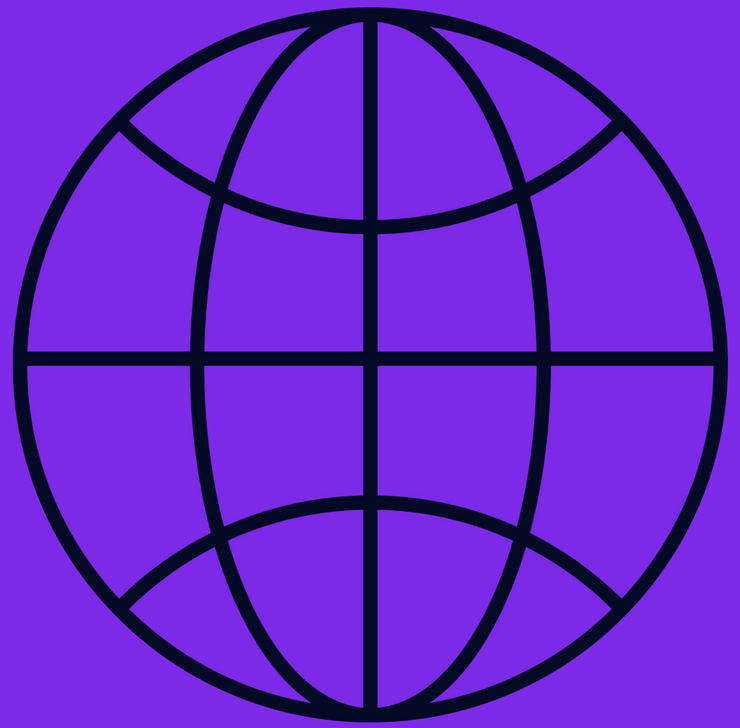

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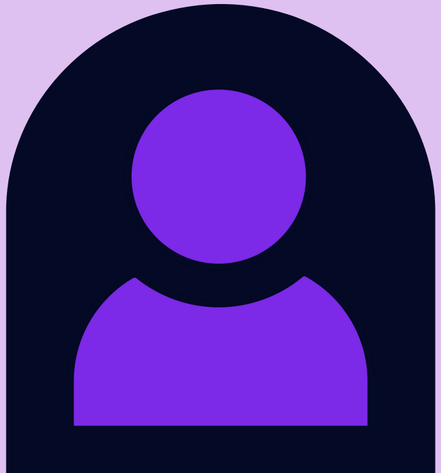
