CHIN GU
(CHess IN nuGU)

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Introduction

- NUGU's position

사람

NUGU

제3자?

친구?

사회자?

반려동물?

App Idea


신챔프의 모든것
입롤의 神
강민 · 클템 · 노페 · 강퀴
e스포츠 해설진들이 들려주는 신챔프 완전 공략!
나르
입롤의 신 보러가기!

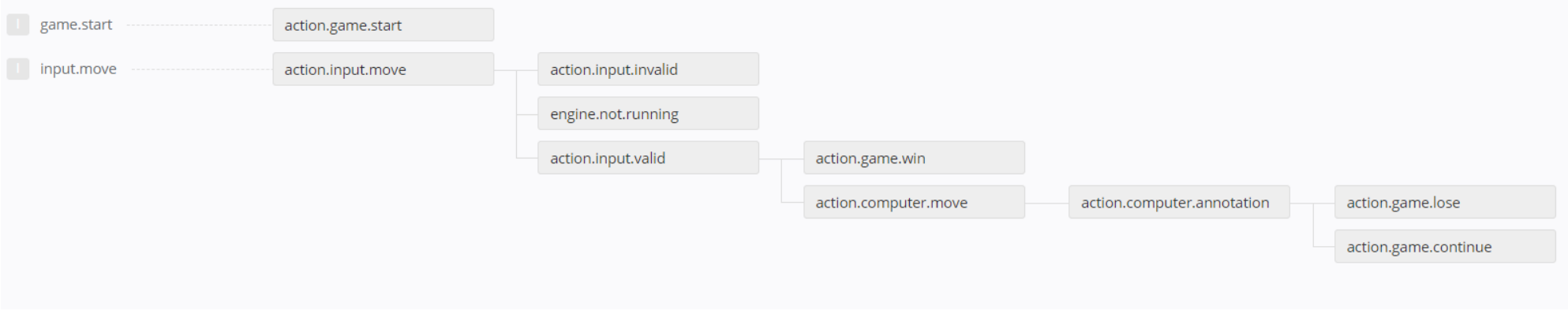

0 - 0
4 : 12
P. Gascoigne
P. Gascoigne
L. Cattermole
BARCLAYS PREMIER LEAGUE
BARCLAYS PREMIER LEAGUE

App

CHINGU

1. Crawling dataset from GameKnot (~= 400,000)
   - 과거 선수들의 게임 기록과 전문가의 평가
2. 1을 바탕으로 learning

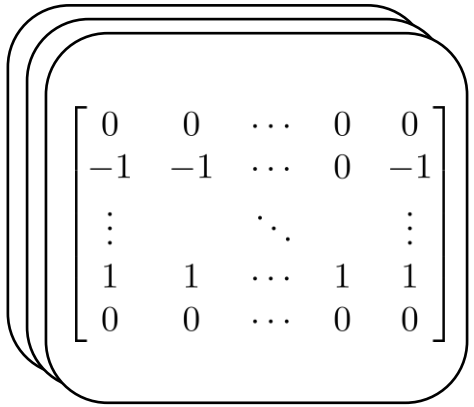
3. Building NUGU App
4. Integrate backend server (with open source chess engine)

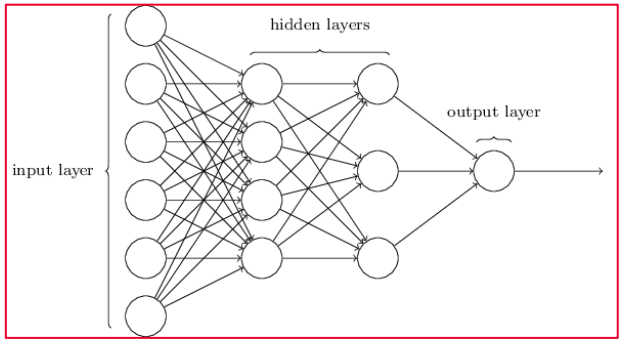


The way we've used in learning

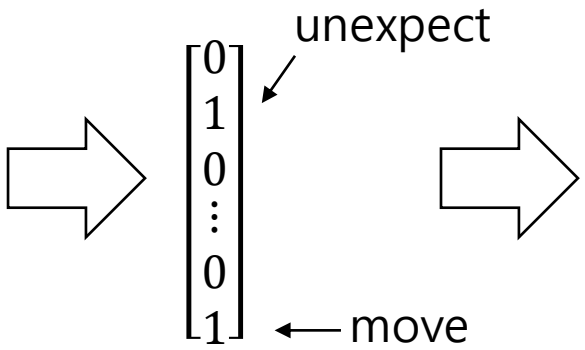
- Dataset : (FEN + movement, annotation)
- Model : Word2Vec(skip-gram) + (CNN or DNN)

