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

Hua Wei*, Jingxiao Chen*, Xiyang Ji*,
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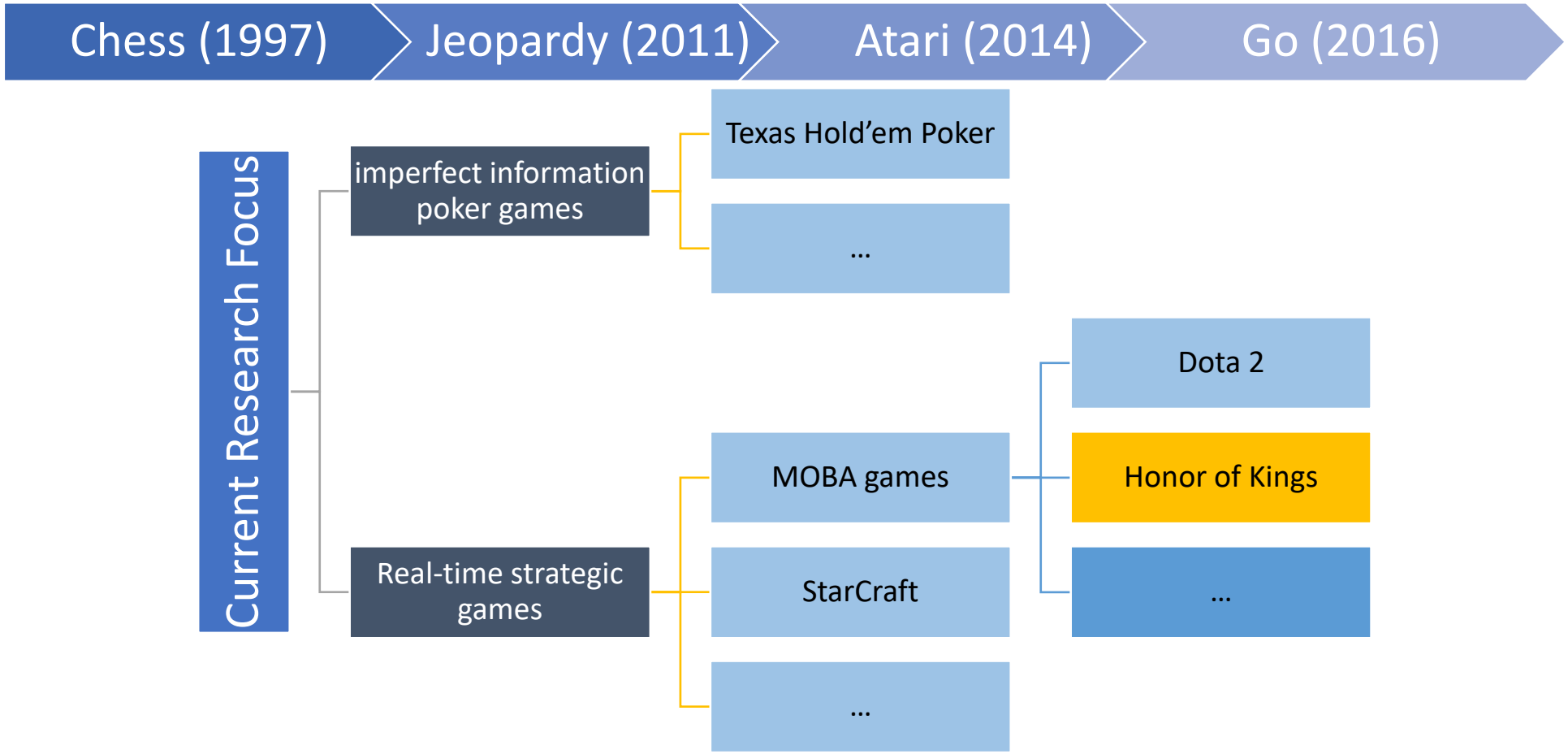
Tencent AI Lab

TIMI STUDIOS

Game as AI testbeds



Honor of Kings Arena: an Environment for Generalization in Competitive Reinforcement Learning, NeurIPS'22

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.