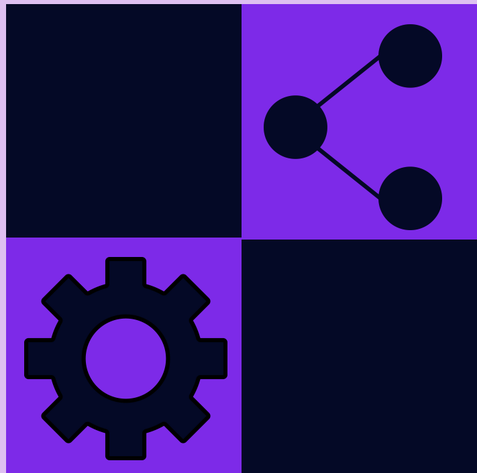
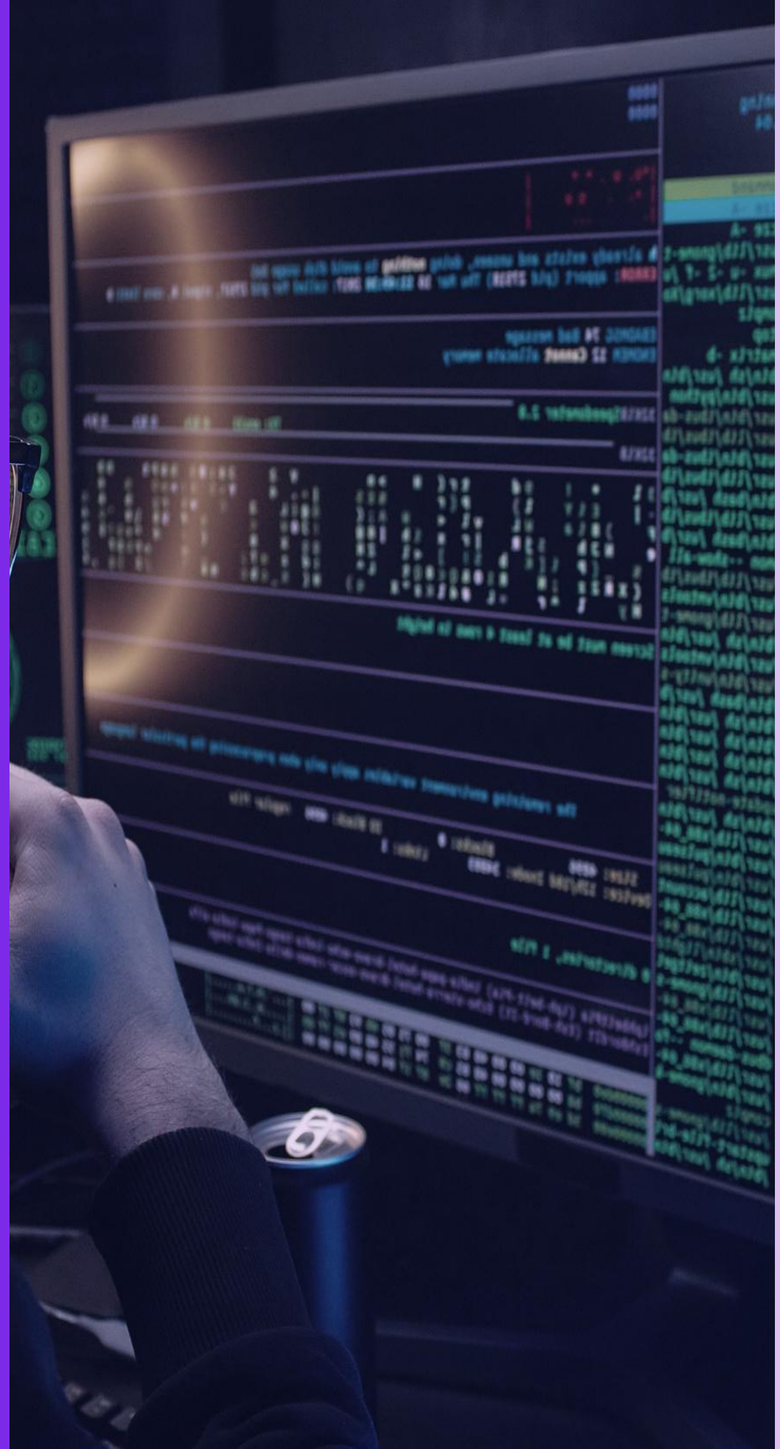
Diabetic Retinopathy Detection





