

**Subject: ??????**

**Topic: AlphaGo - ?????????? Zero????**

**AlphaGo - é»fâ£«â, 'éi-â'ia...-é-(æ¼"è-) Zeroæœ²é"æ¥µé™•**

ã½œè€...: play

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?????11?10????????????

???DeepTech???Â ???Â ???



Google DeepMind?????????AI?????À Oriol Vinyals??EmTech  
China????????2018?1?28-30????????? 2016 ??Google ?? DeepMind ????? AlphaGo  
????????????????? 5 ??AlphaGo ?????????????????????????????????????DeepMind ??? AlphaGo  
**Zero?????????????????**  
?? AlphaGo?  
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**DeepMind ????????????????????? AlphaGo ??? 11 ?**  
10 ???AlphaGoâ€™â€™” ???  
DeepMind ?????Mastering the game of Go without human knowledge???????????????????? Facebook ???  
AlphaGo Zero ????????????? AlphaGo ????????????? AlphaGo Zero ???â€™â€™”AlphaGo ??????  
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Zero??



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? ??? DeepMind ????? AlphaGo  
?? Demis Hassabis?DeepMind ? CEO?????????????  
**???AlphaGo ????????????????????????????? AlphaGo??AlphaGo**  
??AlphaGo ???



????? AlphaGo Master ??? ?? 60

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**AlphaGo Zero** ???

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**Erica**????? **DeepMind AlphaGo** ???

DeepMind AlphaGo ?????? David Silver??

Sutskever?



Demis Hassabis ? David Silver ??? IBM

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????????????2006 ???



????? Erica ? 2010 ?????????? 19 ?????????????? 8 cores?Zen ?? 6 ? PC????? Many  
Faces of GO ?? 12 cores????????????????????????????????????Demis Hassabis  
?? DeepMind????????? **GO Project**  
**?????????????â€”â€”?? Erica????????????????????????????????????AlphaGo ??????????????????????**  
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## 結論

- AlphaGo的成功是深度學習與強化學習
- AlphaGo專案起始至收尾，團結力量大
- 硬體資源與TPU扮演重要角色
- AlphaGo Zero展示了強化學習的巨大
- A.I.在可見的未來將成為人類的工具，

AlphaGo ??????????????????David Silver ???  
70~80%???????? David Silver ???  
??????AlphaGo ??????????? 95%????????? AlphaGo Zero ??????????

## AlphaGo的最 判斷形勢的價值網路

- David Silver的創見，Arthur Guez
- 強化學習結合深度學習(神經網路)
- 左右互搏的自我學習
- 克服overfitting

開路先鋒總是辛苦的.....



? | AlphaGo Master ????? 60 ???AlphaGo  
????????????????? ?????? **AlphaGo Zero** AlphaGo Zero ??????????????????  
?? 19X19 ?????? ??????  
AlphaGo ??? AlphaGo Zero ??????? AlphaGo  
Master?? AlphaGo Master ??????????????3  
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AlphaGo Zero ?? 2000 ? TPU ????? 40 ??? 40  
??AlphaGo Zero  
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?????? **AI** ??? **AI** ??? Far  
Away?? **David Silver** ??????AlphaGo  
?? **AI** ??? **DeepMind**  
?? **DeepMind** ??????? ?????????? AlphaGo Zero  
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### AlphaGo Zero的突破 - 強

- 大量測試AlphaGo Master, 準備與柯潔九
- RL training pipeline效能極大化 - continu
- 移除rollouts, handcrafted features

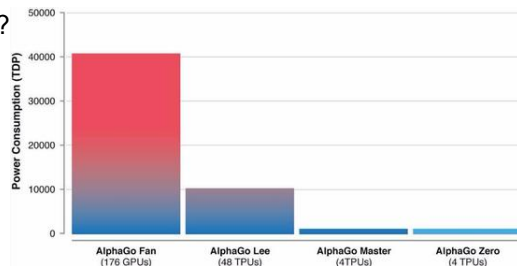
1. AlphaGo Zero 1? AlphaGo Zero  
 2? 36 AlphaGo Zero AlphaGo  
 v18 AlphaGo Lee 3? 3 AlphaGo Zero ?? AlphaGo v18 ?? 100% ??? 4? ???  
 AlphaGo Zero ??? Master ??? Master ??? 60 ??? AlphaGo ??? 5? 40 ??? AlphaGo Zero ??  
 Master ??? 90% AlphaGo



DeepMind AlphaGo 20~30  
 AlphaGo Deep Learning Reinforcement learning Tree Search

Elo ratings AlphaGo Policy Network Value Network

(Placeholder text for the section above)



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Zero 21 ????????????????????? AlphaGo Master ????? -End-