UNIVERSITY OF CALCUTTA

B.Sc. Computer Science Honours

(Under CBCS System)

Project Work

Semester – VI

Predictify

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Certificate from the Supervisor

This is to certify that the dissertation is the record of Final Year Project, entitled "Predictify", a web based application" undergone at Bangabasi Morning College, University of Calcutta carried out by Susmit Mukherjee Roll No. 203144 – 21 – 0038, Manotosh Paul Roll No. 203144 – 21 – 0124 and Koushtav Paul Roll No: 203144 – 21 – 0144 of the Department of Computer Science, Bangabasi Morning College, for the partial fulfilment of the award of the degree of Bachelor of Science (Session 2020 - 2023) by University of Calcutta in the year 2023 under my supervision and guidance. To the best of my knowledge, the results embodied in this report, are original in nature and worthy of incorporation in the present version of the report for B.Sc programme in Computer Science. This report has not been submitted to any other university or institution for the award of any degree.

Guide / Supervisor

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Acknowledgement

First of all, we, Susmit Mukherjee, Manotosh Paul and Koushtav Paul of B.Sc Honours Computer Science semester VI, would like to express our profound sense of gratitude towards our Project Guide Mrs. Pallavi Roy, Asst. Professor, Department Of Computer Science, for her able guidance, support and encouragement during the course of our final year project : Predictify , a web based application. This project work was undertaken in partial fulfilment of the requirements for the award of the degree of Bachelor of Science from Bangabasi Morning College, University of Calcutta.

We are deeply indebted to our Project Guide for giving us this opportunity to work on this project and for her kind help and support to develop an understanding of the subject and making a clear knowledge by providing necessary insight. Her readiness for consultations at all times, her educative comments, her concern, concrete support and assistance even with practical things have been invaluable. Lastly, we would like to thank the entire faculty of the Department of Computer Science of our college for cultivating a healthy and creative environment to work in the project.

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Date :

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ABSTRACT:

Predictify is a web-based application designed to extract text from images using an AI model that works on Optical Character Recognition (OCR) technology and then post process that data using our personalized parameters. The application's database is based on MongoDB. Predictify is an MERN stack app that has seamless communication between the frontend and backend, facilitating efficient hosting of the web app.

The user journey in Predictify is straightforward and efficient. Users begin by uploading an image containing text, which is sent as a payload to the backend where Google Vision that uses OCR to extract text. The image is then processed by Google vision to identify handwritten text. Then we post process the data using our python model and then send it to the frontend . Simultaneously, the predicted text, along with the user's name, email, predicted text and input image, is stored in the database. On the frontend, the predicted text is displayed as the output for the user.

Google Vision that uses OCR to extract text and our post-processing model is the core component of Predictify.

Predictify ensures efficient communication between the frontend and backend, enhancing the overall performance of the web app.

Predictify offers various features to enhance user experience. These include a login system for users to access the application with their email accounts, a main page where users can upload images and receive predicted text, a history page to view past scans and their respective predictions, and voice support for the predicted result.

In real-life scenarios, Predictify finds utility in numerous ways. It can be used to convert doctors' prescription images into readable formats, helping with prescription management. Teachers can employ it to convert handwritten question papers into printable formats, simplifying distribution and grading processes. The voice support feature can be particularly beneficial for visually impaired individuals, as it allows them to understand the text within images.

Overall, Predictify offers an efficient solution for extracting text from images. Its user-friendly features and practical applications make it a valuable tool in various domains

INTRODUCTION

Predictify is a web-based application designed to extract text from images using an AI model that works on Optical Character Recognition (OCR) technology and then post process that data using our personalized parameters. Predictify can accurately identify and extract text from images, offering a user-friendly interface and streamlined communication between the frontend and backend components.

Domain Description :

Hardware description:

i. Processor **–** 230 MHz, Pentium 4 (233 MHz) processor or faster.

ii. RAM – Atleast 256 MB.

iii. Hard Disk – Atleast 8 GB for Handsets & 100 GB for Desktops.

Software to be used:

i. Operating System – Windows, Linux, iOS, Android.

ii. Browser – Any JavaScript Enabled Browser.

Scope of work

Predictify is a web-based application designed for text extraction from images. The app utilizes OCR technology through Google Vision API for text extraction and applies a personalized Python model for post-processing. Key features include user registration, image upload, text prediction display, and a history page for past scans. Predictify stores user information and scan history in a MongoDB database. The application also includes voice support for predicted result. Thorough testing, documentation, and seamless deployment will be ensured. Practical applications include converting doctors' prescriptions, handwritten question papers, and aiding visually impaired users. The project will be effectively managed, with post-deployment support and maintenance provided.

Methodology:

Software Requirement Specification(SRS) :

Purpose :

Text Extraction from Images: The primary purpose of Predictify is to extract text from images using Optical Character Recognition (OCR) technology. It employs AI models, specifically Google Vision, to analyze images and convert the text within them into a readable format.

Post-processing and Personalized Parameters: Predictify goes beyond simple OCR by implementing post-processing of the extracted text using a personalized Python model. This allows for additional refinement and customization of the extracted data based on specific parameters.

Database Storage: Predictify utilizes a MongoDB database to store relevant information associated with each prediction. This includes the user's name, email, predicted text, and the input image. The database enables the retrieval of past scans and their respective predictions, contributing to a history feature within the application.

Efficient Frontend-Backend Communication: Predictify ensures seamless communication between the frontend and backend components of the application. This efficient communication enhances the overall performance of the web app, providing a smooth user experience.

User-Friendly Features: Predictify incorporates several user-friendly features. These include a login system for user authentication, a main page for image uploading and receiving predicted text, a history page for viewing past scans and predictions, and voice support for multilingual dictation of the predicted text.

Real-Life Applications: Predictify finds utility in various real-life scenarios. For example, it can be used by doctors to convert prescription images into readable formats, aiding in prescription management. Teachers can utilize Predictify to convert handwritten question papers into printable formats, simplifying distribution and grading processes. Additionally, the voice support feature can be beneficial for visually impaired individuals, enabling them to understand text within images.

Functional Requirements :

User's Registration Page :

Input: Email address, Password.

Output: On Confirmation of registration forwards to the Login page.

Login :

Input: User's Email id and password.

Output: If input is valid navigates to homepage and if it is invalid, an error message will be displayed.

Forgot Password : Forgot Password will be available only for the User by clicking the link that will be sent to the user's email.

Input: User's Mail address .

Generated link Output: Redirects to the Update Password Page without Previous Password.

History : User can check their uploaded history.

Input: NA.

Output: History (All the details of past uploads with their text will appear on the screen).

Listen: User can listen the text

- Input: Predicted Text.

- Output: voice support for predicted result.

Non-functional Requirements :

USABILITY:

This software provides an easy to use and attractive user interface which helps the user to use and perform a lot of task by only one click. Also this application provides a very clear and understandable error message and notification. And also this application is very much user friendly.

