
Algorithm:Genetic algorithm

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function GET ACTION(S as state)
    for  $1 \leq i \leq 108$  do                                ▷ There are 108 cards in a UNO deck
         $\text{Mask}_i \leftarrow [\text{Card}_i \in \text{S.Playable}]$         ▷ [ ] represents Iverson bracket
     $\text{Mask}_0 \leftarrow 1$                                     ▷ Player may always take a card from the deck
     $\text{Result} \leftarrow \text{Network.Run}(\text{S})$ 
     $\text{Result} \leftarrow \text{Sigmoid}(\text{Result}) + 1$ 
    return  $\text{Argmax}(\text{Mask} \odot \text{Result})$                     ▷  $\odot$  represents Hadamard product

function GENETIC DIFFUSION
     $\text{Alpha} \leftarrow$  The cell achieved the highest rank
    for Cell in Petri \ Alpha do
         $\text{Cell.Weights} \leftarrow (\text{Cell.Weights} + \text{Alpha.Weights}) / 2$ 

function MUTATE
    for Cell in Petri do
         $\text{Cell.Weights} \leftarrow \text{Cell.Weights} + \text{Gaussian random}()$ 

function EVOLUTION
    Petri  $\leftarrow$  Cells initialized with zero weights
    for Cell in Petri do
        for 1 To N do                                    ▷ N is an arbitrary number
             $\text{Result} \leftarrow$  Cell v.s. Opponent
            if Result is Win then
                 $\text{Cell.Rank} \leftarrow \text{Cell.Rank} + 1$ 
    Genetic Diffusion()
    Mutate()
```
