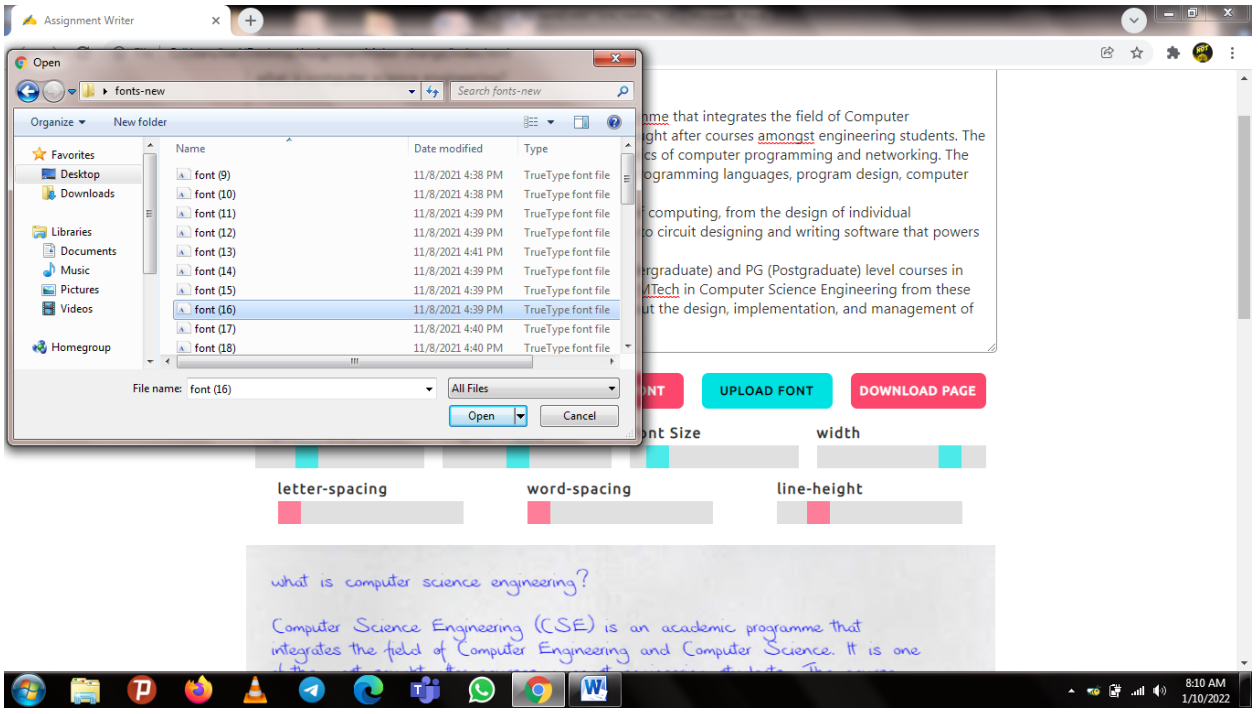
SAMPLE FONT-3



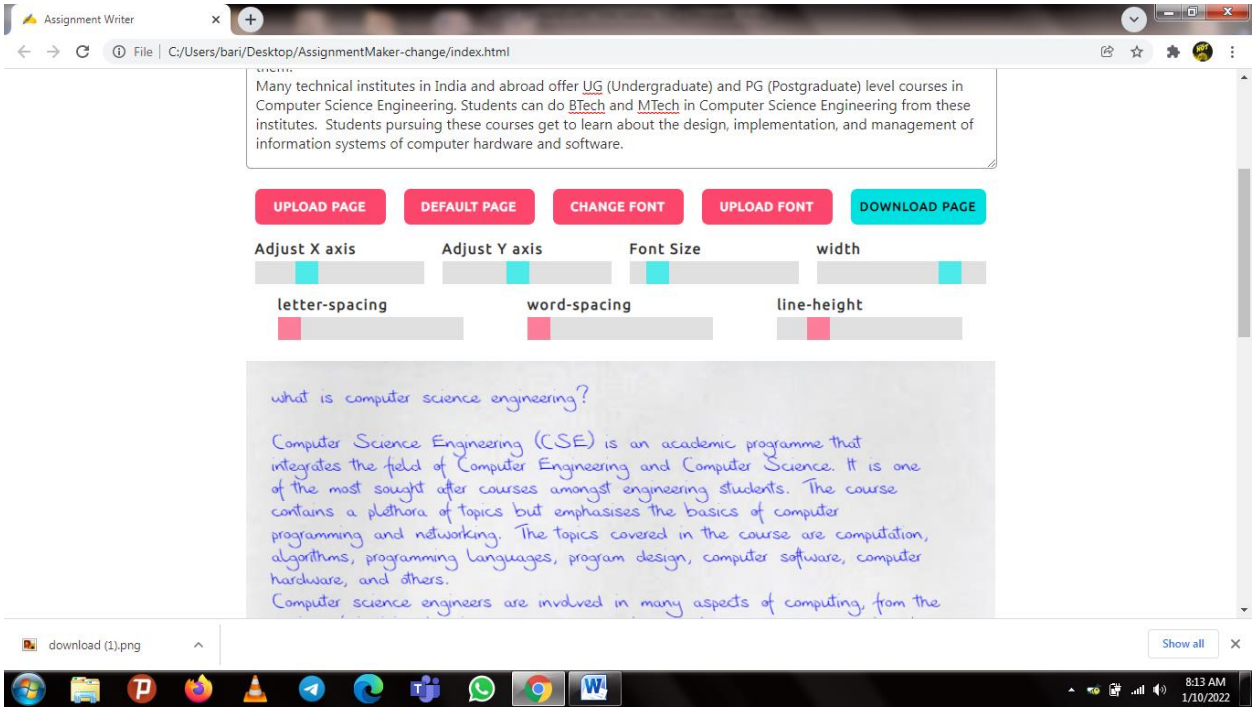
SAMPLE FONT-4



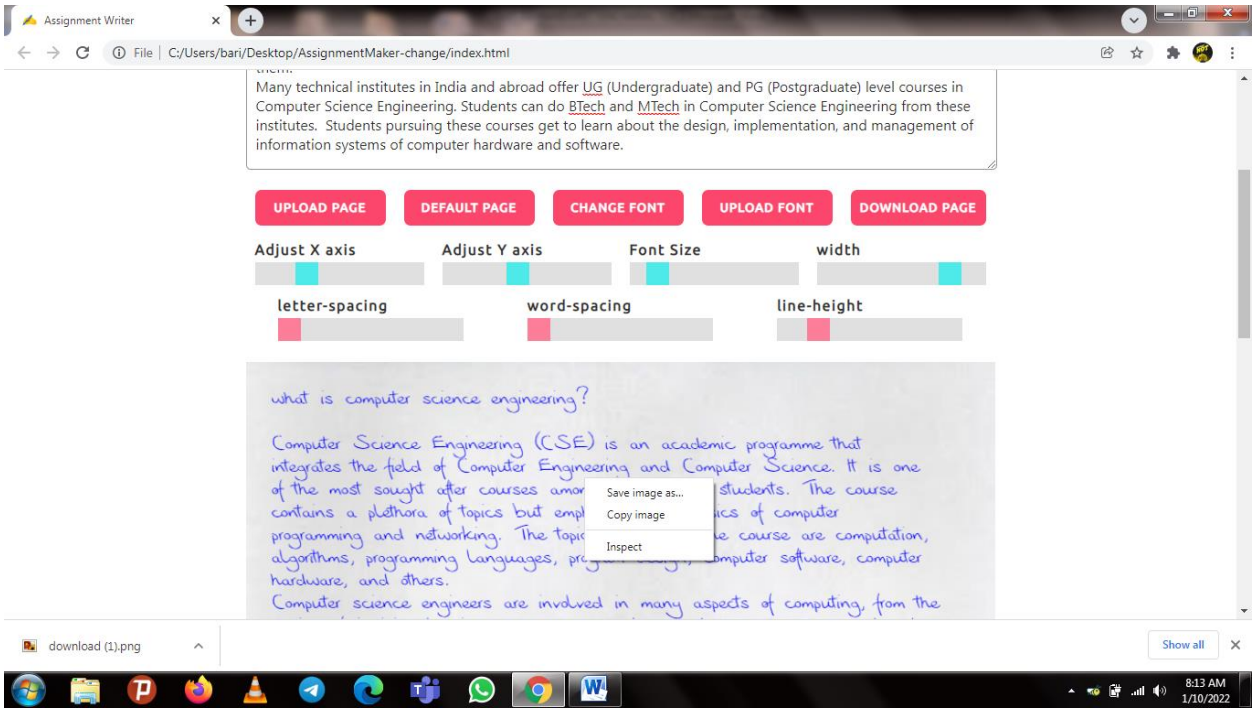
8.7 UPLOAD NEW FONT



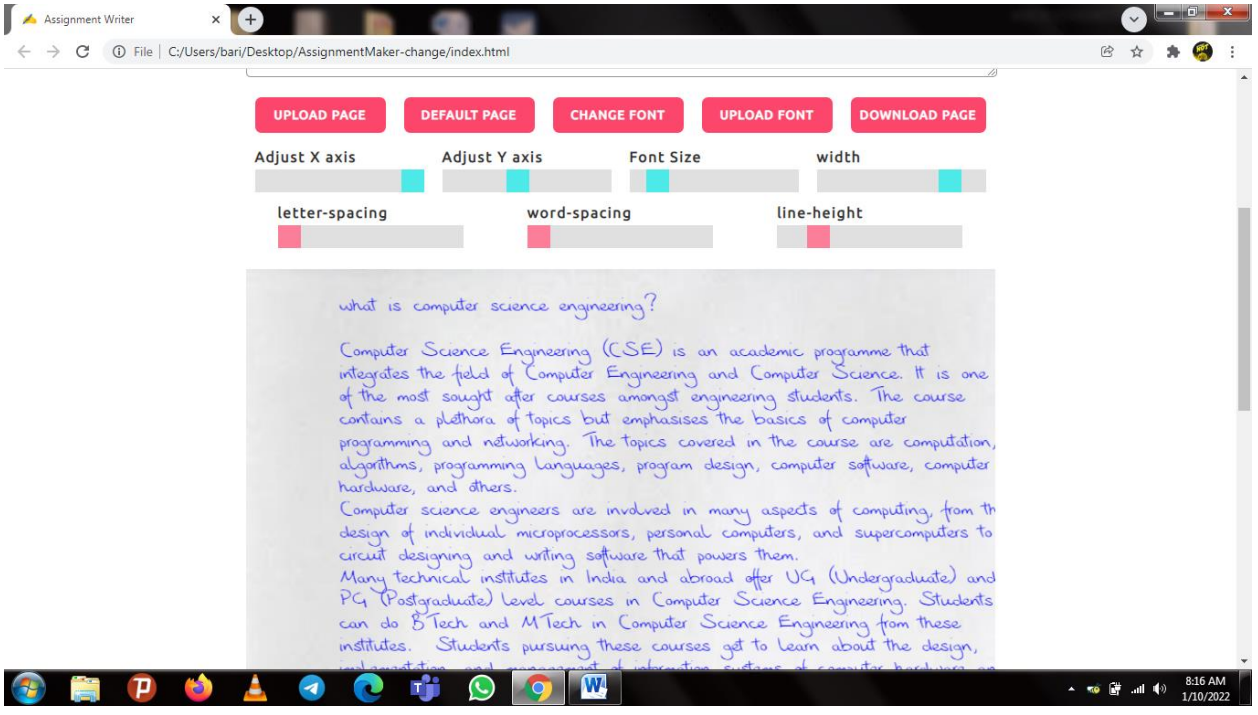
8.8 DOWNLOAD PAGE



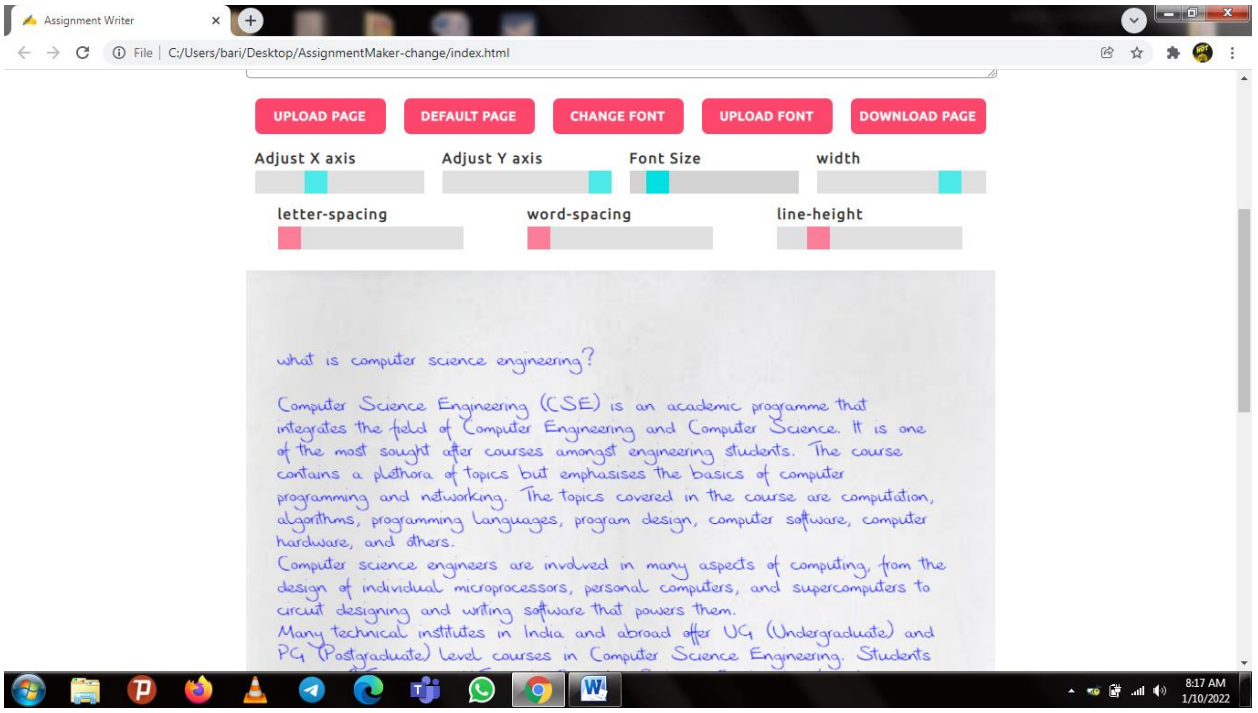
