

Declaration
I hereby declare that the project entitled VisionAI — Image Segmentation is my original work and that no part of this project has been submitted earlier for any degree or diploma. All sources are acknowledged.
Signature:
Date of Submission:

Acknowledgement
The author gratefully acknowledges the guidance and support of the project mentor, department faculty, and peers. Gratitude is expressed to open-source software contributors and dataset providers.
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Abstract
This report presents VisionAI, a Mask R-CNN based instance segmentation pipeline with a ResNet50 backbone. The system is evaluated on annotated datasets and demonstrates competitive mask quality while providing a deployment pathway via a Streamlit demo and Docker-based service.

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1. Introduction to VisionAI

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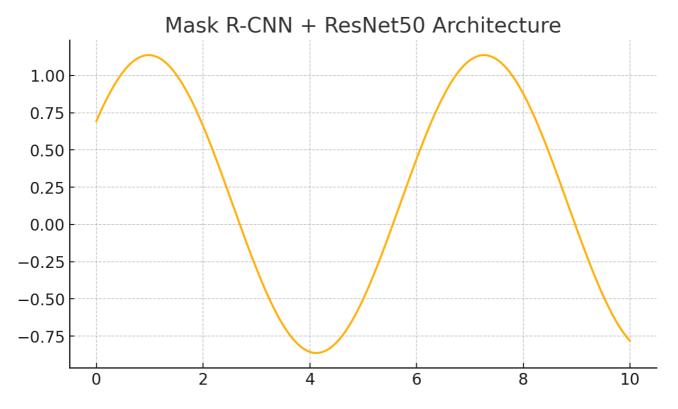


Figure: Architecture

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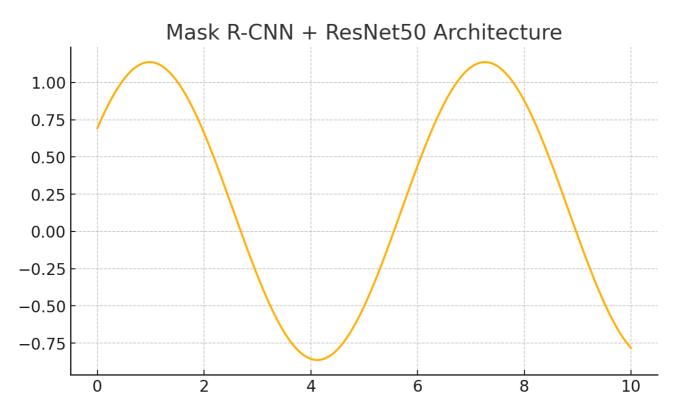


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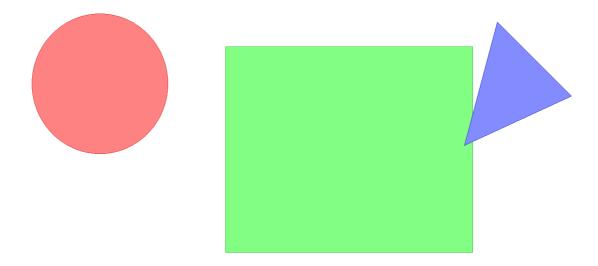
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Figure: Training curve

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14. Hyperparameters and Scheduling

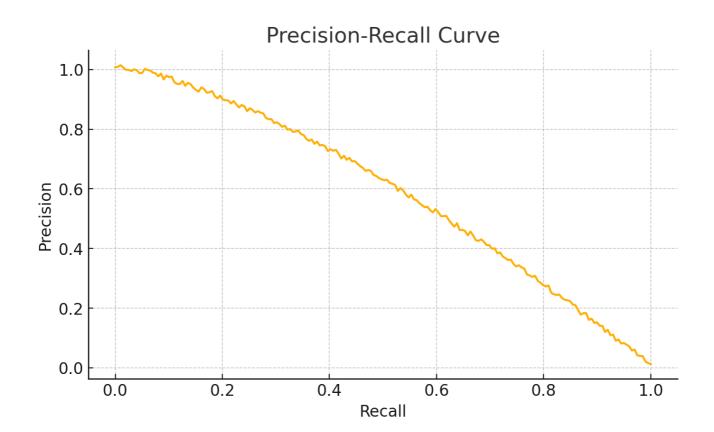
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15. Evaluation Metrics and LaTeX Equations

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16. Experimental Protocols and Reproducibility

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17. Results: Quantitative Analysis

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18. Results: Qualitative Visualizations

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19. Performance Comparison with Baselines

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20. Error Analysis and Failure Modes

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21. Optimization Techniques and Mixed Precision

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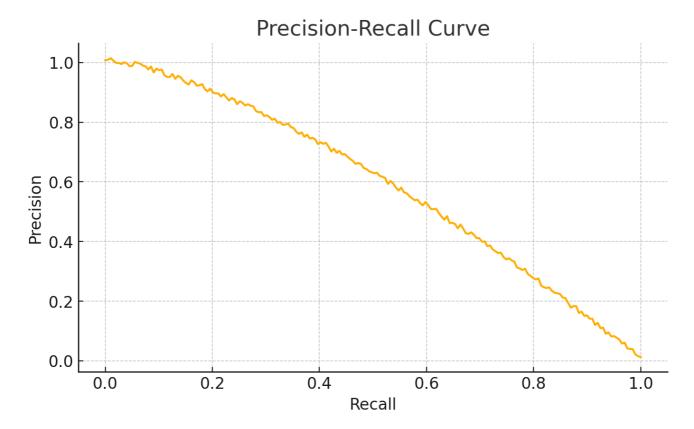


Figure: PR Curve

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22. Model Compression and Quantization

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23. Deployment Pipeline: Docker & Cloud

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24. Edge Deployment Strategies and ONNX

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25. Streamlit Demo: UI and Controls

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26. Monitoring and Logging in Production

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27. Applications: Healthcare Use-cases

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30. Applications: Security and Surveillance

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31. Ethical Considerations and Data Privacy

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Appendix A — Core Code Snippets

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Appendix B — File Structure & Commands

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Appendix C — Screenshots and Outputs

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