Mastering the game of Omok

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Project Introduction

- **Goal**
  - train human-like neural networks for Omok,
  - predict moves made by professional players,
  - and build an AI bot for the game

- **Personal goal**
  - Have fun exploring deep learning with my favorite game Omok!
  - Learn how deep learning can be useful for classical board games.
Progress Report

● **Data collection**
  ○ contacted:
    ■ GomokuWorld.com
    ■ researchers at Chinese Academy of Sciences (Beijing, China)
  ○ collected ~150k game datasets in total (duplicates not yet removed)

● **Cleaned up data**
  ○ used RenjuLib software to convert .lib files to .txt files
  ○ used .lib, .txt, .csv, .rif files to get the 15*15*3 images

● **Setup Google Cloud**
  ○ machine type: n1-standard-4 (4 vCPUs, 15 GB memory)
  ○ bootdisk: Ubuntu 16.04 LTS / amd64 xenial image built on 2018-04-05
Challenges

- **Data collection**
  - searching for the source of datasets
  - converting files to readable formats
  - cleaning up raw data for DL models
  - making decisions for proper DL model training

- **Scaffold setup**
  - models: Tensorflow, Keras
  - testing games: RenLib
Demo

Training images

csv format

txt format

Rif format

Keras model

(retrieved from lib files)
Lessons Learned

- **Keras**
  - very effective and easy to learn
  - finding proper arguments for the layers is difficult
- **classical board games**
  - details are important (e.g. rotation, level of the player, etc.)
  - different sets of rules to Omok
Looking forward

- **Immediate next steps**
  - datasets: board rotation, duplicates, etc.
  - split the datasets into training and testing data
  - Keras details (e.g. test out various architectures, create validation set, add callback, etc.)
  - train large datasets on Google Cloud

- **Roadblocks and solutions**
  - unfamiliar with Keras ⇒ working with Martin

- **Biggest risks in completing**
  - time constraint
  - reliability of the datasets is a little questionable (i.e. might require manual sorting of datasets)
  - the bot’s skill level might be a little questionable

- **Revisions to plan**
  - final demonstration/UI