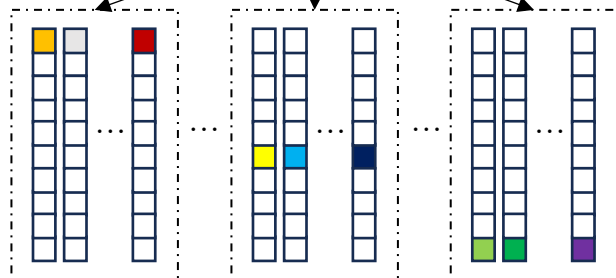


Repeated N times

Select

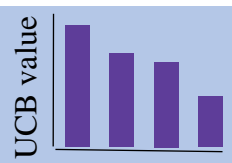
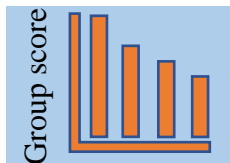
$L*19$  child nodes



Group 1

Group  $i$

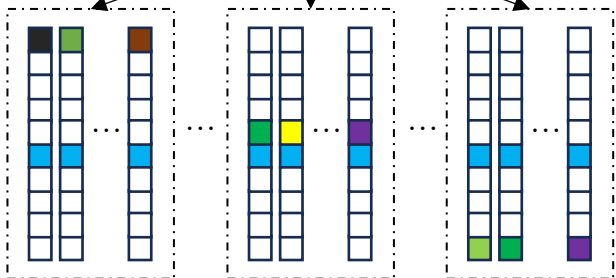
Group  $L$



filter

Expansion

$(L-1)*19$  child nodes



$G_i$ : Randomly select from  $G_1, G_2, \dots, G_L$

$$x^* = \arg \max_{x_i \in G_i} P(x_i)$$

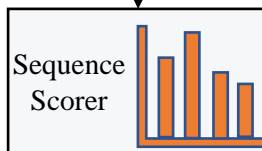
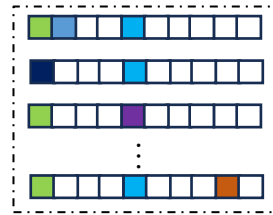
Generate ESM-2 probability matrix

0.1	0.2	0.2	...	0.1	0.3
0.05	0.2	0.1	...	0.01	0.3
0.2	0.1	0.4	...	0.15	0.3
...	0.2	0.01	0.05	0.4	0.01
0.5	0.2	0.01	...	0.1	0.3

Select the node with the largest probability value in  $G_i$

Simulation

Random mutation  $m$  times



Take the average value of  $m$  sequences as the final simulation value

Backpropagation

Update the value of its parent node and its visit count.

Update layer by layer along the path.