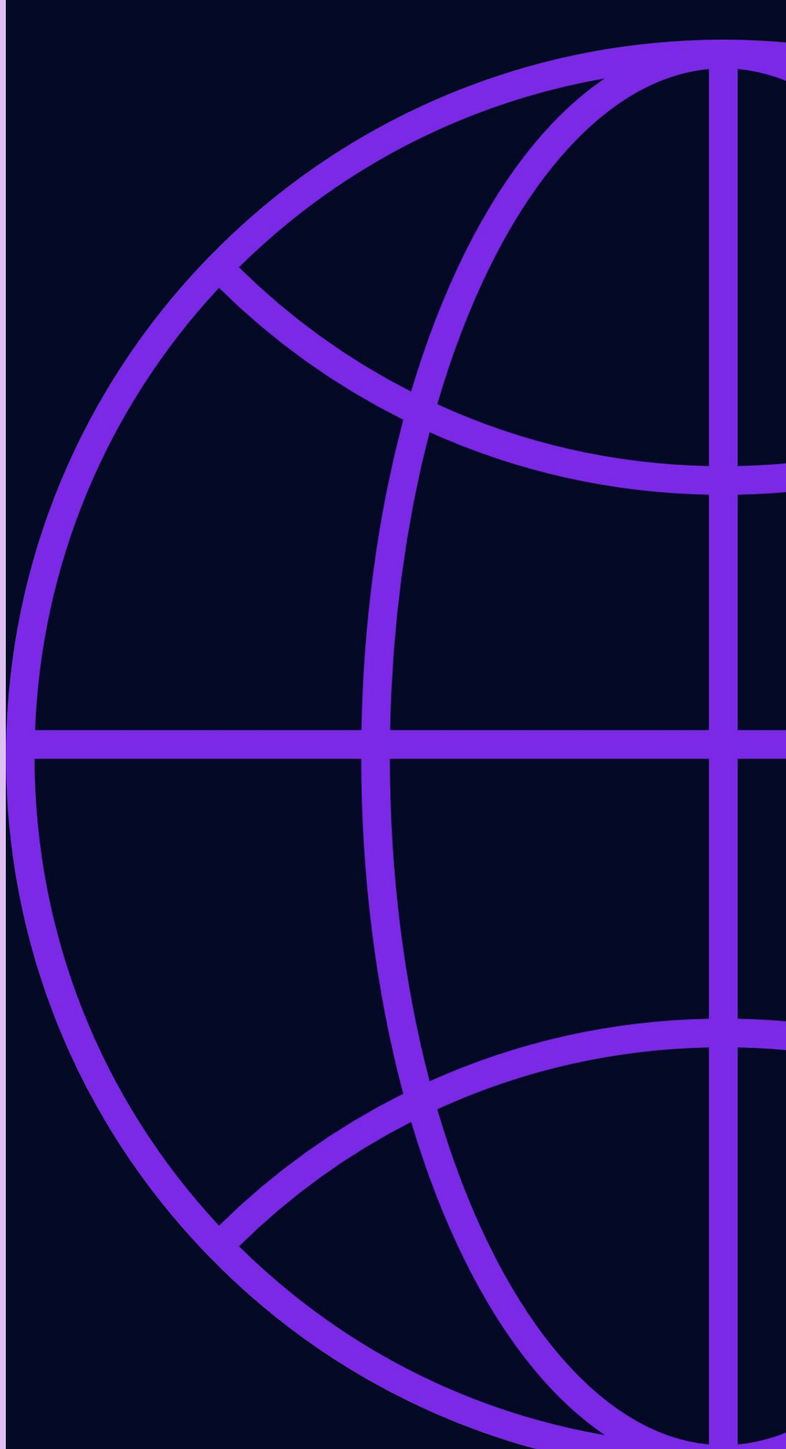
INTRODUCTION



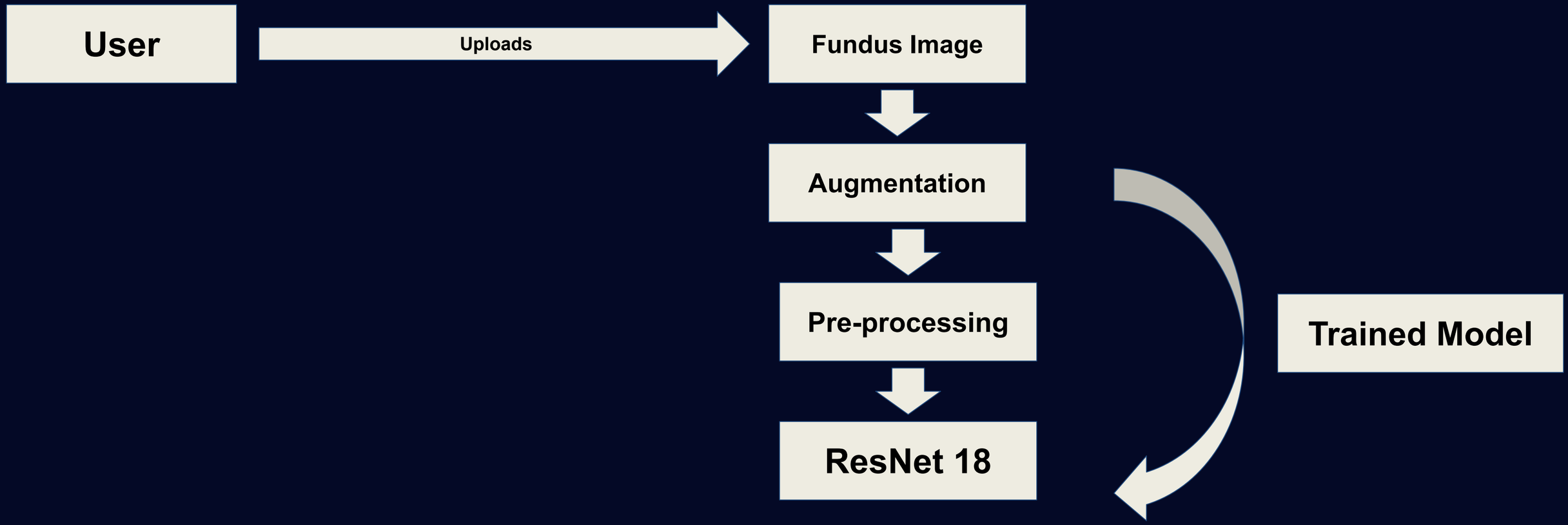
Blindness and Diabetic Retinopathy present critical challenges for individuals affected by diabetes, as they can lead to severe vision impairment if not addressed in a timely manner. The condition arises due to swelling and leakage of blood vessels in the retina, commonly occurring in both Type 1 and Type 2 diabetes. Managing blood sugar levels over an extended period is crucial to prevent the progression of these complications. To address this pressing issue, A user-friendly interface has been developed that empowers users to detect Diabetic Retinopathy conveniently. By simply uploading a fundus image, the interface initiates a robust preprocessing stage before utilizing a specially trained ResNet architecture. The adoption of ResNet significantly enhances the performance of neural networks, especially when dealing with more complex