

A decorative border made of watercolor-style floral and leaf patterns in shades of green, orange, and purple, framing the central text.

Study Of Liver Tumor Detection Using Machine Learning Techniques

**Project Group Number: CSERGC0034
Course Code : CSE445**

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Project Overview

The Liver Tumor Detection project aims to develop a user-friendly web application utilizing AI technique for the detection and detection of liver tumors in medical images. The key features of this project include:

- ❑ **User-Friendly Web Application:** Designed and developed a web application using Python and the Django web framework. This application allows users to conveniently upload medical images for analysis.
- ❑ **Tumor Detection and Analysis:** The application employs Deep Learning algorithms to determine the presence or absence of liver tumors in the uploaded images. It also identifies the stage of tumors, locates them within the image, and provides users with a percentage representation of affected area.
- ❑ **Visualization:** The application visualizes the detected tumors separately, facilitating user-friendly interpretation of the results.



Tech Stack Used For This Project

This project utilizes the following technologies:

- ✓ **Python** : Programming language used for development and implementing the algorithms.
- ✓ **Django** : Web framework for building the user interface and handling the user interactions.
- ✓ **MySQL Database** : Database management system for storing and managing the information about the users credentials.

Versions Used :

- Python : 3.7.0
- MySQL : 5.5
- Editor : Jupiter notebook (recommended) or Visual Studio

Project Steps :

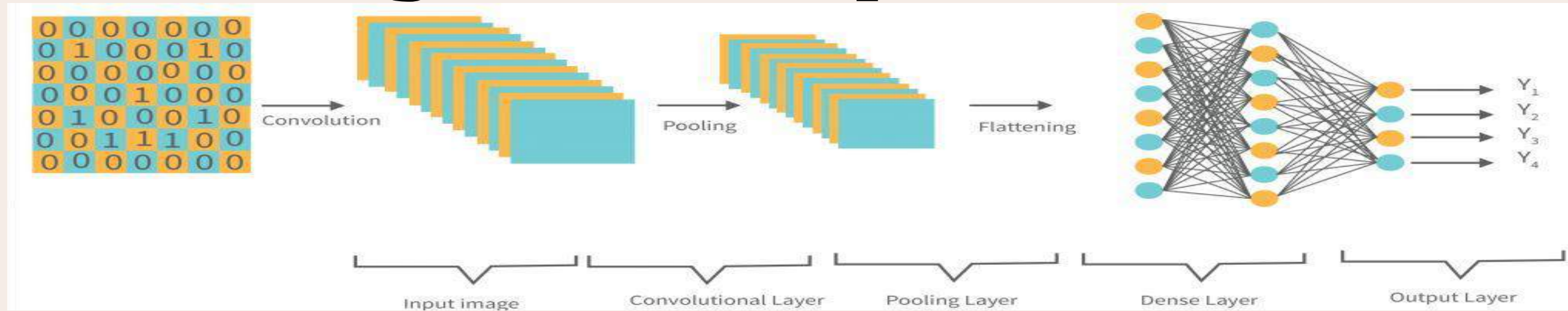
1. Data Collection : Dataset is collected on Kaggle and it includes over 755 liver tumor images and corresponding 755 mask images (each image have dimensions of 512x512 pixels) to enhance detection accuracy. Mask images are essential as they serve as ground truth labels, enabling the model to learn and accurately identify tumor regions.

2. Data Preprocessing : Preprocessing the photos to enhance their quality and make model training easier involves applying methods including augmentation, scaling, and normalization.

