ARTIFICIAL INTELLIGENCE PROJECT

PREDICTING MENTAL HEALTH CRISIS USING SMARTPHONE USAGE PATTERNS

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AGENDA

- Problem Statement
- Proposed System/Solution
- System Development Approach
- Algorithm & Deployment
- Result
- Conclusion
- Future Scope
- References

PROBLEM STATEMENT

With increasing smartphone usage, it is crucial to understand its impact on mental health.

Predicting mental health crises using smartphone data can provide early intervention opportunities.

This project aims to develop a model that predicts mental health crises based on screen time, call logs, and message frequency.

PROPOSED SOLUTION

The proposed system aims to:

1. Collect smartphone usage data (screen time, call logs, message frequency).
2. Preprocess the data to handle missing values and outliers.
3. Use machine learning algorithms to predict mental health crises.
4. Develop a user-friendly application to provide real-time predictions.

SYSTEM APPROACH

System requirements:
- python libraries: numpy, pandas, scikit-learn, matplotlib,seaborn
- data sources: smartphone usage data

Development steps:
1. Data collection: collect synthetic data using python.
2. Data preprocessing: handle missing values, outliers, and feature engineering.
3. Model training: train the model using the preprocessed data.
4. Model evaluation: evaluate the model using test data and metrics like accuracy, precision, and recall.
5. Deployment: deploy the model in A user-friendly application.

ALGORITHM & DEPLOYMENT

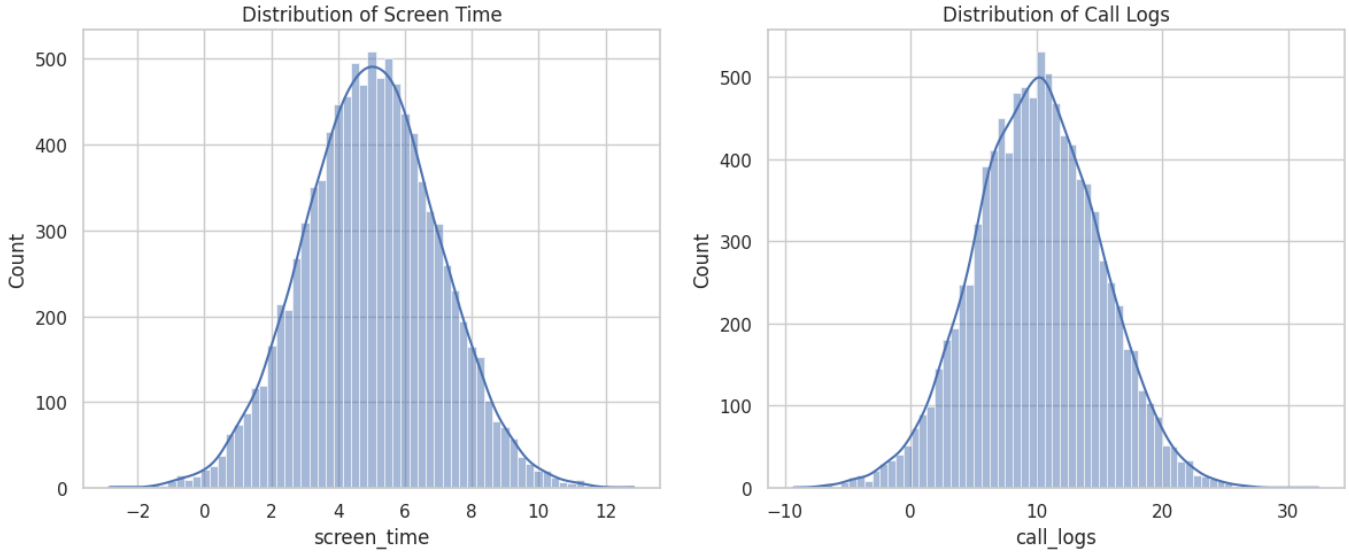
Algorithm selection:
- chosen algorithm: logistic regression
- justification: effective for binary classification problems

