

# COMPARATIVE ANALYSIS OF CONVOLUTIONAL NEURAL NETWORKS (CNNs) FOR DEEPFAKE DETECTION

Jeet Kumar  
Hood College  
M.S. Cybersecurity  
Fall 2024



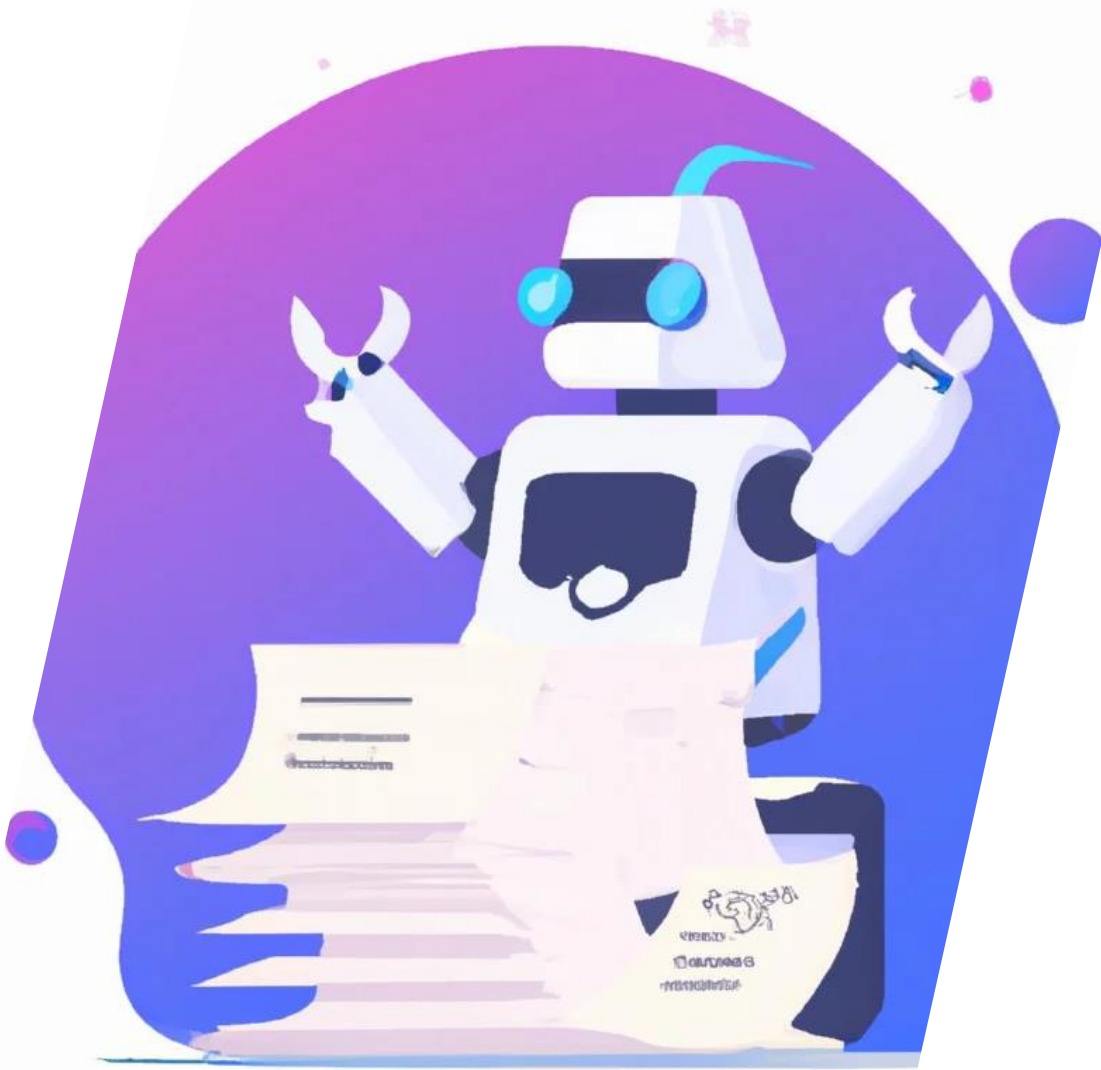
# INTRODUCTION

Rise of AI-Generated Content

Need for Detection Methods

Challenges in Detection





# LITERATURE REVIEW

## DEEPPAKE TECHNOLOGY

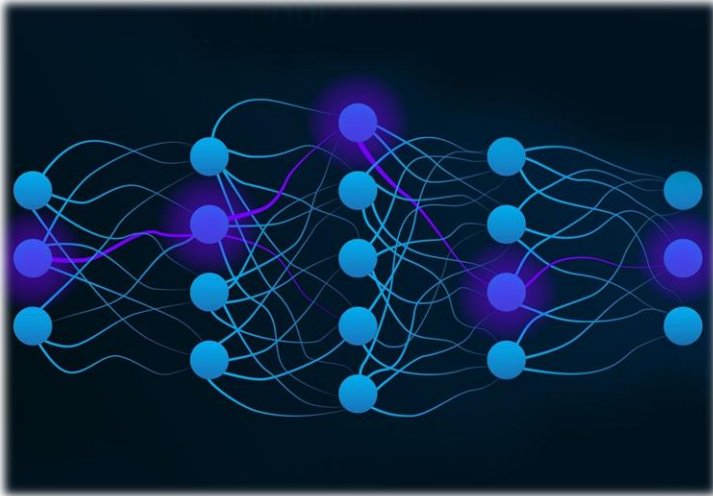
ROLES OF CNNs IN DETECTION  
(ROSSLER 2019 AND DOLHANSKY,  
2020)

## RESEARCH OBJECTIVE

- RESNET (HE, 2016)
- EFFICIENTNET (TAN & LE, 2019)



