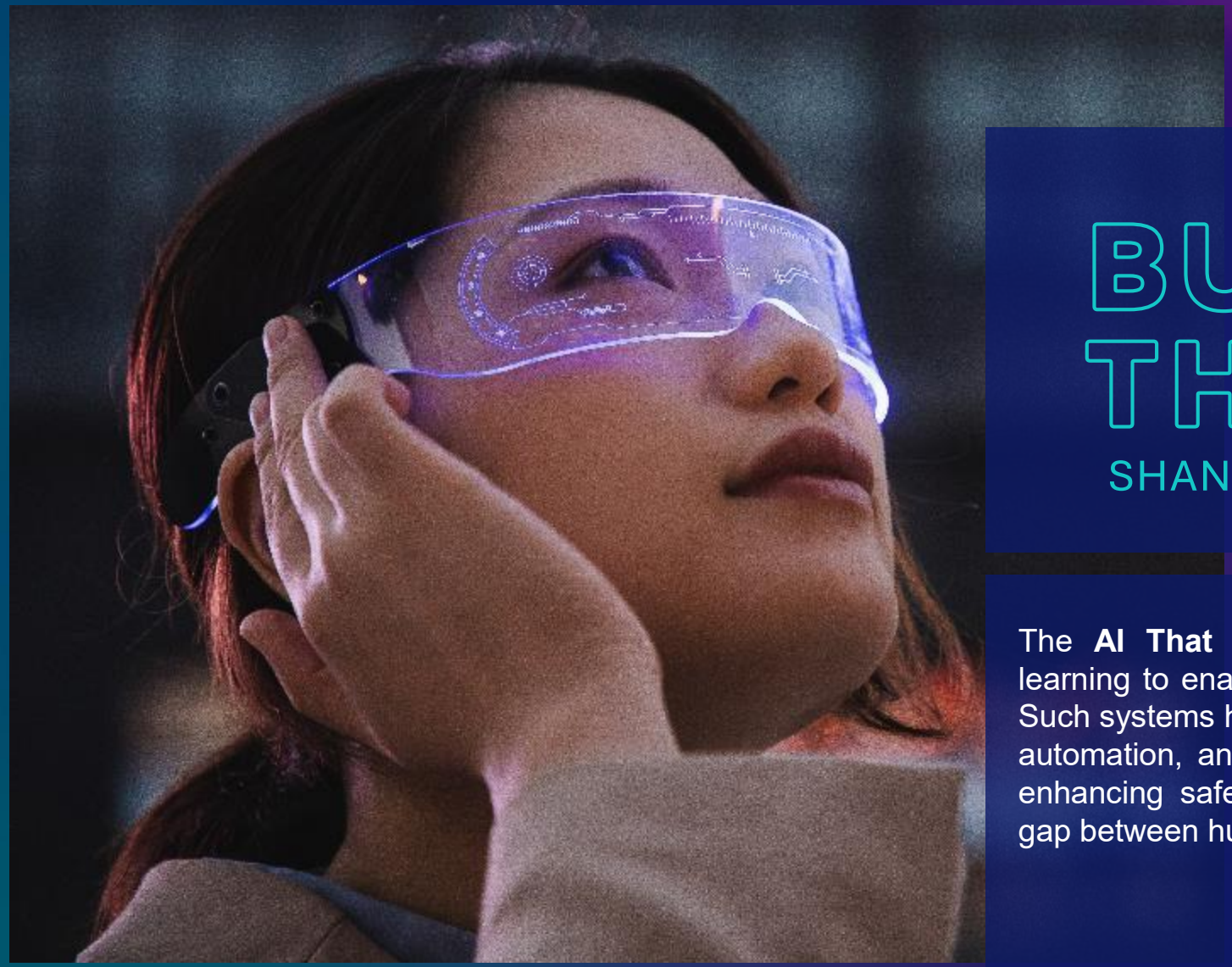


BUILD AI THAT SEES

SHANIA MARGARET SAINI

The **AI That Sees** project leverages computer vision and deep learning to enable machines to interpret and understand visual data. Such systems have transformative applications in healthcare, security, automation, and accessibility, empowering smarter decision-making, enhancing safety, and creating innovative solutions that bridge the gap between human perception and artificial intelligence.