SECURITY :

All the users are protected by authentic email id and password mechanism. The application is an online system, so proper protective measures are taken to protect the system. All the personal details are maintained carefully and only the authentic person can modify it. So this system is very much secure.

PERFORMANCE :

The system shall take as less time as possible to provide service to the user.

DESIGN CONSTRAINTS :

The frontend of Predictify, built using React.js and supported by libraries like Chakra UI, provides an intuitive and user friendly interface. This combination of advanced technology and user-centric design makes Predictify stand out from existing solutions.
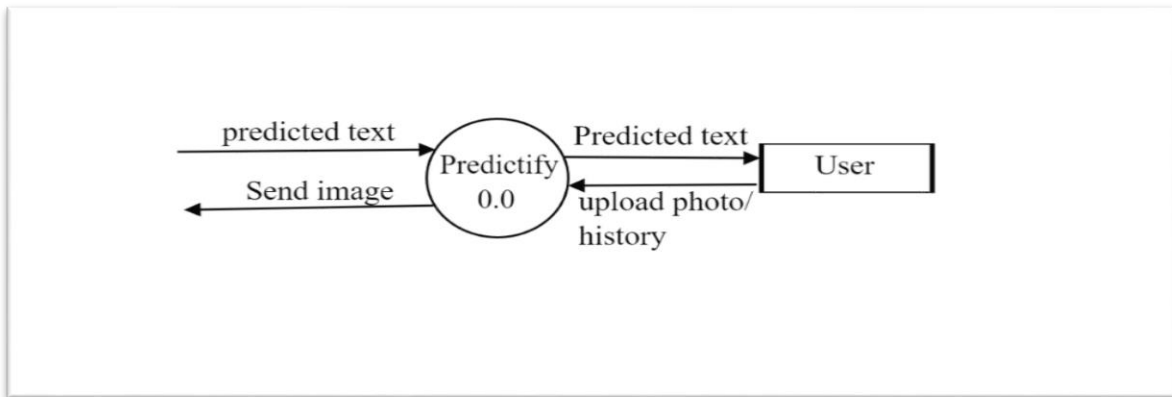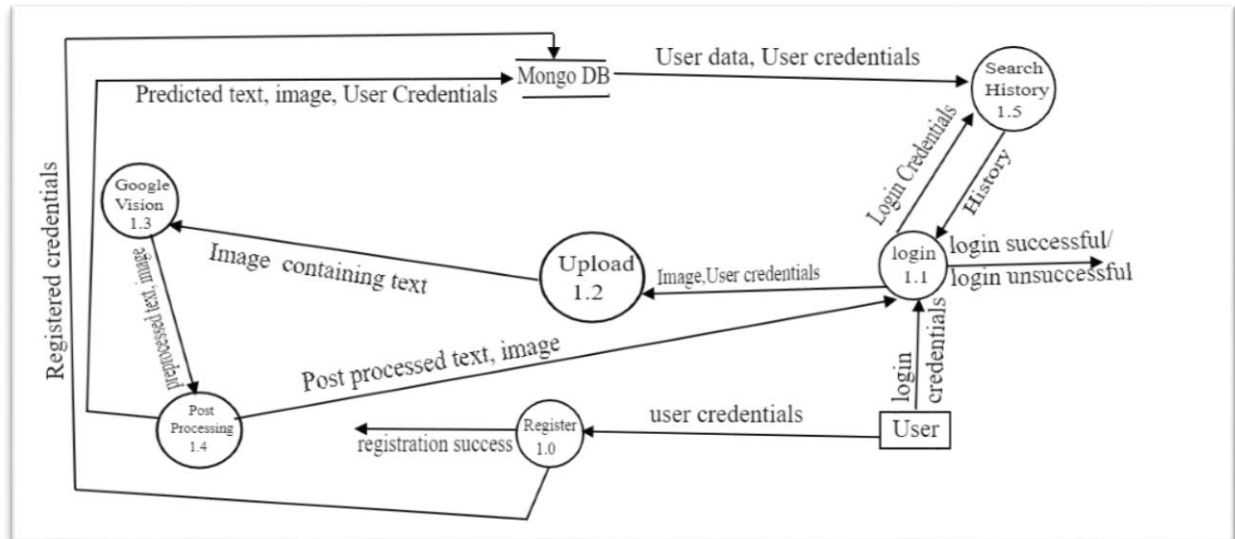
LEVEL 0 DFD