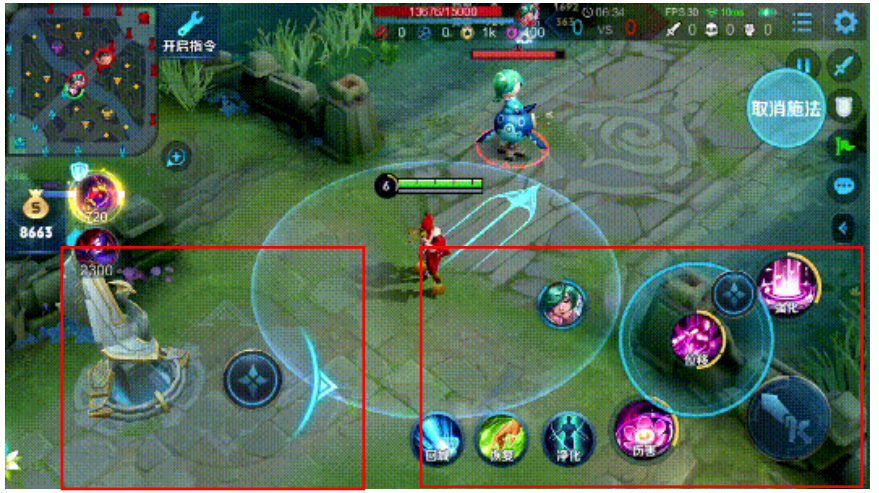
Multi-agent

- 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

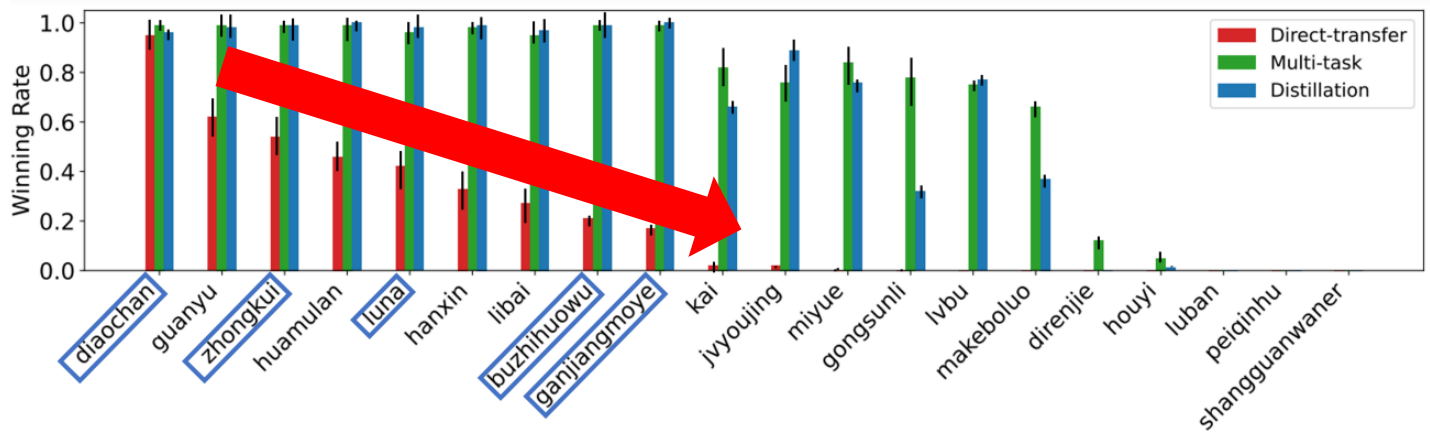


Generalization Challenge in HoK

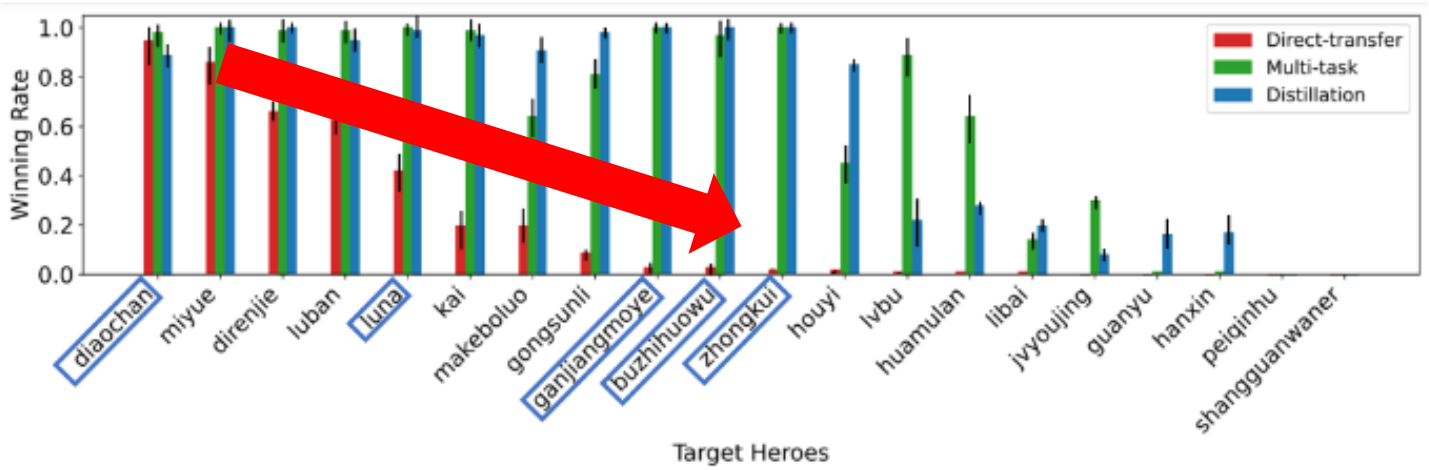
- Generalization across opponents
- Generalization across targets

Results and Remedies

- Generalization across Opponents



- Generalization across Targets



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

Codes and Resources

- Code: https://github.com/tencent-ailab/hok_env
- Documentation: https://aiarena.tencent.com/hok/doc/

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in NeurIPS 2022