

# Algebra Grader AI

A robust, AI-powered tool for automatically grading handwritten algebra quizzes. It uses Google's Gemini models to analyze student work, award partial credit, and generate detailed feedback reports.

## Features

- **AI-Powered Grading:** Uses Gemini 3 Pro (and fallbacks) to understand handwritten math and logic.
- **Partial Credit:** Awards points for correct steps even if the final answer is wrong.
- **Detailed Feedback:** Generates a PDF for each student explaining their mistakes.
- **Teacher Summary:** Creates a class-wide report identifying common misconceptions and problem areas.
- **Anti-Cheating:** Analyzes student reasoning across the class to detect suspicious similarities and potential copying.
- **Privacy Focused:** Optional "Privacy Mode" suppresses detailed logging to ensure student data remains ephemeral.
- **Resume Capability:** Automatically skips already graded quizzes if interrupted, saving time and API credits.
- **Streaming Responses:** Shows grading progress in real-time to prevent browser timeouts.
- **Robustness:** Handles API timeouts with retries and prevents computer sleep during grading (Wake Lock).
- **Math Rendering:** Cleanly renders mathematical symbols (fractions, exponents, roots) using Unicode.
- **Customizable:** Configurable rubric and misconception thresholds.
- **Fairfield Prep Theme:** Designed with the school's official colors.

## Requirements

- Python 3.10+
- Google Gemini API Key

## Setup

### 1. Clone the repository:

```
git clone <repository-url>  
cd algebra_grader
```

### 2. Install dependencies:

```
pip install -r requirements.txt
```

### 3. Configuration:

Create a `.env` file in the ``algebra_grader`` directory with your API key and settings.

#### Sample `.env` file:

```
# Your Google Gemini API Key
GEMINI_API_KEY=your_actual_api_key_here

# Threshold for including misconceptions in the Teacher Summary (0.4 = 40%)
MISCONCEPTION_THRESHOLD=0.4
```

## Usage

### 1. Start the application:

```
python app.py
```

### 2. Open in Browser:

Go to ``http://127.0.0.1:5001``.

### 3. Grade Quizzes:

- **Select Folder:** Click the button to choose the folder containing your student PDF quizzes.
- **Upload Rubric:** Select your grading rubric file (Text, Markdown, PDF, or Word).
- **Privacy & Cheating:**
  - **Privacy Mode:** Checked by default. Prevents saving work for training and suppresses local data logging.
  - **Anti-Cheating:** Checked by default. Enables cross-student analysis to detect copying.
- **Start:** Click "Start Grading".

### 4. View Results:

- Watch the progress in real-time.
- Find individual feedback PDFs in a ``feedback`` subfolder within your quiz directory.
- Find the ``Teacher_Summary.pdf`` in the same ``feedback`` folder after grading completes.

## License

MIT License

## Built With

- **Google Gemini 3 Pro:** Advanced multimodal AI model for reasoning and grading.
- **Antigravity:** Agentic AI coding assistant by Google DeepMind.