LEVEL 1 DFD

LEVEL 2 DFD

FRONT END LINK : https://predictify-v1.vercel.app/

BACKEND LINK : https://predictify-backend.onrender.com/
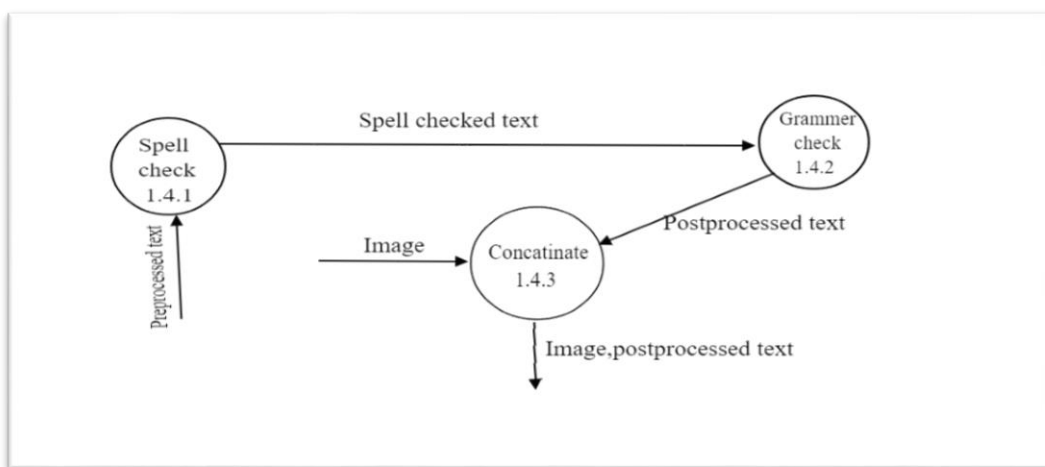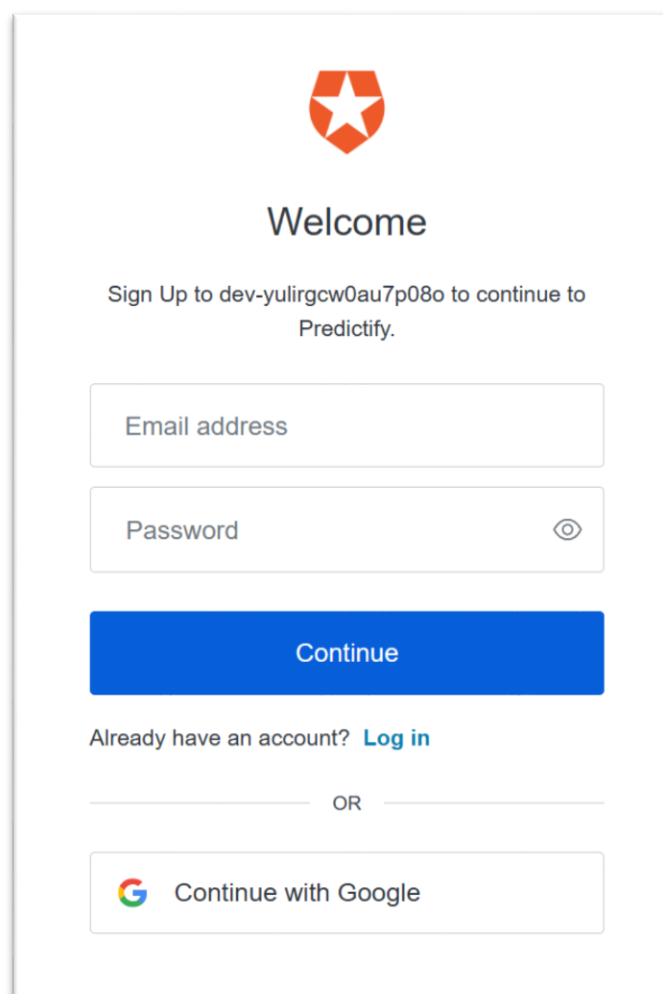
Results and Discussion
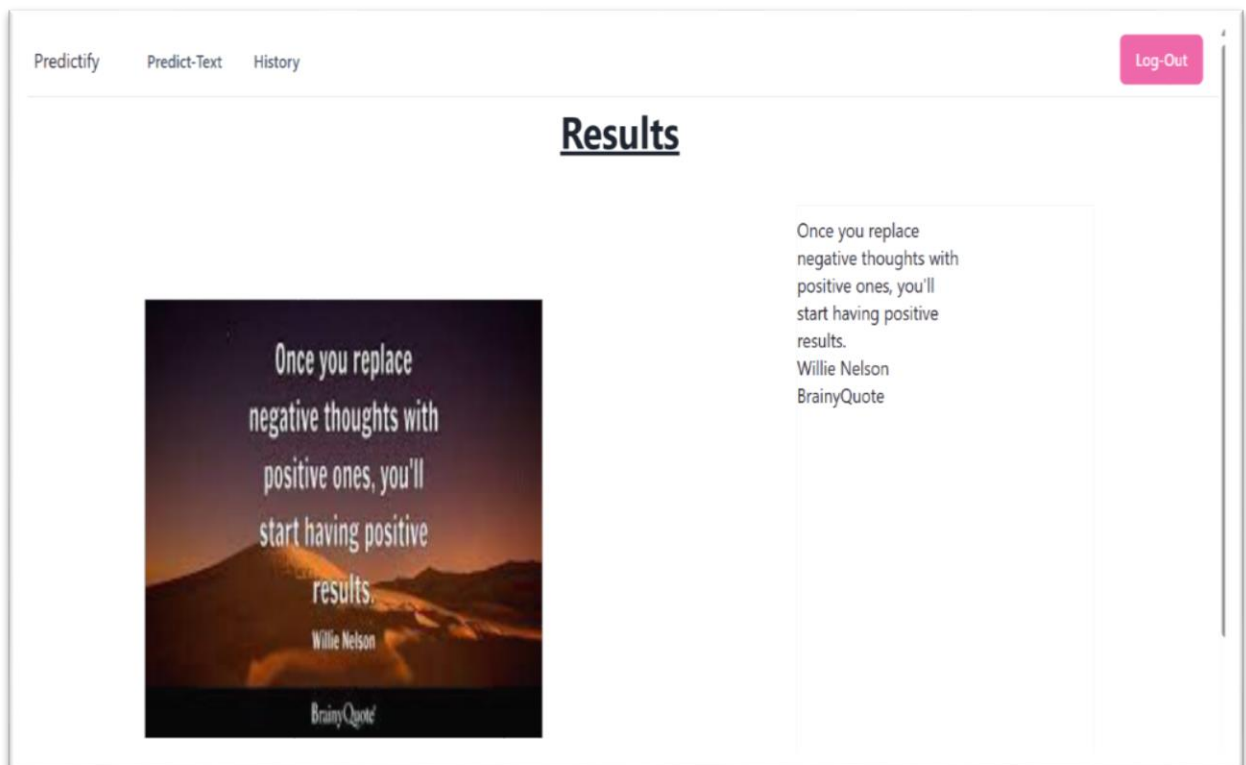
User Authentication