3. Algorithm :

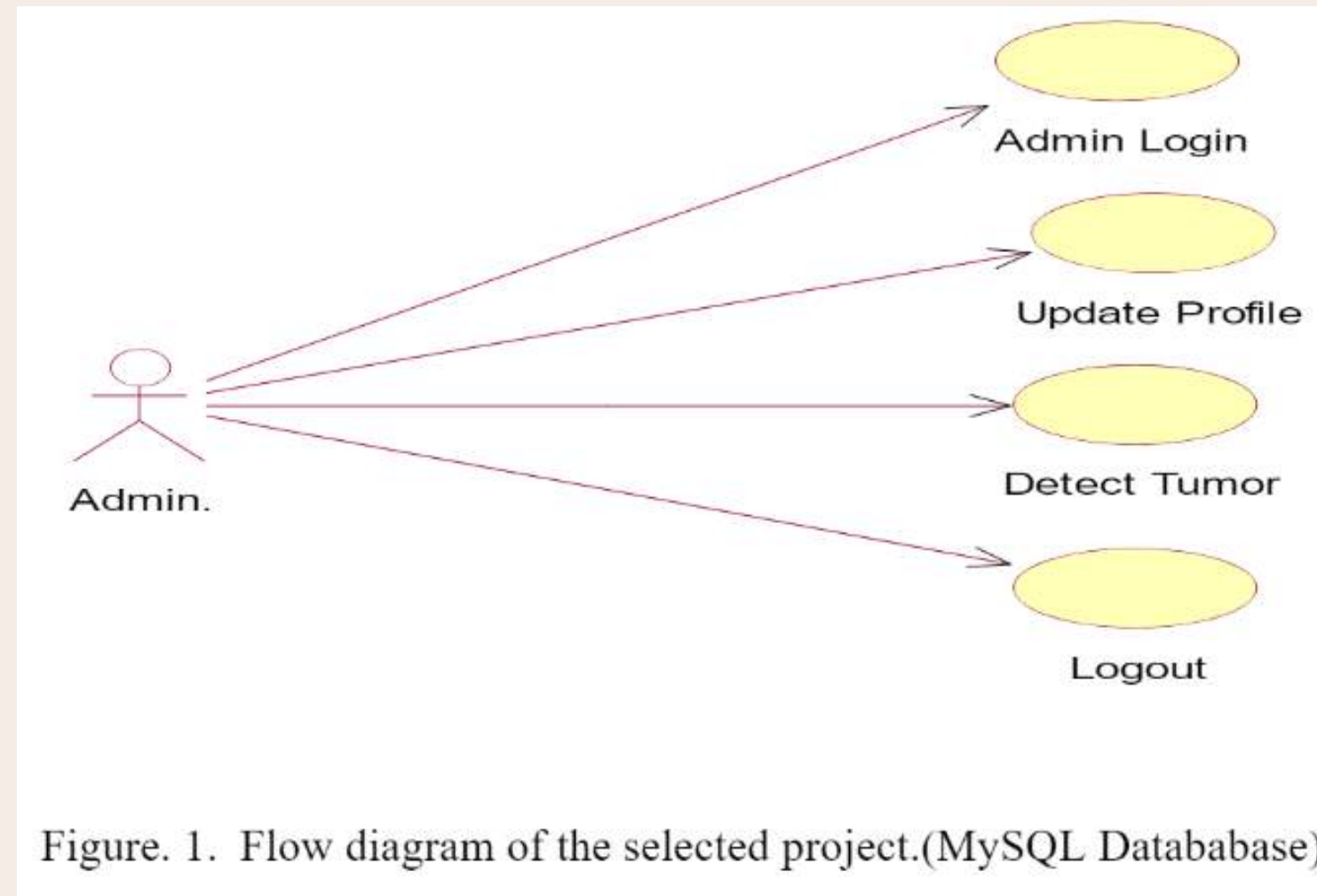
Unlike traditional algorithms, CNNs are used for liver tumor detection because of their capacity to automatically learn features from images, capturing complicated patterns essential for accurate detection. Because of their hierarchical nature, which makes feature extraction efficient, they are ideally suited for the analysis of medical pictures such as liver scans. Use algorithm and train the model.

Project Steps :