APPROACH

DATASET SELECTION & PREPROCESSING

- Chose CIFAR-10 dataset containing 10 image categories.
- Resized, normalized, and reshaped images for CNN input.
- Split into training and testing sets.

MODEL ARCHITECTURE

- Implemented a Convolutional Neural Network (CNN) with multiple convolution, pooling, and dense layers.
- Used ReLU activation for non-linearity and Softmax for multi-class output.

DATA AUGMENTATION

- Applied transformations (rotation, flipping, zoom) to improve generalization and reduce overfitting.
- Calculated accuracy, precision, recall, and F1-score.
- Generated a confusion matrix to visualize misclassifications

OPTIMIZATION

- Applied transfer learning using MobileNetV2 for potential performance gains.
- Compared transfer learning results with the baseline CNN.

CONFUSION MATRIX

```
from sklearn.metrics import
confusion_matrix,classification_report

import numpy as np

y_pred_c10=model.predict(X_test_c10).argmax(a
xis=1)

cm=confusion_matrix(y_test_c10,y_pred_c10)

print(classification_report(y_test_c10,y_pred_c1
0))

import seaborn as sns

plt.figure(figsize=(8,6))

sns.heatmap(cm,annot=True,fmt='d')

plt.xlabel('Predicted')

plt.ylabel('True')

plt.show
```

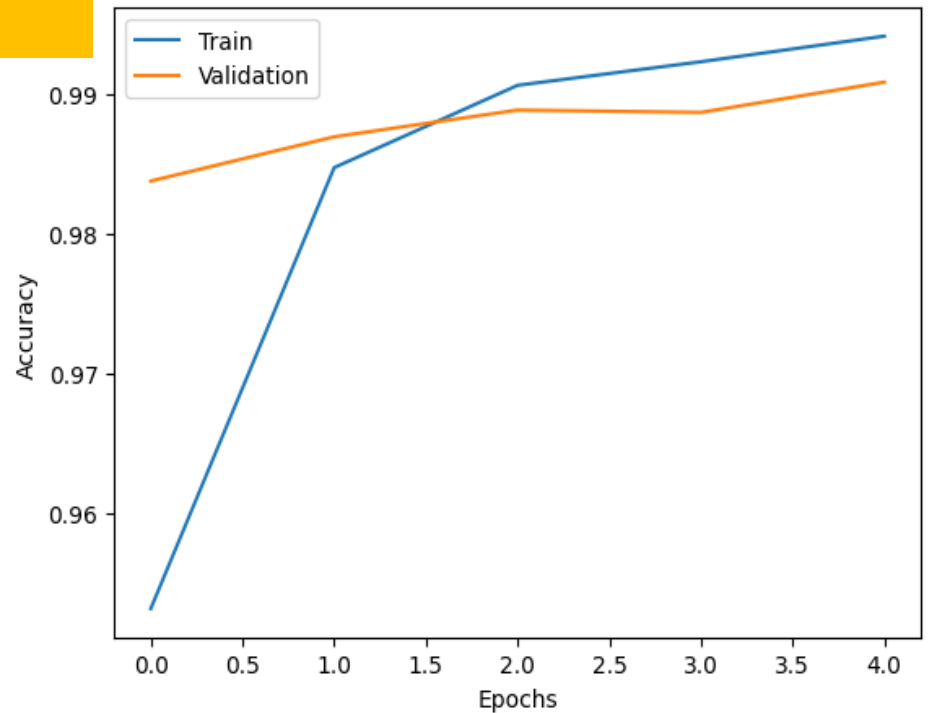
DATA

```
313/313 ━━━━━━━━━━━━━━━━━━━━ 4s 13ms/step
              precision    recall  f1-score   support

           0       0.75      0.73      0.74      1000
           1       0.81      0.89      0.85      1000
           2       0.64      0.54      0.58      1000
           3       0.59      0.33      0.43      1000
           4       0.82      0.51      0.63      1000
           5       0.46      0.83      0.59      1000
           6       0.71      0.85      0.77      1000
           7       0.77      0.73      0.75      1000
           8       0.89      0.79      0.84      1000
           9       0.76      0.81      0.78      1000

    accuracy                           0.70     10000
   macro avg       0.72      0.70      0.70     10000
weighted avg       0.72      0.70      0.70     10000
```