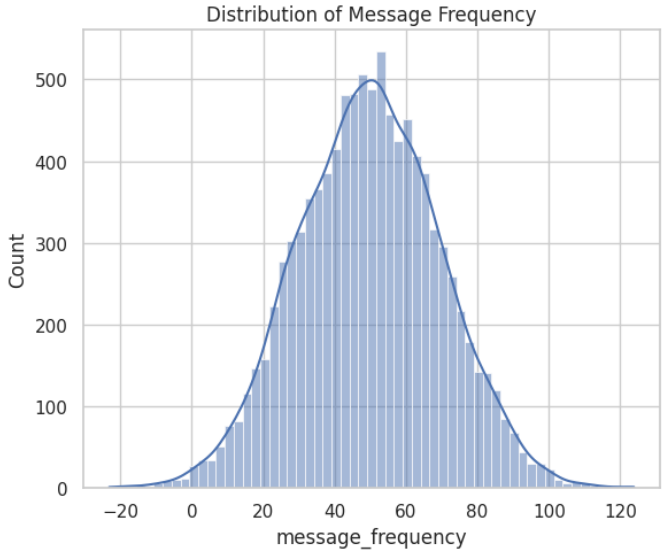
Data input:
- features: screen time, call logs, message frequency
- target: mental health crisis (binary)

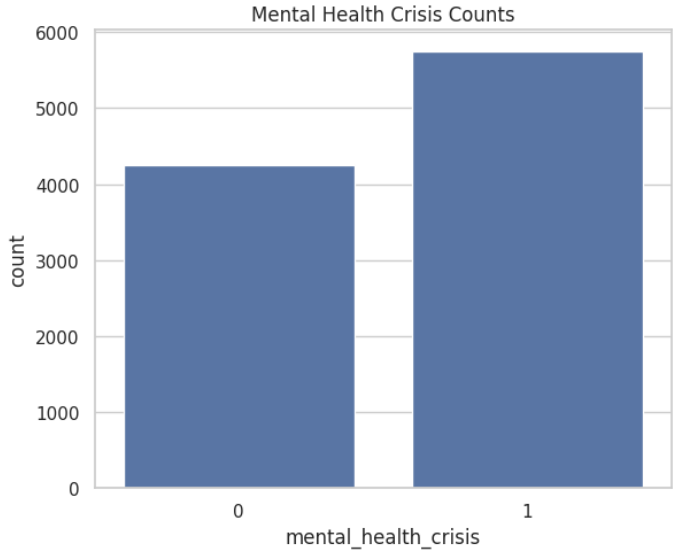
Training process:
- train the model using historical data
- techniques: hyperparameter tuning

Prediction process:
- make real-time predictions based on new input data

DISTRIBUTION OF FEATURES(BEFORE PREPROCESSING)







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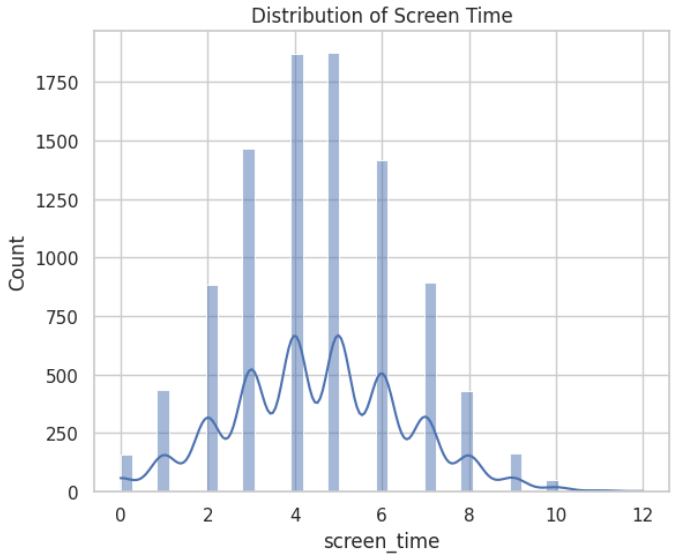

