



AlphaCandy:
Mastering the game of Candy Crush
without human knowledge

?, ?, Tim Niklas Witte

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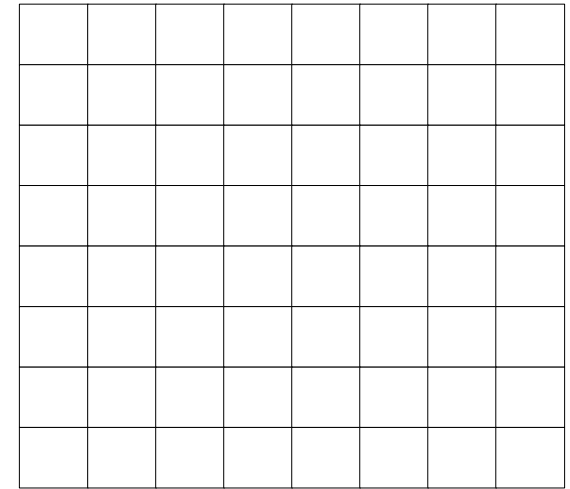
Environment

Candies



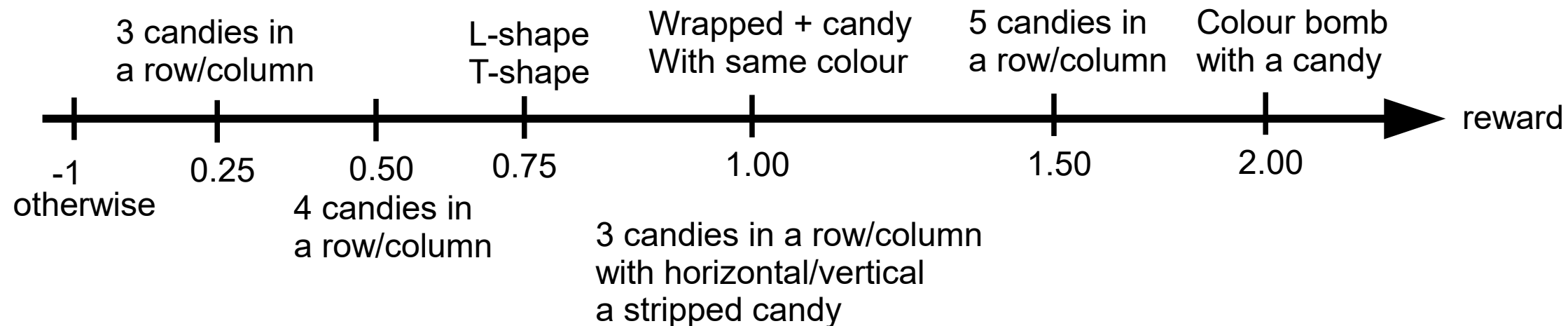
Field

width = 8



height = 8

Reward system



Evaluation

Monte Carlo tree search
(as in AlphaGo zero)

Q-networks

- DDQN
- DDDQN
 - No sequence
 - CNN
 - Self-Attention
- Sequence
 - concat → CNN
 - RNN

Regression problematic?
→ MSE: $1/256$

VS

Handle huge action space
... but artificially generated
expert training data

Policy Gradients

- Reinforce
- DDPG
- A2C
- GAE
- PPO

$8*8*4 = 256$ actions
→ $1/256$
→ small gradients?

Decision Transformer

Podcast


<https://www.youtube.com/watch>

Speak 1337 Podcast mit Tim Witte - YouTube



Tim beschreibt hier für euch und in seiner Publikation seine neueste Findung: Wie man eine Malware wie einen Nutzer...

