SKIN CANCER DETECTION USING MACHINE LEARNING

INTRODUCTION

Skin cancer is one of the most prevalent forms of cancer globally, and early detection plays a crucial role in effective treatment and recovery. In this project, Machine Learning (ML) techniques were used to develop a model that detects skin cancer by analyzing medical images. The focus was on building a robust and accurate model to classify whether a lesion is benign or malignant, which aids in early diagnosis.

SKILLS LEARNED

- **Python Programming:** Implemented ML algorithms using Python.
- **Machine Learning Techniques:** Learned supervised learning methods, including classification algorithms.
- **Libraries and Tools:** Utilized libraries such as TensorFlow/Keras, Scikit-Learn, NumPy, Pandas, and Matplotlib for data processing, modeling, and visualization.
- **Image Preprocessing:** Applied techniques such as resizing, normalization, and augmentation for handling medical images.
- **Model Evaluation:** Gained experience in evaluating models using accuracy, confusion matrix, and ROC-AUC scores.

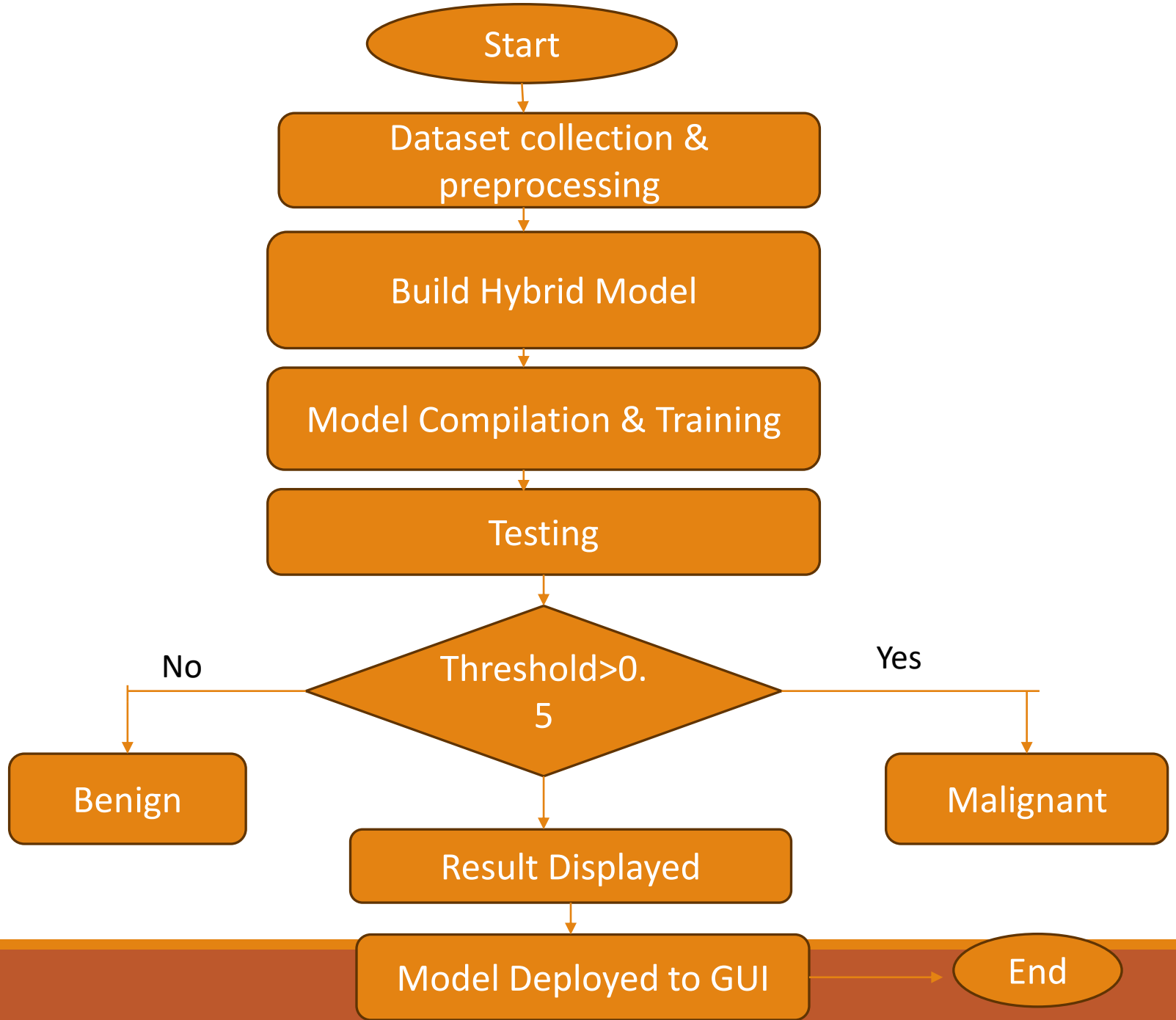
OBJECTIVE

The objective of this project was to:

1.Develop a Machine Learning model to classify skin lesions as **benign** or **malignant** using medical image datasets (e.g., ISIC Dataset).