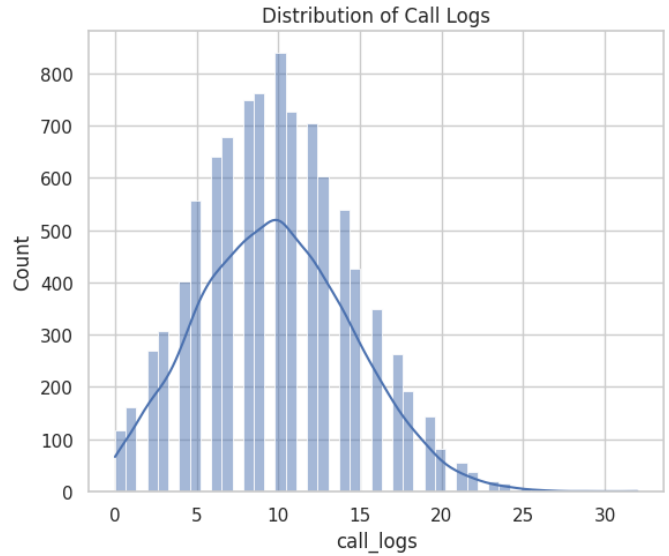

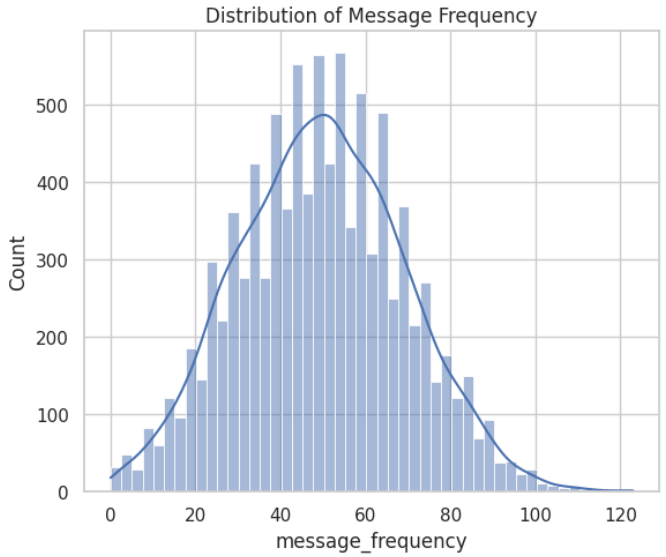

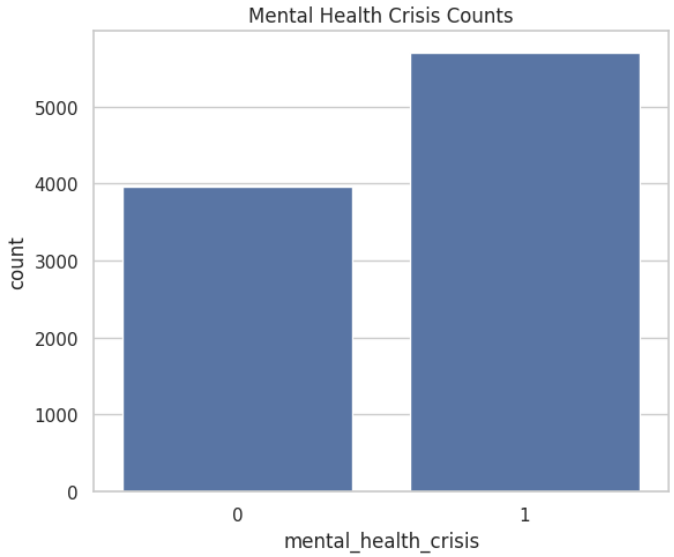

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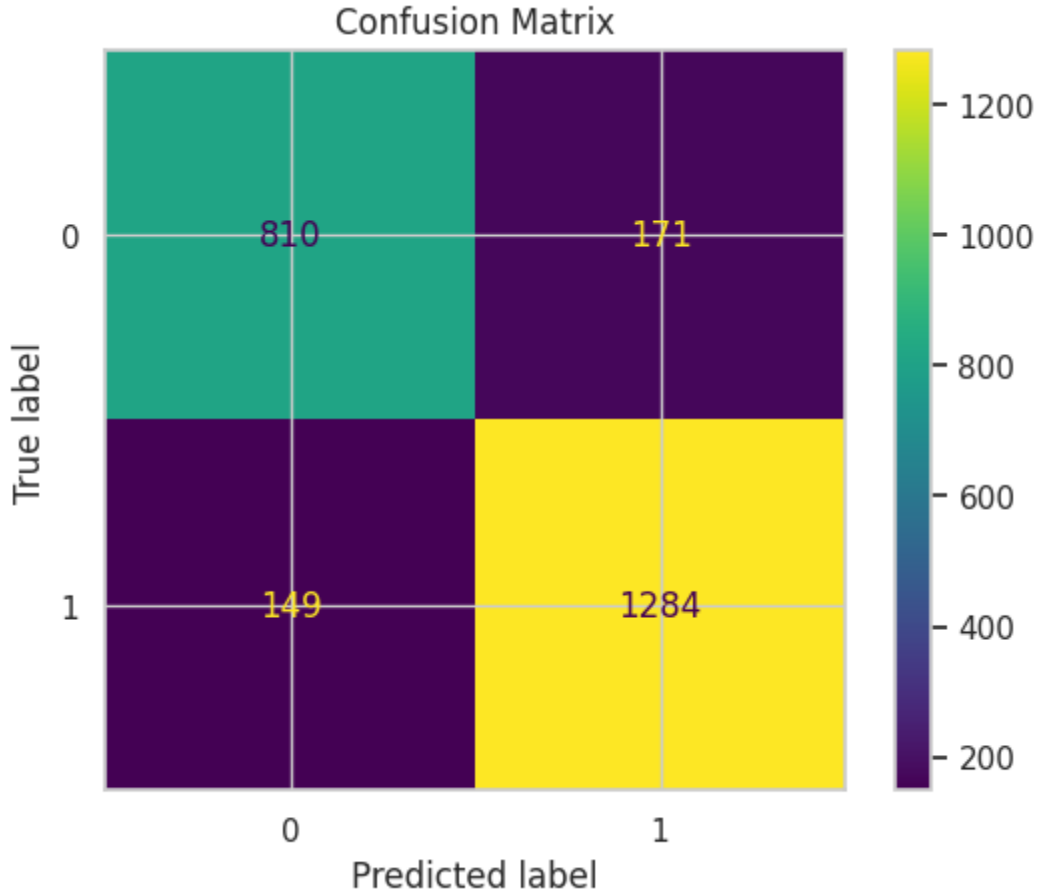
RESULT

