



# AI-DOCHelper

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# INTRODUCTION

- For many years, many people have died due to undetected diseases. Early detection of these diseases at the micro classification stage can be useful for providing proper treatment to the patients at the early stage and could have saved a lot of lives. A lot of research is being done to detect these diseases at the earliest.

# PROBLEM STATEMENT

- AI-DocHelper, an artificial intelligence-based system.
- The model that gives the best accuracy and minimum loss.
- The output of Final result will be a prediction.

# REQUIREMENTS

## Hardware Requirements :

- Processor : Intel Core i3 / Pentium
- RAM : 4 GB Minimum
- Hard Disk Space : 30 GB Minimum

# REQUIREMENTS

## Software Requirements :

- Operating System : Windows / MacOS / Linux
- Browser : Google Chrome / Mozilla Firefox
- Software Libraries : Python 3.x, Tensorflow 2.0, Annaconda, Jupyter Notebook, Numpy, Pandas, Scikit-learn, Flask/Django

# FEATURES

- Early detection of disease
- User friendly GUI
- Precise results
- User Data Store

# WHY AI-DOCHelper ?

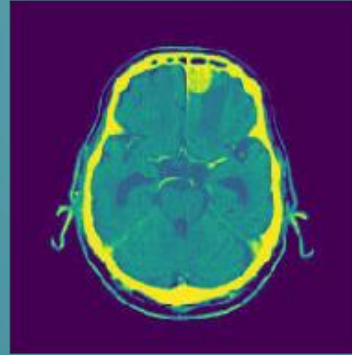
- Existing system available are able to detect only one or two diseases.
- Everything in the future will be automated.



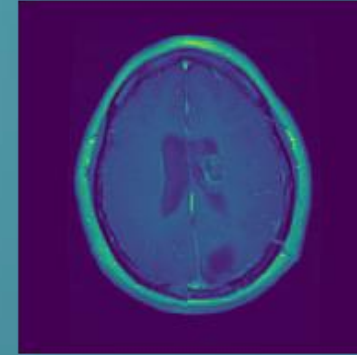
# DATASETS

- Brain Tumor Classification (MRI) Dataset : 3624 samples and 4 classes(No Tumor, Glioma Tumor, Meningioma Tumor, Pituitary Tumor)