2.Enhance the model's accuracy through image preprocessing and hyperparameter tuning.

3.Assist healthcare professionals by providing a tool for faster and more reliable skin cancer detection.


Start
Dataset collection & preprocessing
Build Hybrid Model
Model Compilation & Training
Testing
Threshold>0.5
No
Yes
Benign
Malignant
Result Displayed
Model Deployed to GUI
End

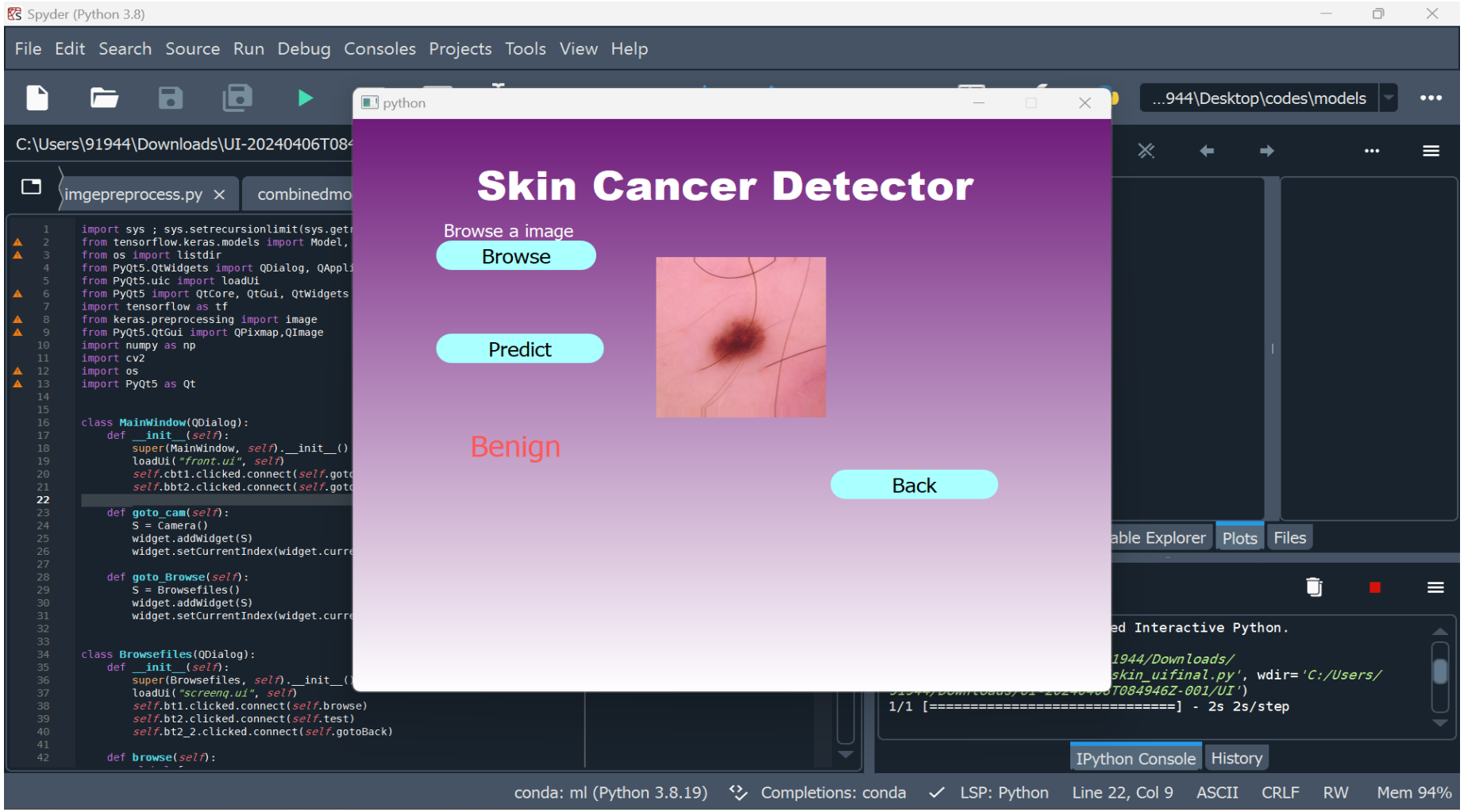
Comparison of Performance

Models	Accuracy	Precision	Sensitivity	F1 Score
MobileNet	86.4	86.46	83	84.60
InceptionV3	84.4	80.31	87	83.52
Resnet	75.5	80	61.3	69.43
Vgg16	83.5	78.1	88.3	82.94
Hybrid Model	91.9	89.9	83.3	86.5

