Baseball Hall of Fame Project

TTK28 Modeling with Neural Networks Exam

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Goal

Determine if an eligible Major League Baseball (MLB) player will make it into the Baseball Hall of Fame (HoF) based on career statistics.

- ▶ BBWAA and Veterans Committee can nominate and elect individuals to HoF
- ▶ Subjective voting system
- ▶ MLB players are eligible after playing 10 years
- ▶ Player, managers, umpires and executives are eligible
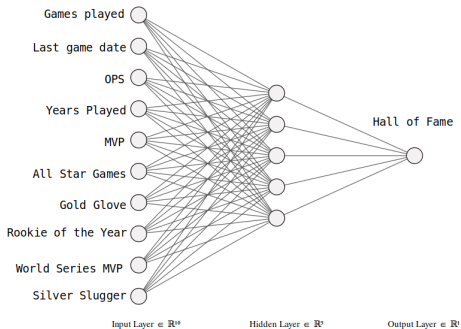
Dataset

- Sean Lahman's Baseball Archive[1]

- Imbalanced dataset:
    - 226 players in HoF
    - 3190 eligible players not in HoF
    - 14:1 ratio of non-HoF to HoF

- Hold-out split: Training 80%, Testing 20%

- Difference in quality features by positions
    - Good for batters (OPS, SLG, OBS, etc.)
    - Okay for pitchers (WHIP, K/BB, K/9, etc.)
    - Poor for other defense (FFRA, UZR, etc.)

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[1]http://www.seanlahman.com/baseball-archive/

Model

- Depth: 3
- Width:
  - 10
  - 5
  - 1
- Activation:
  - ReLU
  - ReLU
  - Sigmoid
- Loss: Binary Cross-entropy
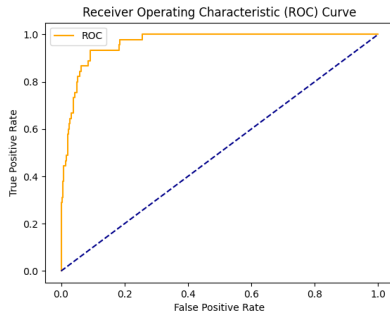- Batch Size: 1
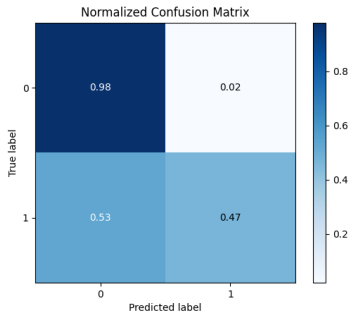- Epochs: 50
- Optimizer: Adam

Implementation

- ▶ Fair amount of pre-processing
- ▶ Primarily used Keras and Scikit-learn tools
- ▶ Stratified 10-fold Cross-validation
- ▶ Final Test only done at the end.
- ▶ Handling and small imbalanced dataset:
  - ▶ Tried undersampling
  - ▶ Class Weights
  - ▶ Small Batch Size

Results

- ▶ Accuracy: 0.95
- ▶ AUROC: 0.96
- ▶ Precision: 0.66
- ▶ Recall: 0.47
- ▶ F1: 0.55

Normalized Confusion Matrix

Receiver Operating Characteristic (ROC) Curve

Thank you for your attention!