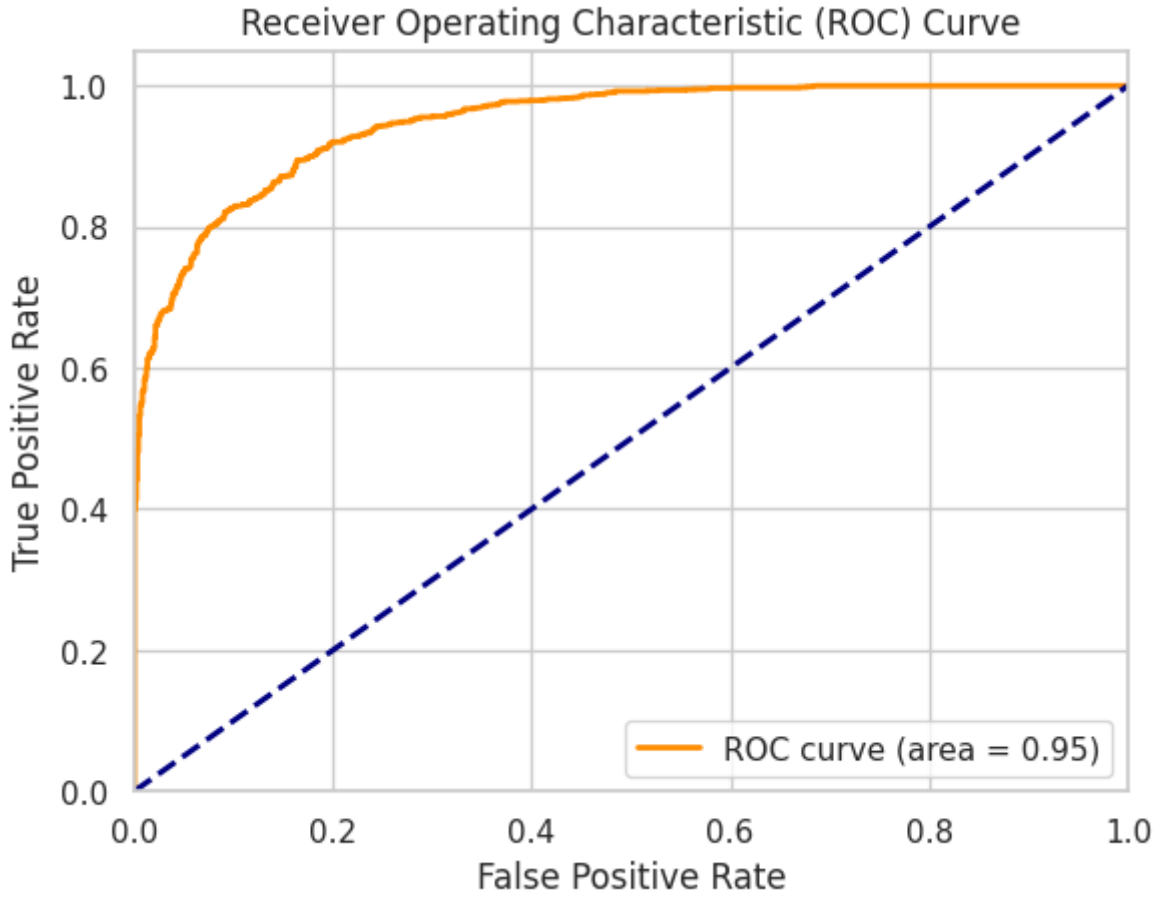
Model Performance:

