ESL Final

Pi-Go

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ABSTRACT

A raspberry pi with touch screen that is able to play Go against other players, including AIs, via the our "Go Chat" website on public IP address.

INTRODUCTION

In HW1, we implemented a website named "Go Chat". Users will first type their username, then they will enter a chat lobby where they can (1)chat with everyone, (2)change their own profile picture, or (3)play Go against other users.

In March 2016, Google DeepMind came up with an artificial intelligence(AI) that are able to beat Lee Sedol, a former world champion, by 4 to 1. Ever since, there is no doubt that human are capable of building AIs that are better than all humankind in playing Go. Thus, we determined to integrate AI into our "Go Chat", where users can not only play against other human beings, but also play against computers. Also, we make our raspberry pi a portable device to play Go on "Go Chat" by combining a touch screen with it.

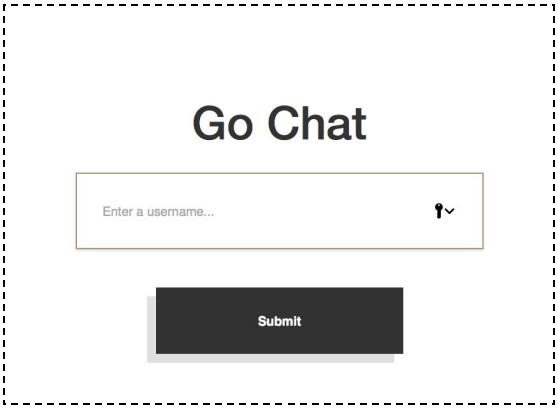
MAIN FEATURES

- Portable device: rpi + touch screen + virtual keyboard + mobile power
- Touch screen: Official Raspberry Pi 7" Touchscreen Display
- Easy-launch app and simple interact interface
- Direct online battle with AI/human
- Public IP Address: 59.124.162.92:8888
- Two of the most powerful open-sourced AIs in the world:

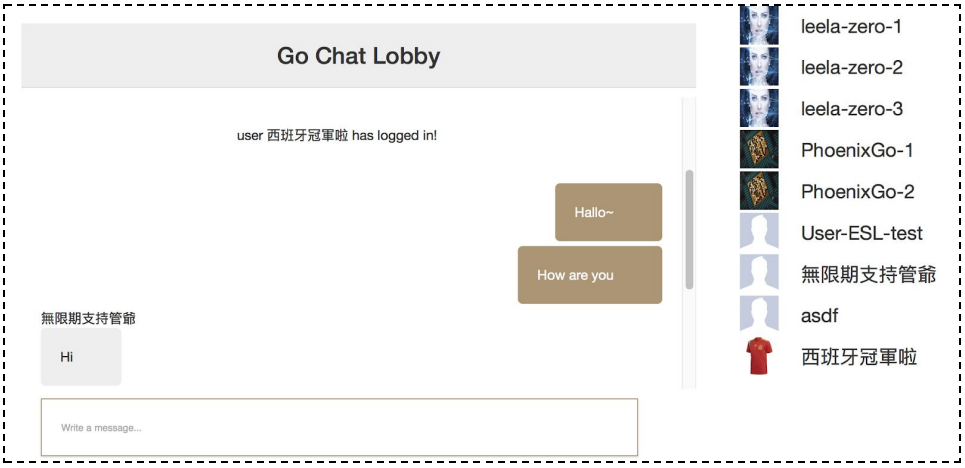
- **Leela-zero**: A free and open-source computer Go software released on October 2017. It is developed by Belgian programmer Gian-Carlo Pascutto, the author of Go engine Leela. Leela Zero's algorithm is based on DeepMind's paper about AlphaGo Zero, but it is trained by a distributed effort. Members of the community provide computing resources by running the client, which generates self-play games and submits them to the server. Leela-zero ranked third in 2018 AI Go Competition.
- **PhoenixGo**: Developed by Wechat(微信) group in Tencent(騰訊), PhoenixGo also follows the algorithm of DeepMind's AlphaGo Zero. However, it is trained solely by Tencent and the code was released not until May 2018. Nevertheless, it is the best open-sourced Go AI currently, which ranked first in 2018 AI Go Competition.