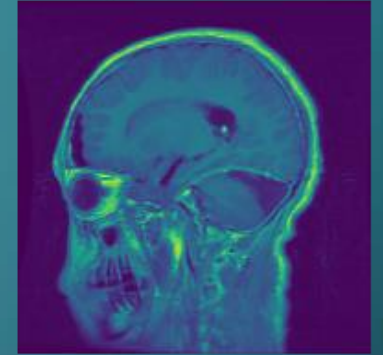
Meningioma tumor



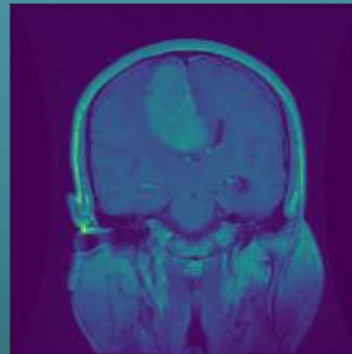
Glioma tumor



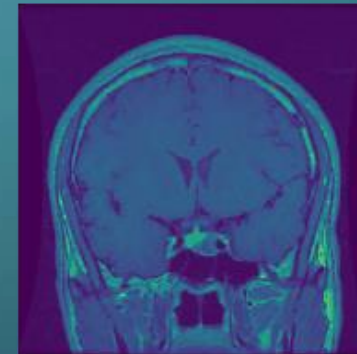
Glioma tumor



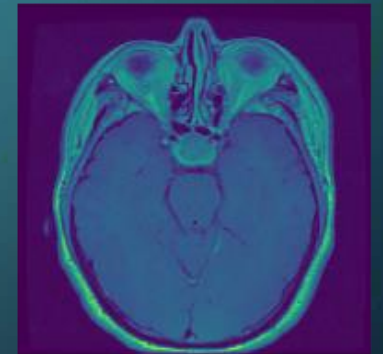
Meningioma tumor



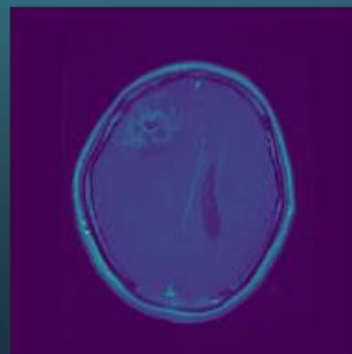
Pituitary tumor



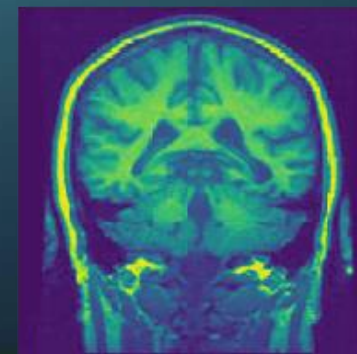
Pituitary tumor



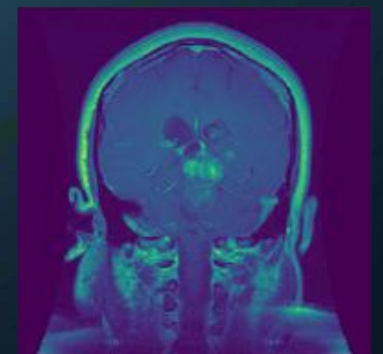
Glioma tumor



No tumor



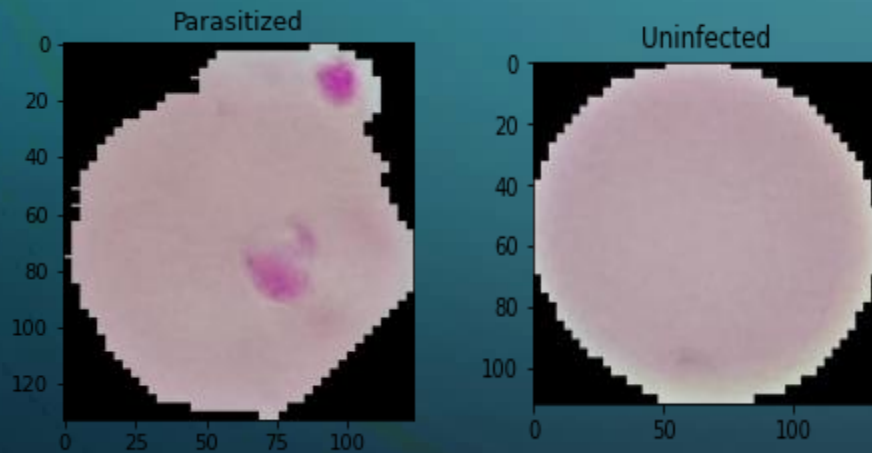
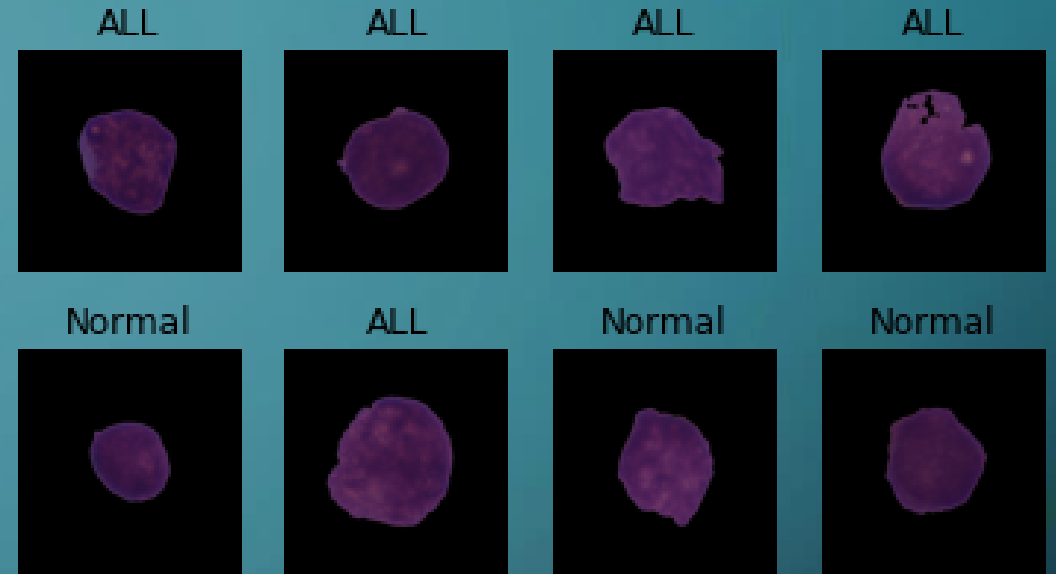
Glioma tumor