- Accuracy: 86.7%
- Precision: 88.2%
- Recall: 89.6%

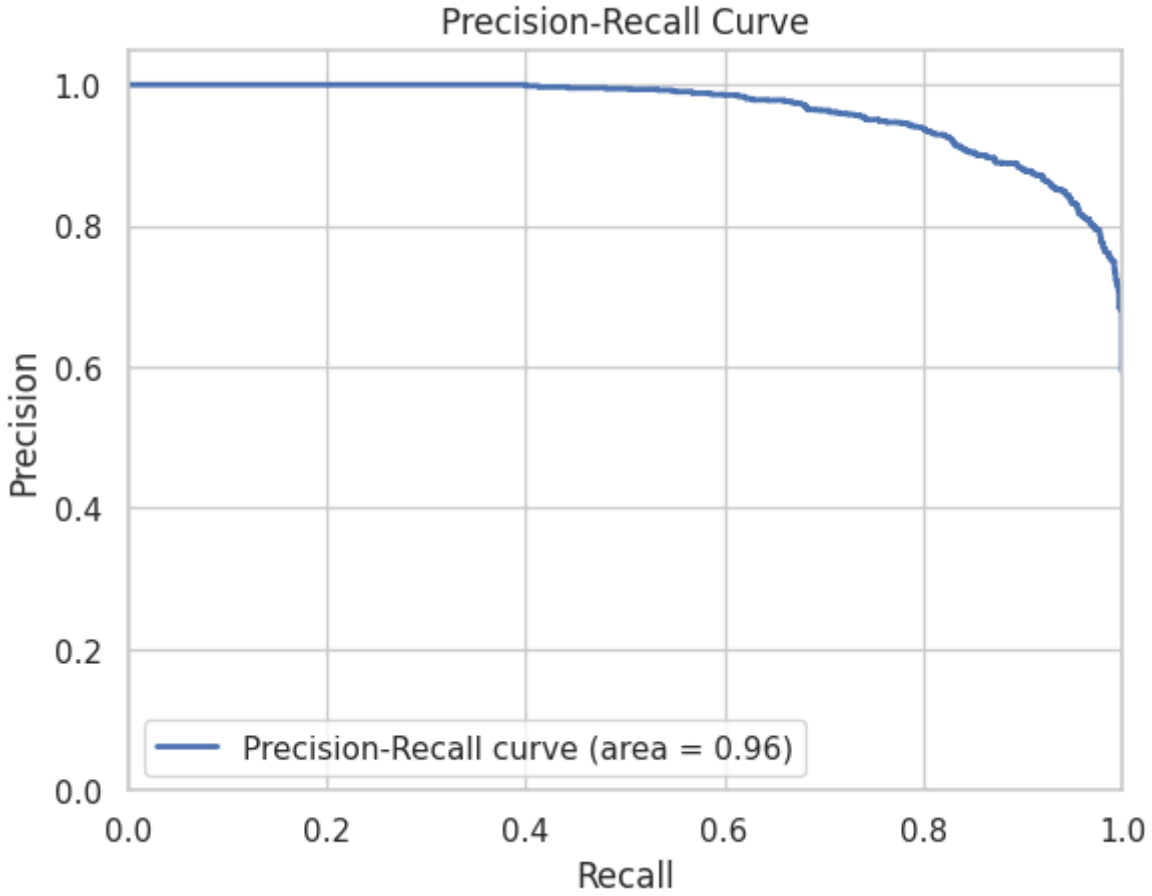
VISUALIZATIONS – CONFUSION MATRIX



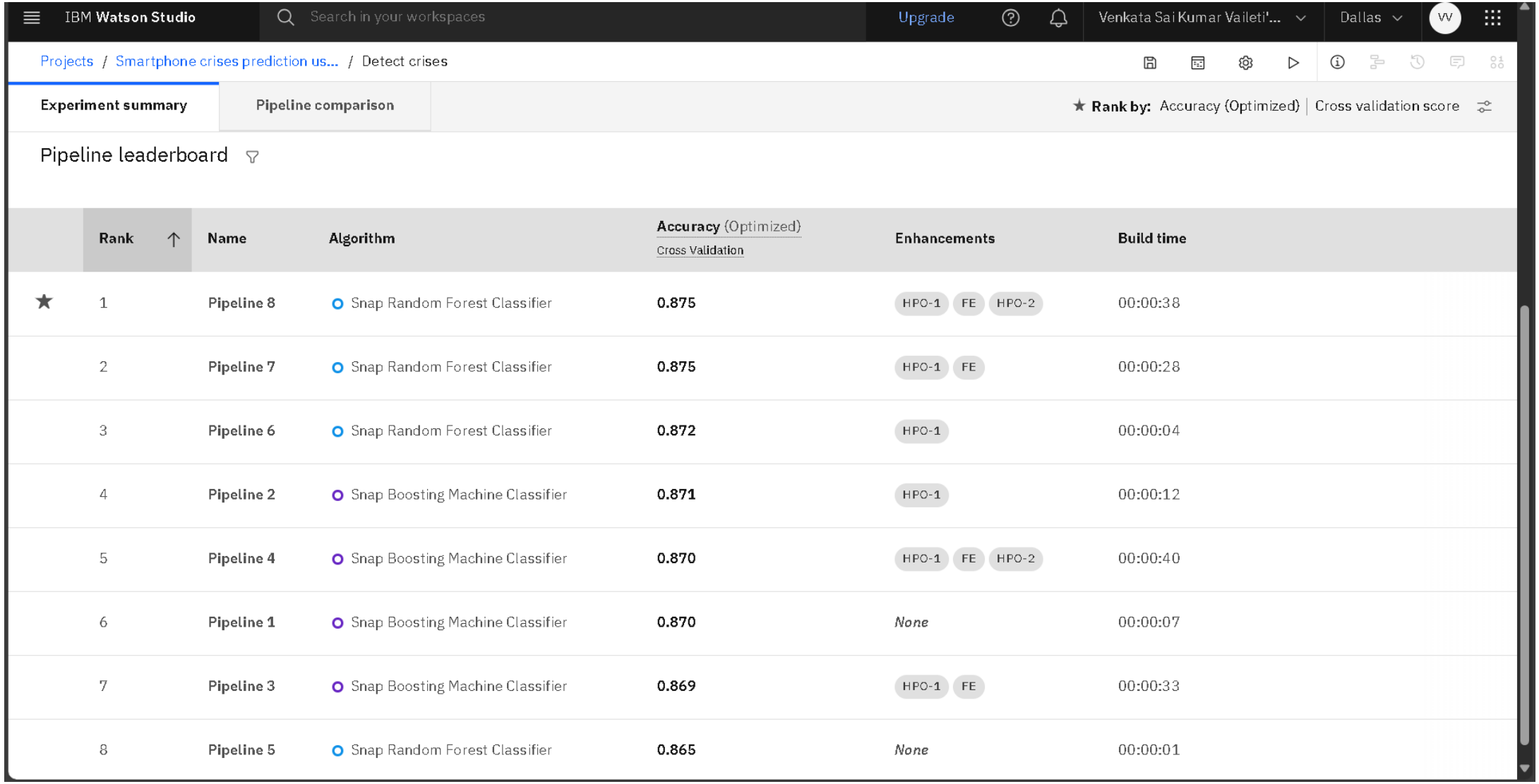
VISUALIZATIONS – ROC CURVE



VISUALIZATIONS – PRECISION-RECALL CURVE

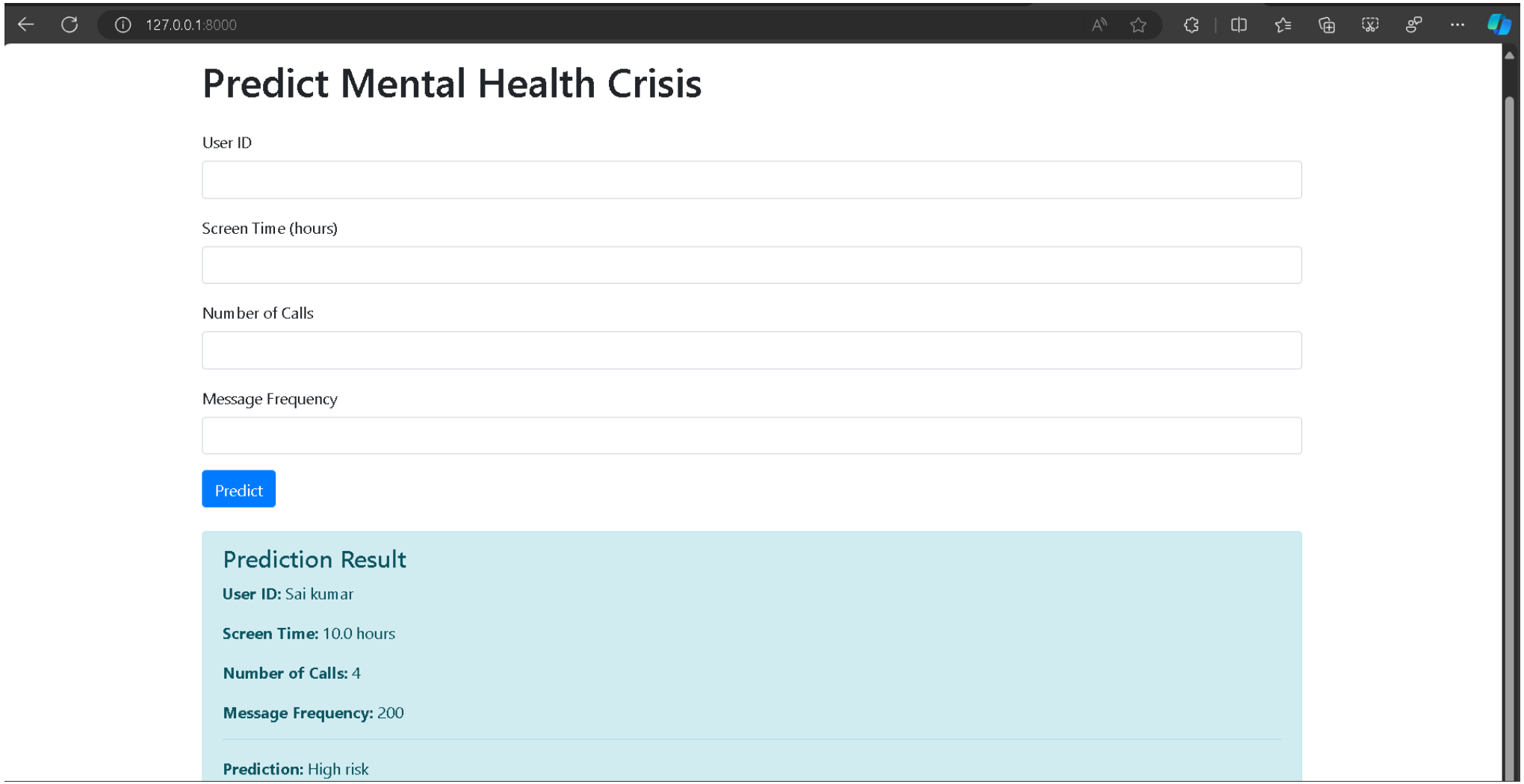


AUTOML



	Rank	Name	Algorithm	Accuracy (Optimized) Cross Validation	Enhancements	Build time
★	1	Pipeline 8	Snap Random Forest Classifier	0.875	HPO-1 FE HPO-2	00:00:38
	2	Pipeline 7	Snap Random Forest Classifier	0.875	HPO-1 FE	00:00:28
	3	Pipeline 6	Snap Random Forest Classifier	0.872	HPO-1	00:00:04
	4	Pipeline 2	Snap Boosting Machine Classifier	0.871	HPO-1	00:00:12
	5	Pipeline 4	Snap Boosting Machine Classifier	0.870	HPO-1 FE HPO-2	00:00:40
	6	Pipeline 1	Snap Boosting Machine Classifier	0.870	*None*	00:00:07
	7	Pipeline 3	Snap Boosting Machine Classifier	0.869	HPO-1 FE	00:00:33
	8	Pipeline 5	Snap Random Forest Classifier	0.865	*None*	00:00:01

WEB APPLICATION



CONCLUSION

Findings:

- The model effectively predicts mental health crises based on smartphone usage data.
- Early predictions can help in timely interventions.

