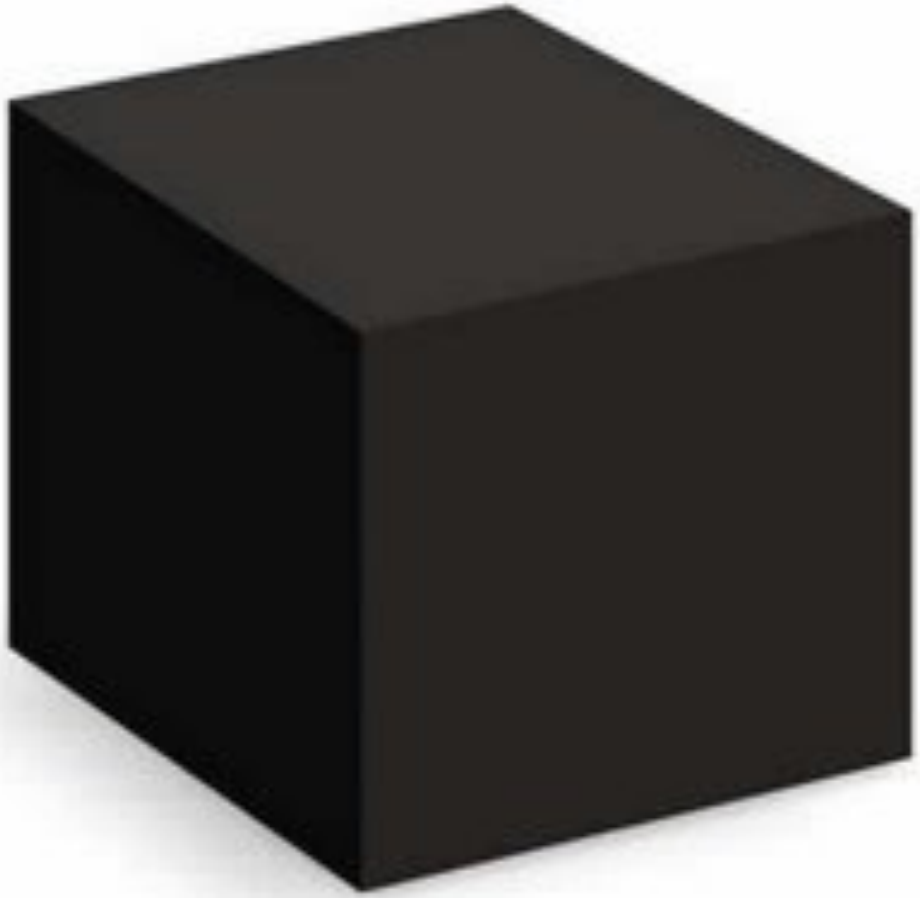
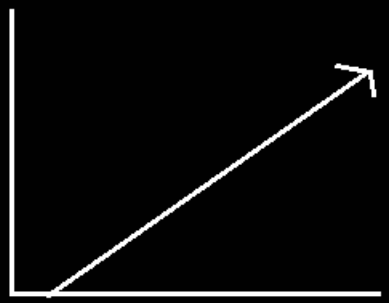


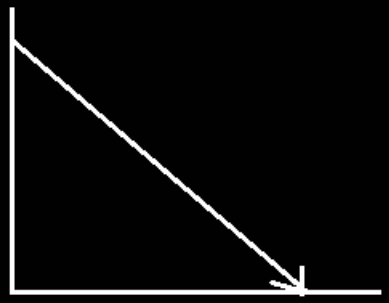
Towards understanding the black box:
Analysis of evolved neural networks

Keiland Cooper

$$\begin{bmatrix} -78 & -73 & -67 & -62 & -58 & -67 & -64 & -55 \\ -65 & -69 & -73 & -38 & -19 & -43 & -59 & -56 \\ -66 & -69 & -60 & -15 & 16 & -24 & -62 & -55 \\ -65 & -70 & -57 & -6 & 26 & -22 & -58 & -59 \\ -61 & -67 & -60 & -24 & -2 & -40 & -60 & -58 \\ -49 & -63 & -68 & -58 & -51 & -60 & -70 & -53 \\ -43 & -57 & -64 & -69 & -73 & -67 & -63 & -45 \\ -41 & -49 & -59 & -60 & -63 & -52 & -50 & -34 \end{bmatrix}$$