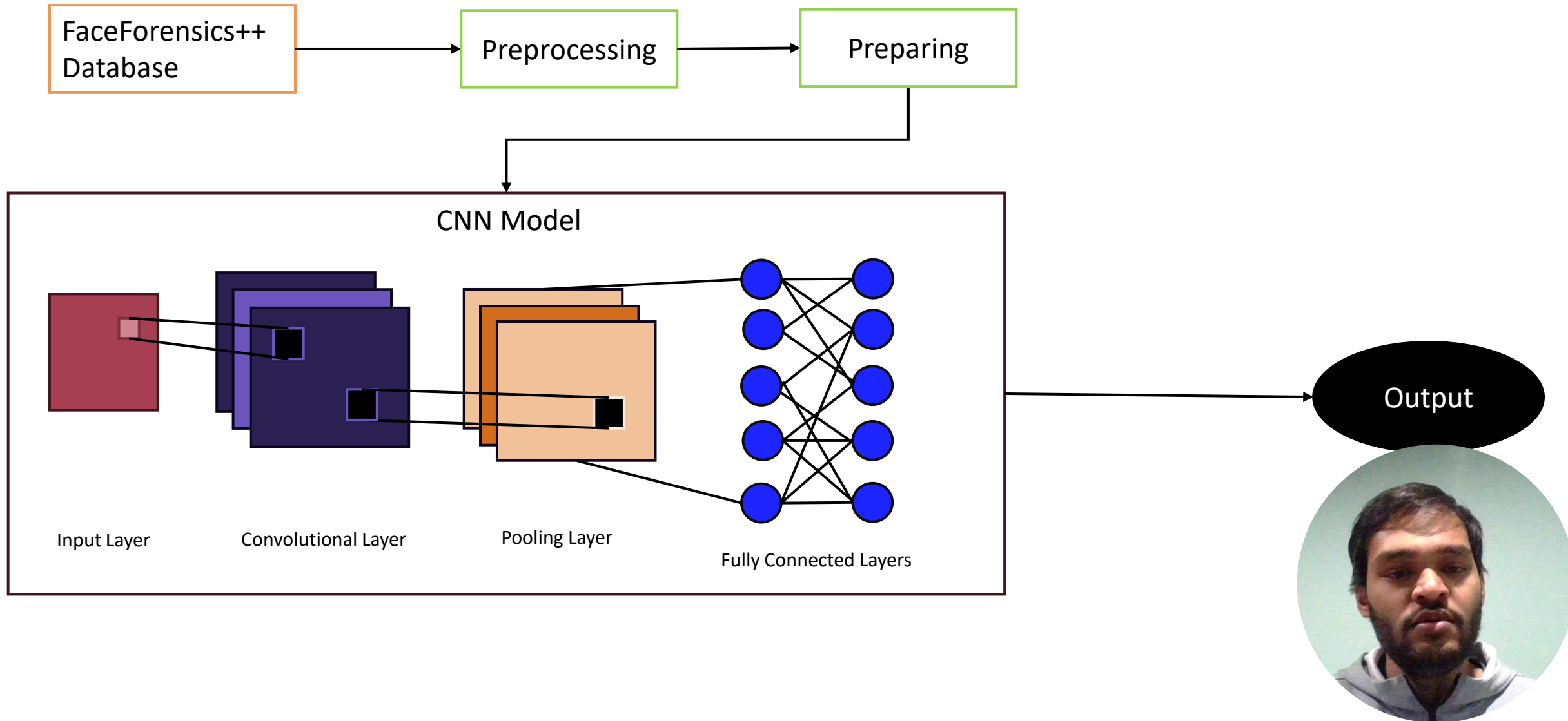
# BACKGROUND



- Deepfake Detection
- Neural Networks
- Convolutional Neural Networks
- Comparative Metrics



