CS 445 Final Project Proposal: Pokémon Card Grader

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Motivation

We're building a Pokémon Card Grader, a tool that predicts the PSA grade of a trading card based on a user-submitted image. Inspired by similar projects like *mint_condition* for baseball cards, we'll focus on key grading criteria: centering, corner sharpness, edge wear, and surface clarity. This project combines real-world computer vision with a fun, collector-focused use case. We hope to learn how traditional CV techniques and deep learning models, specifically pretrained ResNet18 model, can work together in quality estimation.

Milestones

- **Week 1**
  - Collect sample card images (eBay, Reddit, or personal scans)
  - Implement card detection and perspective alignment using OpenCV, which prepares standardized inputs for ResNet classifier
  - Start centering and edge whitening feature extraction
- **Week 2**
  - Finalize feature extractors (blur, corner sharpness, surface clarity)
  - Build grading logic (ResNet18 model)
- **Week 3**
  - Evaluate model using known-graded card images
  - Refine results and finetune model
  - Write report and prepare visual results

Evaluation

We'll evaluate the tool by testing it on Pokémon cards with known PSA grades. A successful outcome would be consistent grade predictions within ±0.5 point of the real grade. We'll also report on accuracy and consistency across card conditions and lighting.

Resources

- OpenCV, NumPy, scikit-image for feature extraction
- scikit-learn (optional ML grading model)
- Sample images scraped from eBay or card forums
- GitHub reference: mint_condition

Group (All members contribute to implementation, testing, and final report)

- **Adrian**: Card detection, contour extraction, and perspective alignment; dataset collection and image preprocessing
- **Kashvi**: Feature extraction (centering, edge whitening, blur detection, surface clarity); data visualization and documentation

- **Aditya**: Grading logic with pretrained ResNet18, creating baseline pipeline setup, training pipeline setup, model refinement/finetuning