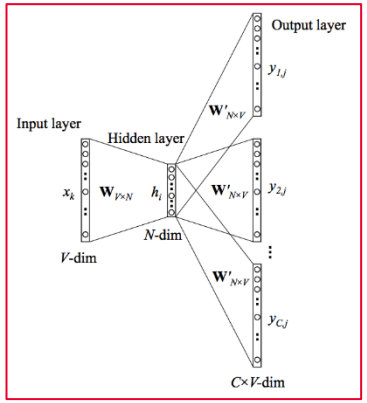
"An unexpected move!"





CNN or DBN





Word2Vec

$$\begin{bmatrix} 0.38 \\ \vdots \\ 0.22 \\ 0.24 \end{bmatrix}$$

Dataset

- # of games : 12313
- # of data: 293070 (train: 211400, test: 81670)
- # of cleaned words: 5016

1... d6

I was sincerely surprised. Pirc-Ufimtsev Defense is not a usual one for Topalov, and this opening is hardly worth using in the tournaments of the highest category. White has too many opportunities for anybody's liking: one can lead an acute or a positional game, one can vary different ways of developing the initiative. Nevertheless, Topalov obviously counted on surprise, as he thought that I would play worse in a situation I was not ready for, and besides, he hoped to avoid my opening preparation, which he had faced before.

2 comments

cplusplus11 (1703) on 20-Jul-14:

It's a standard defense, but secondary in popularity.

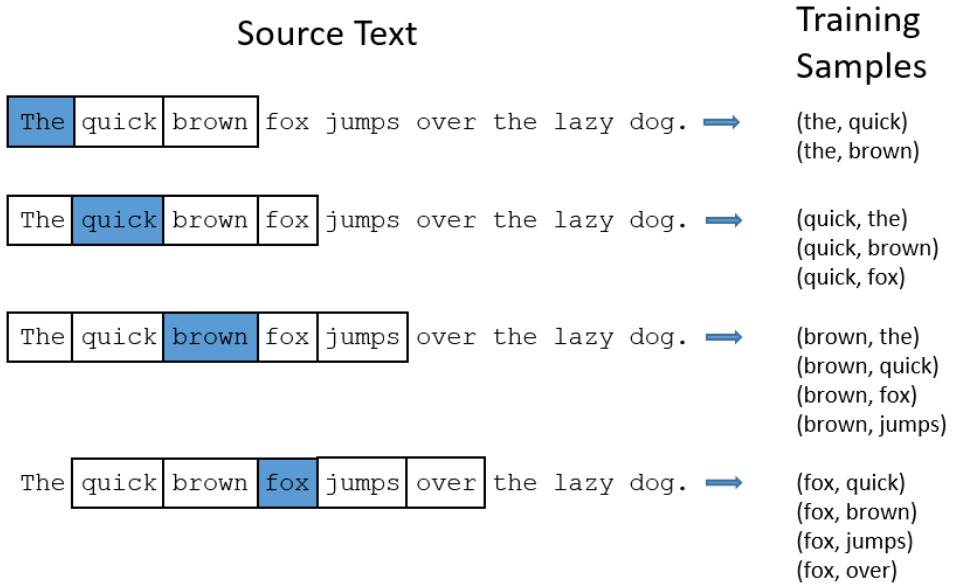
minuchin (1685) on 26-Aug-14:

Jkarp, the sicilian is 1...c5. The Caro-Kann is 1...c6...