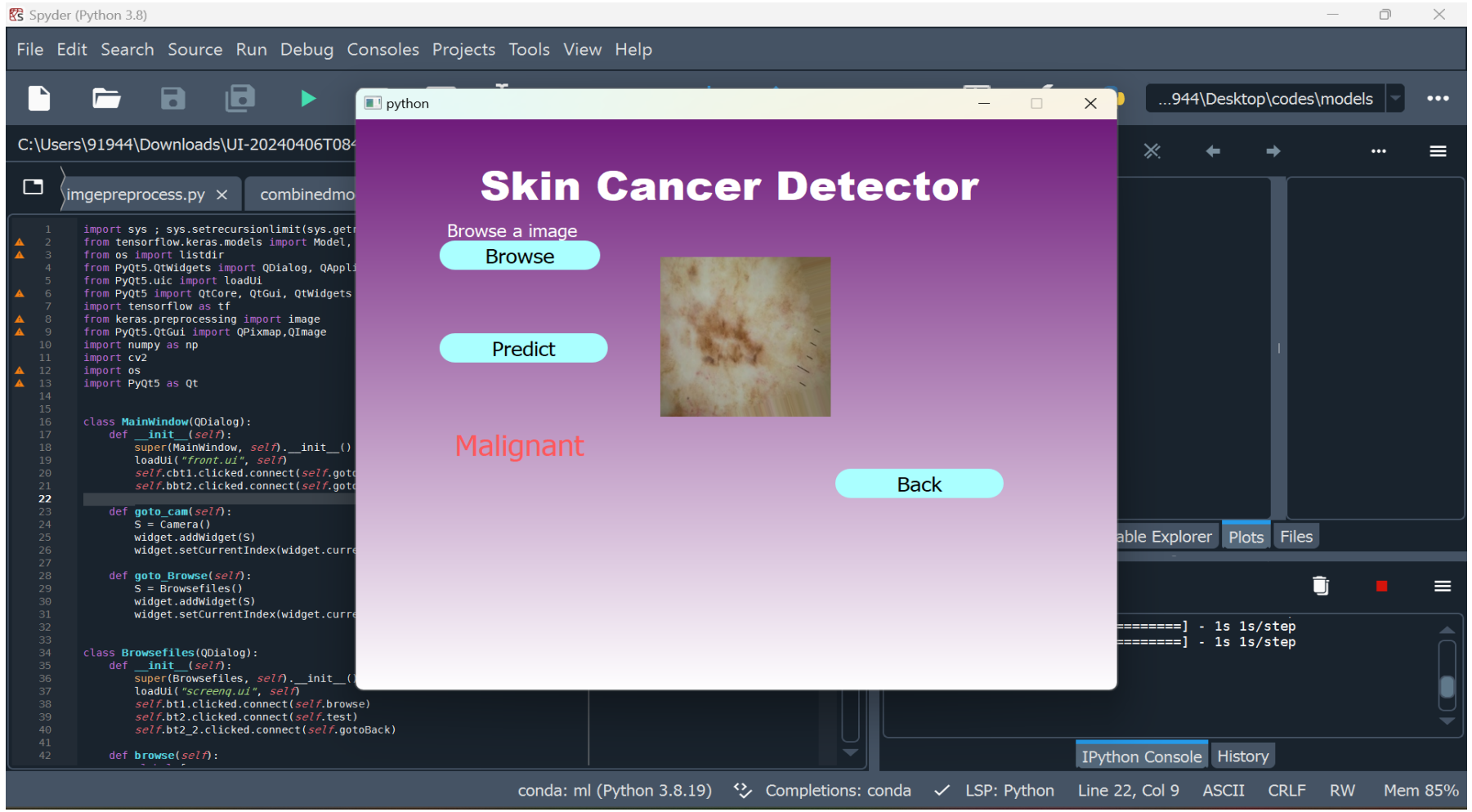
RESULT

- We have developed a skin cancer detection system based on camera image analysis.
- The key feature of our system is its ability to identify skin lesions as either benign or malignant using a hybrid neural network model.
- This classification is presented through a graphical user interface (GUI).

