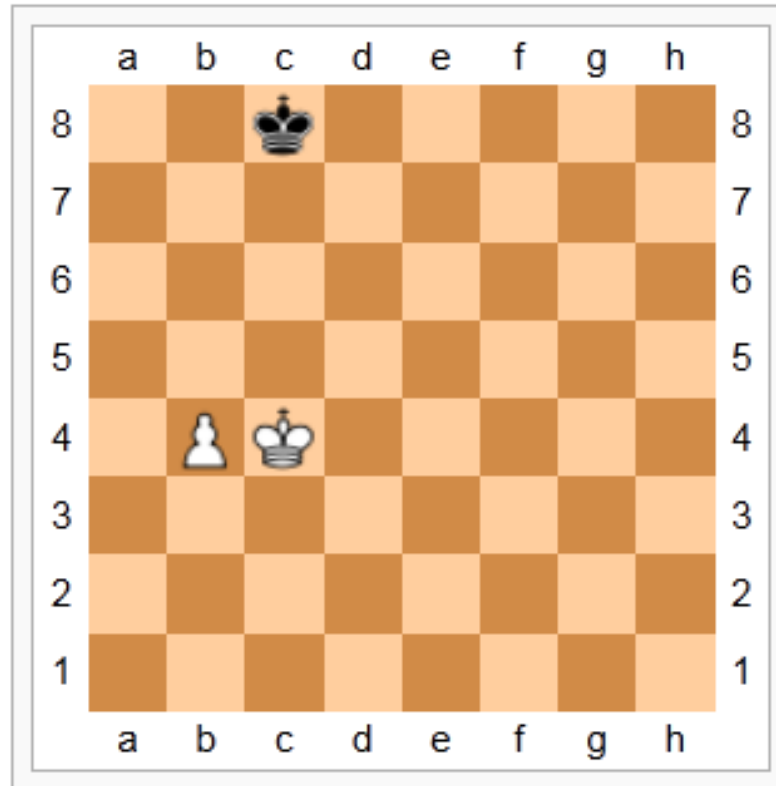# Intuition and chess endgame classifier
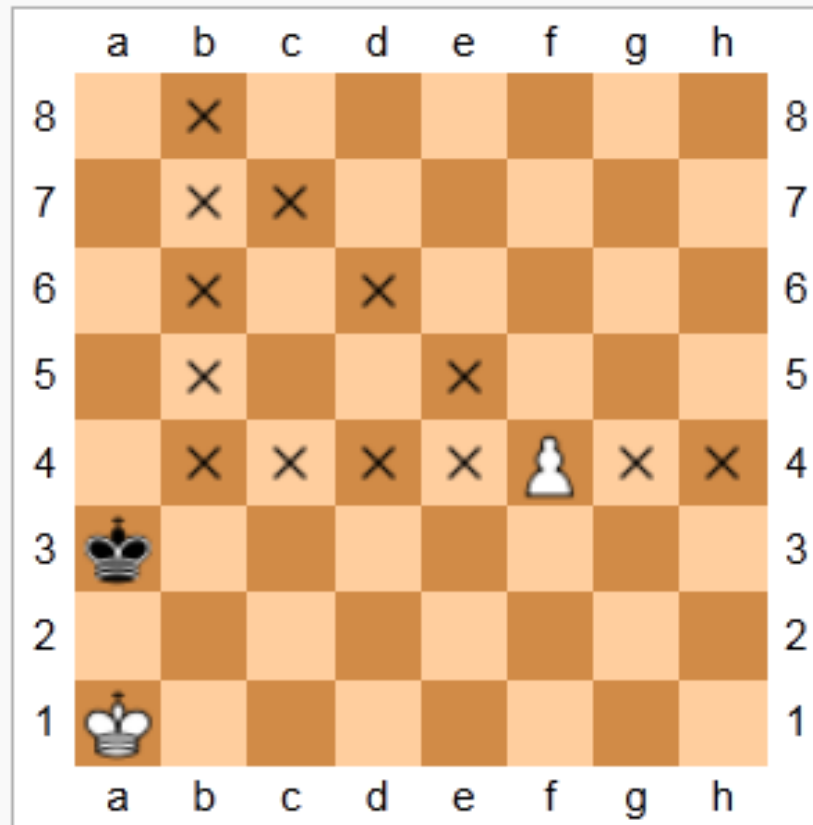
Sutanu Gayen

