GAME GENRE CLASSIFICATION FROM SCREENSHOTS USING DEEP LEARNING

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PROBLEM AND DATASET

Video game stores and platforms rely on genre labels for recommendation and organization.
However, genre annotation is manual and inconsistent.

We propose an automatic system that predicts the genre of a video game using only a gameplay screenshot.
This is formulated as a **multi-class image classification** problem:
Input: RGB screenshot
Output: One of 5 genres:

- Shooter
- RPG / MMORPG
- Sports
- MOBA
- Sandbox / Survival

Kaggle Video Game Image Classification Dataset

21 different games mapped into 5 genres.
Special split: **Game-level split**

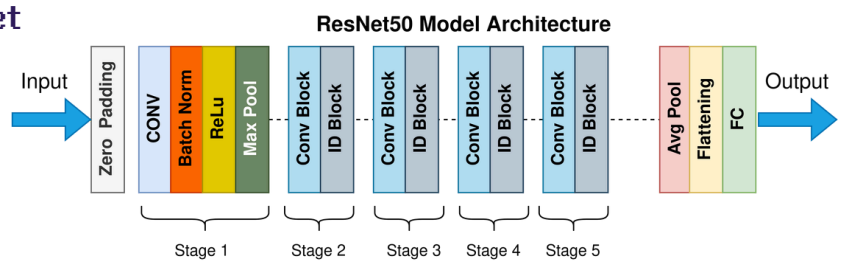
METHODOLOGY

Model

Transfer Learning with ResNet50
Pretrained on ImageNet
Fine-tuned last layers
Framework: PyTorch
Optimizer: Adam
Loss: Cross-Entropy

Preprocessing

- Resize → 224×224
- Normalization
- Data augmentation



Evaluation

Metrics:

- Accuracy
- Precision
- Recall
- F1-score

We analyze:

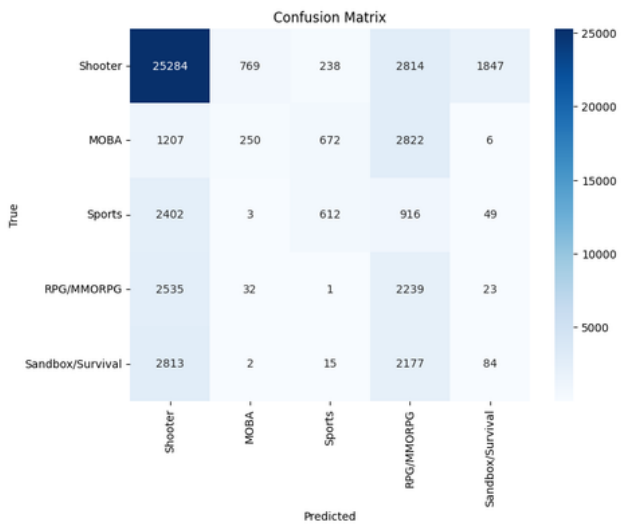
- Confusion matrix
- Misclassified samples

RESULTS AND ANALYSIS

Results
Test set: 49,812 images from unseen games
Accuracy: **57%**
Weighted F1: **0.54**

The model achieves near-perfect validation accuracy but fails on unseen games.
This shows the network learns visual patterns, not game identity.
Shooter genre is easiest due to strong visual cues (crosshair, HUD).
Genre recognition from static images is inherently difficult.

Genre	F1
Shooter	0.78
RPG/MMORPG	0.28
Sports	0.22
MOBA	0.08
Sandbox	0.02



Github link