# DATASETS

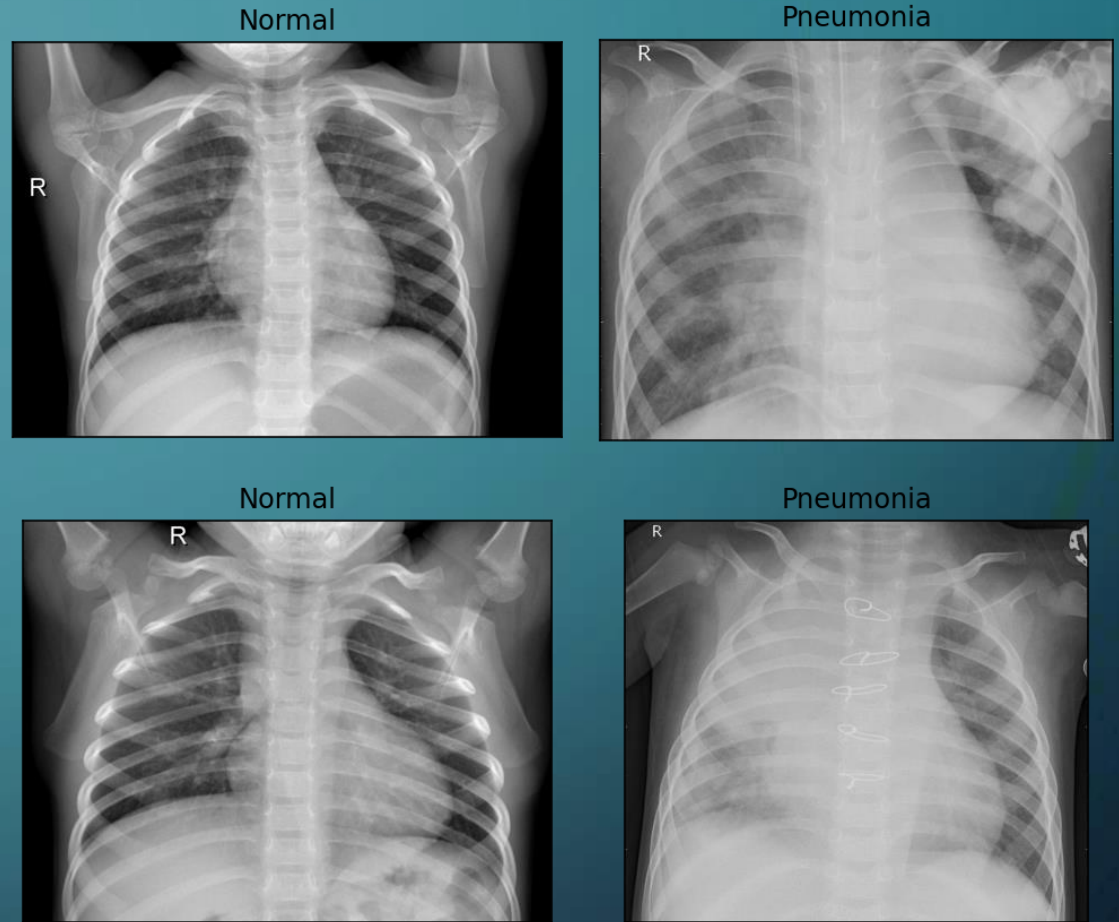
- Leukemia Classification Dataset : 3527 samples and 2 classes(ALL, HEM)



- Malaria Cell Image Dataset : 27.6k samples and 2 classes (Uninfected, Parasitized)

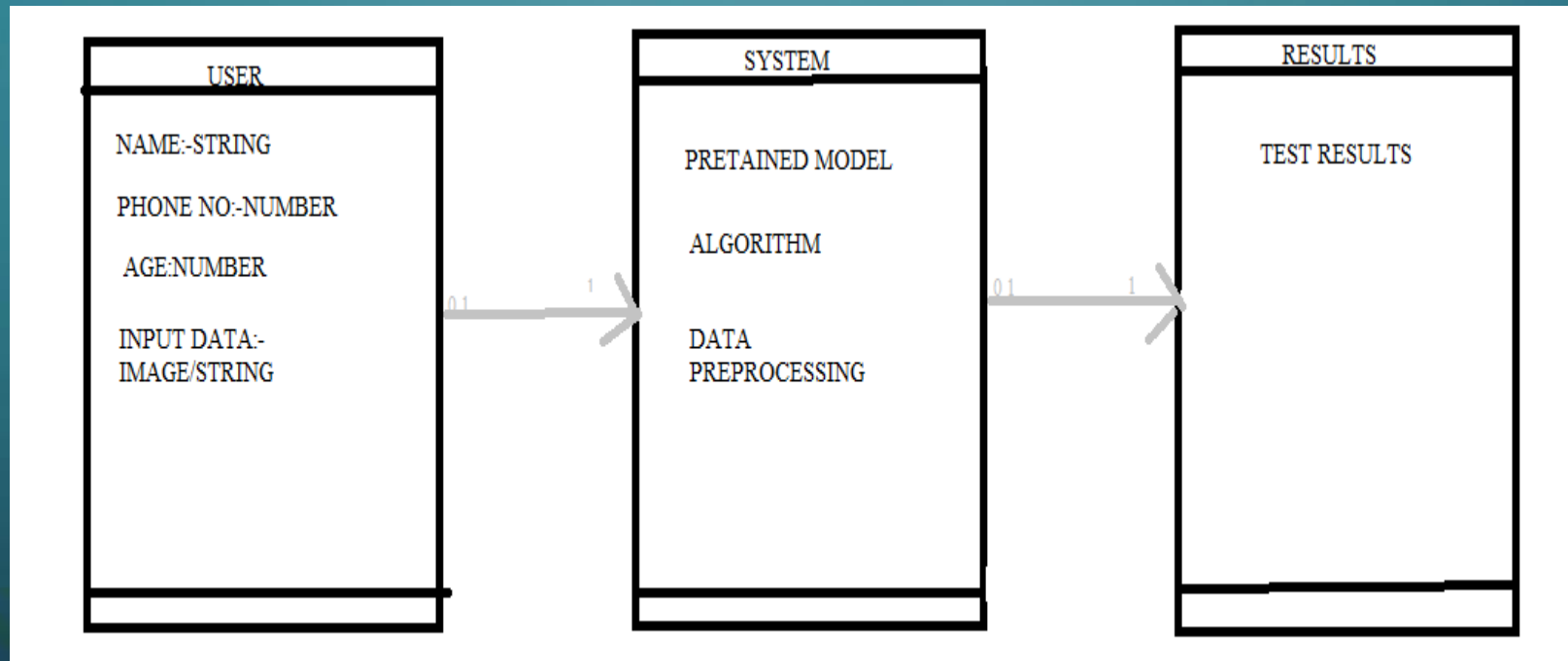
# DATASETS

- Pneumonia X-ray Images Dataset : 5856 samples and 2 classes (normal, opacity)