YouTube · The Morpheus Tutorials · 17.10.2020



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Phantom Malware: Conceal Malicious Actions From Malware Detection Techniques by Imitating User Activity

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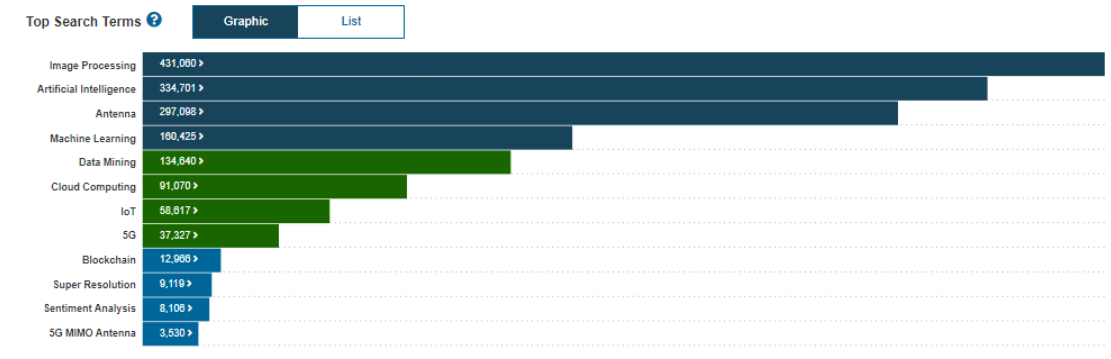


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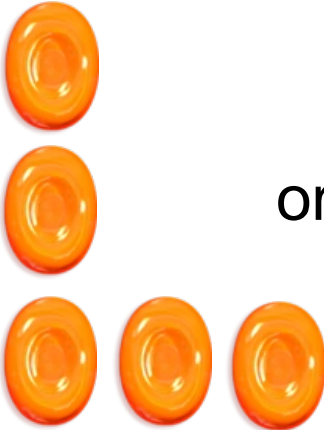






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ADDON: Environment

Event	Example	Reward
Otherwise		-1
Three in a row or column	 or 	0.25
Four in a row or column	 or  1) 2)	1) 0.50 +  2) 0.50 + 

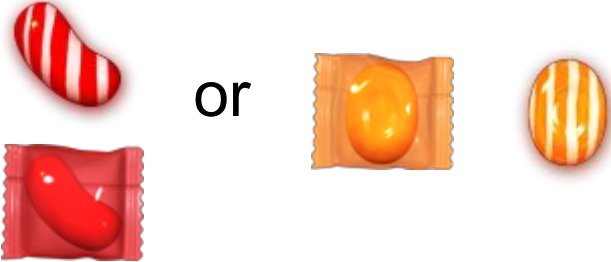

ADDON: Environment

Event	Example	Reward
L-shape or T-shape	 or 	0.75 + 
Horizontal stripped candy in column	 or 	1) 1.0 + clear row
Vertical stripped candy in row	 1)  2)	2) 1.0 + clear column

