CP4210 Progress Report
AI-Based Skin Cancer Detection Using CNN

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Project Overview

I have continued with my original proposal of building a computer vision system for skin cancer classification using deep learning. The goal of this project is to develop a Convolutional Neural Network (CNN) that can classify dermoscopic skin lesion images into categories such as benign and malignant. The system is intended to simulate a simplified clinical decision-support tool.

Work Completed So Far

1. Repository and Environment Setup

I began by properly setting up the development environment to make sure the project is clean, reproducible, and organized.

The following has been completed:

- Created a Python virtual environment
- Installed PyTorch with CUDA support
- Verified GPU acceleration is working
- Generated and committed a `requirements.txt` file
- Initialized and structured the Git repository

The repository is organized into directories for dataset handling, model architecture, training scripts, evaluation, and utilities. This ensures the project can scale cleanly as I continue development.

2. GPU Configuration

I confirmed that PyTorch is running with CUDA enabled and that my RTX 3060 GPU is properly detected. This is important because CNN training on image datasets is computationally intensive, and GPU acceleration significantly improves training time.

3. Dataset Planning

I reviewed several possible medical imaging datasets suitable for skin lesion classification. I am currently narrowing it down to one primary dataset to begin implementation. My approach is to first build a complete and working pipeline before expanding into additional datasets or increasing complexity.

Current Stage

At this point, the setup phase is complete and I am transitioning into implementation. The next steps are:

- Integrate the selected dataset into the repository
- Implement image preprocessing (resizing and normalization)
- Create training and validation splits
- Build PyTorch dataloaders
- Implement a baseline CNN architecture
- Run the first training experiment

Next Phase of Development

After the initial baseline model is trained, I plan to evaluate performance using accuracy, loss curves, and a confusion matrix. Based on results, I will improve the model through data augmentation and possibly a deeper CNN architecture. If time permits, I may explore transfer learning using a pretrained network.

Where the Project Is Headed

By the final submission, I plan to demonstrate:

- A working CNN-based classification system
- Quantitative evaluation metrics
- Sample predictions on lesion images

Overall, I have completed the technical foundation of the project and am now entering the core model development phase.