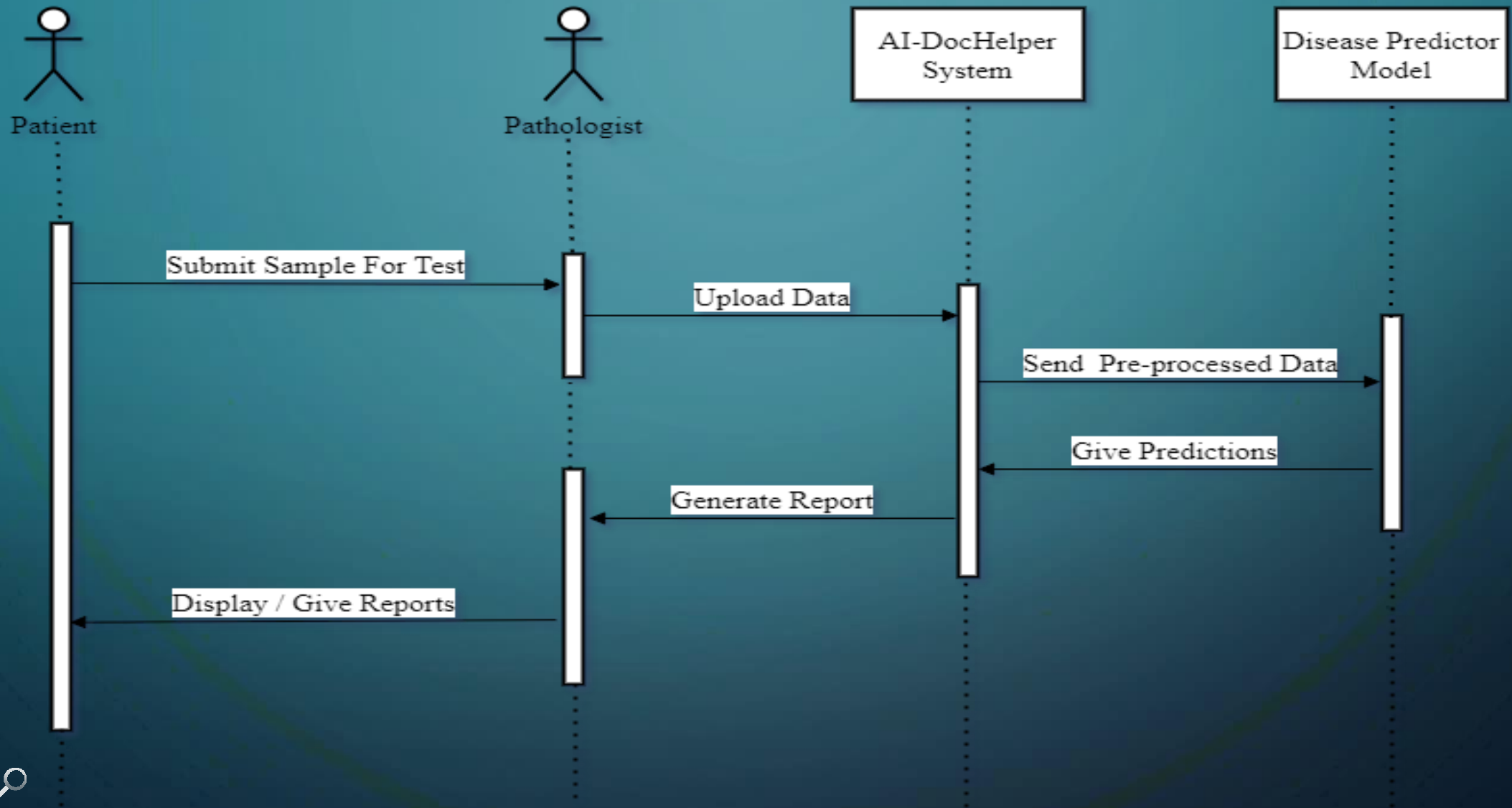


And many more...