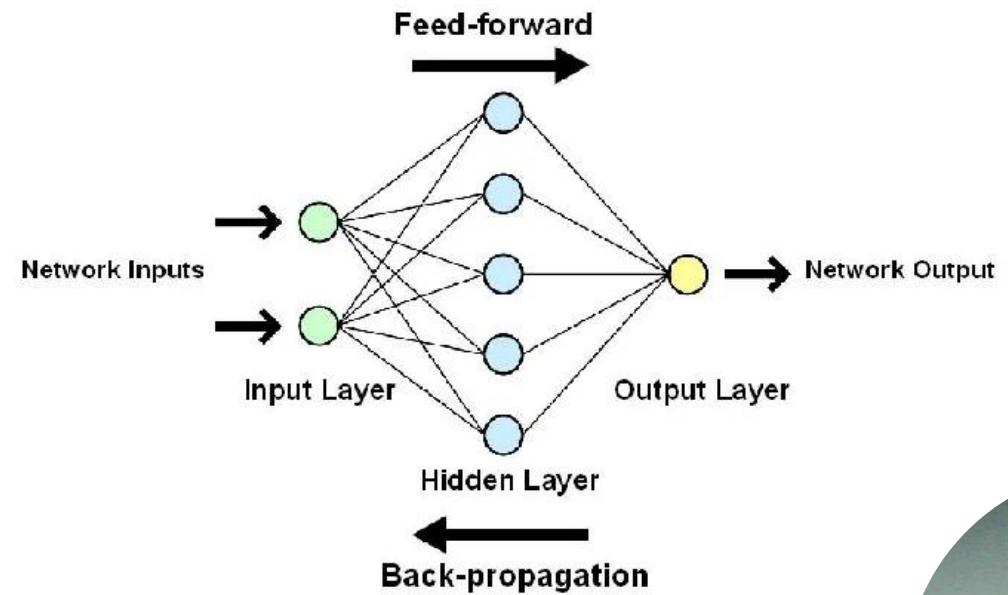
# METHODOLOGY



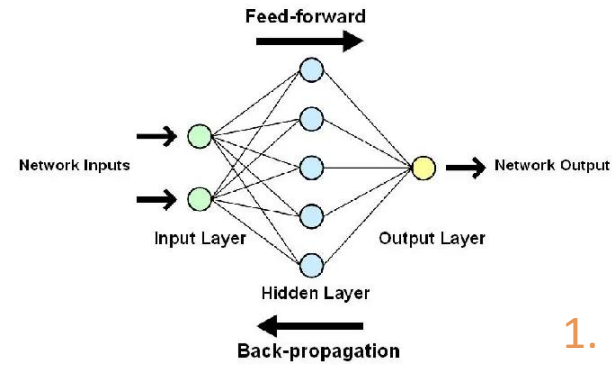


# ANALYSIS

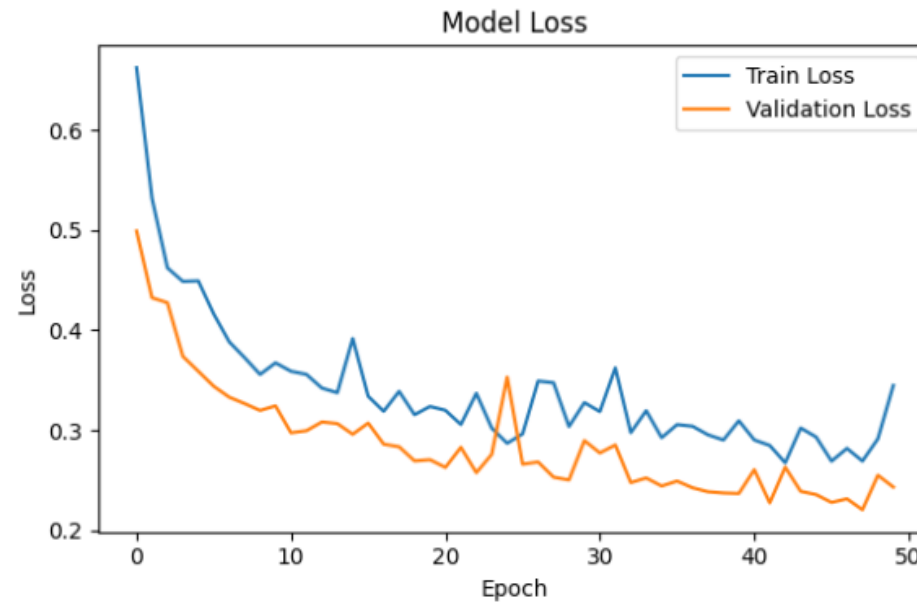
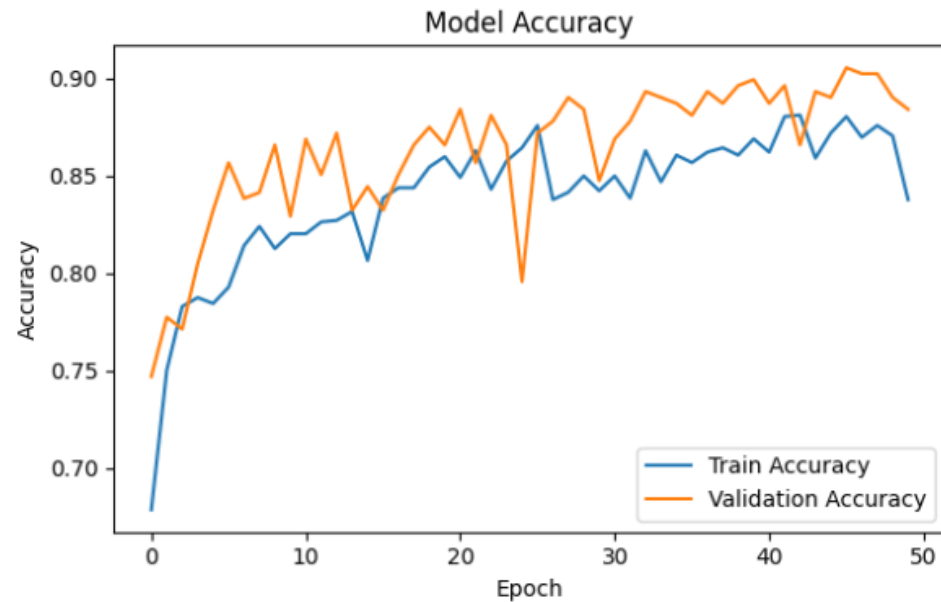
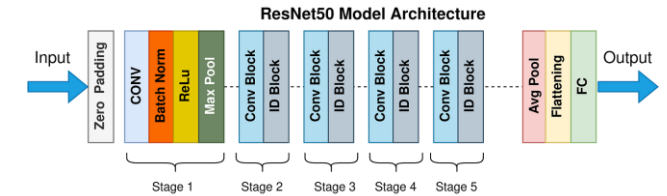
1. Comparison for efficacy
2. ResNet50 and EfficientNetV2B0
3. Performance Metrics
  - a. Training
    - 1) Accuracy
    - 2) Loss
  - b. Validation
    - 1) Accuracy
    - 2) Loss
  - c. Training time