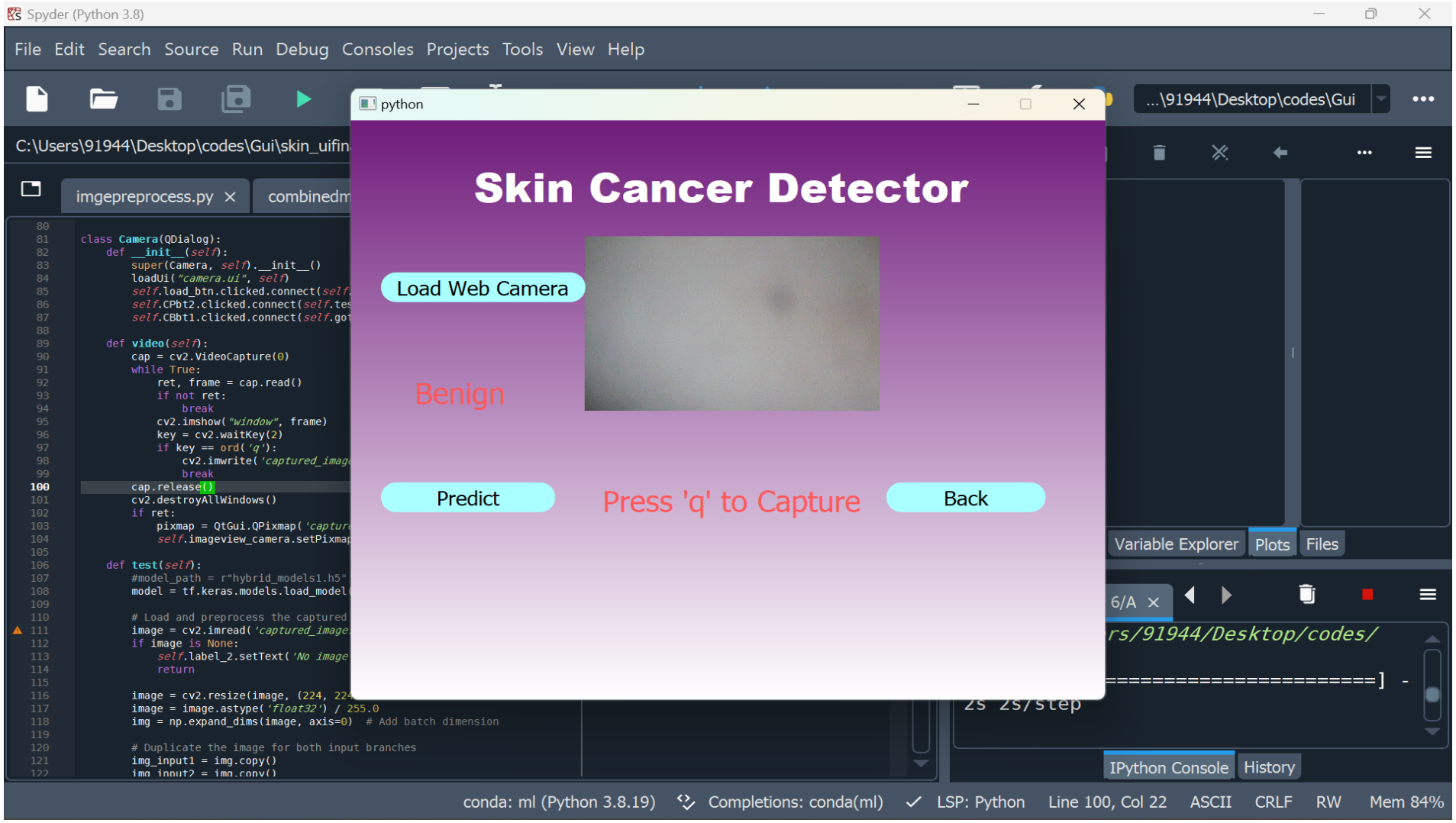
Output of Dataset Image-Benign



Output of Dataset Image-Malignant



Output of Realtime Image



CONCLUSION AND FUTURE SCOPE

- The proposed hybrid model could classify the Skin types into benign class or malignant class. In this work, we obtained an accuracy of 91%

- GUI-integrated skin cancer detection expands healthcare access to underserved and remote populations, facilitating timely diagnosis and care. it empower individuals with self-assessment capabilities, promoting proactive healthcare and timely medical intervention.

- Complementary Healthcare Tool can also support healthcare professionals by enhancing diagnostic accuracy and efficiency, optimizing patient care outcomes.

- The future extension to this work includes improving the prediction accuracy by parameter tuning, remodeling the network to multiclass case, which could detect different categories of skin lesions.

- The system which is put forward is to a great extent an effective tool that helps in the timely as well as lively evaluation of the disease. The system further has an integrated user-friendly and user accountable form of GUI.