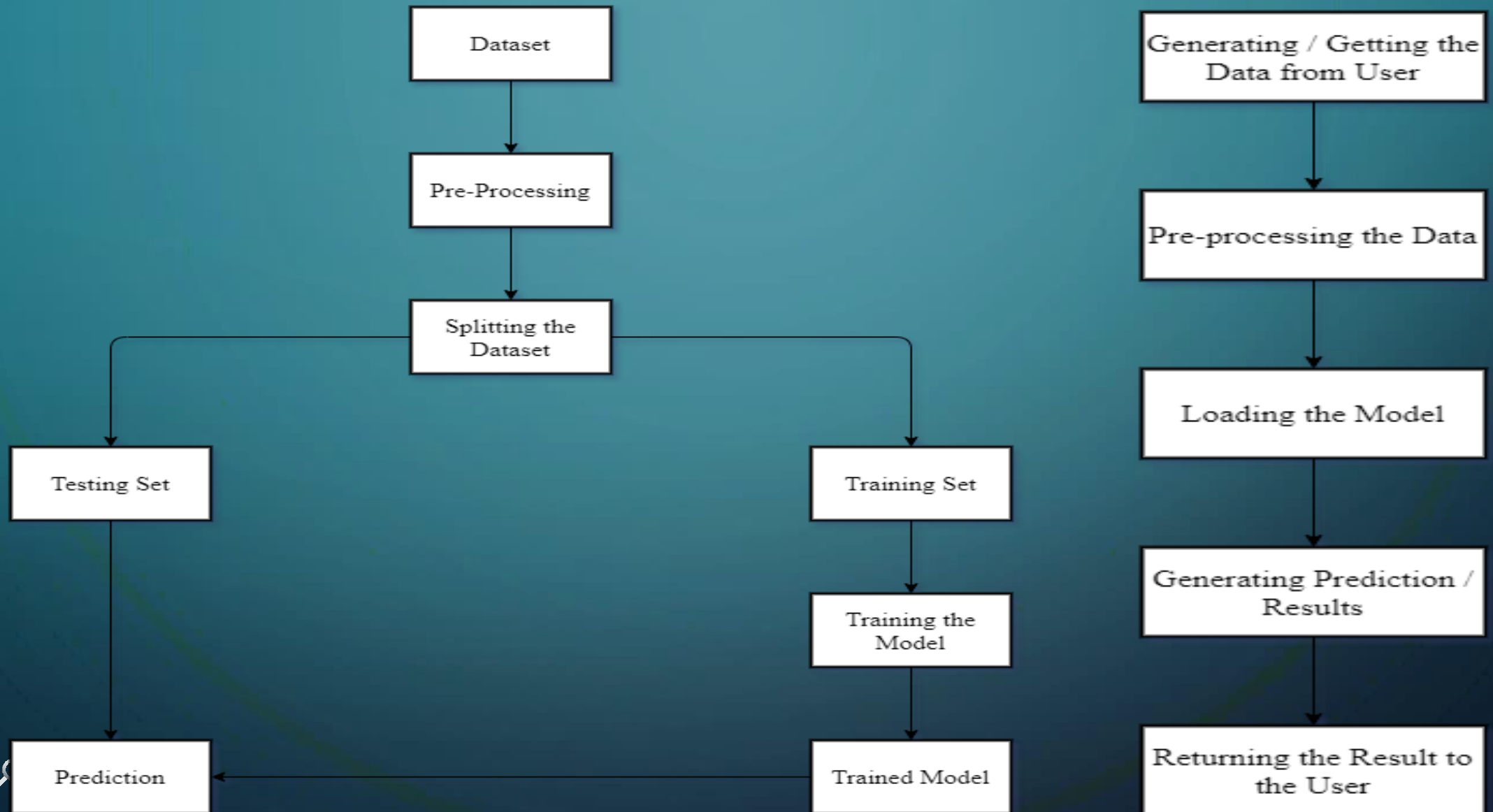
# CLASS DIAGRAM



# FLOW OF EVENTS



# PROPOSED SYSTEM : WORKFLOW

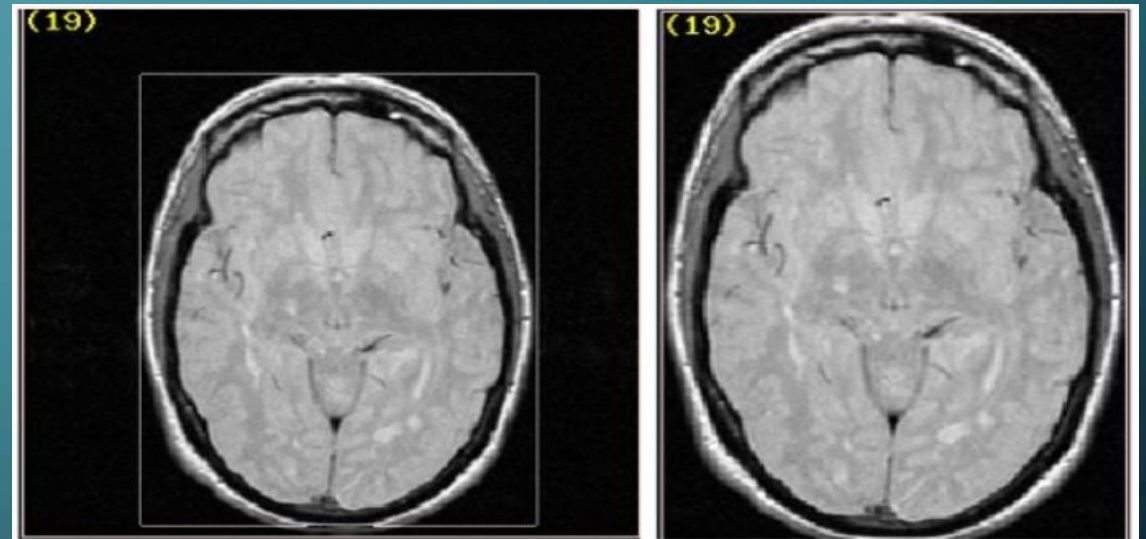


# PRE-PROCESSING THE TEXTUAL DATASET

- Dropping the unnecessary fields.
- Replacing all the missing fields with a value.
- Scaling the data
- Converting categorical data to numeric data.

