Poker Strategy Advisor

Group Members

- Ngoc Tran
- Tri Bui

What We're Doing

The app teaches poker rules, estimates win probability, and suggests fold/call/raise based on real game data.

Programming Language

- Python 3.x (with Streamlit, Pandas, NumPy, Plotly)

Datasets

- **Kaggle Poker Hold'Em Games:** Hand and board cards with strength score
- **Huggingface PokerBench:** Game-state features (hole, pot, players) and action labels

Existing Code & Extensions

- **Core Libraries:** Streamlit (UI), Pandas/NumPy (data handling), Plotly (visualizations).
- **Hand Evaluation:** Custom *RealPokerDataProcessor* class for:
    - CSV upload and demo data generation
    - Card-to-feature mapping (rank and suit encoding)
    - Linear regression model for win probability
    - Rule-based action decision (win% vs. pot odds)
- **UI Structure:** Four tabs in Streamlit for analysis, exploration, practice, and progress tracking.

Algorithm/Approach

1. **Load Data:** Upload the real Kaggle CSV or click to generate the demo dataset.
2. **Feature Extraction:** Convert hole cards and board cards into numeric features (rank and suit mappings).
3. **Model Training:** Fit a simple linear regression model (numpy least-squares) to predict win probability from card features.
4. **Action Logic:** Compare predicted win% against pot odds to decide fold, call, or raise.
5. **UI Workflow:**
    - **Real Data Analyzer:** Upload/train model, enter hand & board, see win% and recommended action.
    - **Dataset Explorer:** Visualize dataset stats, strength distribution, and sample rows.
    - **Practice:** Generate random hands, collect user win% guesses, compare to model predictions.
    - **Learning Analytics:** Track and plot user estimation accuracy over practice sessions.

Platform

- Works on any laptop

Roles & Responsibilities

Both Ngoc and Tri has ML experiences

- **Tri Bui:** Implement data loading and demo generation
- **Ngoc Tran:** Create features and train models
- **Both:** Develop Streamlit UI, write project report, and prepare slides