

# paper\_review\_World Models

March 14, 2019

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- date: 2019-03-13

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paper - <https://arxiv.org/abs/1803.10122> - <https://worldmodels.github.io/>  
code - <https://github.com/hardmaru/WorldModelsExperiments/tree/master/carracing>  
reference - <https://medium.com/applied-data-science/how-to-build-your-own-world-model-using-python-and-keras-64fb388ba459> - <https://towardsdatascience.com/world-models-in-tensorflow-episode-1-2b3c217ebc8f>  
about Evolution Strategy - <http://blog.otoro.net/2017/10/29/visual-evolution-strategies/>

## 1 1. Introduction

'Mental Models'. Mental Model model-based RL, .  
. / . 1. 2. 3. ()  
World Model, . - VAE ( $x \rightarrow z$ ) - MDN-RNN(Mixture Density Network & RNN)  
( $z_{t+1}$ ) - CMA-ES( ) reward

$s_t$   $\dots$   $C$  .

$$a_{t+1} = C_{\theta}(s_t)$$

$R$  .  $s_t$   $a_t$   $r_t$  .

$$r_t = R(s_t, a_t) = R(s_t, C_{\theta}(s_{t-1}))$$

$C$  .

$$G = \sum_{t=1}^T r_t \tag{1}$$

$$= \sum_{t=1}^T R(s_t, C_{\theta}(s_{t-1})) \tag{2}$$

$$\tag{3}$$

$$\arg \max_{\theta} \mathbb{E}[G] \tag{4}$$

$C$   $s_t$   $s_t$  ?  $C$  .  
VAE  $s_t$   $z_t$  ,  $a_t$   $z_t$  ( $h_t$ ) .  $C$  CMA-ES , V / M / C .