This screen serves the purpose of registering a new user to Predictify. We need the information email id, password. User can also use his/her google account using Continue with google.
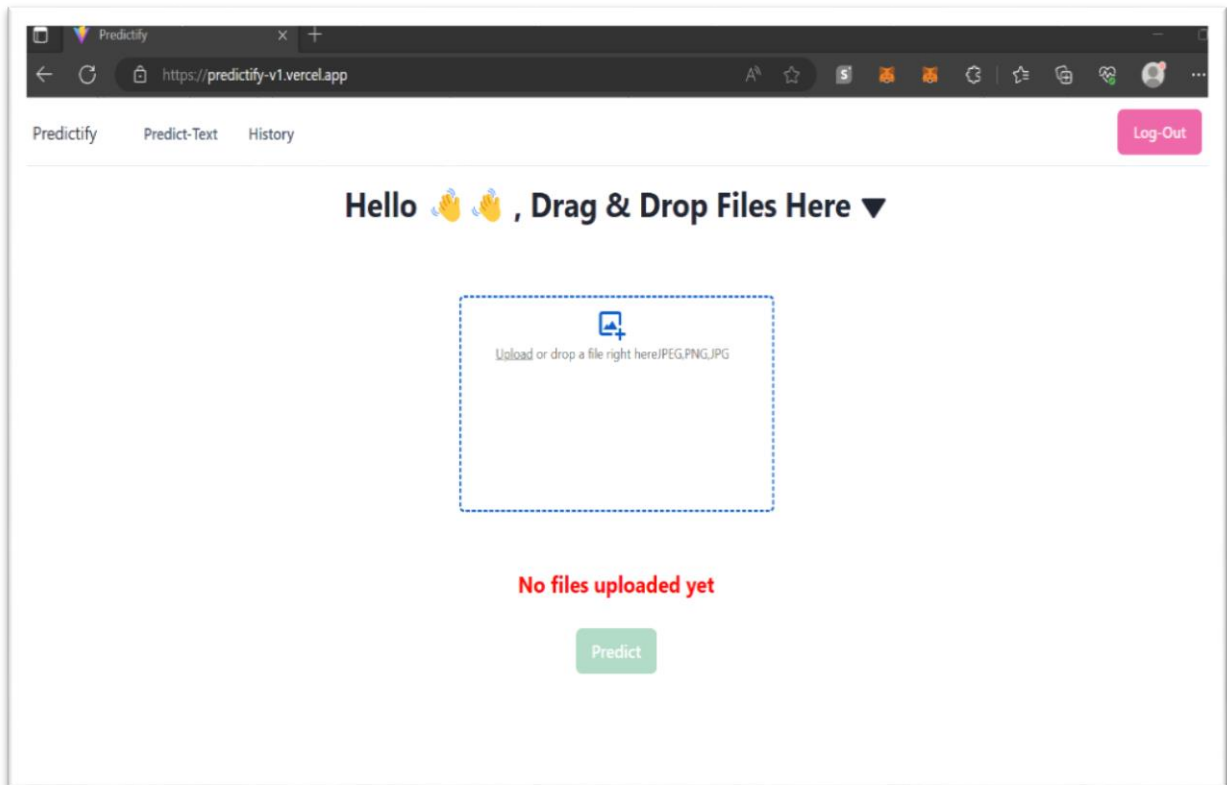
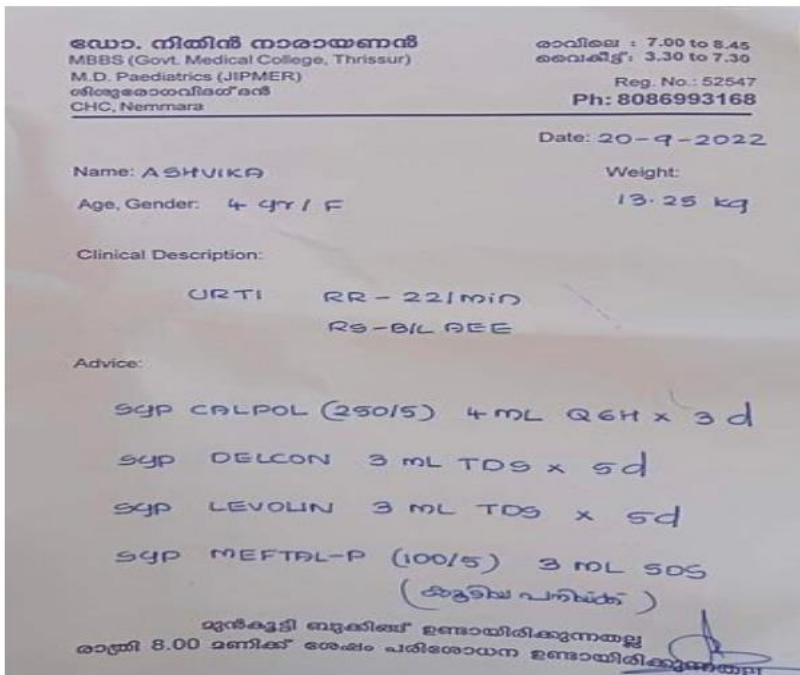This screen represents our homepage.
Here we are uploading an image user can also drag and drop an image.
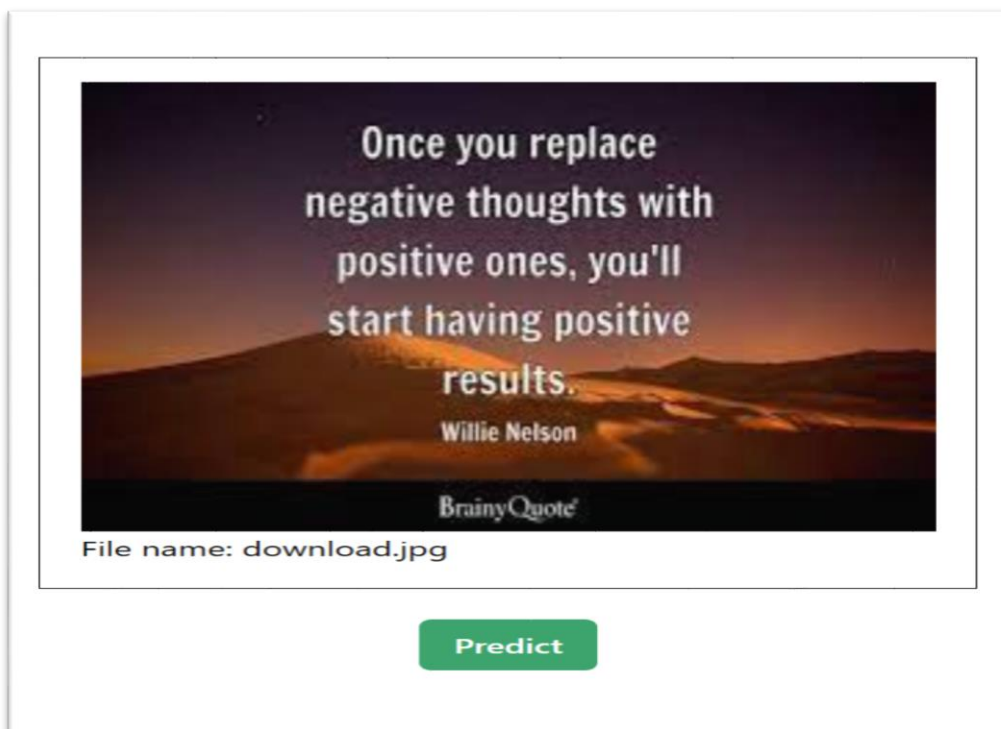
After clicking on predict the result is showing.

User can use our listen feature to listen the predicted text using Listen button. And can stop it using Stop button.
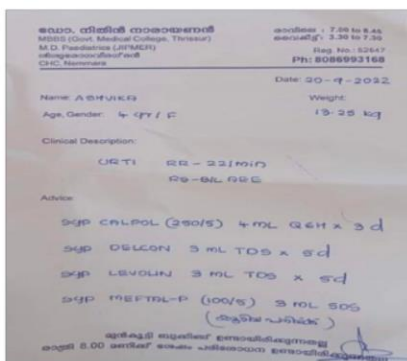
Doctor's prescription

File name: kerla.jpg

Predict

Results

ഡോ. നിതിൻ നാരായണൻ
MBBS (Govt. Medical College, Thrissur)
M.D. Paediatrics (JIPMER)
ശിശുരോഗവിദഗ്ധൻ
CHC, Nemmara
Name: ASHVIKA
Age, Gender: 447/ F
Clinical Description:
Advice:
URTI
RR-22/Min
RS-BIL PEE
രാവിലെ : 7.00 to 8.45
വൈകിട്ട് 3.30 to 7.30
Reg. No: 52547
Ph: 8086993168
Dat020-9-2022
Weight:
13.25 kg
sgp CALPOL (250/5) 4 ML Q6H x 3 d
syp DELCON 3 ML TDS X 5d
sgp LEVOLIN 3 ML TDS x 5d

Here we have uploaded a screenshot of a youtube channel.

