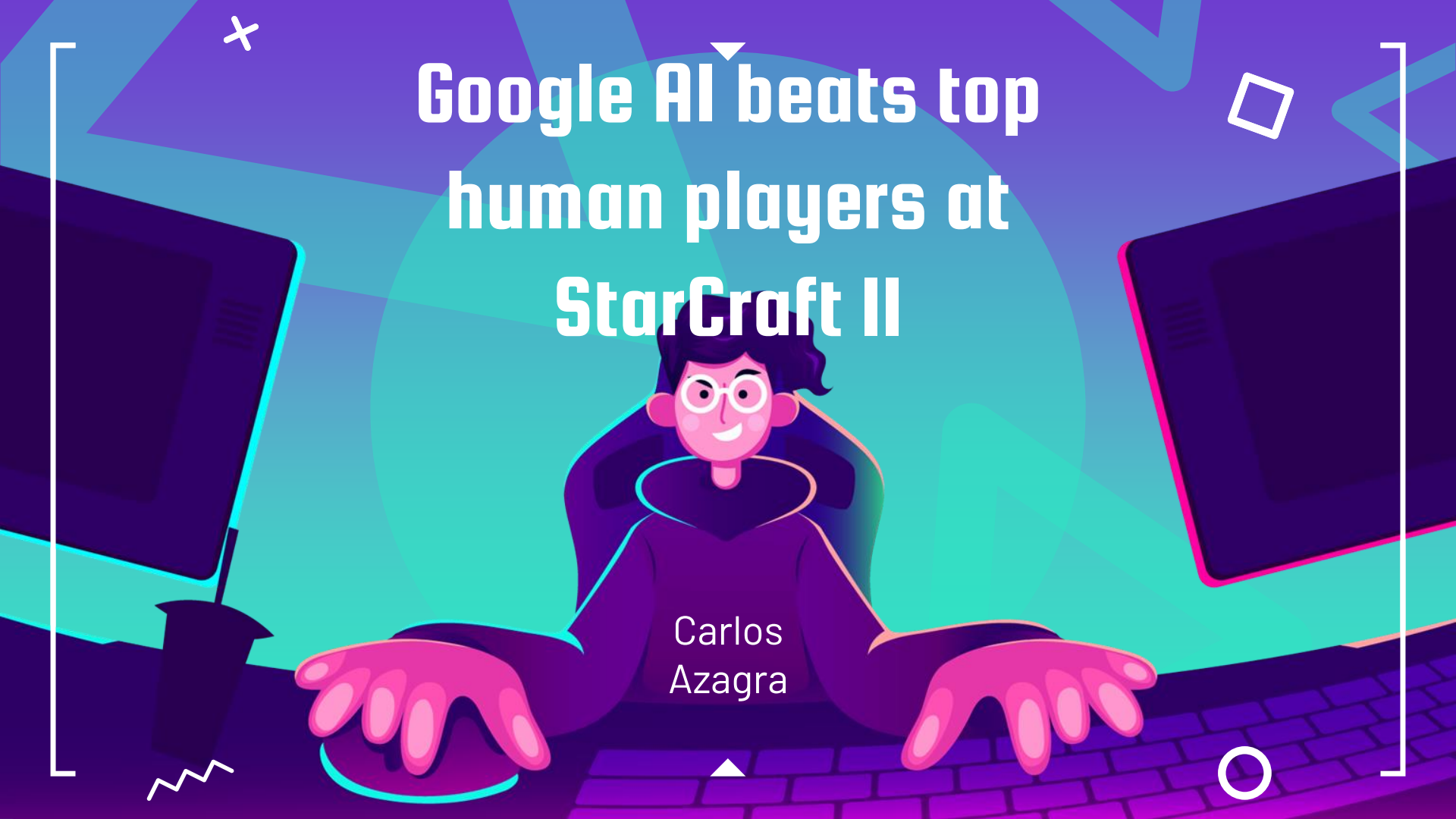



Google AI beats top human players at StarCraft II

Carlos
Azagra





“Were not machines unbeatable at strategy games?”

—**CARLOS AZAGRA**

01

WHY

STARCRAFT II



WHY STARCRAFT II

StarCraft II is considered as one of the most complicated, complete and challenging game for the online community.

It is an online strategy game where Humans (Terrans) and 2 aliens factions (Zergs and Protoss) fight in a warzone.





WHICH ARE THE CHALLENGES

01

Real-time game:
simultaneous movements,
not following turns

03

Need to obtain and
manage **resources**:
Mineral, Gas, Supplies and
Special Resources

02

There are **more than 90**
types of pieces, which can
be created during game

04

Imperfect information
game, where one player
does not know all the
other playing is doing

STARCRAFT EDUCATIONAL



StarCraft is even used in the academic world: there are AI related courses in UC Berkley or Washington State University which use the game as academic material



Blizzard Entertainment released the game in April 2017



Widespread use of StarCraft has elad to a creation of three annual StraCraft AI competitions



02

AI

ALPHASTAR



WHAT IS ALHASTAR

DEEPMIND

British AI company
acquired by Alphabet in
2014

SUCCESSOR

Of AlphaGo – Deep Mind's
AI who beaten Go world
number one

LAUNCH

Unveiled to the public in
January 2019



ONE STEP FORWARD

	Innovation
Old AI	Before the popularisation on Neural Networks and Deep Learning, many of the Artificial Intelligences followed hard-coded rules
AlphaStar	Use of Neural Networks and Deep Reinforcement Learning (by trial and error – Unsupervisedly), specially by recognizing patterns

03

ALPHASTAR TRAINING



DIFFERENT STEPS FOLLOWED

01

Learning to imitate

from a set of nearly one million human games, to understand the different rules and types of gaming and how to behave

02

Self playing

in order to improve its level and really study which are its weak points. They also used exploiter agents (created to find flaws)

03

AI League

Competition against other AIs. This method makes sense for a game like StarCraft II in which no one strategy is best

TIME TO COMPETE





EQUALITY

Limitation of engaging actions at the same pace of the top players

AI cannot win because better-performing, but for better-thinking

GOOD BUT NOT BEST

EUROPEAN SERVER

after 27 days of training,
AlphaStar achieved grandmaster
level

Final version relies on a
cumulative 44 days of training:
still not able to beat TOP players





WHY SO MUCH TROUBLE TO MASTER A GAME

DeepMind argues that insights from AlphaStar might benefit other fields that need to operate under the following circumstances:

- Real-time
- Imperfectly observed information
- No dominant strategy

Examples: robots, self-driving cars or virtual assistants



DON'T FORGET WHAT'S IMPORTANT

- Considerations of discerning if the information in which is trained is correct or not

For example: 'racist' or 'sexist' algorithms

- How can we limit the use of the technology or, in this case, Artificial Intelligence?

Starcraft Knowledge can be used in a warzone, to conquer, etc...

- AIs can be great at solving optimisation challenges such as winning at StarCraft, but what about more general challenges?

Situations of conflict of interests, or no dominant action



THANKS!

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