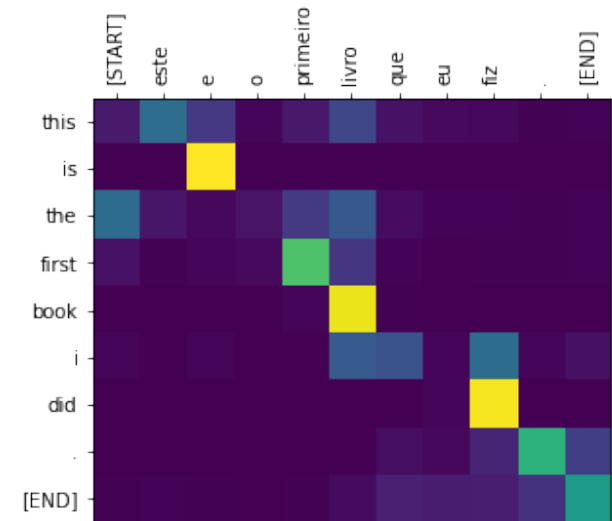
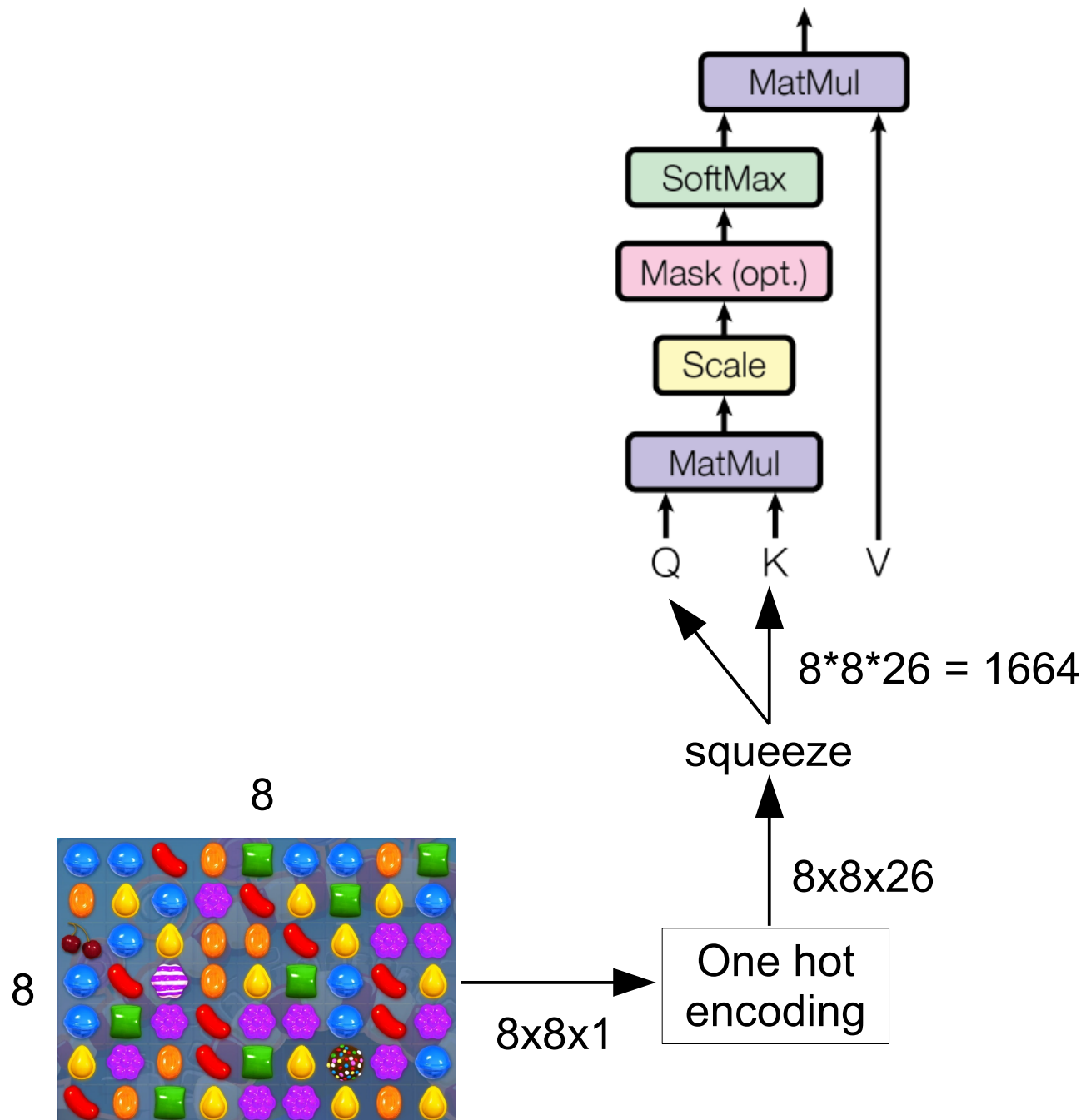
ADDON: Environment

Event	Example	Reward
Wrapped candy with same colour	 or 	1.0 + clear 3x3 field around it
Five candy in a column or row	 or 	1.5 + 

ADDON: Environment

Event	Example	Reward
Wrapped candy with same colour	 or	1.5 + clear 3 columns and 3 rows around it
Color bomb candy with a candy of colour X		2 + clear all candies With colour X

ADDON: Self-attention – candy-wise attention



queries and keys of dimension d_k
values of dimension d_v