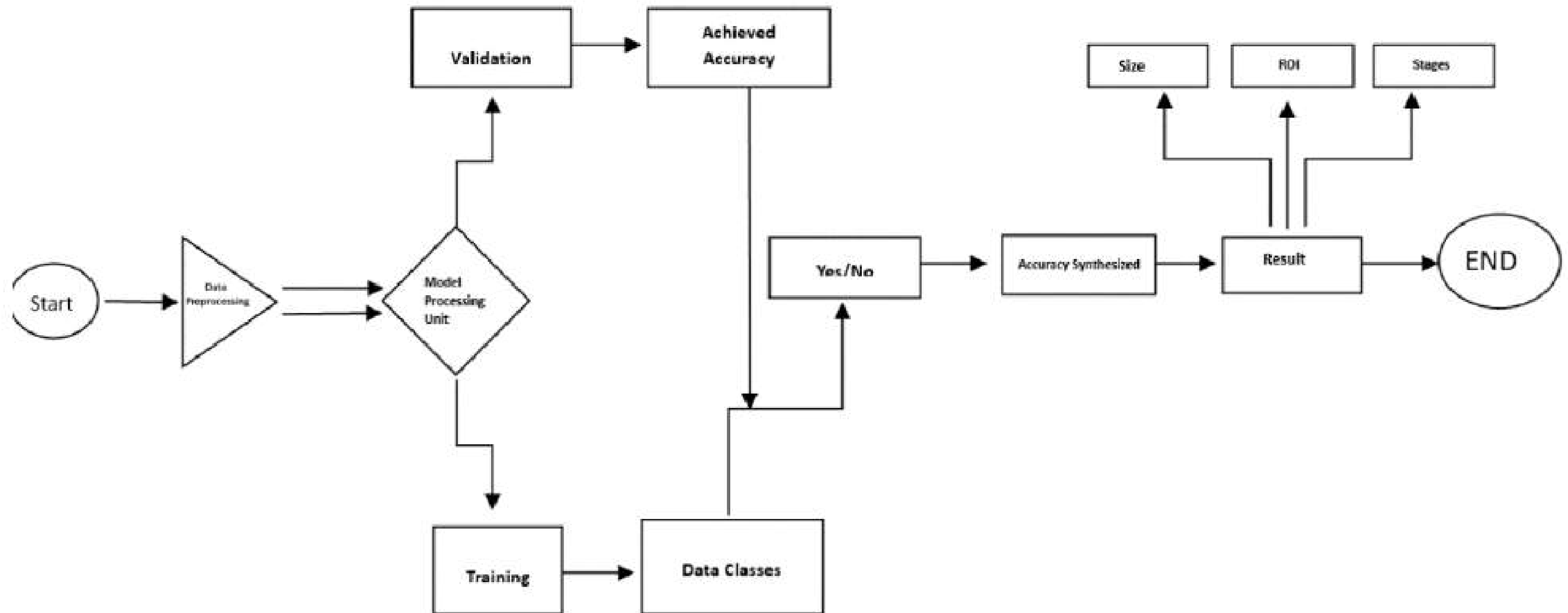


- 4. Model Evaluation And Optimization :** Utilizing the validation set, assess the CNN model's performance. Based on the outcomes of the validation process, adjust the hyper parameters and optimize the model architecture.
- 5. Result :** Using the trained CNN, the model uses the image received over the web interface to predict and segment the tumor region. Bounding boxes are drawn on the original image to represent the detected tumors, and a classification based on the proportion of afflicted area is used to indicate the tumor stage.
- 6. Django Framework :** Users can view the result interactively on the web interface, which gives them access to real-time tumor detection results.

DFD (DATA FLOW DIAGRAM) :



DFD (DATA FLOW DIAGRAM) :



Project Images :



Figure. 1| Source code of proposed system
(Details about the Project)

