Poker Hands

Group: P-1

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Introduction

- Why this project?
  - Project type 2 (Comparative Analysis)

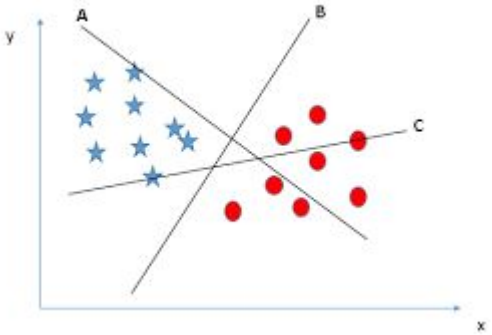
- **General Purpose:** Given a hand in a game of poker, define the type for that specific hand? Eg. Royal Flush, Four of a kind, straight, two pair etc.

- **Our Goal:** Create a learner that will recognize the hand it's given based on features we think will help the algorithm distinguish the different hands and classify it.

Approaches

Chosen Models:

- SVM
- Genetic Learning



S1	C1	S2	C2	S3	C3	S4	C4	S5	C5	hand
4	9	2	1	2	2	4	7	2	8	0
1	4	3	6	1	12	3	11	2	7	0
1	11	4	1	3	7	4	11	2	1	2
2	9	2	4	3	6	1	9	4	9	3
1	8	2	4	2	11	2	2	2	1	0
2	5	1	5	2	13	2	3	3	13	2
3	10	4	6	1	4	2	13	4	5	0
4	10	3	1	2	13	4	2	4	7	0
3	2	4	10	3	3	4	4	1	9	0
2	7	3	8	4	8	2	13	2	12	1

SVM Approach

Flush	Rank1	Rank2	High	Low	Straight	Hand

- Create features to distinguish the different hands.
- Rank1 number of most frequent card, so if Rank1 = 3 and Rank2 = 2
  - Full house
- Rank1 = 2, Rank2 = 1
  - One pair
- Apply the sklearn library and train the model using the features.

Genetic Approach

- Approach (mostly from scratch):
  - We define a rule as a conjunction of 3 features that are pre-programmed, ex:

    Rule 9 = isAsc(ranks) $\wedge$ isAsc(suits) $\wedge$ True

  - Each generation defines 5 unique rules for a hand 0-9.
  - Take the best 2 solutions from each generation and perform a crossover and mutation operation to obtain the next generation.
  - We run the algorithm for a variable number of generations.
- Preliminary Results: Can define rules and calculate accuracy.

Thank you