Challenges:

- Handling overfitting with synthetic data.
-

Improvements:

- Incorporating more features like type of usage, notifications
- Using advanced algorithms

FUTURE SCOPE

Potential Enhancements:

- Integrating additional data sources like social media activity
- Optimizing the algorithm for better performance
- Expanding the system to cover diverse populations

Emerging Technologies:

- Edge computing for real-time analysis
- Advanced machine learning techniques for improved predictions

REFERENCES

Mental health prediction using machine learning: taxonomy, applications, and challenges - chung - 2022 - applied computational intelligence and soft computing - wiley online library

Smartphones in mental health: a critical review of background issues, current status and future concerns - PMC (nih.Gov)

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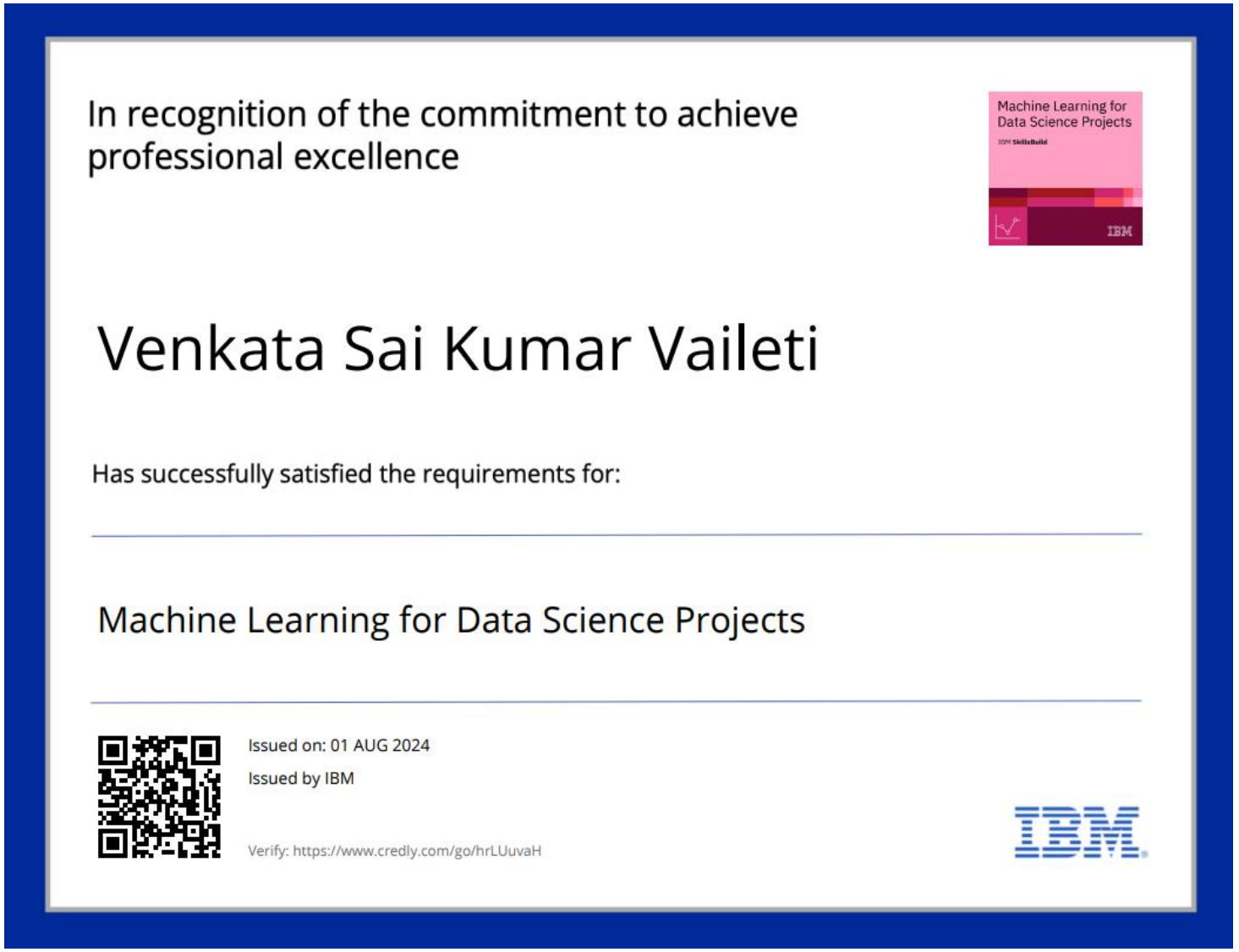

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