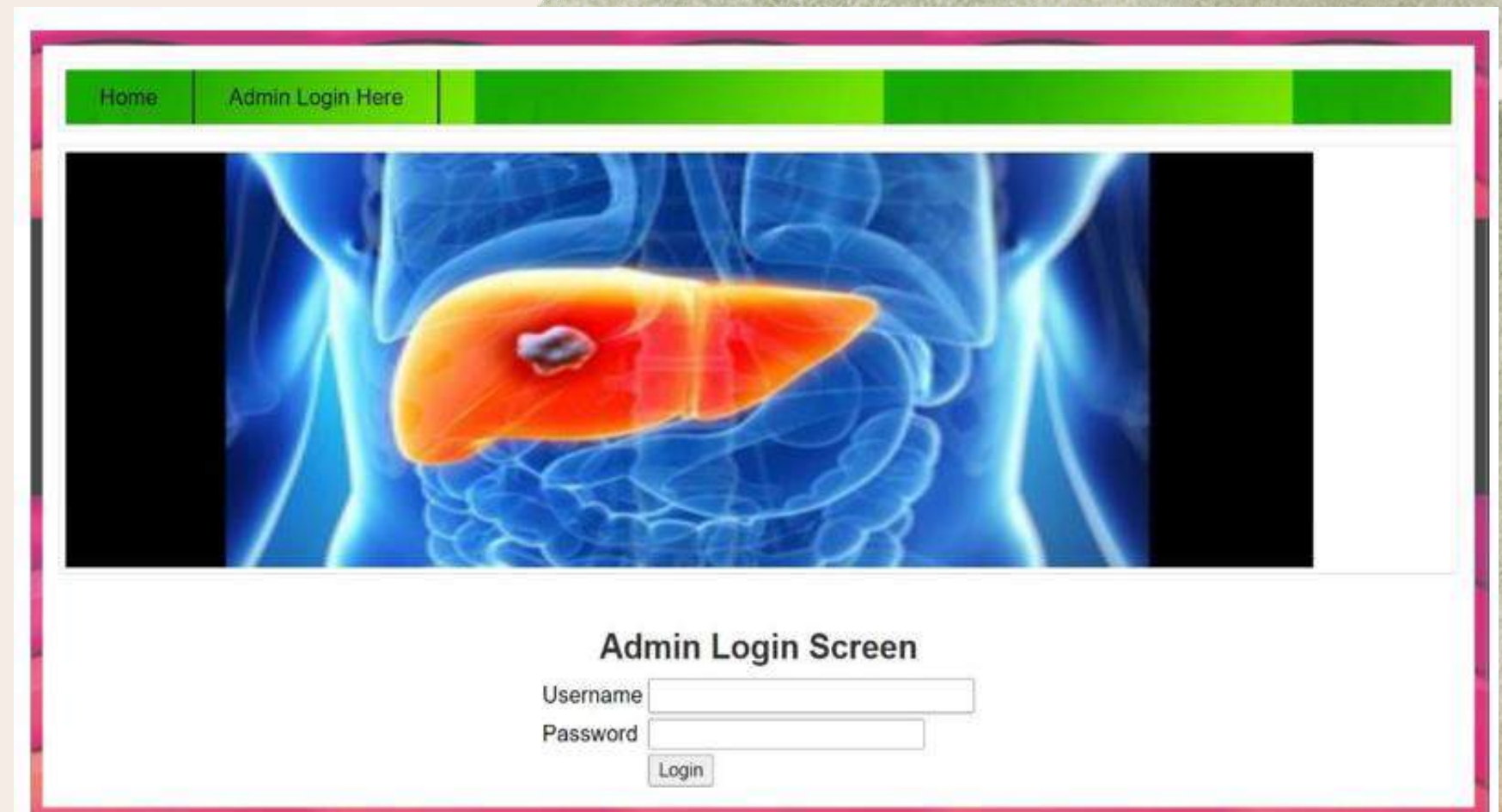


Figure. 2| Output snapshot of proposed system (Login Page)

Project Images :