# RESNET50 MODEL

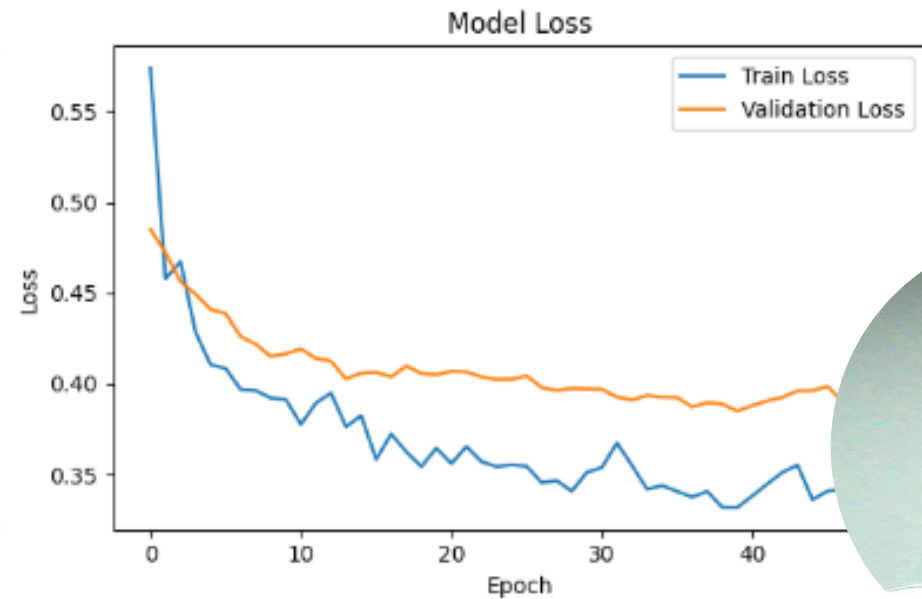
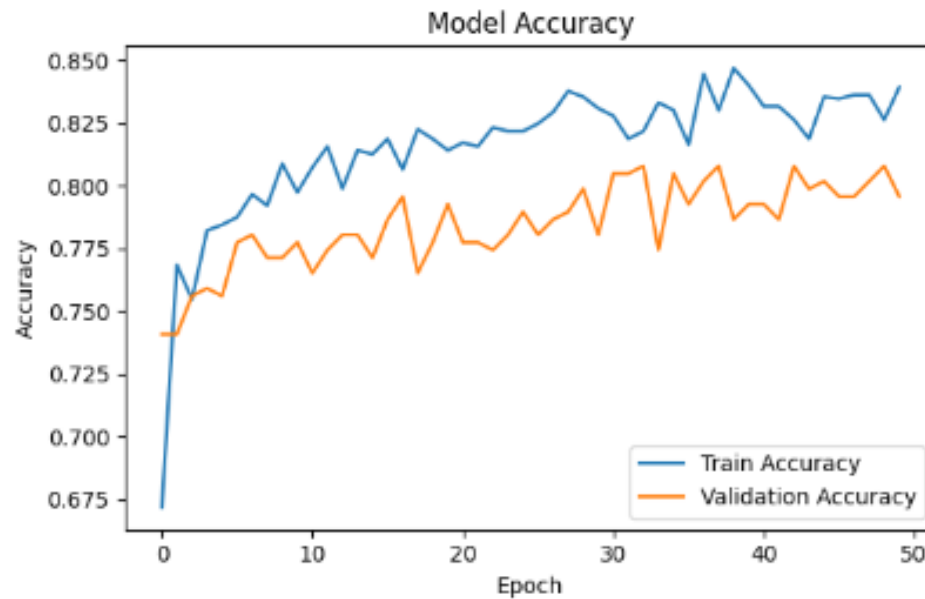
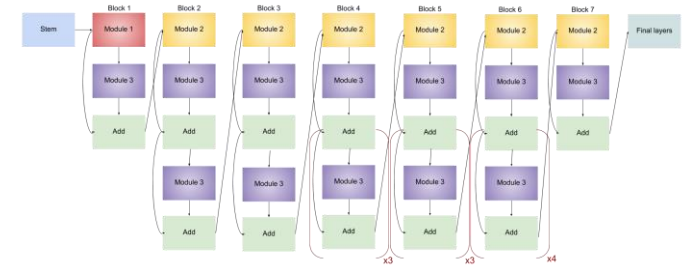