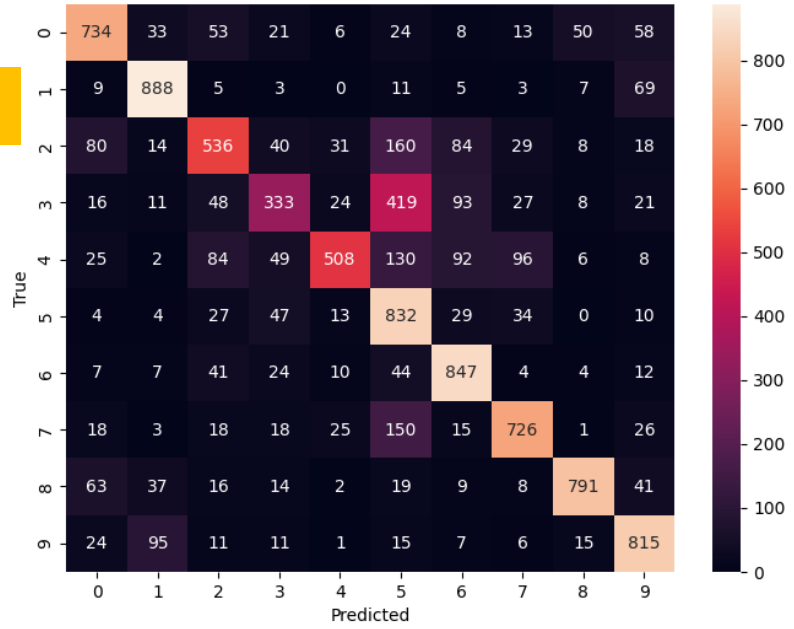
ACCURACY CURVE



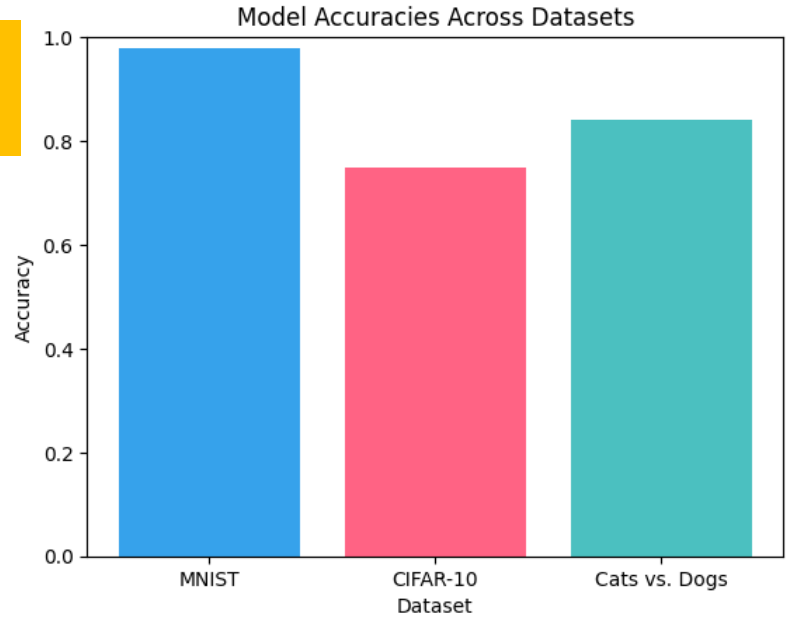
EVALUATION RESULTS

Metric	Value
Accuracy	70%
Macro Avg Precision	72%
Macro Avg Recall	70%
Macro Avg F1-score	70%
Weighted Avg Precision	72%
Weighted Avg Recall	70%
Weighted Avg F1-score	70%

PREDICTIONS



MODEL ACCURACY GRAPH



CONCLUSION & FUTURE WORK

The Build AI That Sees project successfully demonstrated the development of a deep learning–based image recognition system using Convolutional Neural Networks. By applying data preprocessing, augmentation, and model training techniques, the system achieved 70% accuracy on the CIFAR-10 dataset, with balanced precision, recall, and F1-score across multiple classes. These results highlight the model's capability to generalize to unseen data while also indicating areas for improvement. The project emphasizes the importance of computer vision in enabling machines to interpret and understand visual information, laying the foundation for applications in automation, security, and accessibility. Future enhancements could include leveraging advanced architectures, fine-tuning hyperparameters, and deploying the model for real-time predictions.