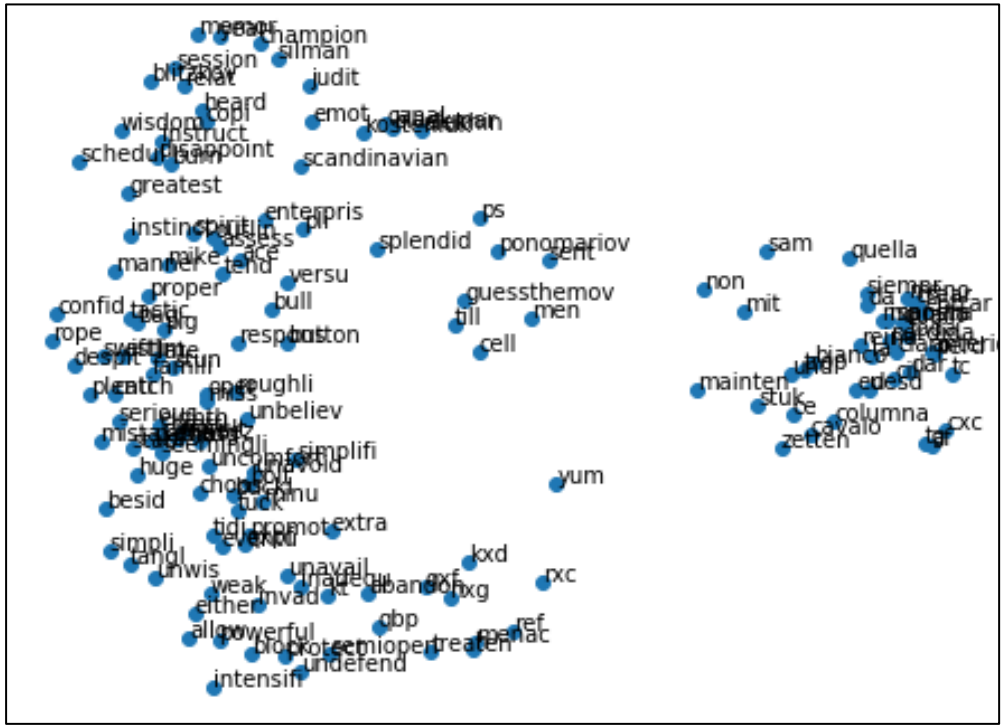
GameKnot (https://gameknot.com/best-annotated-games.pl)

Word2Vec

- **skip-gram** (나는 { } **정말** { }) vs. CBOW(나는 버거킹을 { } 사랑한다.)
- # of features(dimension of vector): 50
- window size : 10
- Used gensim module



Skip-gram of window size 2



Plot 150 randomly selected words

DNN vs. CNN

- Tool : pytorch
- Optimizer : adam
- Loss : MSE
- Patience for early stopping : 20
- Batch_size: 5000
- Learning rate: 0.001
- Activation: Relu
- CNN : conv(filter size 3) - maxpooling(2, 2)

models	testRMSE
DNN(3-layers)	0.062575
CNN(1 cv + 2 fc)	**0.061483**
CNN(2 cv + 2 fc)	0.061527

test RMSE comparison

Hidden units	DNN(3-layers)
(512, 256, 100)	0.065862
(256, 128, 50)	0.065907
(256, 512, 128)	**0.065859**

# of filters	CNN(1 cv + 2 fc)
(64, 256, 100)	0.065494
(32, 128, 50)	0.065479
(32, 256, 128)	**0.065478**

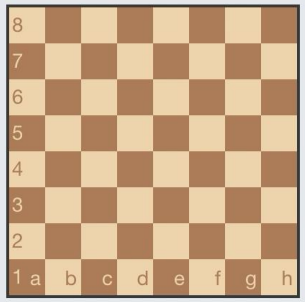
# of filters	CNN(2 cv + 2 fc)
(32, 64, 256, 100)	0.065443
(64, 128, 256, 100)	0.065479
(32, 64, 512, 256)	**0.065415**