Drawbacks of state-of-the art chess engines
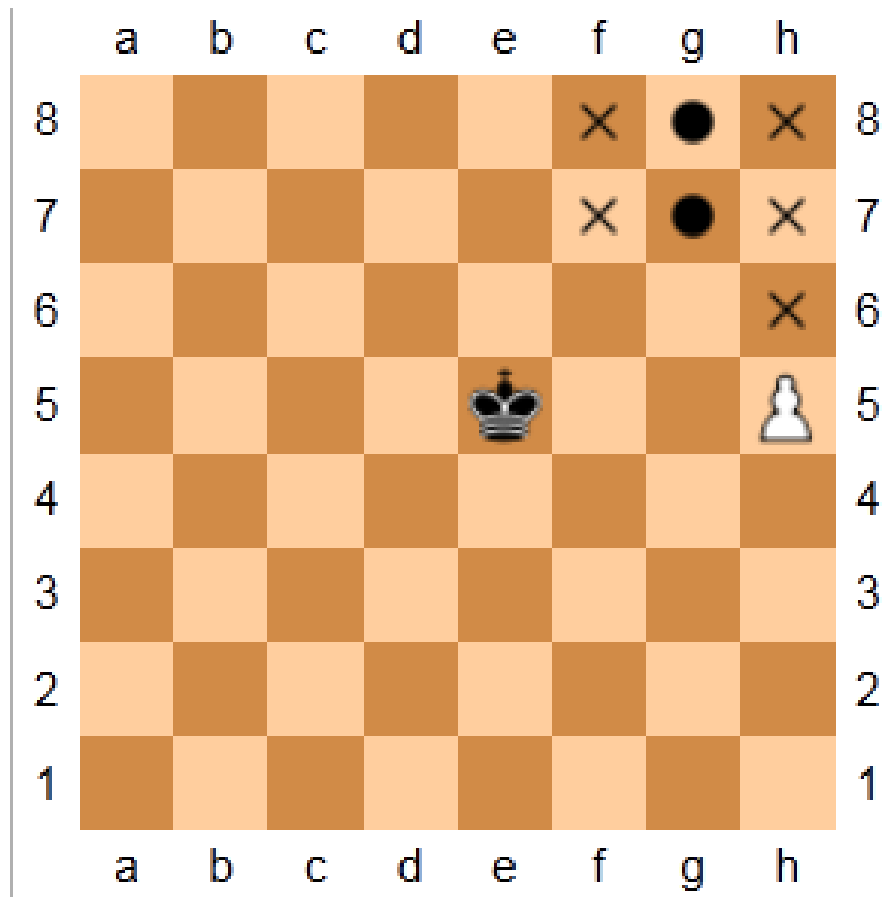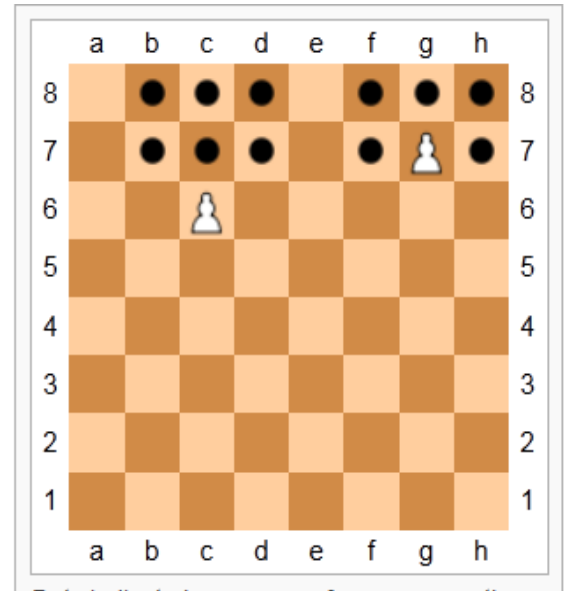
Contd..

