PC-Value-Estimator

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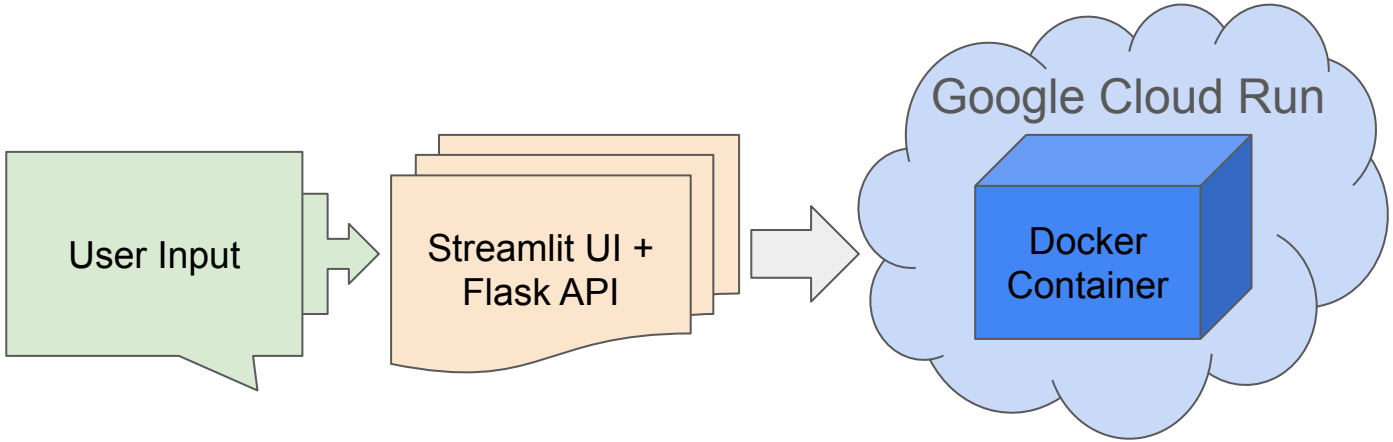
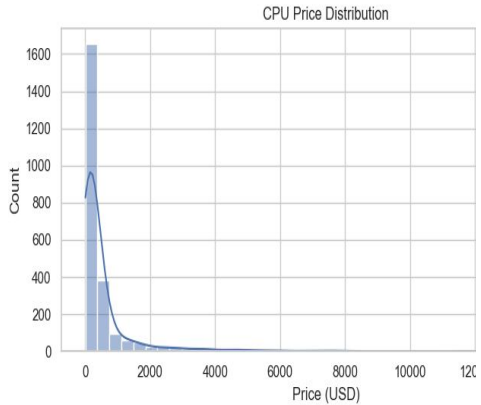
Project Motivation + Architecture Pipeline

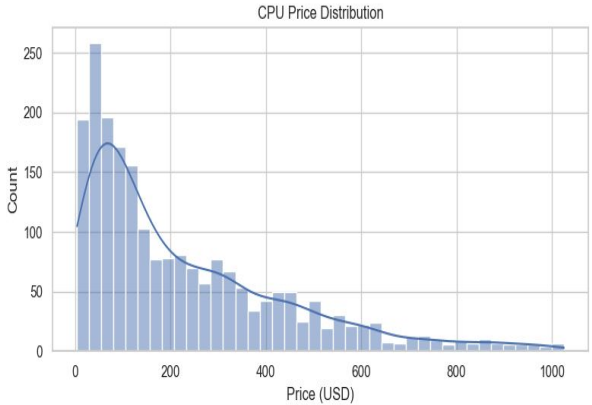
- Develop a containerized web app to estimate fair market prices for user-selected CPUs and GPUs, based on benchmark data from similar components
- The application will integrate a **Streamlit front-end** with a **Flask-based API**, containerized using **Docker**, and deployed on **Google Cloud Run**



Dataset

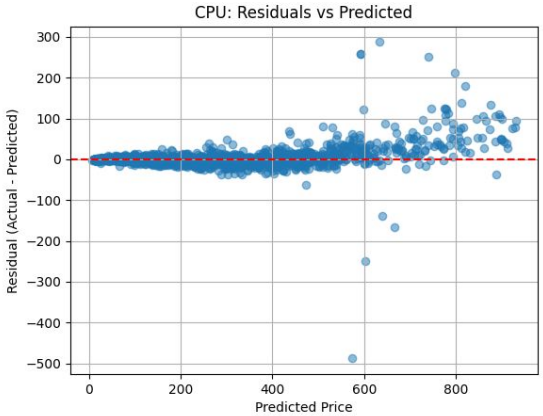
- Data Collect: BeautifulSoup and Requests
  - 5140 CPU scores and prices from cpubenchmark.net
  - 2695 GPU scores and prices from videocardbenchmark.net
- Data Cleaning
  - Filtered out "Engineering Sample" and "Unknown" entries
  - Removed extreme outliers (e.g., CPUs priced over $1000), and normalized price
- Scraped Attributes:
  - Device name (CPU/GPU)
  - PassMark benchmark score
  - Rank
  - Value score
  - Price

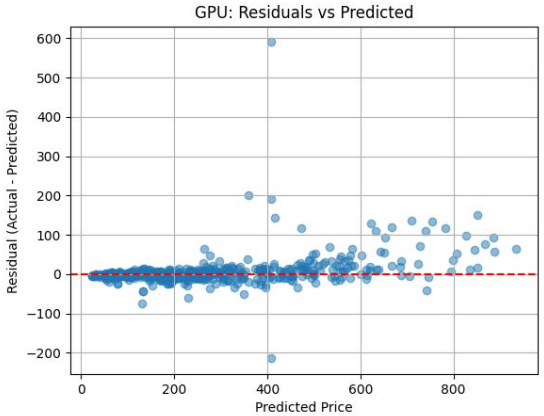




Model

- Trained CatBoost Regressor model separately for CPU and GPU
  - Strong performance on tabular data and native support for categorical variables
  - Features: PassMark Score, ValueScore, Rank, Brand
  - Target: Log-transformed price
- Achieved reliable estimates with low RMSE
  - CPU RMSE: $44.10
  - GPU RMSE: $39.61
- Residuals close to 0





Reliable predictions for most components, minor overprediction in high-end cases

Application + Demo

- App allows users to select a CPU and GPU and get estimated fair prices
- Estimated predictions are compared with 4 components closest in price
- Deployed app is accessible at:
  - https://pc-value-estimator-135418392758.us-central1.run.app