Using Machine Learning to Convert an Image of a Chessboard to FEN

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The Problem

Can we create a ML Model to decipher chessboard images to output a chess position in FEN?

What is FEN?

Forsyth-Edwards Notation

`rnbqkbnr/pppppppp/8/8/8/8/PPPPPPPP/RNBQKBNR`

Closer Look

rnbqkbnr/
pppppppp/
8/
8/
8/
8/
PPPPPPPP/
RNBQKBNR/

Data

Preparing Data for Machine Learning

dataset/test/R3q3-8-5k2-n7-8-3Q2pb-3K1P2-6N1.jpeg

R3q3-8-5k2-n7-8-3Q2pb-3K1P2-6N1

Preparing Data for Machine Learning

pieces = prbnkqPRBNKQ_

pieces index =	p	r	b	n	k	q	P	R	B	N	K	Q	_
	0	1	2	3	4	5	6	7	8	9	10	11	12

Preparing Data for Machine Learning

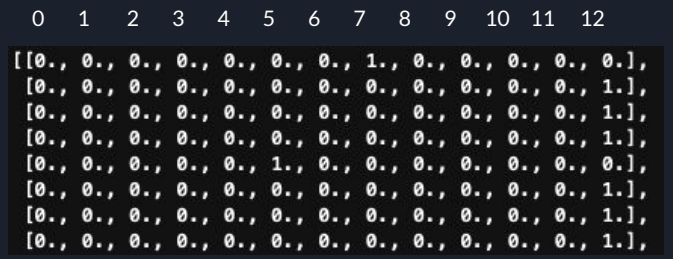
R3q3-8-5k2-n7-8-3Q2pb-3K1P2-6N1

Top Row, First 8 Squares

```
[[0., 0., 0., 0., 0., 0., 0., 1., 0., 0., 0., 0., 0.],
 [0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 1.],
 [0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 1.],
 [0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 1.],
 [0., 0., 0., 0., 0., 1., 0., 0., 0., 0., 0., 0., 0.],
 [0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 1.],
 [0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 1.],
 [0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 1.],
```

Closer Look into the Matrix

R3q3 → R _ _ _ q _ _ _ →



pieces index =

p	r	b	n	k	q	P	R	B	N	K	Q	_
0	1	2	3	4	5	6	7	8	9	10	11	12

Image Processing for Modeling

Processing

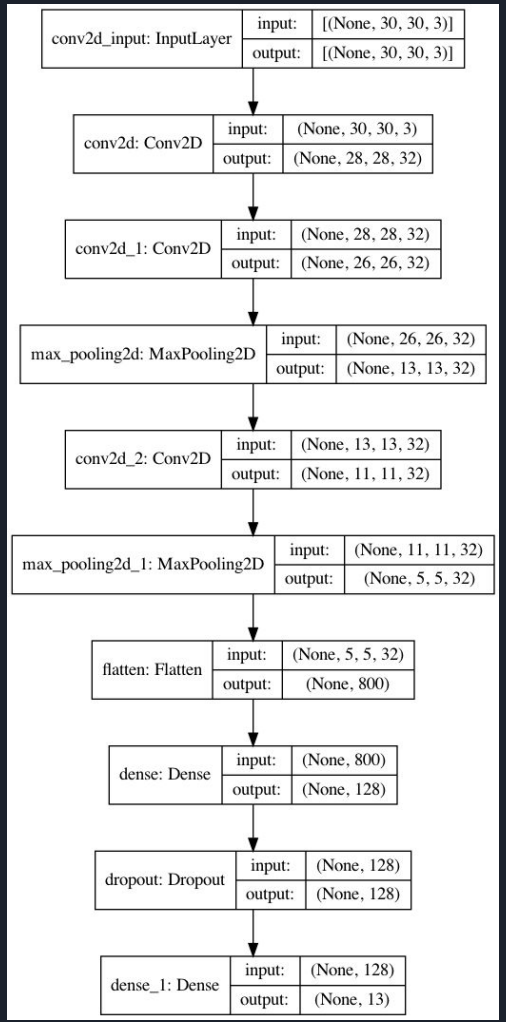
```
[[[0.82091503, 0.84836601, 0.8875817 ],
  [0.83529412, 0.8627451 , 0.90196078],
  [0.8379085 , 0.86535948, 0.90457516],
  ...,
  [0.83660131, 0.86405229, 0.90326797],
  [0.83398693, 0.86405229, 0.90065359],
  [0.82309368, 0.87320261, 0.90588235]],

 [[0.82875817, 0.85620915, 0.89542484],
  [0.84313725, 0.87058824, 0.90980392],
  [0.84575163, 0.87320261, 0.9124183 ],
  ...,
  [0.83921569, 0.86666667, 0.90588235],
  [0.83529412, 0.86666667, 0.90196078],
  [0.82222222, 0.87320261, 0.90457516]],

 [[0.83224401, 0.85969499, 0.89891068],
  [0.84313725, 0.87058824, 0.90980392],
  [0.84662309, 0.87407407, 0.91328976],
  ...,
  [0.84313725, 0.87058824, 0.90980392],
  [0.83921569, 0.86666667, 0.90588235],
  [0.8130719 , 0.86405229, 0.89542484]],

 ...,
```

Machine Learning Model



Model Results

99.17% Accurate

Predicting FEN with our Model

DEMO

Conclusions and Further Research

Thank you!


YOU WERE SWERVING PRETTY BADLY BACK THERE. LET'S SEE IF YOU CAN WALK A STRAIGHT LINE.
AWWW, CRAP!