# PRE-PROCESSING THE IMAGE DATASET

- Dropping all the blur images.
- Region of Interest
- Filtering & Smoothing an image.
- Getting the Region of Interest / Volume of Interest.





# COMPARATIVE STUDY FOR TEXTUAL DATASET

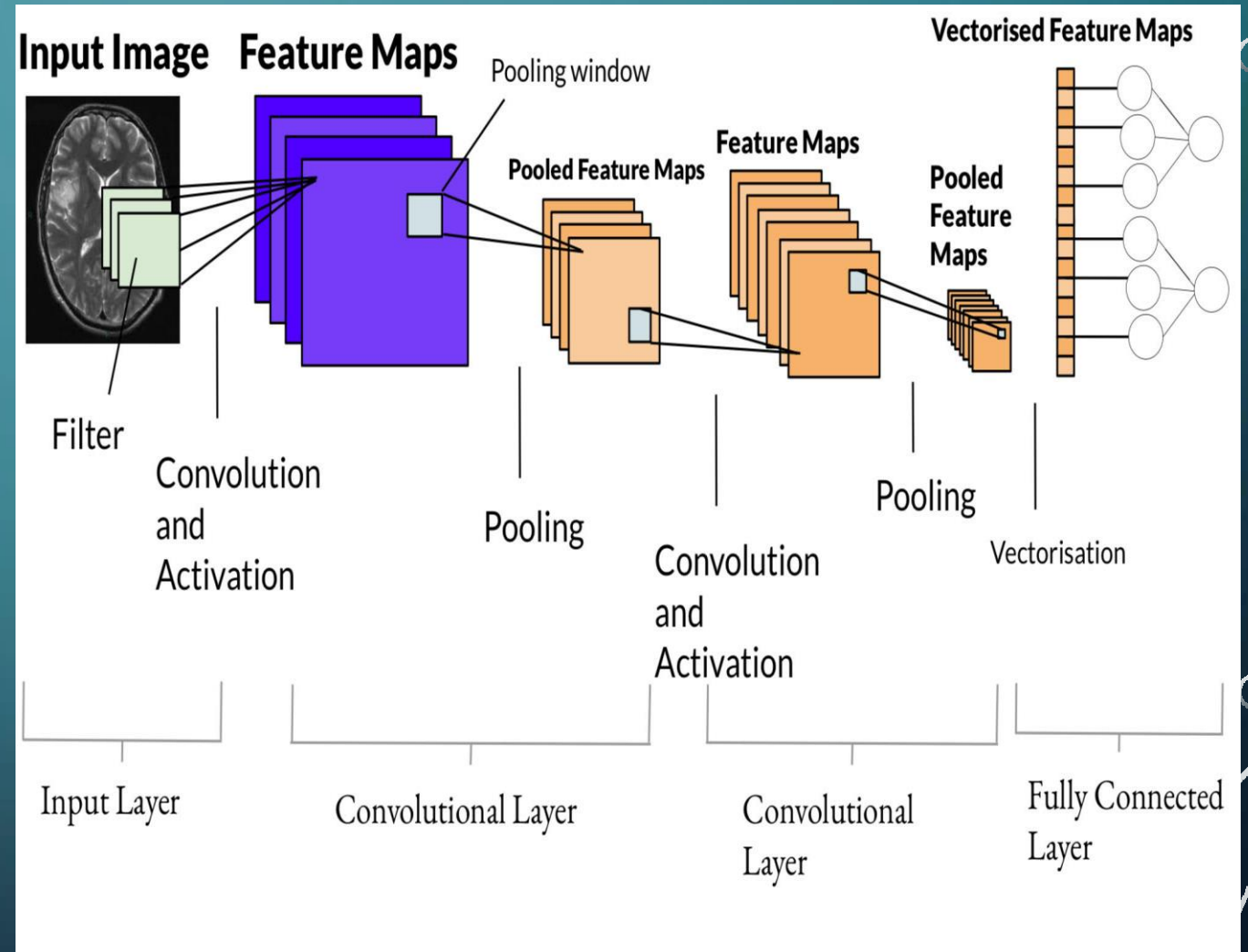
- Pima Indian Diabetes Database / Dataset
- Originally from the National Institute of Diabetes and Kidney Diseases
- Published by UCI Machine Learning
- Dataset Fields : Pregnancies, Glucose BloodPressure), SkinThickness, Insulin, BMI, DiabetesPedigreeFunction, Age, Outcome

# COMPARATIVE STUDY FOR TEXTUAL DATASET

MODEL	ACCURACY
Logistic Regression	82.46%
K-Nearest Neighbour Classifier	79.87%
Support Vector Classifier	82.46%
Naïve Bayes	79.22%
Decision Tree Classifier	70.77%
Random Forest Classifier	82.46%
Artificial Neural Network	70.77%

# STUDY FOR IMAGE DATASET

- Convolutional Neural Network (CNN) with Transfer Learning will be used.