and deep models. The model has been trained to classify fundus images into five distinct categories, namely No_DR, Mild, Moderate, Proliferate, and Severe, facilitating early identification and appropriate management of the disease.

Literature Survey

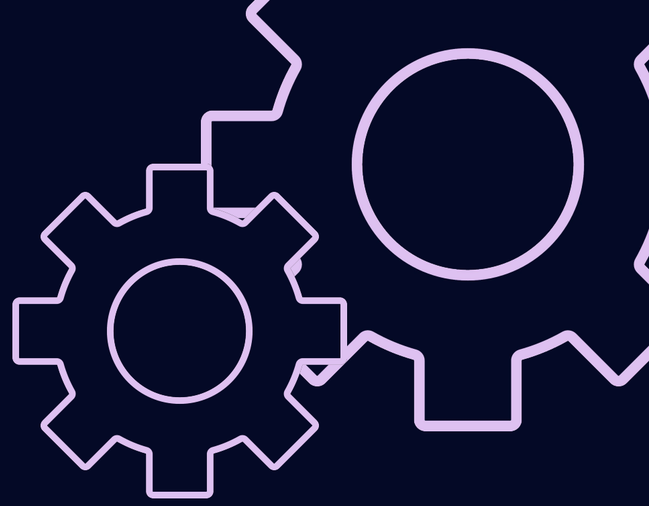
- Abràmoff et al. [1]: Applied Eye Check (AUC = 0.839) and Challenge 2009 (AUC = 0.821) algorithms for Diabetic Retinopathy detection.
- Gargey et al. [2]: Developed a device with AUC values of 0.94 and 0.95 using MESSIDOR 2 and E-Ophtha databases.
- Wilfred Franklin and Edward Rajan [3]: Proposed a blood vessel detection tool with 95.03% accuracy on the DRIVE database.
- Antal and Hajdu et al. [4]: Used image-level, lesion-specific, and anatomical components, achieving AUC of 0.989 on Messidor dataset.
- Liskowski et al. [5]: Utilized deep neural networks, achieving AUC > 0.99, accuracy > 0.97, and sensitivity > 0.87 in fine vessels.



