



# Hearthstone AI Competition

**IEEE Conference on Games 2020**

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# Task Description

- Program an agent, which is capable of playing the game Hearthstone
- We used the Sabberstone Framework (C#) modified for partial observation
- Evaluation in two separate tracks:
  - “Premade Deck Playing”-track
    - Play all possible matches using 9 decks of which 6 are known at time of submission and 3 were secret
  - “User Created Deck Playing”-track
    - Play your own deck against other agents with unknown decks



# “Premade Deck Playing” - track

- 23 submissions (6 disqualified)
  - Every agent needs to play 9 decks of which 6 are known at time of submission and 3 are hidden
- Round Robin Tournament
  - 81 games per matchup of two agents (playing each combination of decks) = 2592 per agent
  - The agent with the highest average win-rate against all other non-disqualified agents wins





## Various Decks = Various Playstyles



Reno Kazakus Mage



Midrange Jade Shaman



Aggro Pirate Warrior



Midrange Buff Paladin



Miracle Pirate Rogue



Zoo Discard Warlock



## New Contenders



Midrange Secret Hunter



RenoKazakus Dragon Priest



Murloc Druid



# “Premade Deck Playing” – Top Three

**Rank 3 – 68.71 %**

**GretiveComp - DL**  
**Alejandro Romero**



# “Premade Deck Playing” – Top Three

**Rank 2 – 70.91 %**

**Team CopyCats – DL**  
**Nils Bohnhof, Jon-Mailes Graeffe**

**Rank 3 – 68.71 %**

**GretiveComp - DL**  
**Alejandro Romero**





# “Premade Deck Playing” – Top Three

**Rank 1 – 72.34 %**

**MyAgentSebastianMiller2 – Dynamic Lookahead (DL)**  
**Sebastian Miller**

**Rank 2 – 70.91 %**

**Team CopyCats – DL**  
**Nils Bohnhof, Jon-Mailes Graeffe**

**Rank 3 – 68.71 %**

**GretiveComp - DL**  
**Alejandro Romero**



# “Premade Deck Playing” – Conclusion

- Submitted agents:
  - Slightly improved in quality in comparison to last year
  - Multiple agents were based on previous entries (e.g. the top 3)
  - Bots now make use of the generous time limits
    - some have been disqualified since they were too generous 😞
- Most frequent agent types:
  - simulation-based search algorithms, such as MCTS
  - and modifications of dynamic lookahead (winner of last year)



# “User Created Deck Playing”-track

- 18 submissions
  - Everybody chose his own deck to play against the others
- Round Robin Tournament
  - 1700 per agent (50 starts per player, per matchup)



# “Premade Deck Playing” – Top Three



**Rank 3 – 59.76%**

**ThreeTypeDynLooker – DL**  
**Jade Shaman**  
**Maximilian Schotte, Marcel Krebs**

**Rank 3 – 59.76%**

**MAGEntLookahead – DL**  
**RenoKazakus Mage**  
**Malik Mann**





# “Premade Deck Playing” – Top Three

**Rank 2 – 63.23 %**

**LynamicDookaheadAgentV1 – DL – Midrange Shaman**  
**Nils Bohnhof, Jon-Mailes Graeffe**



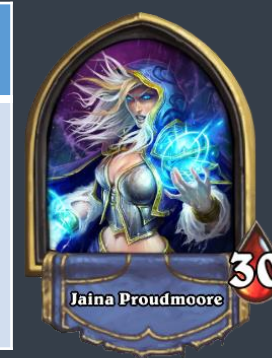
**Rank 3 – 59.76%**

**ThreeTypeDynLooker – DL**  
**Jade Shaman**  
**Maximilian Schotte, Marcel Krebs**



**Rank 3 – 59.76%**

**MAGEntLookahead – DL**  
**RenoKazakus Mage**  
**Malik Mann**







# “Premade Deck Playing” – Top Three



**Rank 1 – 65.47 %**

**DrunkenAggroWarriorAgent – DL – Pirate Warrior**  
**Jann-Marten Kias, Alexander Babel**

**Rank 2 – 63.23 %**

**LynamicDookaheadAgentV1 – DL – Midrange Shaman**  
**Nils Bohnhof, Jon-Mailes Graeffe**



**Rank 3 – 59.76%**

**ThreeTypeDynLooker – DL**  
**Jade Shaman**  
**Maximilian Schotte, Marcel Krebs**



**Rank 3 – 59.76%**

**MAGEntLookahead – DL**  
**RenoKazakus Mage**  
**Malik Mann**





# “User Created Deck Playing” - Conclusion

- Winning agents use top-performing meta-decks
  - JadeDruid, JadeShaman, Odd Paladin, MechaHunter
  - Winning strategies include: MCTS, EA optimized fitness



## Future Work

The deck-playing tracks competition's meta got stale.  
Searching for a new task to spice up the game-play.

Please contact me in case you want to share some  
ideas about how to shape the future of this  
competition or you want to get involved.

Thank you for all your submissions!  
We are looking forward to continue this  
competition in the next year!

Bots of the previous years (and soon 2020)  
are available online.



<https://www.hearthstoneai.github.io>