The background is a dark teal gradient. In the corners, there are decorative white lines resembling circuit traces or a stylized network. These lines connect to small white circles, some of which are also connected to each other, forming a sparse network pattern. The lines are more prominent in the top-left and bottom-left corners, and less so in the top-right and bottom-right corners.

# RESULTS AND EVALUATION

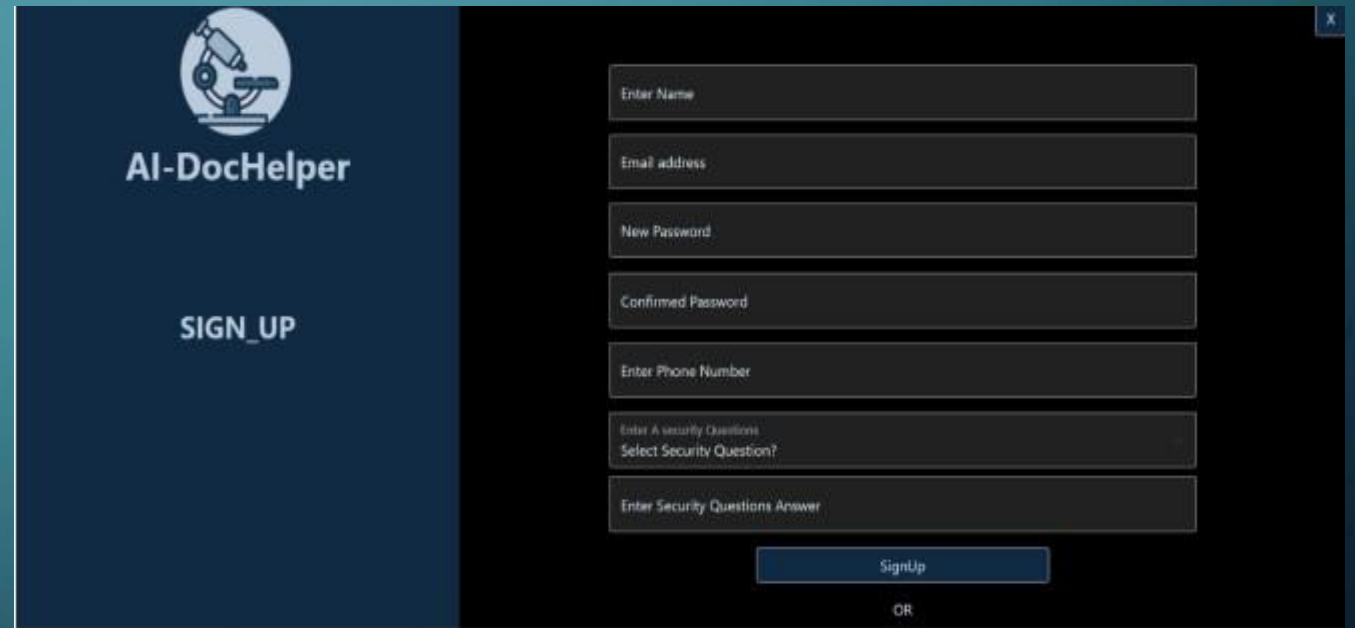
Disease Name	Training Accuracy	Training Loss	Testing Accuracy	Testing Loss
Breast Cancer	87.36%	31.24%	85.49%	38.67%
Pneumonia	95.86%	10.92%	98.25%	14.88%
Glioma Tumor	92.20%	19.64%	92.41%	19.73%
Meningioma Tumor	93.19%	18.18%	90.52%	21.80%
Diabetes	82.40%	23.10%	80.52%	25.13%
Pituitary Tumor	99.06%	3.33%	98.85%	3.03%
Melanoma (Skin) Cancer	85.12%	31.37%	83.87%	33.26%
Acute Lymphoblastic Leukemia (ALL)	84.14%	37.54%	70.43%	58.85%
Heart Disease	91.37%	25.13%	88.97%	28.83%
Chronic Kidney	89.63%	19.53%	86.63%	21.53%
Malaria	89.69%	26.80%	90.49%	24.19%
Brain Tumor	89.21%	28.49%	66.67%	33.72%
Lung Cnacer	94.41%	13.80%	95.26%	11.60%
Invasive Ductal Carcinoma (IDC)	80.57%	43.16%	78.70%	47.90%
Tuberculosis	96.69%	9.75%	95.64%	11.64%
COVID-19	86.56%	33.12%	86.90%	32.88%

# TOOLS & DESIGN

- Web-Based System
- Tools suitable for design.
- Advantage over other tools.

# AUTHENTICATION & ACCESSIBILITY

- Only registered user can access the system.
- Uses SQLAlchemy to connect to database.
- Provides security.