- Rule of square:
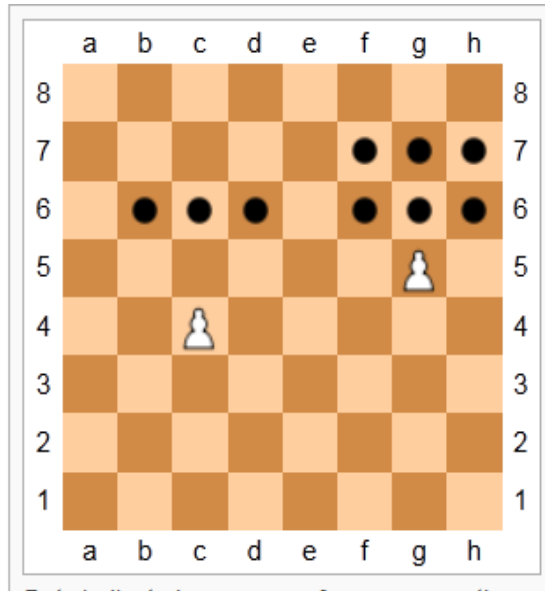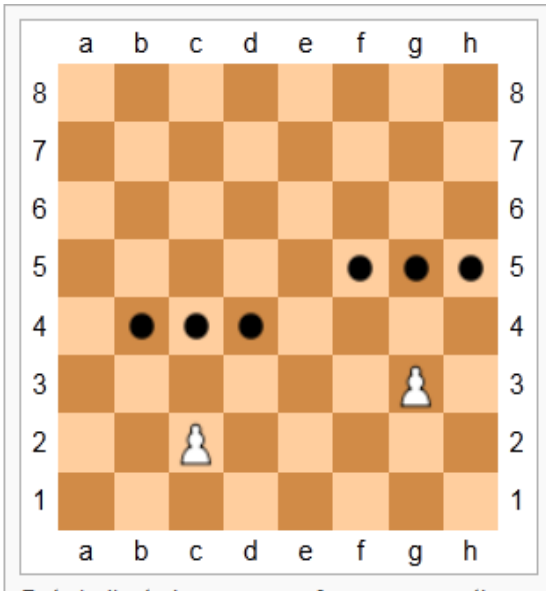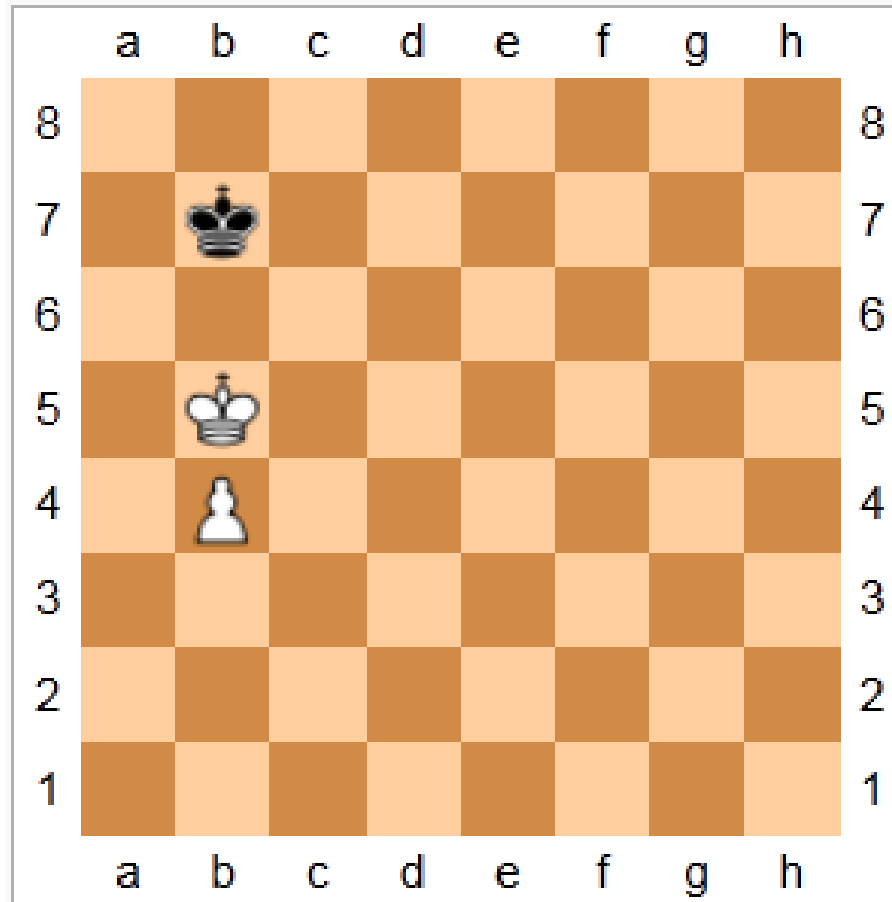
Contd..

- Key squares : Rook pawns

Contd..

- Key squares : Non Rook pawns

Contd..

- Taking the opposition:

Contd..

- With only one exception , if black gets in front of or next to next square it's a draw

- White wins if at least any two of the following conditions are met:

  (a) his king is in front of the pawn

  (b) he has the opposition

  (c) his king is on the sixth rank

Methodology

randomgenerator.c

Random board positions(fen) with desired validity function

Remove duplicates using filter.c

8/8/k7/8/8/8/3K3P/8/ b - - 0 1

Feed to xboard and note output

Using the output and fen data produce 64 d and 3-d vector with +/- labels using svmgen.py

Results

Total w:637,d:363

Train: Test	Train (+ : -)	Test(+ : -)	64 dim accuracy	3 dim accuracy
500:500	320:180	317:183	63.4	64.4
600:400	378:222	259:141	64.8	67.3
700:300	447:253	190:110	63.3	62.7
800:200	510:290	127:73	63.5	67.5
900:100	574:326	63:37	63	68
950:50	609:341	28:22	56	52
975:25	620:355	17:8	68	68
990:10	631:359	6:4	60	60

Code used:

- libsvm : c implementation of SVM classifier
- Input format :<label> <dimension1>:<component1> ......

- Output format : column of predicted values and accuracy of prediction

- Flexible in terms of kernel functions

Use and Improvements..

- Standard chess engines can use classifier to check result for all possible(<8) king moves
- Given time more number of basis train data can be generated for each of type of board positions described in the first portion
- We can improve the training process by choosing to work with 10 test data at a time
- New pieces can be introduced like two pawn king position

References

- All images are taken from wikipedia.org
- Credits to libsvm , xboard
- Linhares paper
- Guidance of Prof Amitabha Mukherjee ,Ankit Gupta.

-              THANK YOU.