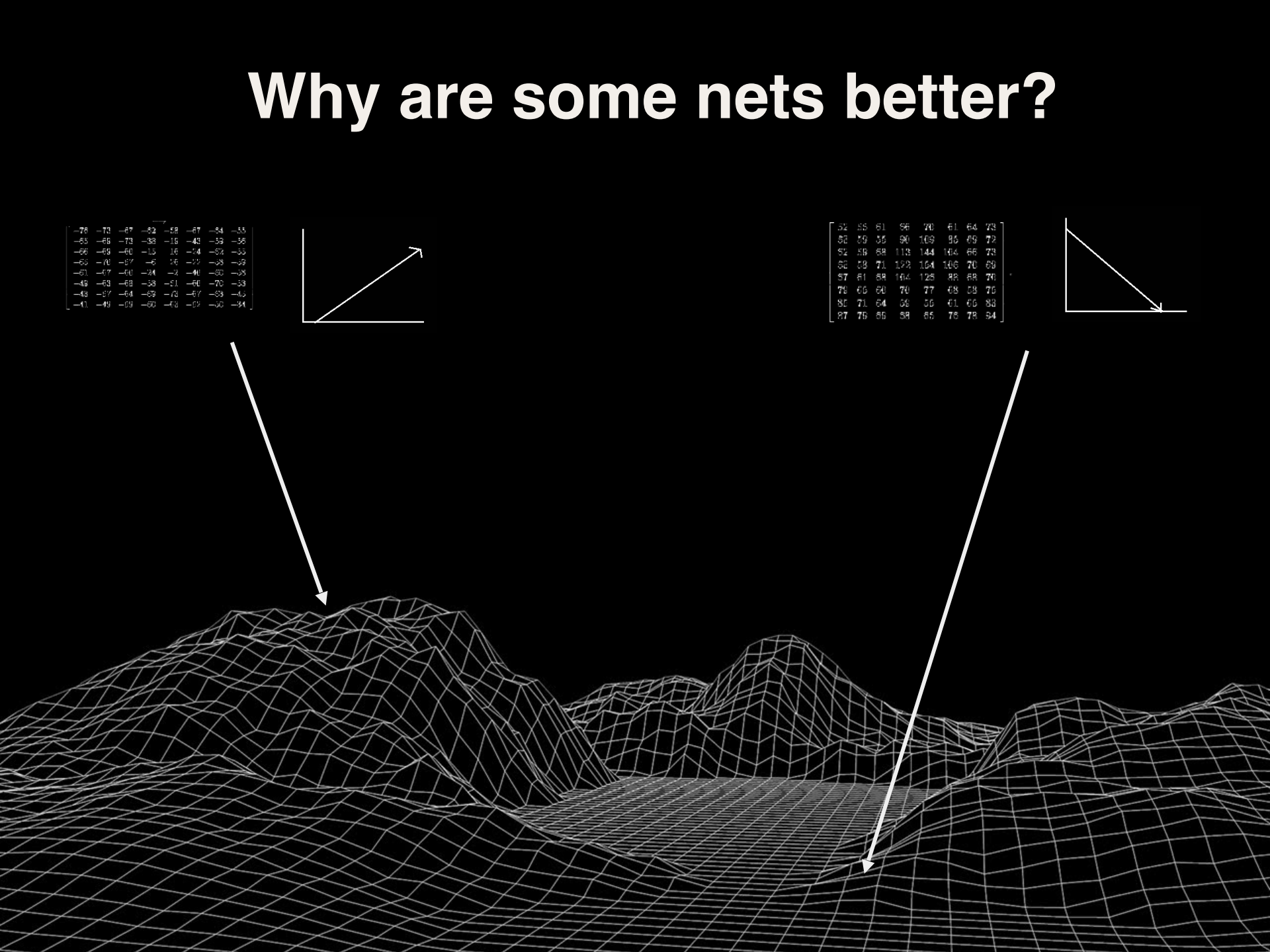


$$\begin{bmatrix} 52 & 55 & 61 & 66 & 70 & 61 & 64 & 73 \\ 63 & 59 & 55 & 90 & 109 & 85 & 69 & 72 \\ 62 & 59 & 68 & 113 & 144 & 104 & 66 & 73 \\ 63 & 58 & 71 & 122 & 154 & 106 & 70 & 69 \\ 67 & 61 & 68 & 104 & 126 & 88 & 68 & 70 \\ 79 & 65 & 60 & 70 & 77 & 68 & 58 & 75 \\ 85 & 71 & 64 & 59 & 55 & 61 & 65 & 83 \\ 87 & 79 & 69 & 68 & 65 & 76 & 78 & 94 \end{bmatrix}$$



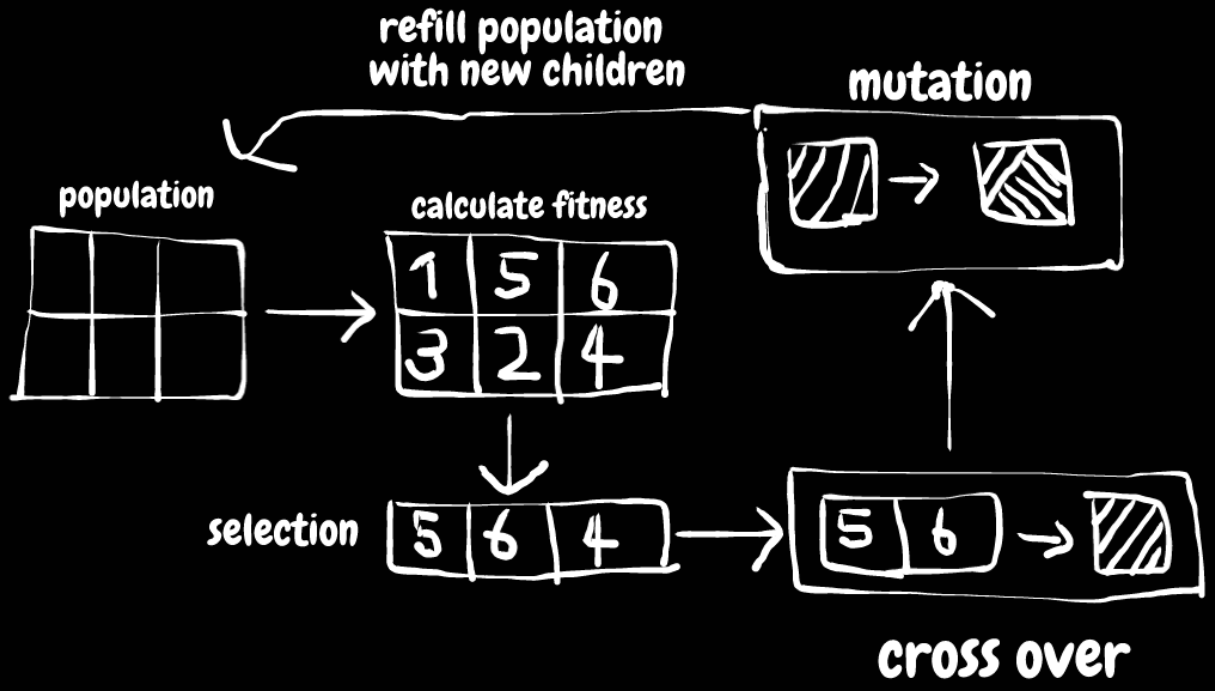
Why are some nets better?