DETAILED FEATURES

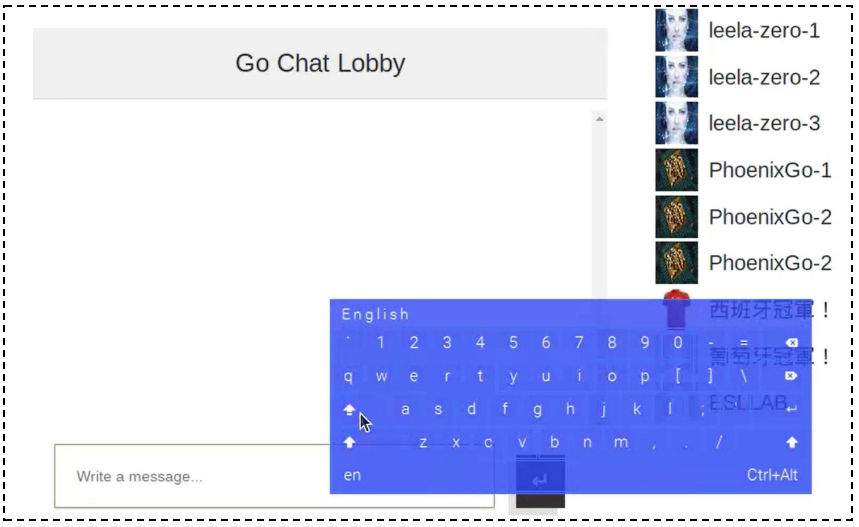
- Need only a mobile power bank, and no other devices are needed.
- The app is running on “chromium”, with plug-in virtual keyboard.
- AI response time: 1~60 seconds. Faster than most of the professional players.
- **The log-in page**
  - Input your username and log in to the chatroom



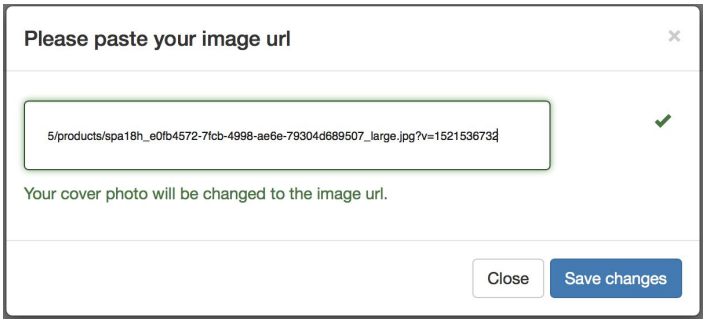
- **The chatroom page**
  - A list of AI and other users on the right side.
  - Chatroom on the left side.
  - Other user’s log in/out information.



- When click input area, virtual keyboard appears in transparent blue style. This is implemented only on Rpi3.



- Clicking on user's own name will launch a form for changing personal profile photo by image url, the app checks if the url is valid.



- Clicking on other user's name and select black/white allows user to invite other to play GO.

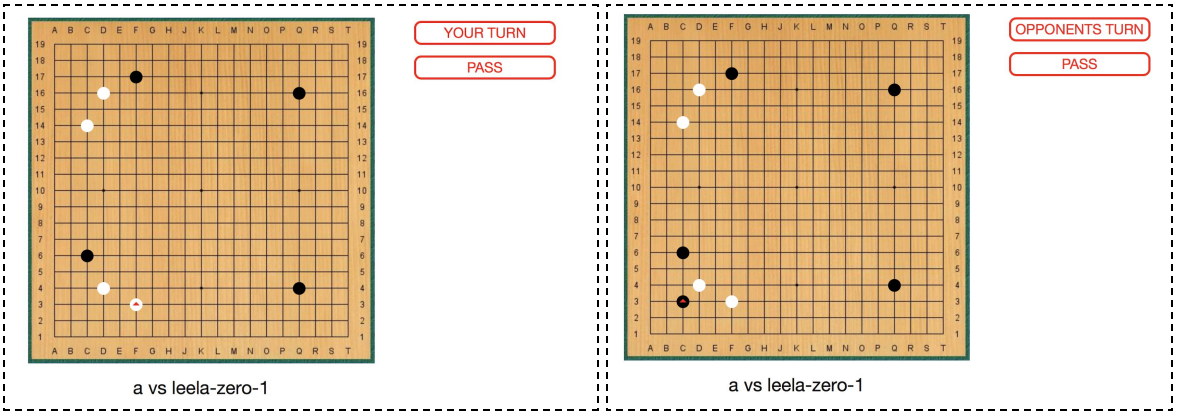
- Clicking on AI name to play with AI.
- After receiving invitation, user can choose to accept or reject.