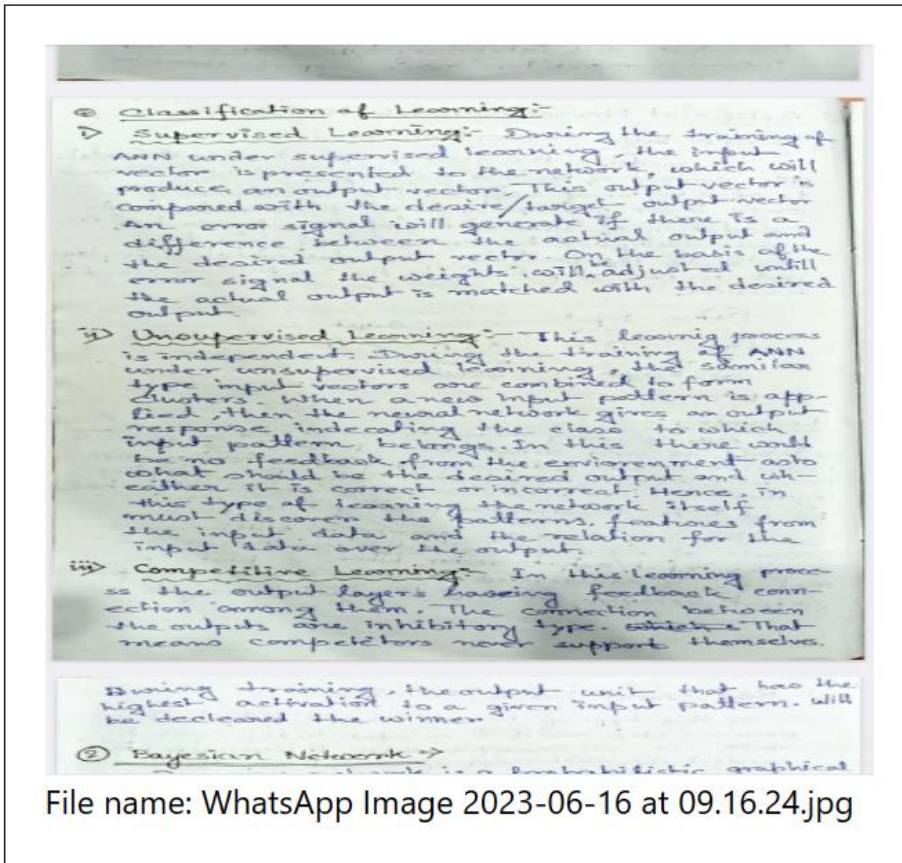File name: WhatsApp Image 2023-07-31 at 12.24.58.jpg

Predict
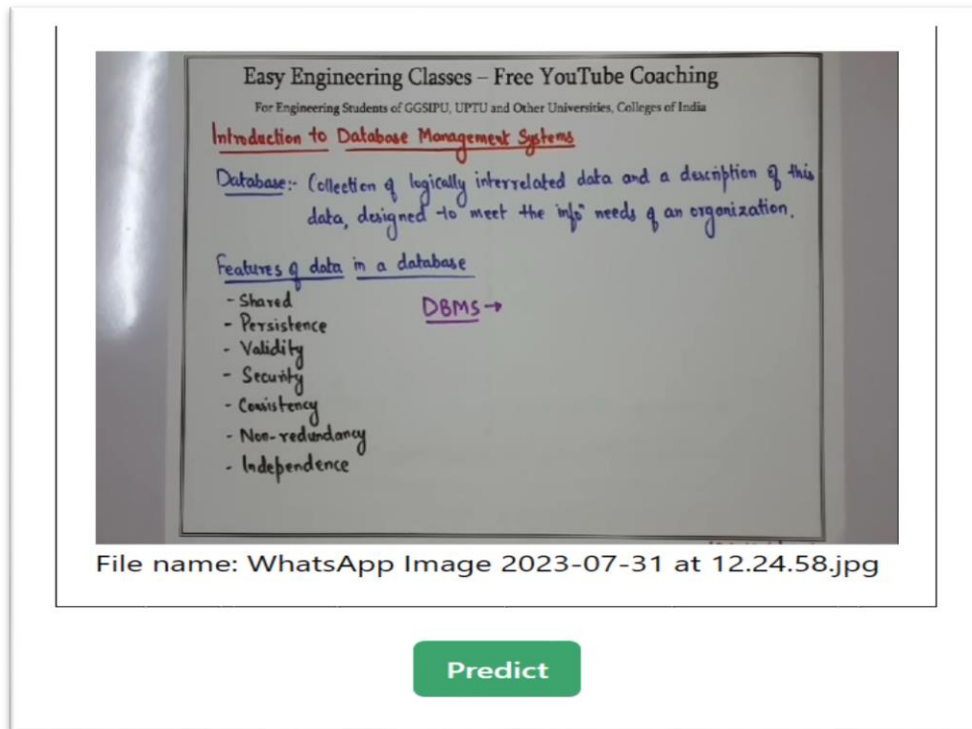
Results
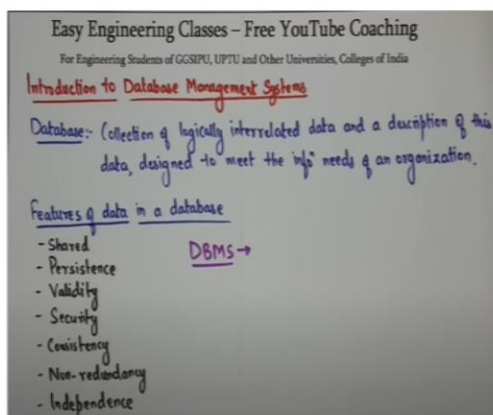
Easy Engineering Classes - Free YouTube Coaching
For Engineering Students of GGSIPU, UPTU and Other Universities, Colleges of India
Introduction to Database Management Systems
Database: Collection of logically interrelated data and a description of this data, designed to meet the info" needs of an organization.
Features data in a database
q
- Shared
Persistence
- Validity
- Security
- Consistency
- Non-redundancy
- Independence
DBMS-

File name: WhatsApp Image 2023-06-16 at 09.16.24.jpg

Predict

Predictify   Predict-Text   History   Log-Out

Results

Classification of Learning: se
1 Supervised Learning: During the training of
ANN under supervised learning, the infort
vector is presented to the network, which will
produce an output vector. This output vector is
compared with the desire/target output vector
signal will generate if there is a
difference between the actual output and
the desired output vector. On the basis of the
error signal the weights will adjusted untill
the actual output is matched with the desired

© **Classification of Learning:-**

i) **Supervised Learning:-** During the training of ANN under supervised learning, the input vector is presented to the network, which will produce an output vector. This output vector is compared with the desire/target output vector. An error signal will generate if there is a difference between the actual output and the desired output vector. On the basis of the error signal the weights will be adjusted until the actual output is matched with the desired output.

ii) **Unsupervised Learning:-** This learning process is independent. During the training of ANN under unsupervised learning, the similar type input vectors are combined to form clusters. When a new input pattern is applied, then the neural network gives an output response indicating the class to which input pattern belongs. In this there would be no feedback from the enviorenment as to what should be the desired output and wheather it is correct or incorrect. Hence, in this type of learning the network itself must discovern the patterns, features from the input data and the relation for the input data over the output.

iii) **Competitive Learning:-** In this learning process the output layer's haveing feedback connection among them. The connection between the outputs are inhibitory type. which is That means competetors never support themselves.