Figure. 3. Upload Liver Tumor Image

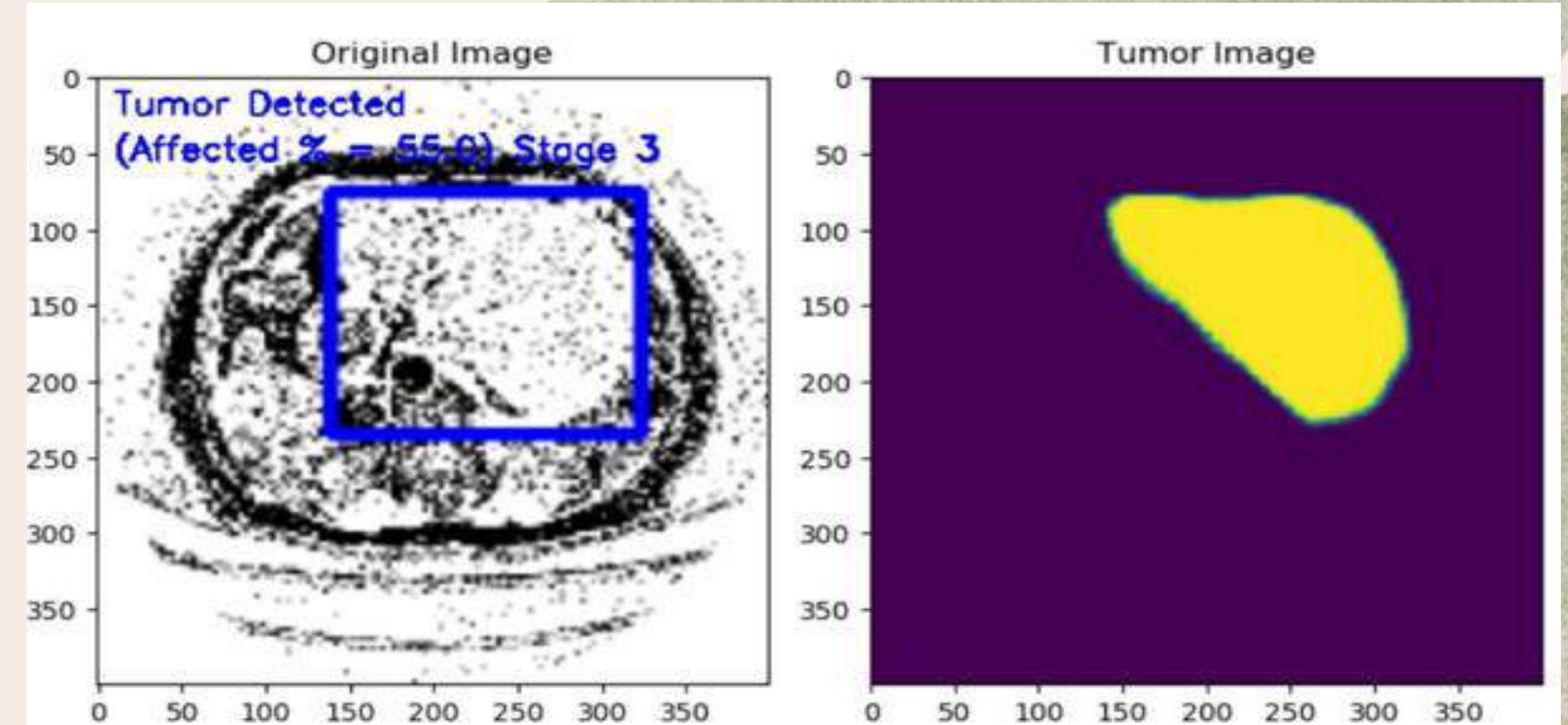
