Honor of Kings Arena: an Environment for Generalization in Competitive Reinforcement Learning

Hua Wei*, Jingxiao Chen*, Xiyang Ji*, Hongyang Qin, Minwen Deng, Siqin Li, Liang Wang, Weinan Zhang, Yong Yu, Lin Liu, Lanxiao Huang, Deheng Ye, Qiang Fu, Wei Yang
Game as AI testbeds


Current Research Focus

- imperfect information poker games
  - Texas Hold’em Poker
    - ...

- Real-time strategic games
  - MOBA games
    - Dota 2
    - Honor of Kings
    - StarCraft
    - ...
  - ...

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MOBA game: Role play and multi-player

Mechanics from MOBA

Role/hero play
- MOBA games have different roles/heroes and each role has different actions

Multi-player
- MOBA games usually involves in two or more parties, each party consists of one or more players

Challenges for AI

Generalization
- Good AI model needs to perform stably well in controlling the actions of different heroes against different opponent heroes.

Multi-agent
- Good AI model need to coordinate well between different players
Honor of Kings: MOBA game

• Appealing environment
  • Popularity
  • Existing research interest
    • 10+ related papers in top AI venues
      • NeurIPS, ICML, AAI, IJCAI, TNNLS, ...

• Game Control Buttons:
  • Steer button: movement control
  • Other buttons: skill control

• Game Units:
  • Turrets, creeps and opponent heroes
Generalization Challenge in HoK

- Generalization across opponents
- Generalization across targets
Results and Remedies

• Generalization across Opponents

• Generalization across Targets

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Honor of Kings Arena (HoK): Provided resources and tools

- HoK: OpenAI Gym-like game environments authorized by Honor of Kings
- Baseline models:
  - Behavior-tree models and trained RL models
- Replay tool
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