During training, the output unit that has the highest activation to a given input pattern. Will be decleared the winner.

② **Bayesian Network** ⇒

Bayesian network is a probabilistic graphical

Classification of Learning: se

1 Supervised Learning: During the training of
ANN under supervised learning, the infort
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output.

An error

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4) Unsupervised Lecorning. This learning process
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the outputs

means competitors

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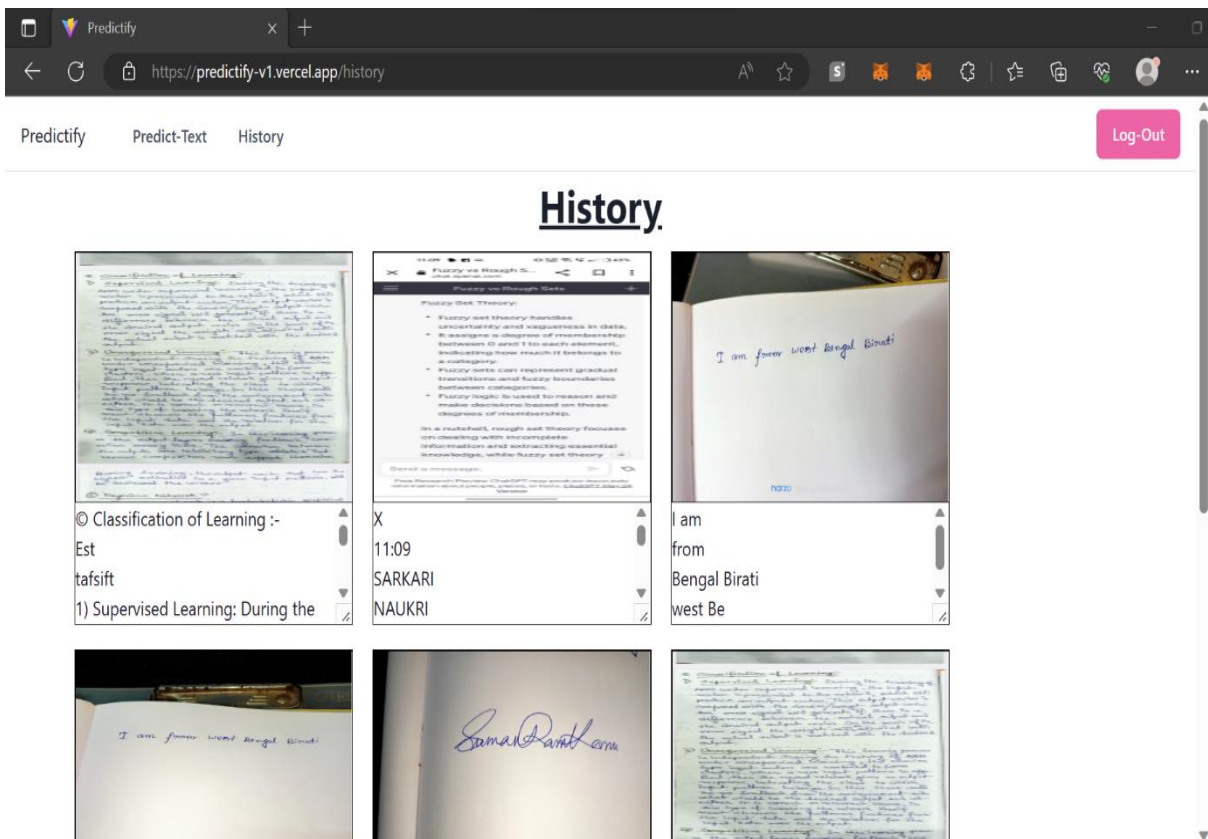inhibitory type. whichs That

support

themselves.

Bayesian Network => never During training, the output whit that has the
highest activation to a
be decleared the winner" given input pattern. Will Junk is a brobabilistic graphical