Valid RMSE comparison

Demo

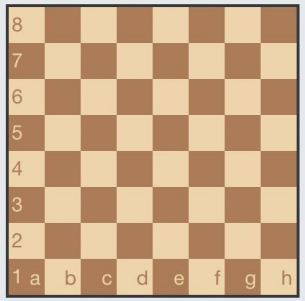
Chess

Player Move

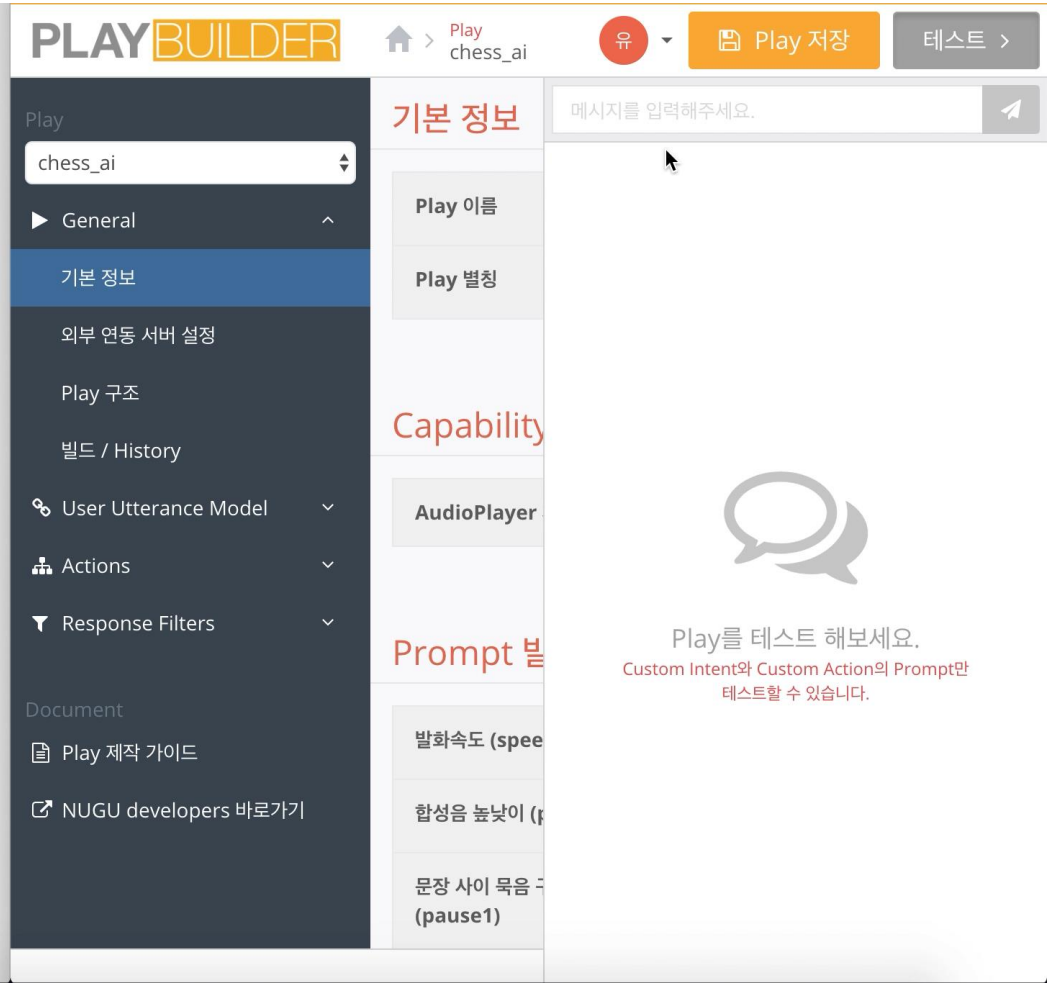


Player Annotation

Computer Move



Computer Annotation



Demo

Chess

a2a3

그거야.

e7e5

그건 두려움이었어.

Chess

d1a4

당신은 상대방을 노려 보았어.

b8c6

그건 금지되었어.

Discussion

기존과의 차이점

before

- 이미 chess board state → score 함수가 존재
- score에 따른 “good” or “bad” 평가 가능

after

- 전문가의 평가에 기반
- context에 맞는 feedback with various words

활용 방안

- 체스 대신에 조금 더 대중적인 보드 게임에 적용할 수 있다.
- learning data? from twitch!
  - 문제점: (board_state, last_move)와 (comment)가 sync가 어려워서 matching이 힘들다.

Reference

- Data
  - GameKnot (https://gameknot.com/best-annotated-games.pl)
  - ChessCentral (http://www.gambitchess.com/semi/pearl/perlepgn.zip)
  - Angelfire (http://www.angelfire.com/games3/smartbridge/)

- Publications
  - Word2Vec(Tomas Mikolov et al. Efficient estimation of word representations in vector space. ICLR Workshop, 2013)
  - **Chess + CNN**(Oshri, B., and N. Khandwala. Predicting moves in chess using convolutional neural networks. In: Stanford University Course Project Reports - CS231n: Convolutional Neural Networks for Visual Recognition, 2016)
  - **Chess + FCN or CNN**(Omid E David, Nathan S Netanyahu, and Lior Wolf. Deepchess: End-to-end deep neural network for automatic learning in chess. In ICANN, 2016)

감사합니다.