8.8.1ALTERNATE DOWNLOAD



8.9 ADJUST X-AXIS

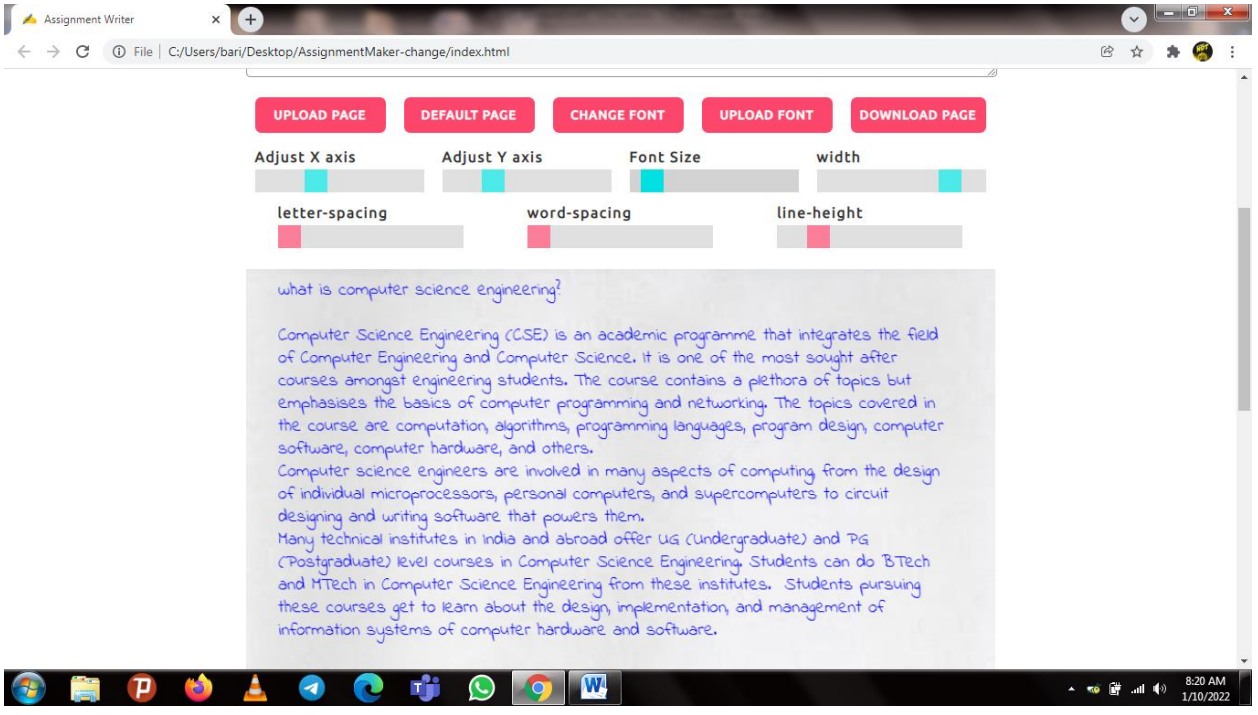


8.10 ADJUST Y-AXIS

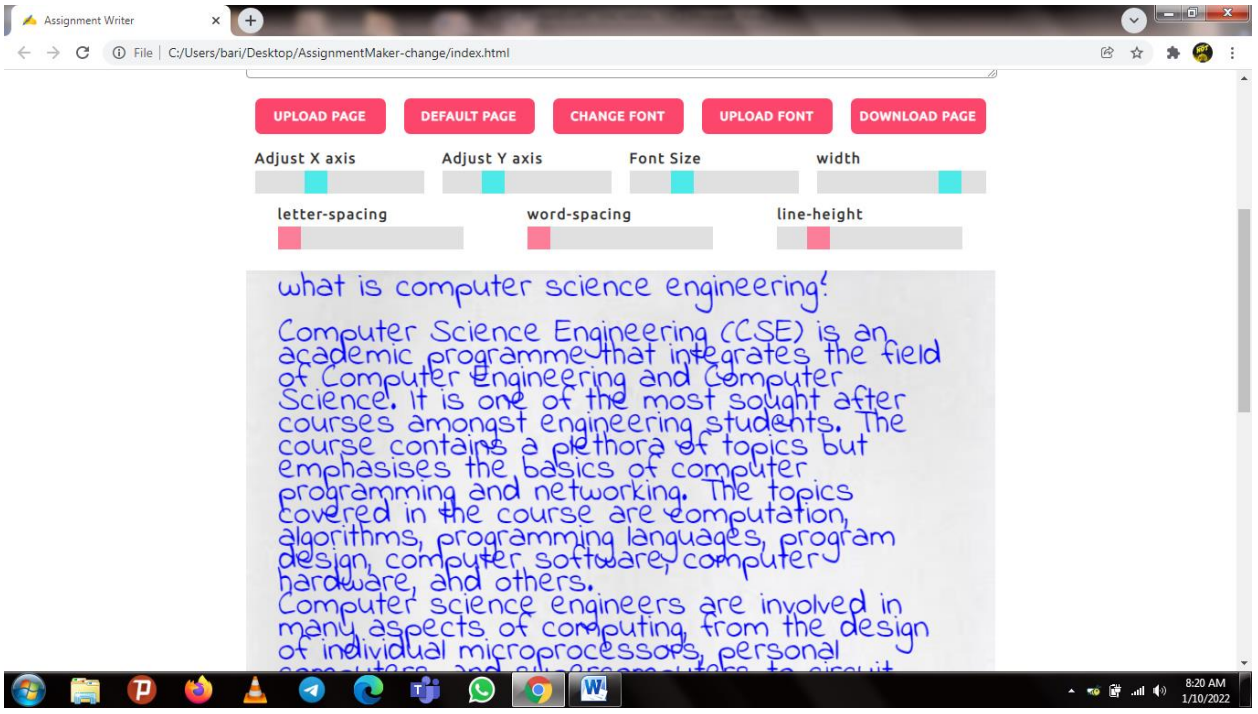


8.11 FONT SIZE

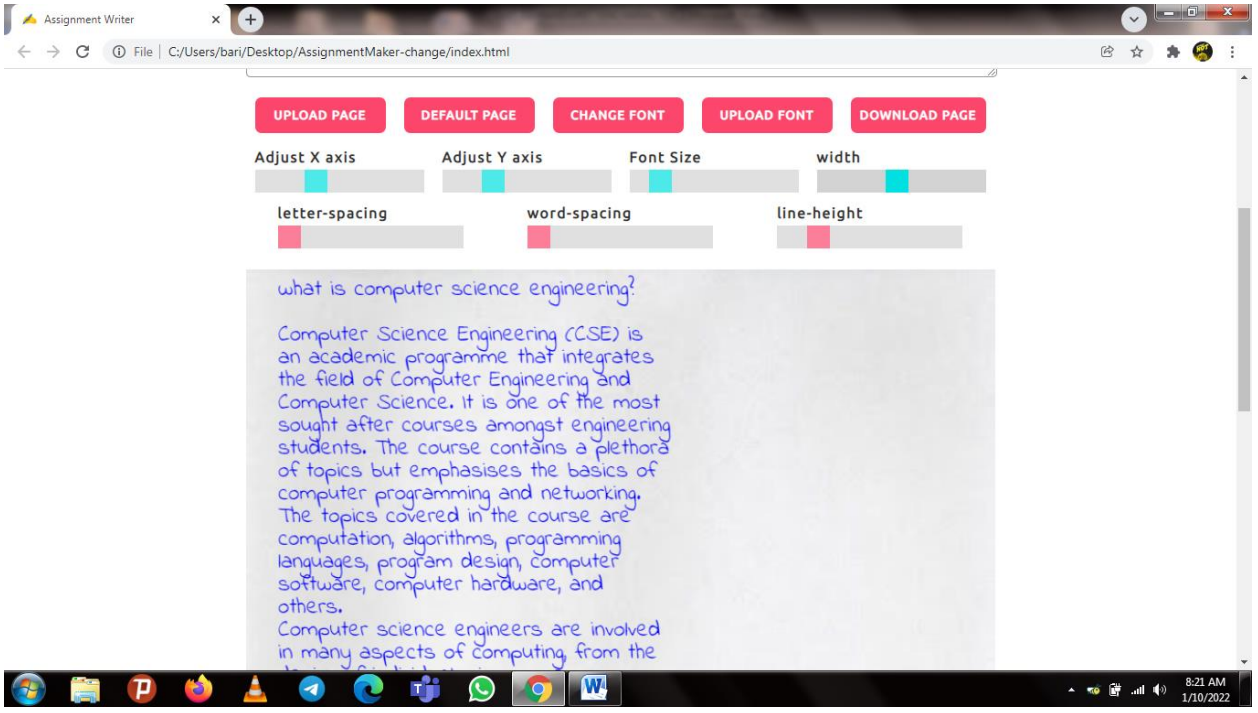
BEFORE



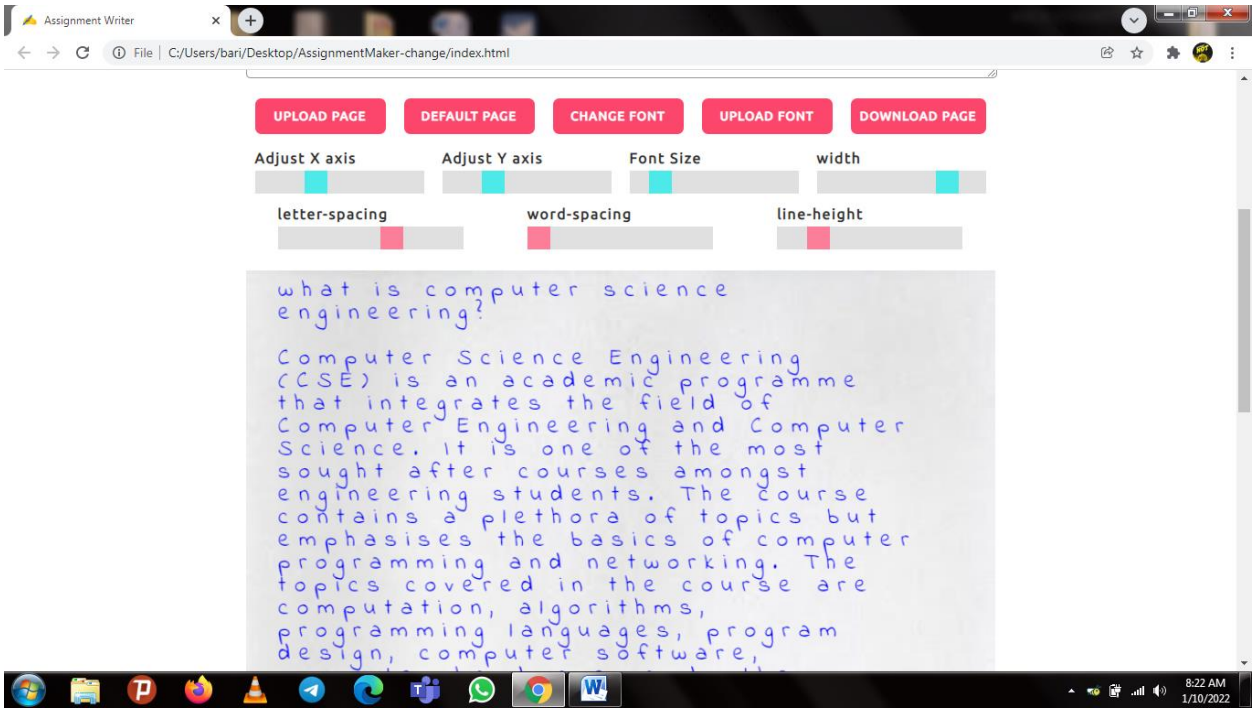
AFTER



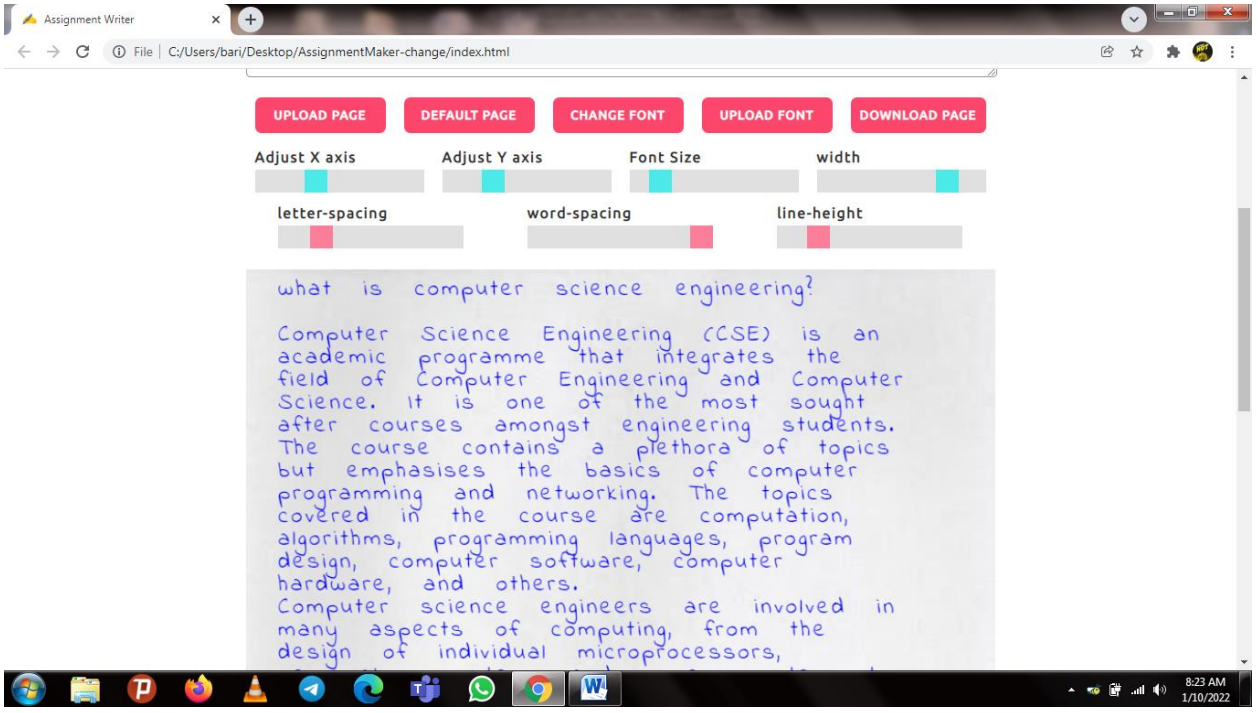