By clicking on history user can watch the previously uploaded images with their converted text.
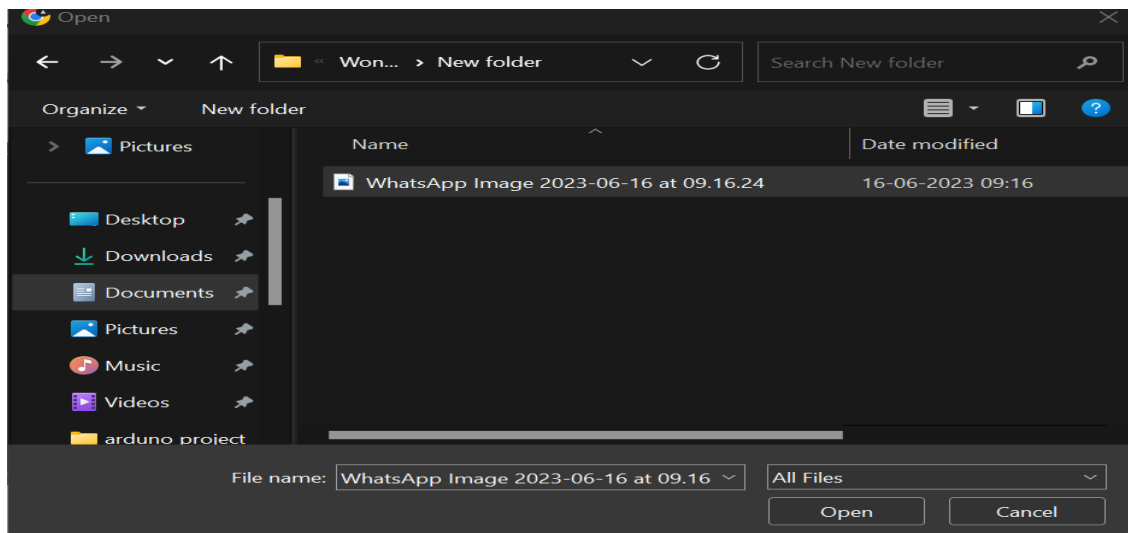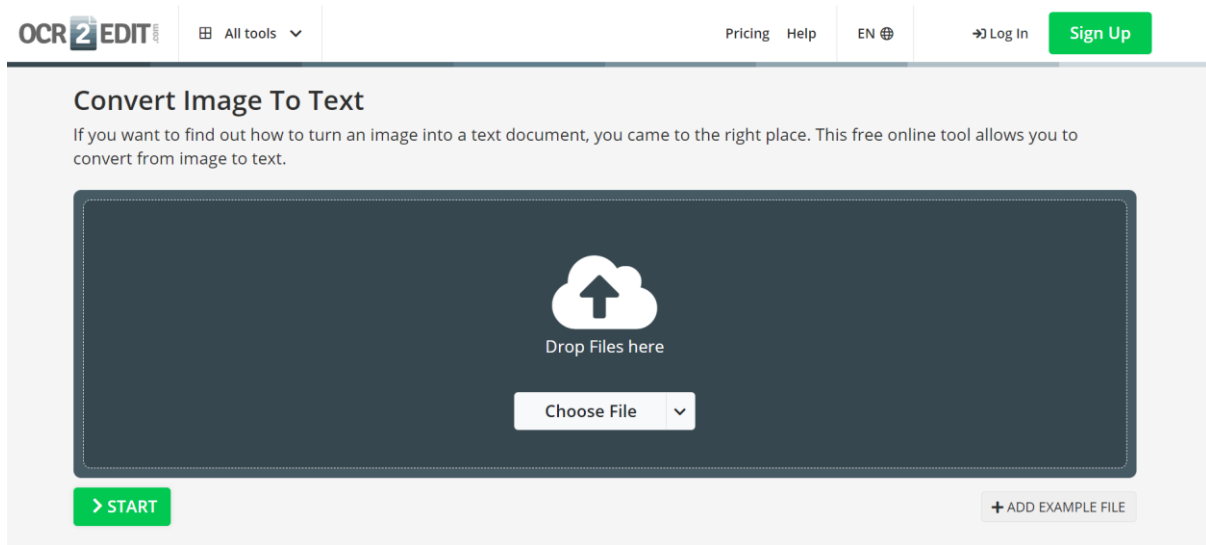
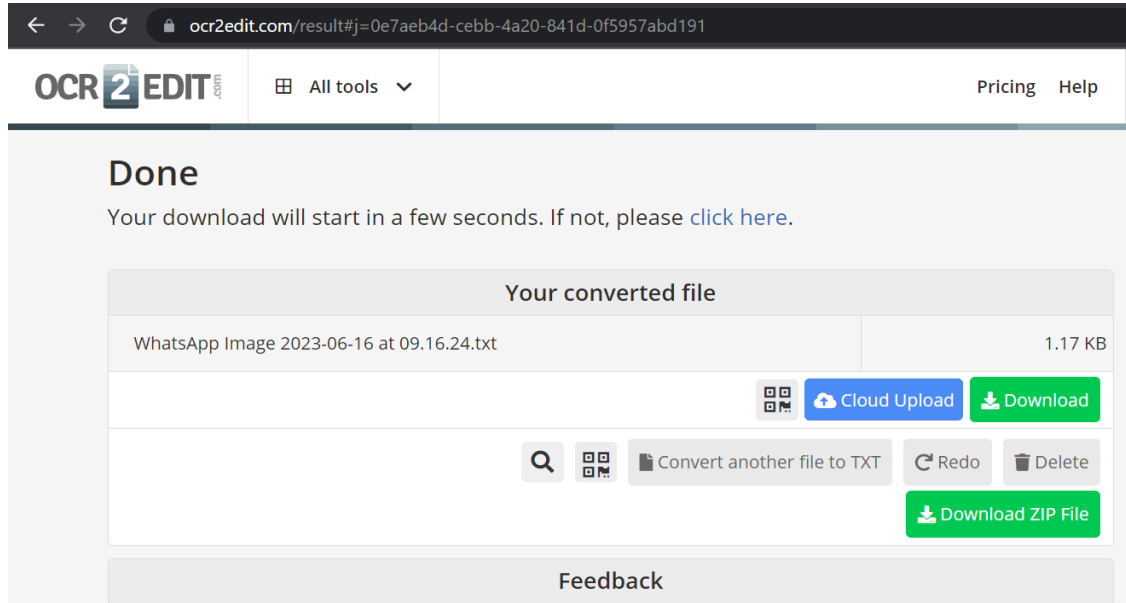<u>**REVIEW OF RELEATED WORK**</u>

<u>Existing Software</u>

Here are the example of two web based applications that serves the same purpose as predictify .
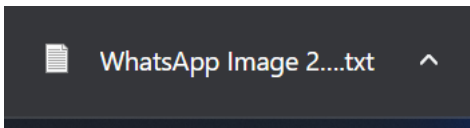We have uploaded same hand written image in the below two web based applications

1. OCR2EDIT(https://www.ocr2edit.com/)
    Here we have uploaded an image of hand written note

In the above screenshot we can see that OCR2EDIT has converted our uploaded image into a .txt file. The result is attached below:

As it is a .txt format we have opened using notepad.