Proposed System



Implementation

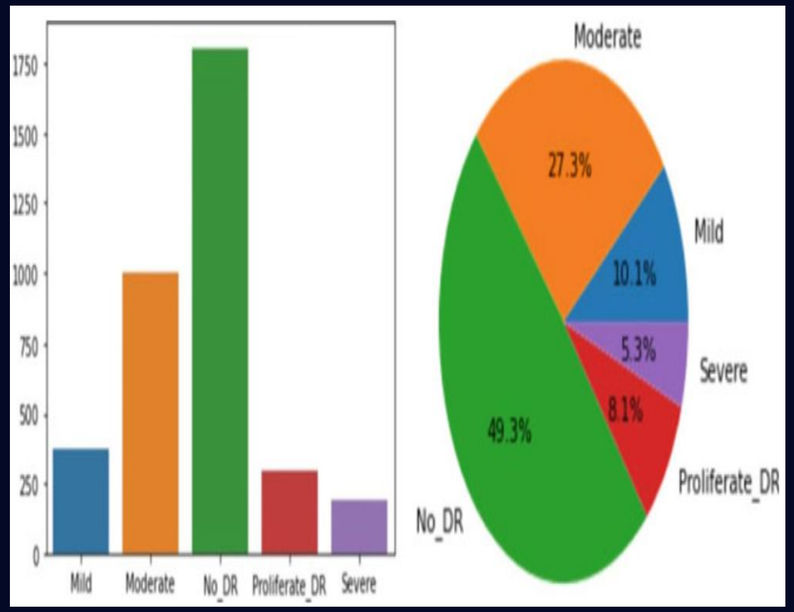


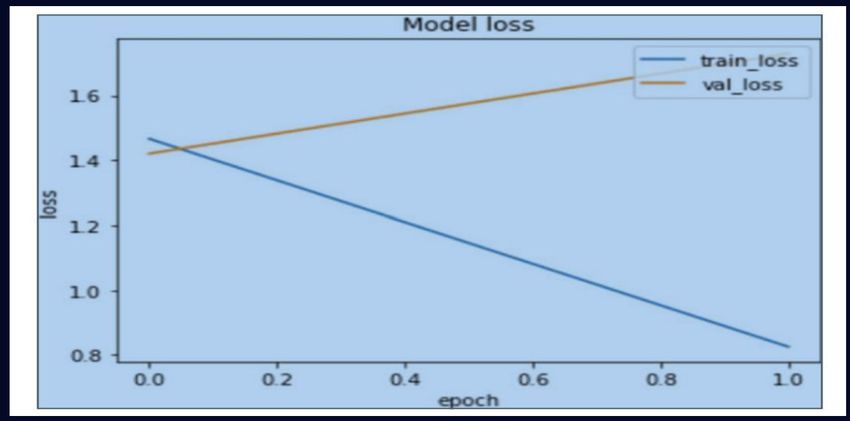
1. Anaconda-Jupyter for training and Anaconda-Spyder for deployment.
2.Sublime text editor along with Programming languages for front end development.
>>Python, HTML, CSS, JS, Flask app.

1. Dataset taken from the Kaggle.
2. Fundus image is taken from the back side of retina while pupil is dilated.
3. Fundus images under different classes.

ResNet architecture to train the model with 18 layers.