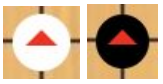
- Before receiving reply, user can't invite other players.

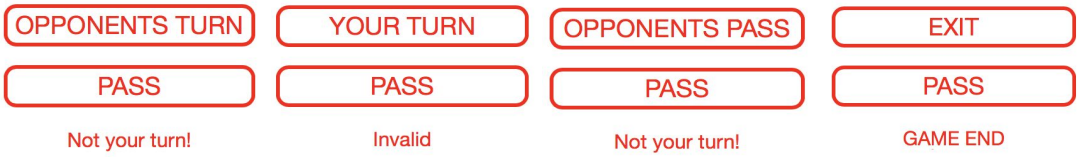
- If invited user is battling, server will reject the invitation.

- If invited user rejects, a message pops.

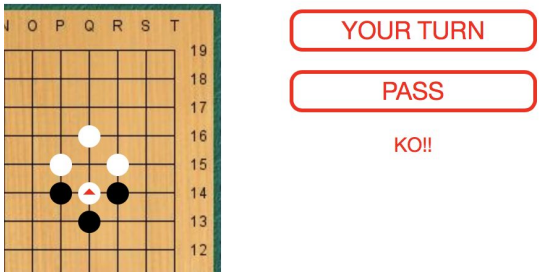
- **The GO board page**
    - Go board on the left side, players' names at the bottom, right side with status bar, pass button, and alerts.



    - Complete rule implemented by javascript, including KO(劫).
    - Last step is indicated by a small red triangle. 
    - Status bar: YOUR TURN, OPPONENTS TURN, OPPONENTS PASS, EXIT(button)
    - PASS button: if both sides click pass, then the game end.
    - Alert: Alert when not user's turn, or click invalid position in board, such as KO situation, or indicate the end of the game.

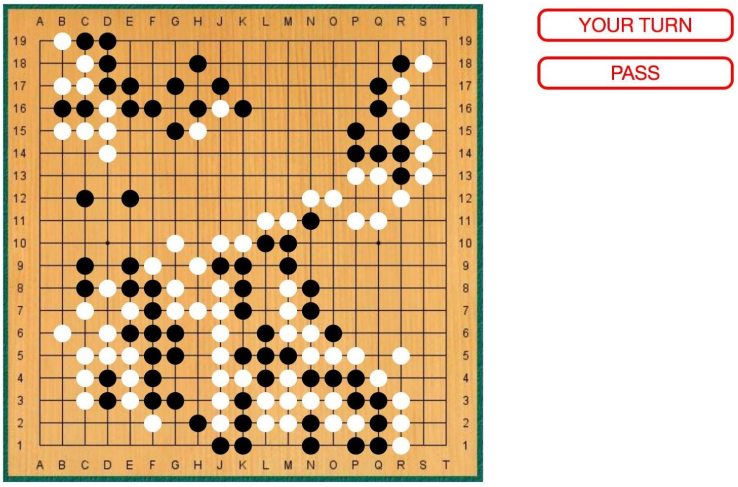


    - KO(劫) situation



- If the opponent leave or disconnect, then the game end and user will get message

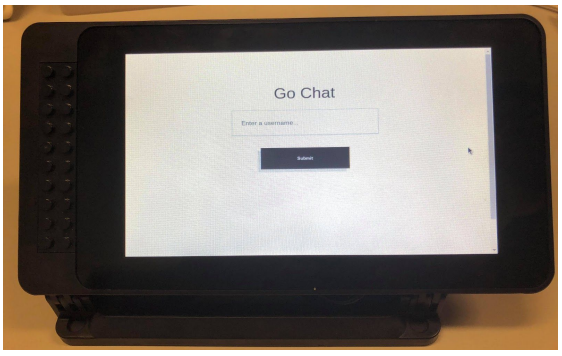
- AI can be run on server or locally (rpi). Since rpi has limited computing ability, AI that run on rpi uses smaller search space.
- Example battle between human(black) and AI(white)



b vs leela-zero

PHOTOS

front:



front-left side:

left side:

right side:

DEMO VIDEO LINK

https://drive.google.com/open?id=1caNG0tRBhQVUOxDP0oUImphVO8APv0h6

WORK DISTRIBUTION

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merge AI with "Go Chat", setup touch screen, improve "Go Chat", report

B03901056 孫凡耕:

setup AI, improve "Go Chat", report