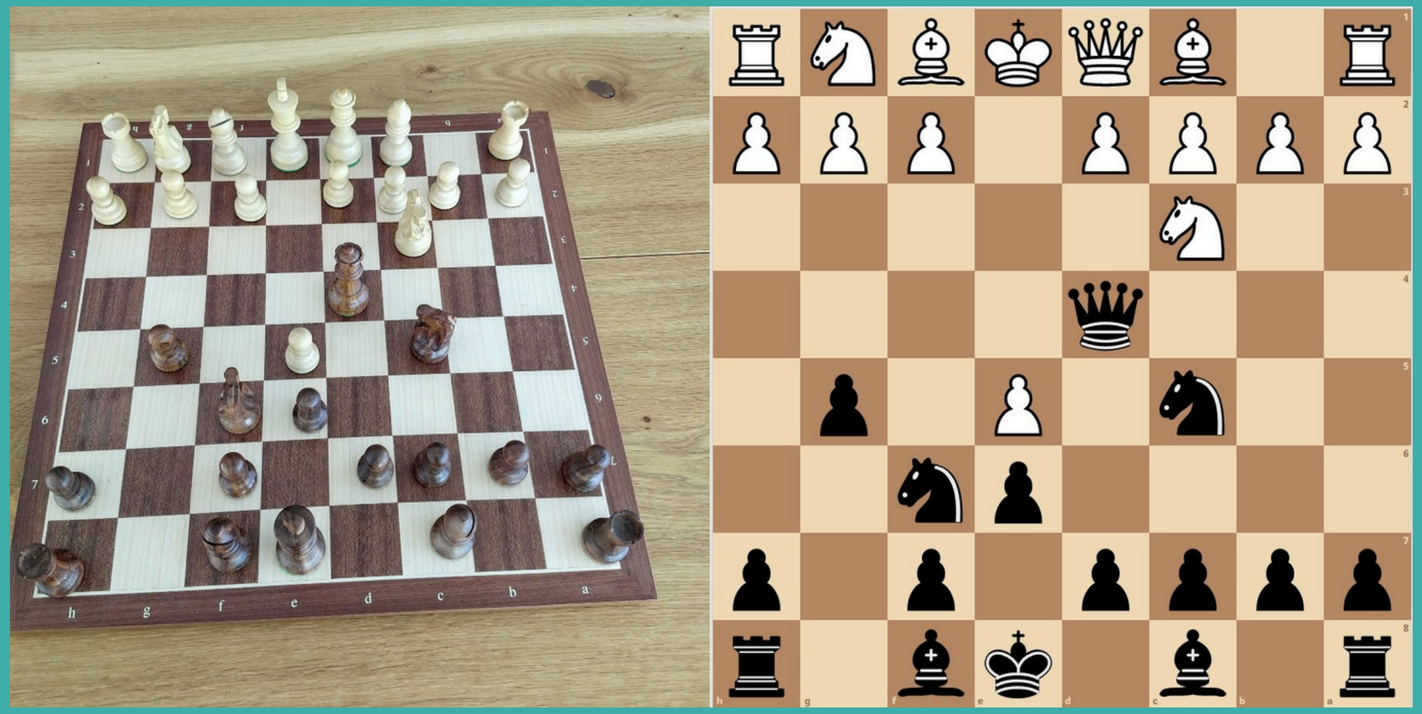
CHESSLENS: DIGITAL CHESS PROJECTION



Problem Statement

Develop a computer vision system that analyzes over-the-board chess matches to detect and classify each move made by the players.

Inspiration:- Over the board chess even at the highest level is not automated for online stream.

Challenges:- Accurate indetification of Squares, Pieces and find the exact move or board positoin that has changed.

Dataset

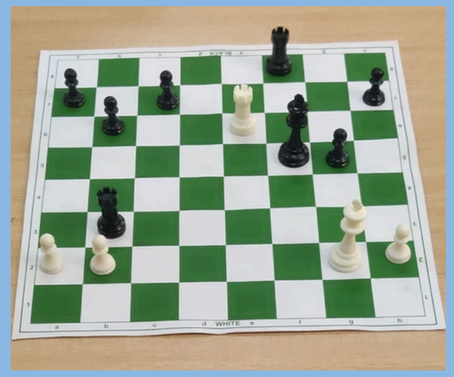
Given Dataset

Camera Flash

Spotlight

Self Made dataset

Position 1



Position 2

***frames from video dataset of our own**

Literature Survey

Research Papers :

- *Chessboard and Chess Piece Recognition With the Support of Neural Networks*
  Key Points :
  - *Chessboard and chess piece recognition present challenges due to suboptimal current solutions like human digitization or specialized chessboards.*
  - *The algorithm offers a novel, robust approach to digitizing chessboard configurations, achieving superior accuracy in chess piece recognition.*

- *Determining Chess Game State From an Image*
  Key Points :
  - *The paper presents a new chess piece recognition method using a large dataset derived from a 3D model, facilitating accurate automatic analysis for amateur players.*
  - *This system combines traditional computer vision with deep learning, achieving superior accuracy. Additionally, a few-shot transfer learning technique allows adaptation to new chess sets with minimal data.*

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Evalution Metrics

1. mean number of incorrect squares per board
2. percentage of boards predicted with no mistakes
3. per-square error rate
4. per-board corner detection accuracy
5. per-square occupancy classification accuracy
6. per-square piece classification accuracy
7. Temporal Move Accuracy

Inference time hardware requirements

- For a chess recognition system to be practically effective, it must also be able to perform an inference in a reasonable amount of time.
- To test this, the authors of Determining Chess Game State From an Image recorded the execution time for each of the test set samples on a Linux machine with a quad-core 3.20 GHz Intel Core i5-6500 CPU and a 6 GB NVIDIA GeForce GTX 1060 GPU.
- They conducted this experiment twice: once with GPU acceleration and once without. Since the forward pass through the neural network was optimized for parallel computation on a GPU, therefore, the pipeline was around six times faster when utilizing the GPU.