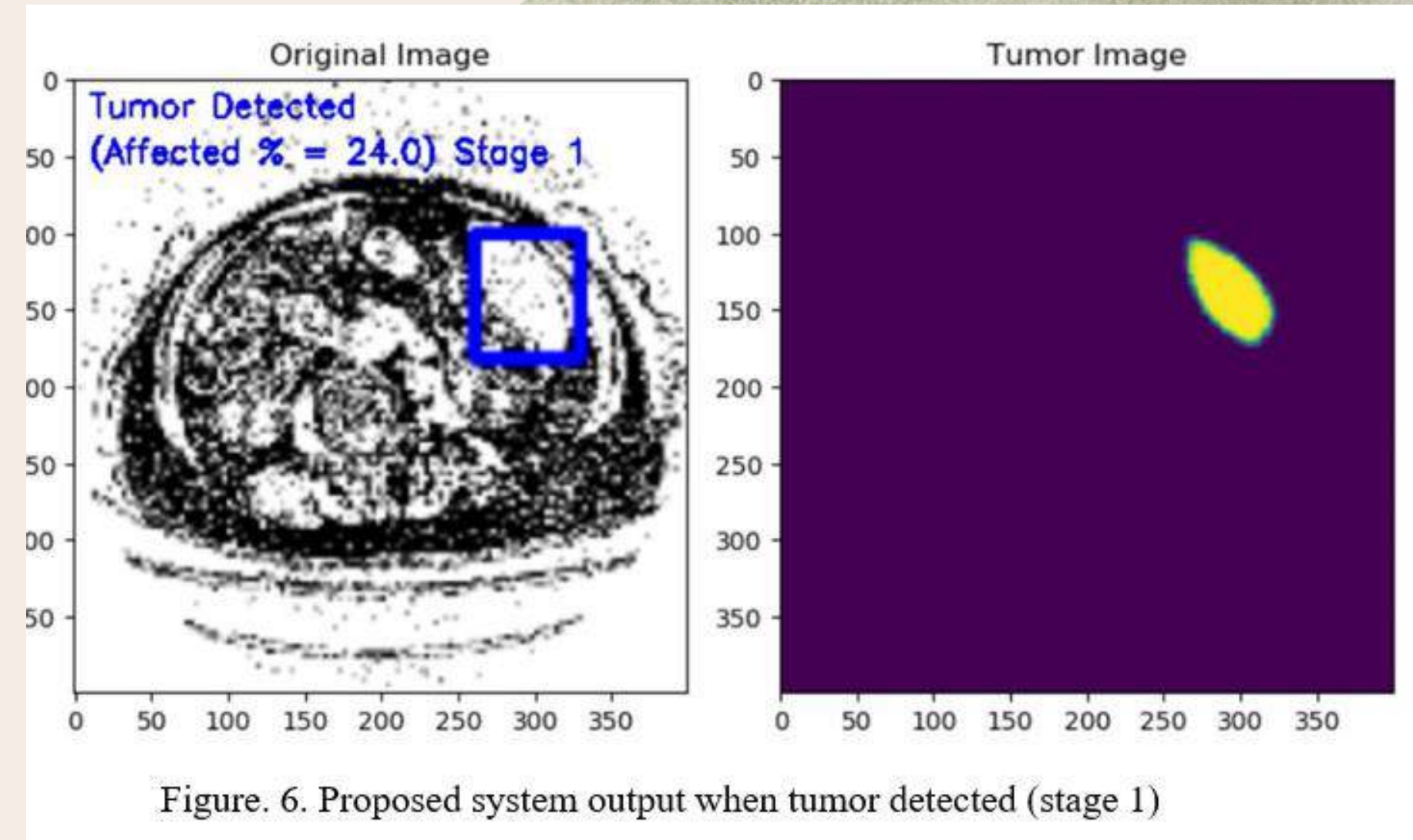
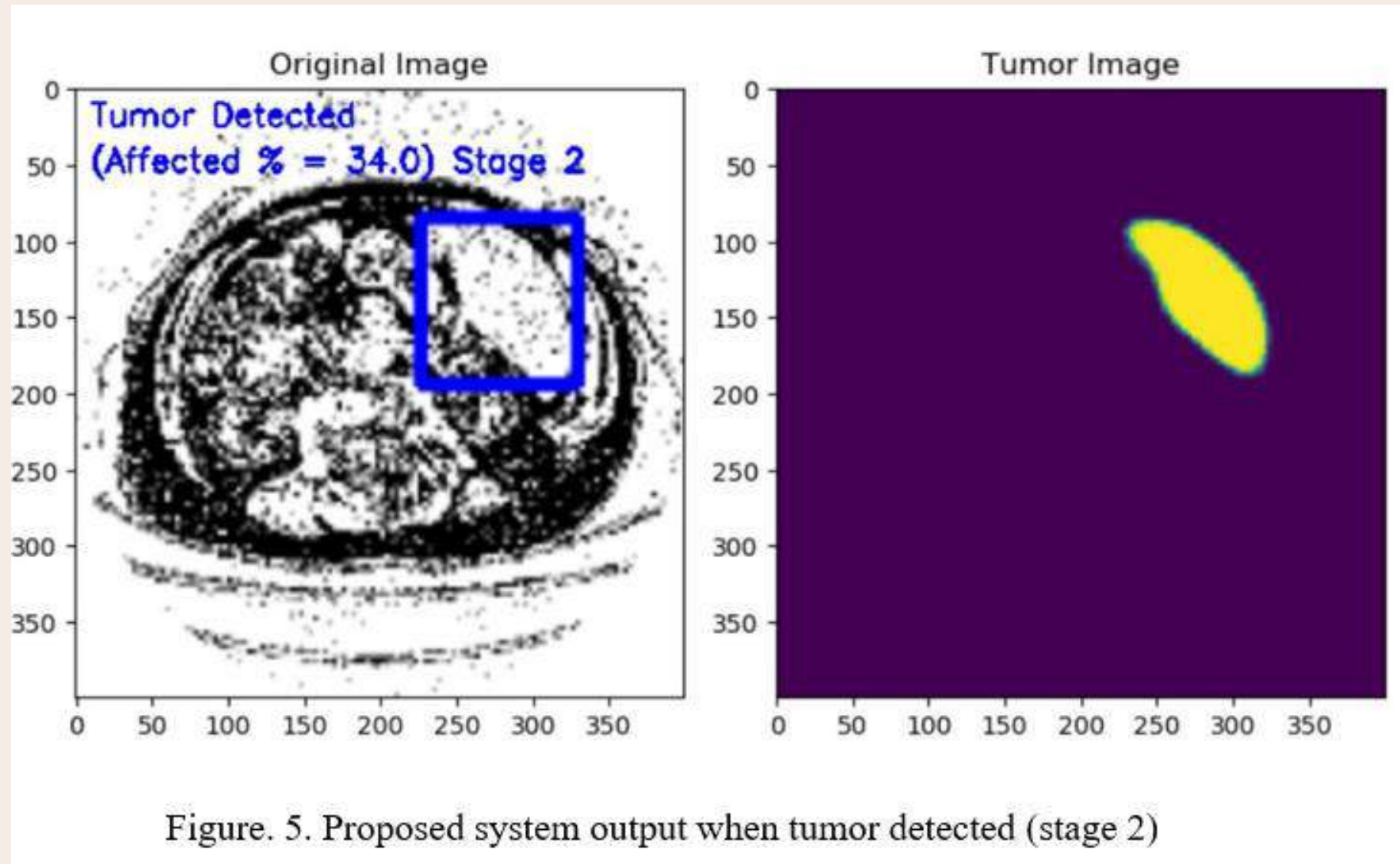