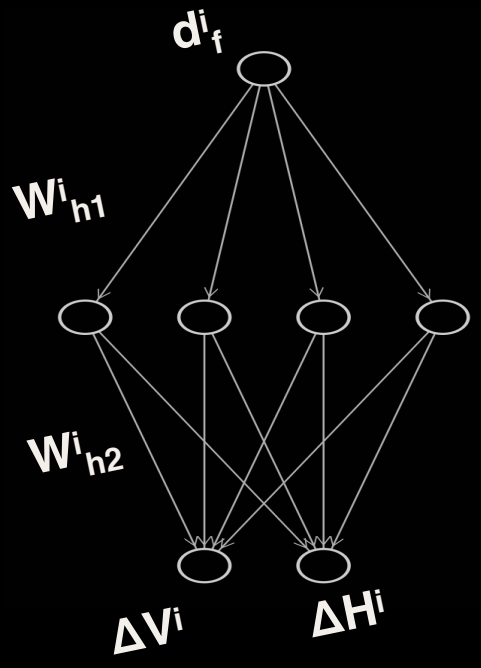
Why are some nets better?



Approach:

Evolve Nets!

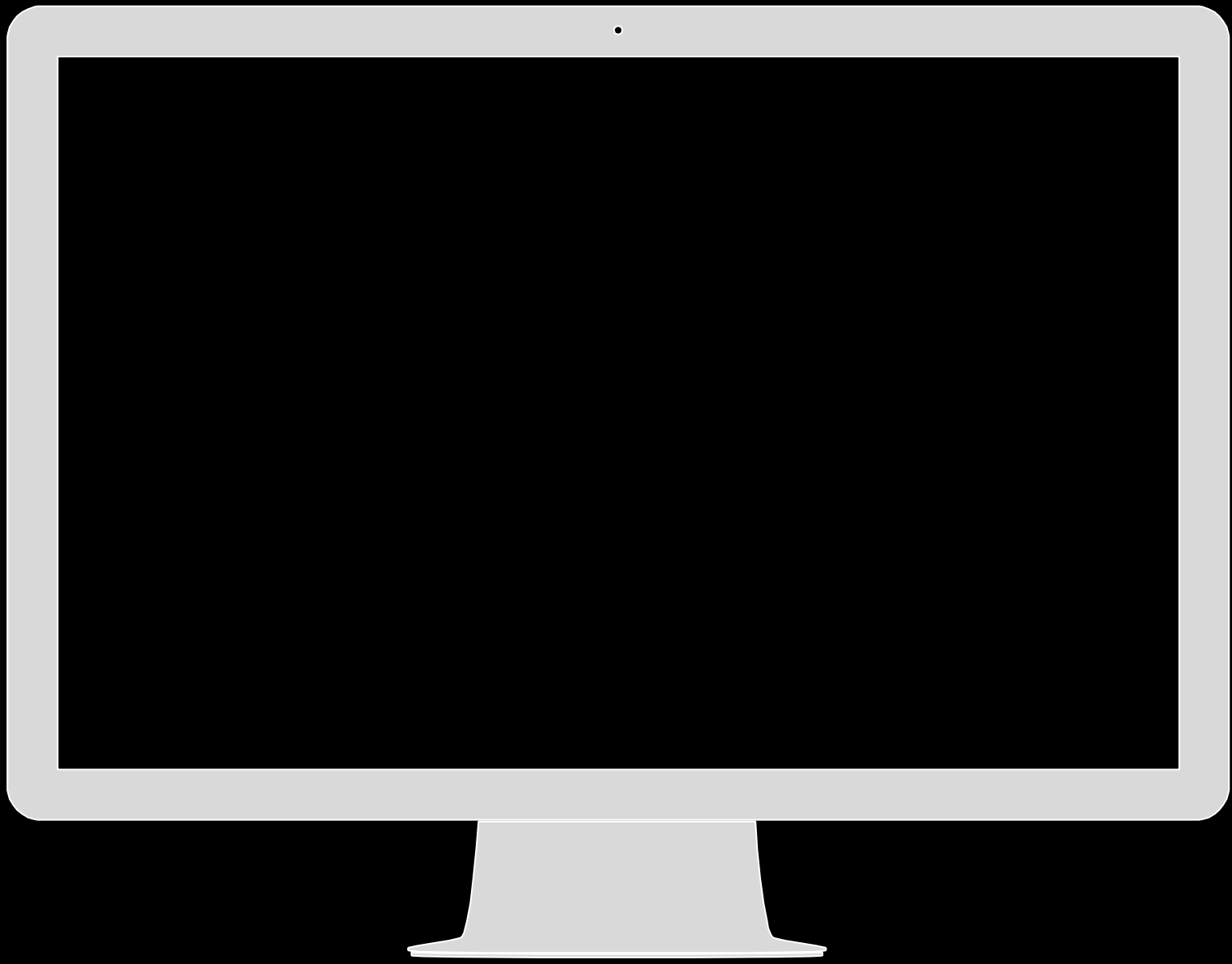




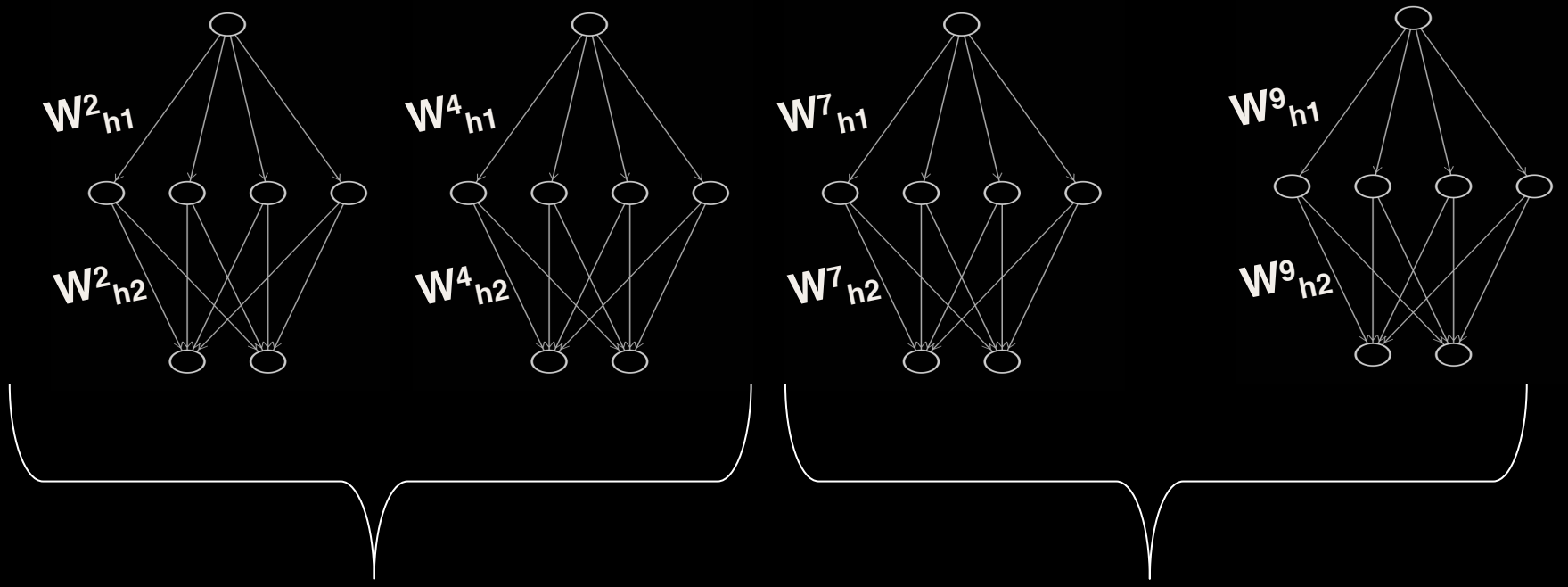