8.12 WIDTH



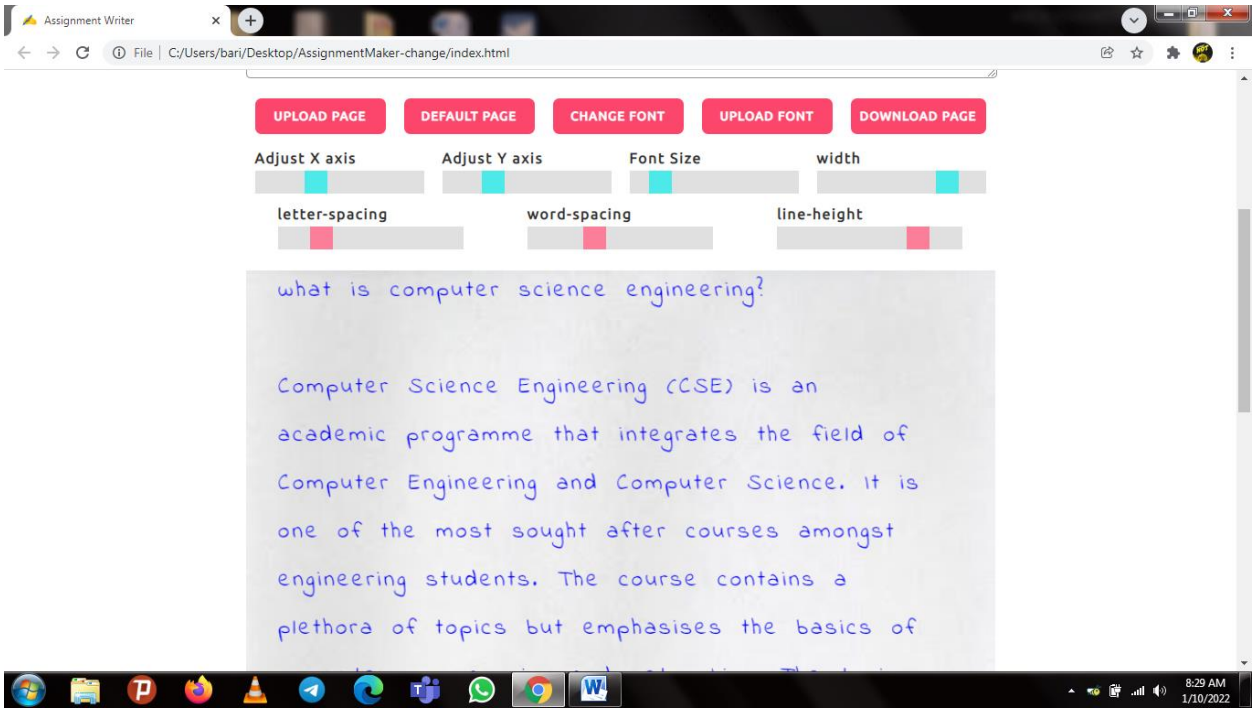
8.13 LETTER SPACING



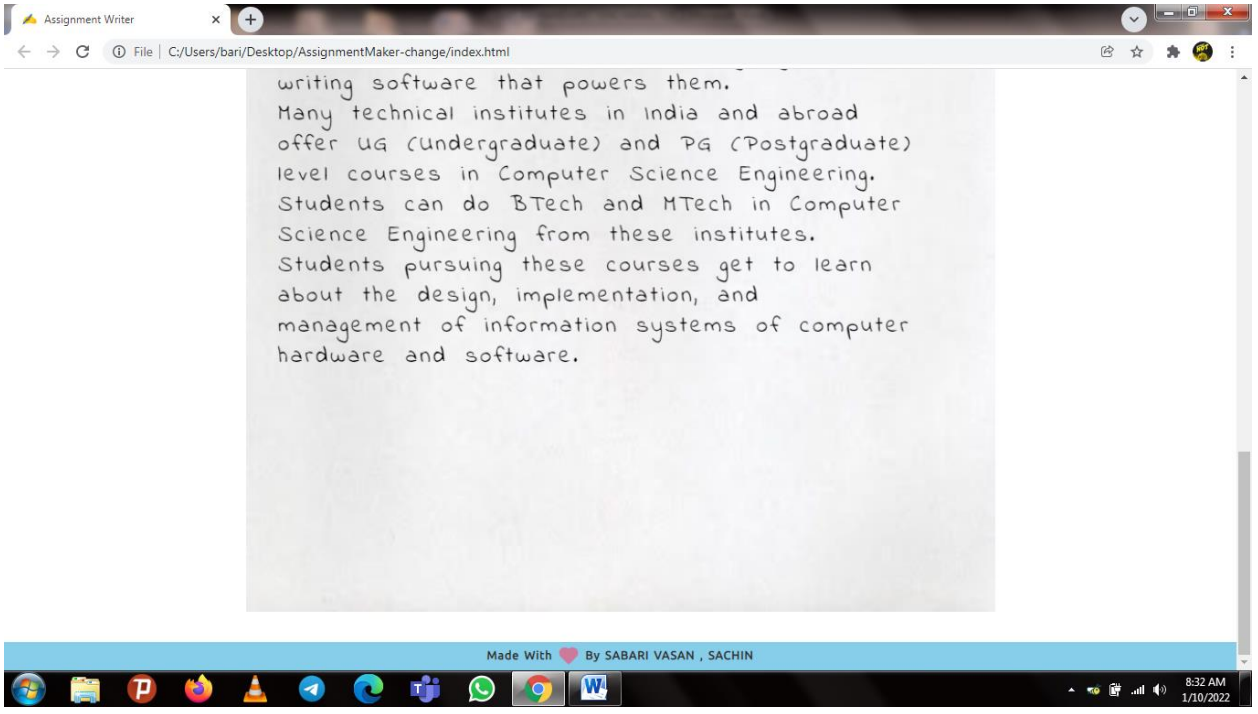
8.14 WORD SPACING



8.15 LINE HEIGHT



8.16 FOOTER



CHAPTER 9

CONCLUSION AND FUTURE WORK

9.1 CONCLUSION

Handwriting recognition system is mainly aiming in converting handwritten data into digital text format with the help of various machine learning concepts such as deep learning, neural networks etc. and converts it into digitalized text format. the first phase of the project involved in literature survey of the project identifying the methodology used to achieve the goal and it involved in giving a short presentation about the project to respective guides. Next phase involves in developing the software by writing the code in python with the help of APIs to meet the objective of the project and testing the efficiency and accuracy of the system.

Apart from converting the handwritten input to digital format as the output this project will also finds its applications in many fields such as financial and banking sectors to identify the amount written in checks it can also be used to identify the postal address of the customer, this project can be used in converting huge volume of handwritten data into digital format in a small period of time efficiently, this can also be used to recognize the prescriptions given by the doctors if the handwriting is not recognizable.

9.2 FUTURE ENHANCEMENT

9.2.1 Facility of cloud storage for each users.

9.2.2 Access of data through Mobile devices.

9.2.3 Store the handwritten data through encryption to provide better security.

9.2.4 Interactive user interface.

9.2.5 Facilities for Backup creation.

REFERENCS

[1] REFFERED SOME WEBSITES FOR DEVELOPMENT