Figure. 4. Proposed system output when tumor detected (stage 3)

Project Images :



Project Images :

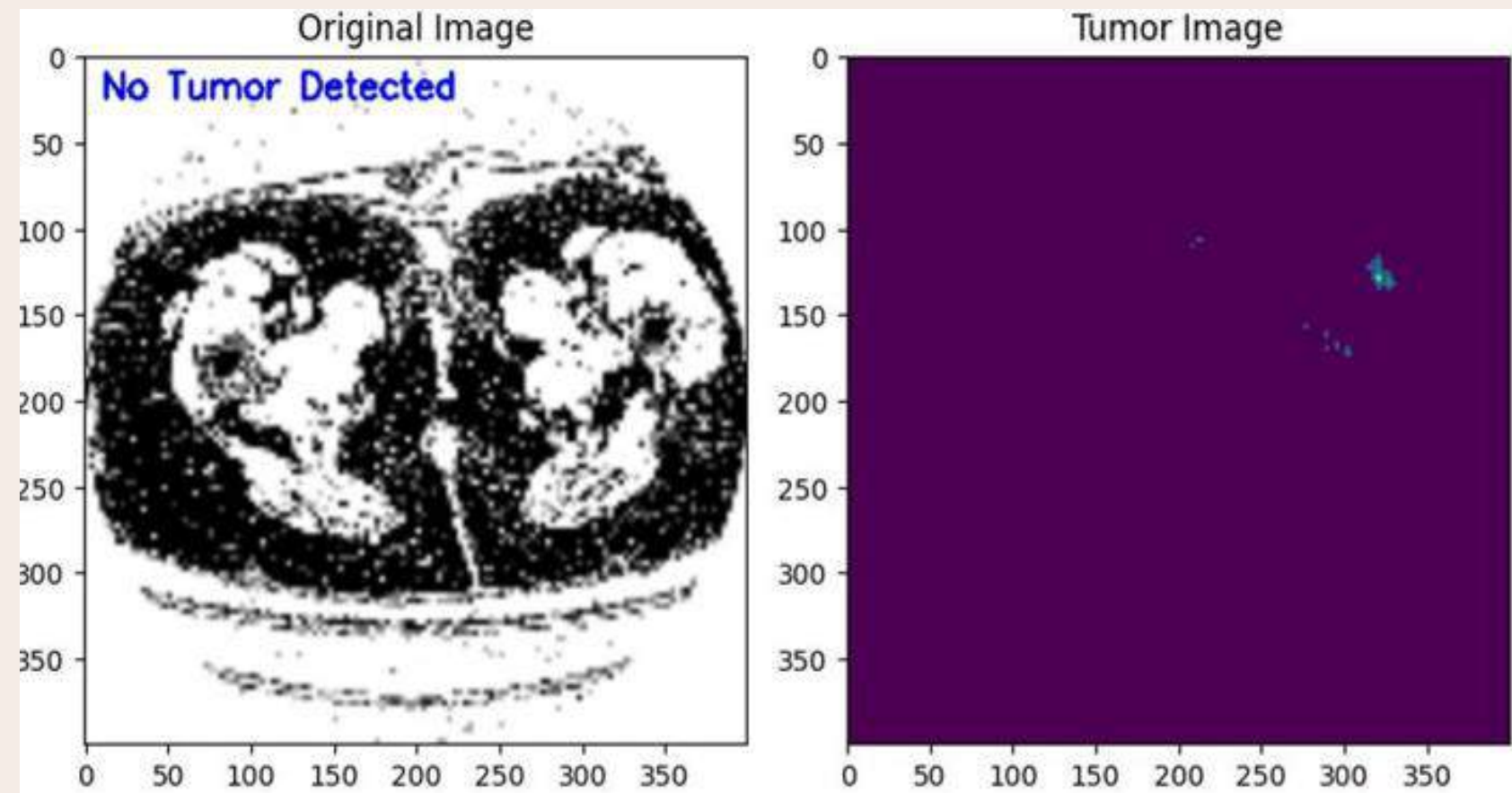


Figure. 7]. Proposed system output when no tumor detected

Update Profile Detect Tumor Logout

Update Account Screen

New Username

New Password

Update

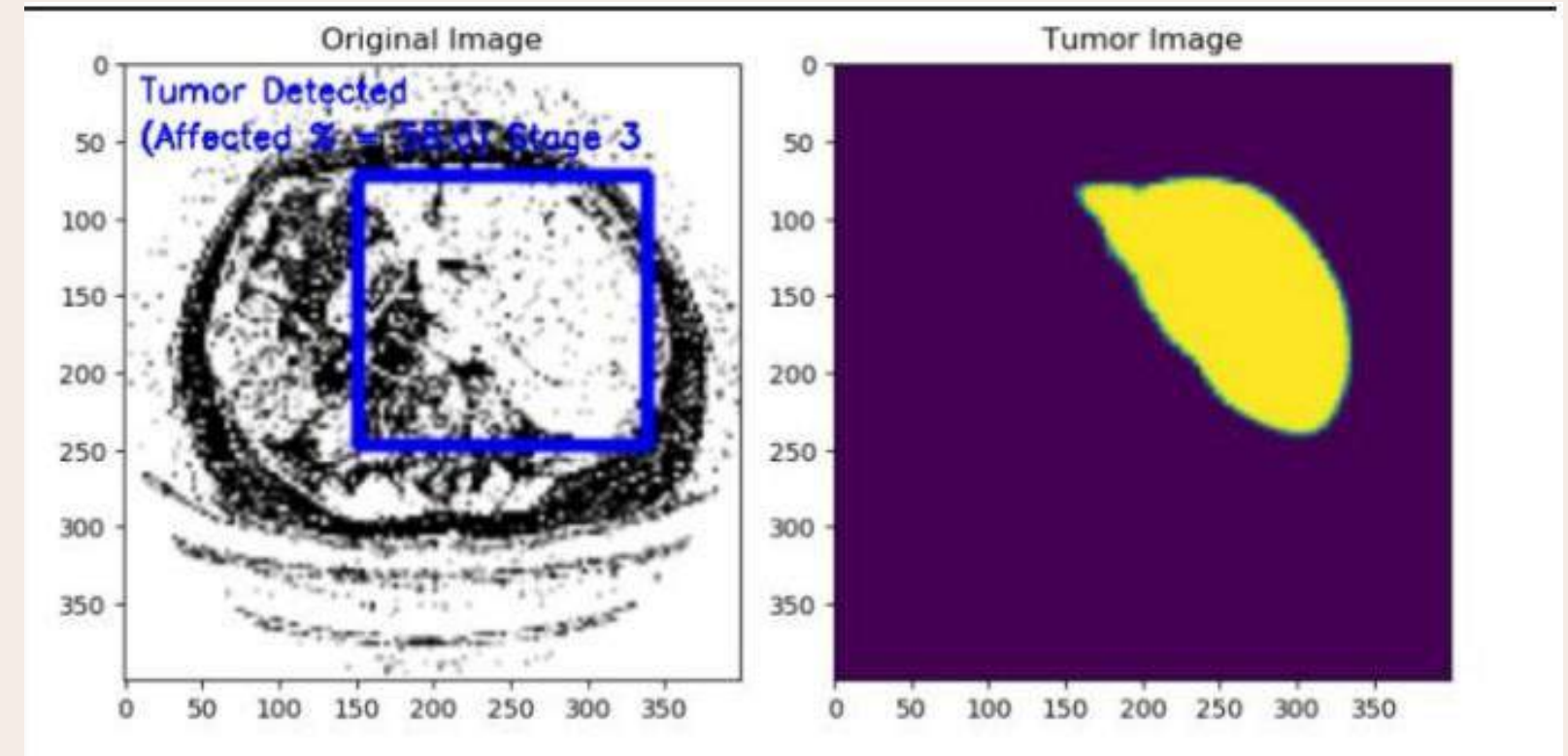
Figure. 8. User can update details of the login credentials.