The image shows a web application interface for 'AI-DocHelper'. On the left, there is a dark blue sidebar with a microscope icon and the text 'AI-DocHelper' and 'SIGN\_UP'. On the right, there is a dark grey form with several input fields: 'Enter Name', 'Email address', 'New Password', 'Confirmed Password', 'Enter Phone Number', 'Enter A security Questions Select Security Question?', and 'Enter Security Questions Answer'. Below the form is a 'SignUp' button and an 'OR' link.

AI-DocHelper

SIGN\_UP

Enter Name

Email address

New Password

Confirmed Password

Enter Phone Number

Enter A security Questions  
Select Security Question?

Enter Security Questions Answer

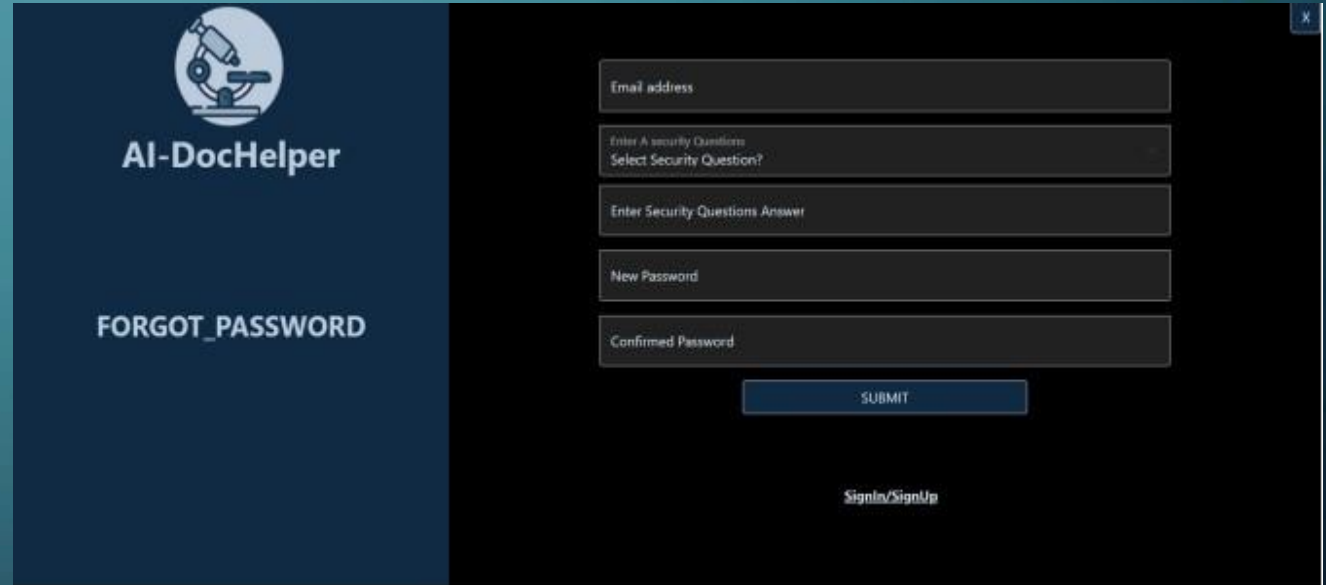
SignUp

OR



# UPDATION IN USER DETAILS

- What if user forgets password
- Provides easy modifications in users details.
- Commits the changes in database and allows accessing system with new details.



The screenshot displays a web interface for the 'AI-DocHelper' application. On the left, a dark blue sidebar contains the application's logo (a microscope icon) and the text 'AI-DocHelper' and 'FORGOT\_PASSWORD'. The main content area is black and contains a form with five input fields: 'Email address', 'Enter A security Question: Select Security Question?', 'Enter Security Questions Answer', 'New Password', and 'Confirmed Password'. Below these fields is a blue 'SUBMIT' button. At the bottom of the form, there is a link that says 'SignIn/SignUp'.

# CONCLUSION

- Better than many systems available in the market as it can detect many diseases.
- Will help to save many lives with precision.
- Human errors will be reduced to a great extent.
- Course of treatment can be planned very quickly.

# REFERENCES

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- 4) X. Zeng, H. Chen, Y. Luo and W. Ye, "Automated Diabetic Retinopathy Detection Based on Binocular Siamese-Like Convolutional Neural Network," in *IEEE Access*, vol. 7, pp. 30744-30753, 2019, doi: 10.1109/ACCESS.2019.2903171.
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- 6) Y. Liu et al., "Detecting Diseases by Human-Physiological-Parameter-Based Deep Learning," in *IEEE Access*, vol. 7, pp. 22002-22010, 2019, doi: 10.1109/ACCESS.2019.2893877.
- 7) A. Shrivastava, I. Jaggi, S. Gupta and D. Gupta, "Handwritten Digit Recognition Using Machine Learning: A Review," *2019 2nd International Conference on Power Energy, Environment and Intelligent Control (PEEIC)*, Greater Noida, India, 2019, pp. 322-326, doi: 10.1109/PEEIC47157.2019.8976601.

The background is a dark teal gradient. In the corners, there are decorative white lines resembling circuit traces or a stylized atomic structure, with small circles at the end of the lines. A large, faint, light-colored arc is visible in the background, centered behind the text.

THANK YOU