Fitness f(x) = # food consumed

Selecting/mutating W_{h1} & W_{h2}

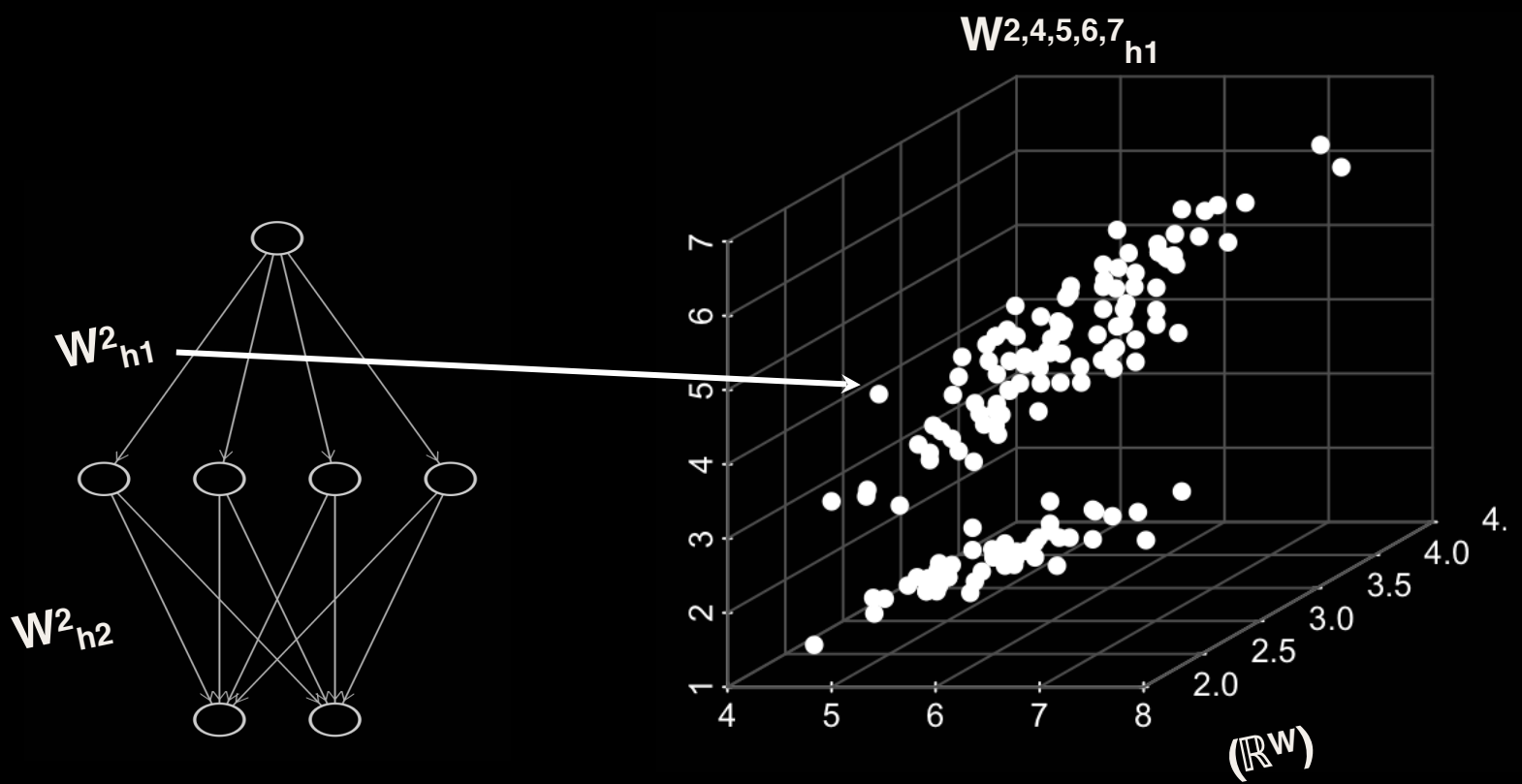
Source left: Nguyễn Việt Hưng



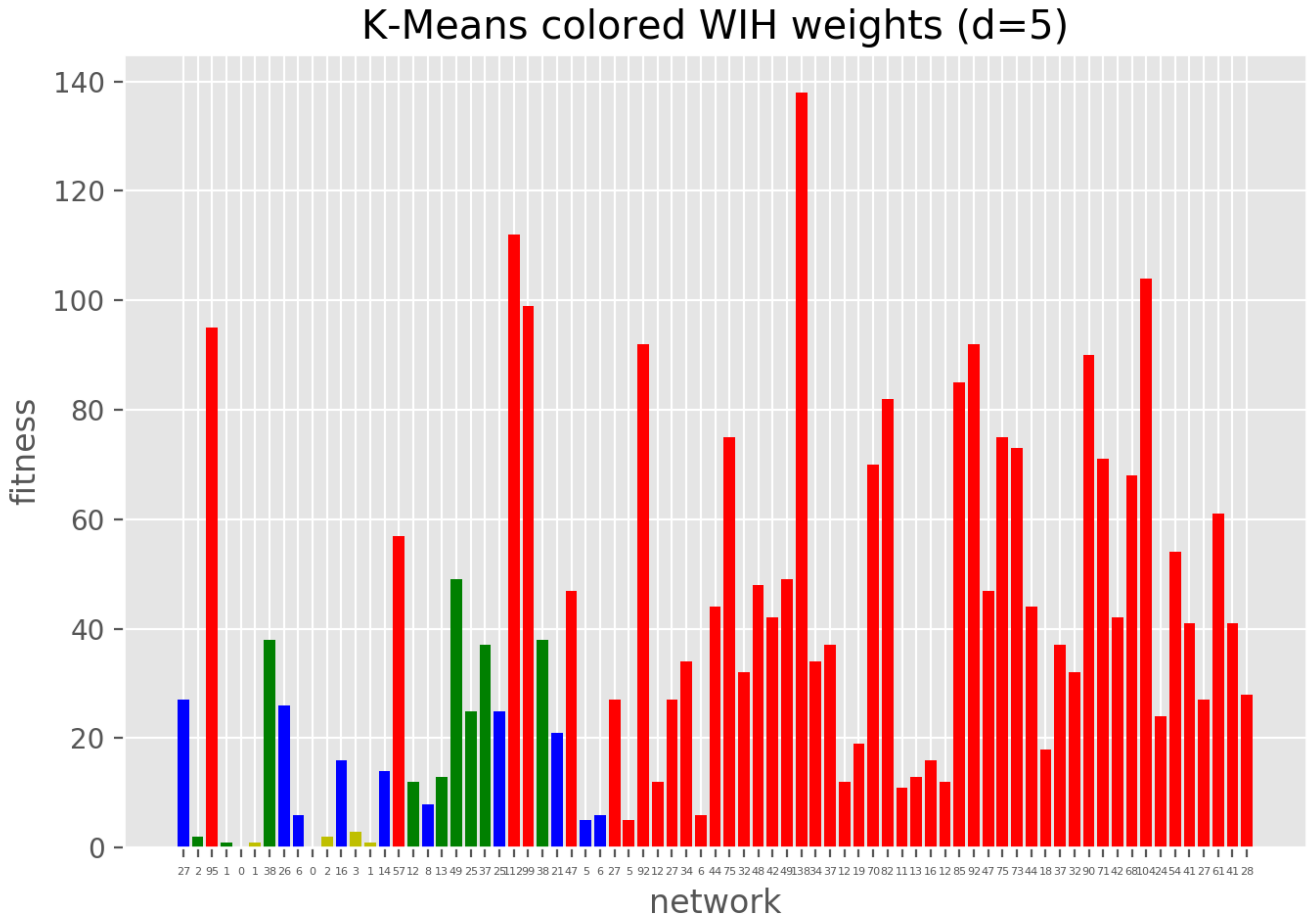
Simulation



Why are some nets better?



KNN?


K-Means colored WIH weights (d=5)
fitness
0
20
40
60
80
100
120
140
network
27 2 95 1 0 1 38 26 6 0 2 16 3 1 14 57 12 8 13 49 25 37 25 112 99 38 21 47 5 6 27 5 92 12 27 34 6 44 75 32 48 42 49 138 34 37 12 19 70 82 11 13 16 12 85 92 47 75 73 44 18 37 32 90 71 42 68 104 24 54 41 27 61 41 28

Thoughts?