Implementation



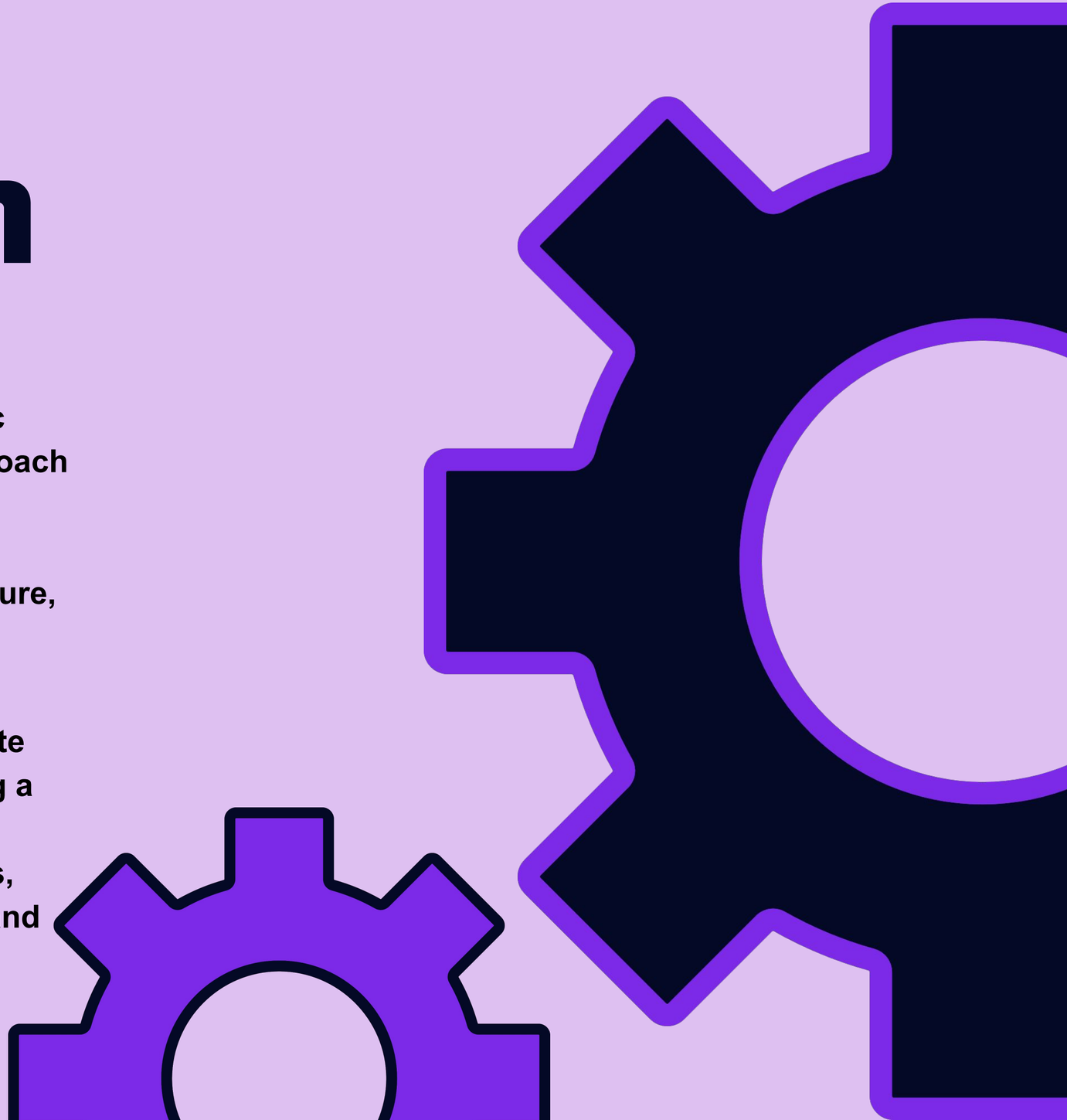


	precision	recall	f1-score	support
Mild	0.71	0.51	0.59	73
Moderate	0.71	0.83	0.76	196
No_DR	0.94	0.97	0.95	371
Proliferate_DR	0.65	0.54	0.59	56
Severe	0.65	0.41	0.50	37
accuracy			0.82	733
macro avg	0.73	0.65	0.68	733
weighted avg	0.82	0.82	0.82	733

Conclusion

In conclusion, our study highlights the significance of leveraging advanced technologies to enhance Diabetic Retinopathy diagnosis. The conventional manual approach of directing images to clinicians for scaling and classification often leads to inaccuracies and delays. However, by harnessing the power of ResNet architecture, we have successfully developed a trained model that offers a fast and accurate alternative.

The ResNet model's implementation enables immediate replies and expedites the diagnosis process, providing a valuable tool for healthcare professionals. With an impressive 82% accuracy in classifying fundus images, our approach demonstrates its potential as a reliable and efficient solution for Diabetic Retinopathy detection.



Thank you!