1. Fixed depth of 50 layers
2. Residual blocks and skip connections



# EFFICIENTNETV2B0

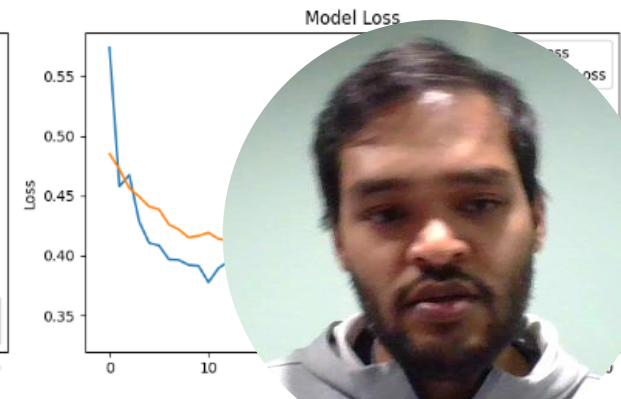
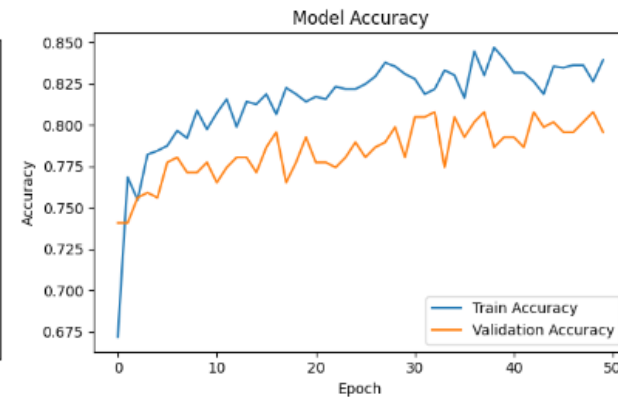
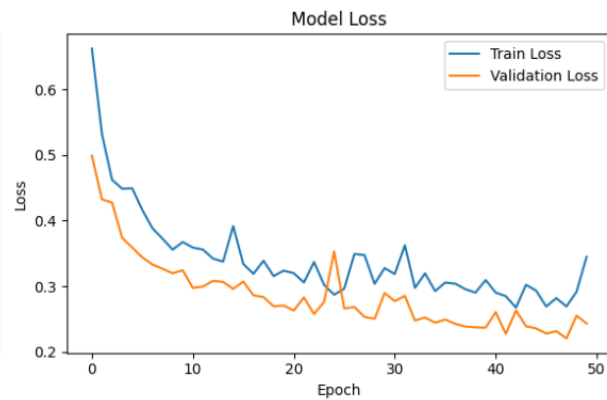
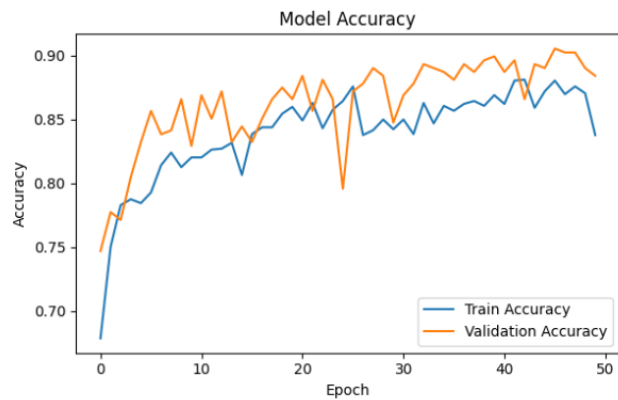
1. Lightweight architecture and depth-wise convolutions
2. Less parameters enabling efficiency





# RESULTS

Model	Parameters	Final Validation Accuracy	Training Time per Epoch
ResNet50	23M	88.41%	45 secs
EfficientNetV2B0	5.9M	79.57%	15 secs



# DISCUSSION

## ResNet50

- Higher validation accuracy: 88.41%
- Gradual learning improvement
- Strong generalization

## EfficientNetV2B0

- Lower validation accuracy: 79.88%
- Faster learning and quicker convergence
- Limited generalization

## Key Tradeoff – Accuracy vs Efficiency



# CONCLUSION

**Key Findings**

**Significance and Contributions**

**Implications for future research**

**Final Thoughts**



THANK YOU