RETRY

Selman 4

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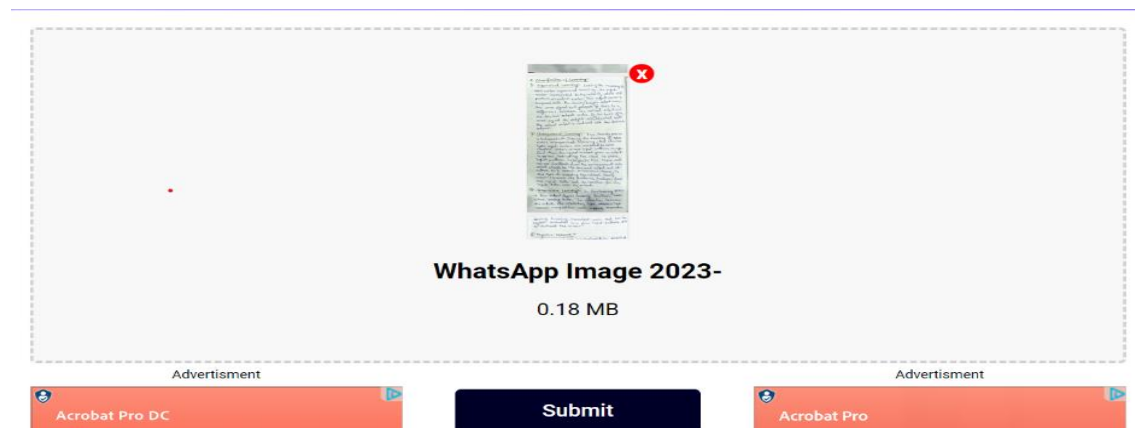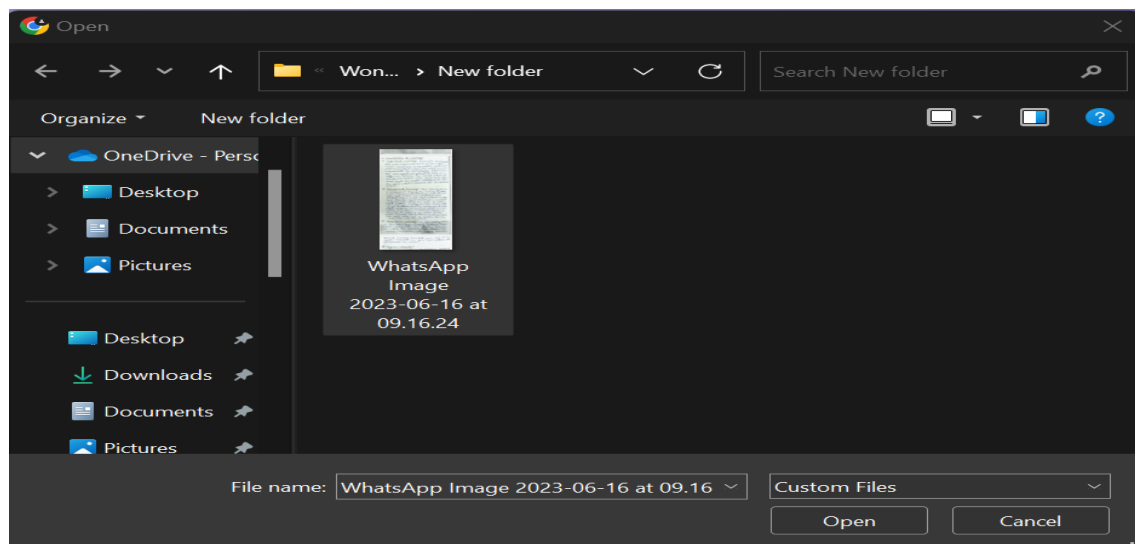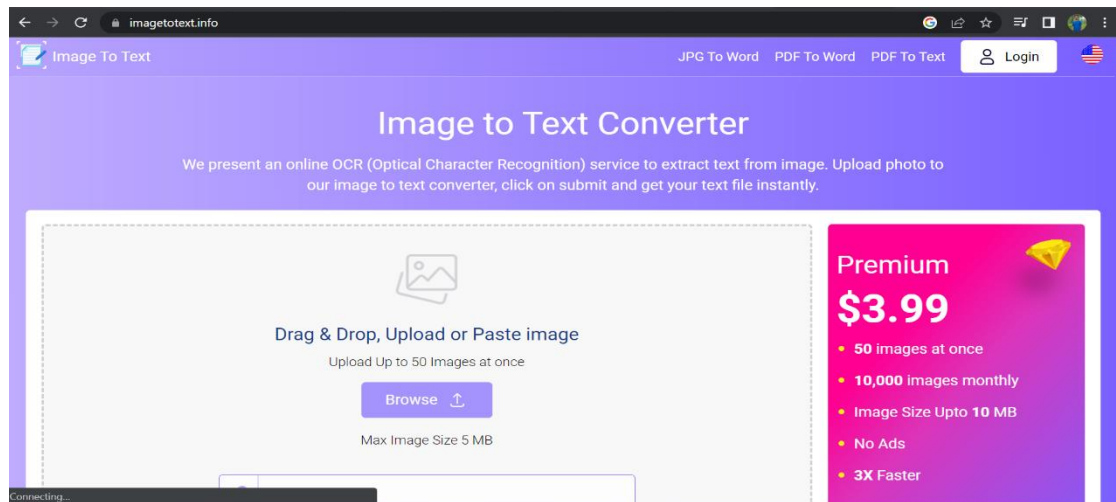
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2. iamgetotext (https://www.imagetotext.info) :

Here we are uploading the same image

Output:

Redo ↻

Copy to Clipboard   Download Text File ⬇

Here is the copied text:

Classification of Learning?fit ↑ Supervised Learning: During the training of ANN under supervised learning, the infort vector is presented to the network, which will produce an output vector. This output vector is compared with the desire / target output. Nector signal will generate if there is a difference between the actival output and the desired output vector. On the basis of the error signal the weights, will, adjusted untill the actual output is matched with the desired output.
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them. The correction between support
themselves.
During training, the output unit that has the
highest activation to a
be decleared the winner"
Bayesian Network => given input pattern. Will ak is a bababilistic graphical

Observation:

<u>In case of OCR2EDIT :</u>

- the output is in .txt file so without using notepad or specified applications we can not open the file and see the result.

- Speaking about the accuracy level of OCR2EDIT is below average.

- It lacks the feature of uploading image using camera.

<u>In case of imagetotext :</u>

- Compare to OCR2EDIT imagetotext does not gives us the result in .txt format, so the text can be easily copied .

- In case of imagetotext the accuracy level is again below average.

- It lacks the feature of uploading image using camera.

Comparison of OCR2EDIT and imagetotext web based application with Predictify

Subject	Predictify	OCRE2EDIT	imagetotext
Accuracy	Provides higher accuracy compare to CORE2EDIT and imagetotext.	Provides lowest accuracy among these.	Provides higher accuracy compare to CORE2EDIT and less accuracy compare to Predictify
History	Contain history of uploaded image	Does not contain history of uploaded image	Does not contain history of uploaded image
Predicted text to speech	Available	Not available	Not available
Drag and Drop feature	Do contain Drag and Drop feature	Do contain Drag and Drop feature	Does not contain Drag and drop feature

CONCLUSION AND FUTURE SCOPE

Conclusion:

Predictify is a web application that uses React.js, Express, and MongoDB to extract text from images. The frontend utilizes React JS with features like React Context API, React Router v6, React-Dropzone, and Chakra UI for a user-friendly interface. The backend relies on Express and MongoDB for efficient server-side operations and data storage. Google-cloud/vision is integrated for Optical Character Recognition (OCR), enabling text extraction from images. Predictify offers practical applications such as converting prescriptions and question papers, while voice support enhances accessibility. With its advanced technology stack, Predictify provides a seamless user experience for text extraction from images.

Future scope for predictify:

Improved Accuracy: Enhancing the OCR technology and post-processing models to improve the accuracy of text extraction from images. This would involve refining the algorithms and incorporating advancements in AI and machine learning.

Expansion of Supported Languages: Enabling Predictify to support a wider range of languages for text extraction and voice dictation. This would involve training the models on multilingual data and incorporating language-specific processing techniques.

Mobile Application Development: Expanding Predictify's accessibility by developing a mobile application for iOS and Android platforms. This would enable users to extract text from images directly from their mobile devices, further enhancing convenience and usability.

Collaboration and Sharing Features: Adding features that allow users to collaborate and share extracted text or processed data with others. This could include functionalities like document collaboration, data export/import, or integration with cloud storage platforms.

Continuous Improvement and User Feedback: Actively seeking user feedback and incorporating it into the development process. Regular updates and improvements based on user suggestions would ensure that Predictify remains relevant, user-friendly, and meets the evolving needs of its users."

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https://www.researchgate.net/publication/323547763_Handwritten_Character_Recognition_HCR_Using_Neural_Network

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https://towardsdatascience.com/secret-of-google-web-based-ocr-service-fe30eecedd01

https://youtu.be/J6mDkcqU_ZE