Conclusion

In conclusion, this project show cases the effectiveness of machine learning techniques in the domain of healthcare industry.

This study intends to improve the patient outcomes by using advanced algorithms to aid in the early detection of liver tumors. This project uses the Django web framework and Python to create a user-friendly web application that makes the liver tumor detection process easier for the users and users can also convenient to upload the images.


This research matters because it has ultimately being responsible for improved patient outcomes and survival rates.



Acceptance Letter

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Gopi Krishna Guntamukkala <gopikrishnaguntamukkala3@gmail.com>

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1 message

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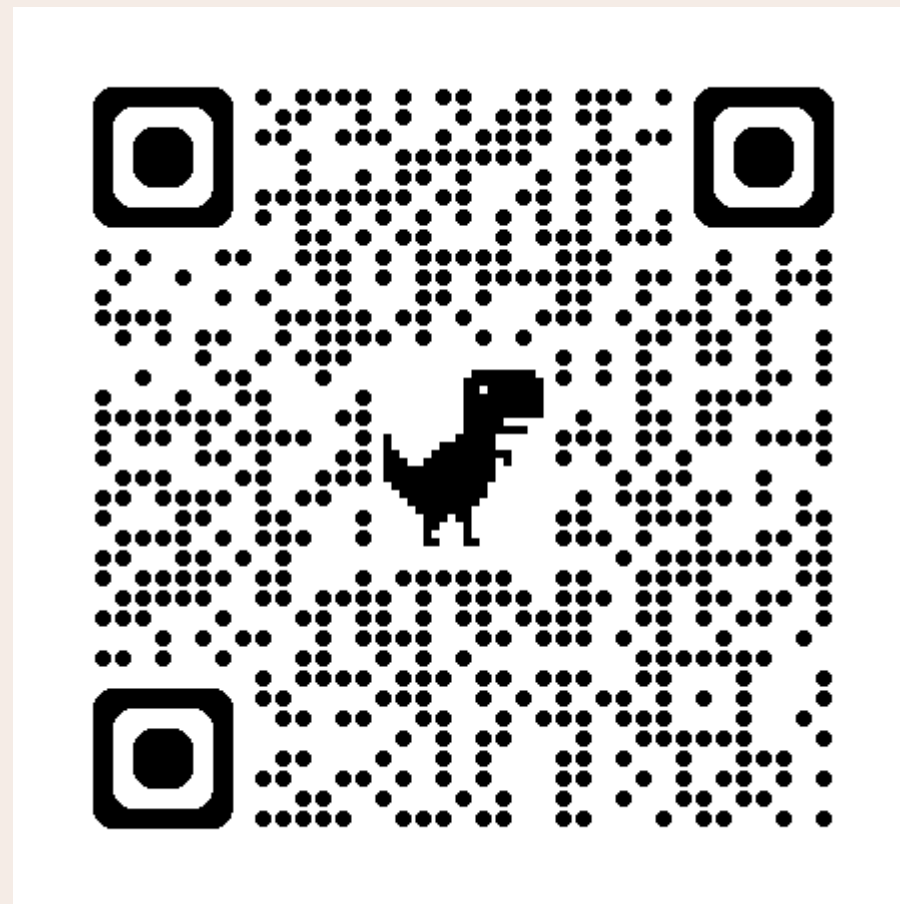
Certificate of Presentation

This is to certify that Dr./Mr./Ms. **Gopi Krishna Guntamukkala** affiliated to **Lovely Professional University** has presented the paper titled **Advancements in Automated Tumor Detection Screening: A Comprehensive Review and Comparative Analysis** in the International Conference on Communication, Computer Sciences and Engineering (IC3SE-2024) organized by Amity University Uttar Pradesh, Greater Noida Campus, Gautam Buddha Nagar, U.P., India, held during 9th – 11th May 2024.

A handwritten signature in blue ink, likely belonging to Prof. (Dr.) Ajay Rana.

Prof. (Dr.) Ajay Rana
Conference Chairperson &
Director General, AUUP, Greater Noida

THANK YOU



Scan For GitHub Link : (included)

- Project Source Code & Working Video
- Capstone Project Report
- Acceptance Letter
- Paper Presentation Certificate
- Capstone Project Images
- Instructions to Run the Program
- Project versions and its Settings