ASSIGNMENT-4
Computational Cognitive Science (CS786)

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May 2, 2019

Question 1:

At the time of encoding we encode world context and item.
While retrieval to find strength of association, we take dot product of encoding and taking current world context as cue ($\sum_k c_k * c'_t$)

over multiple trial using random schedule

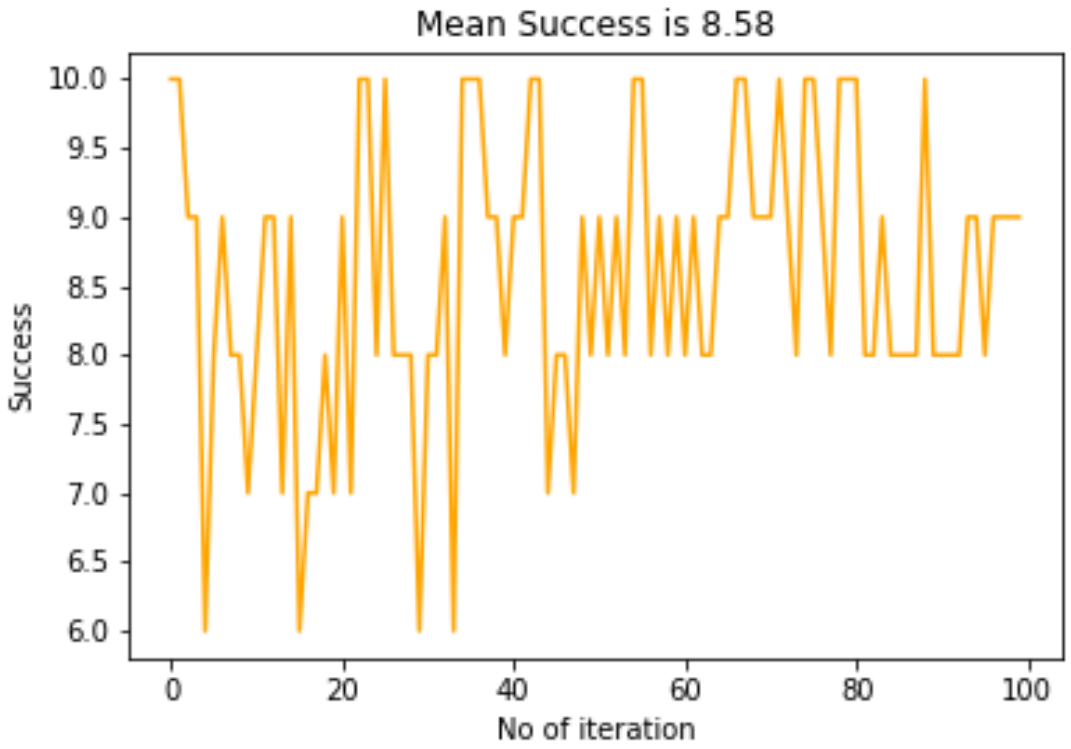

Figure 1: over multiple trial using random schedule

Question 2:

a) Sample delta from mixture of two Gaussian (small and large context change)
For small change we use Gaussian with *0 mean*
For large change we use Gaussian with *1 mean*
Variance in both case is 0.2

Sample Gaussian

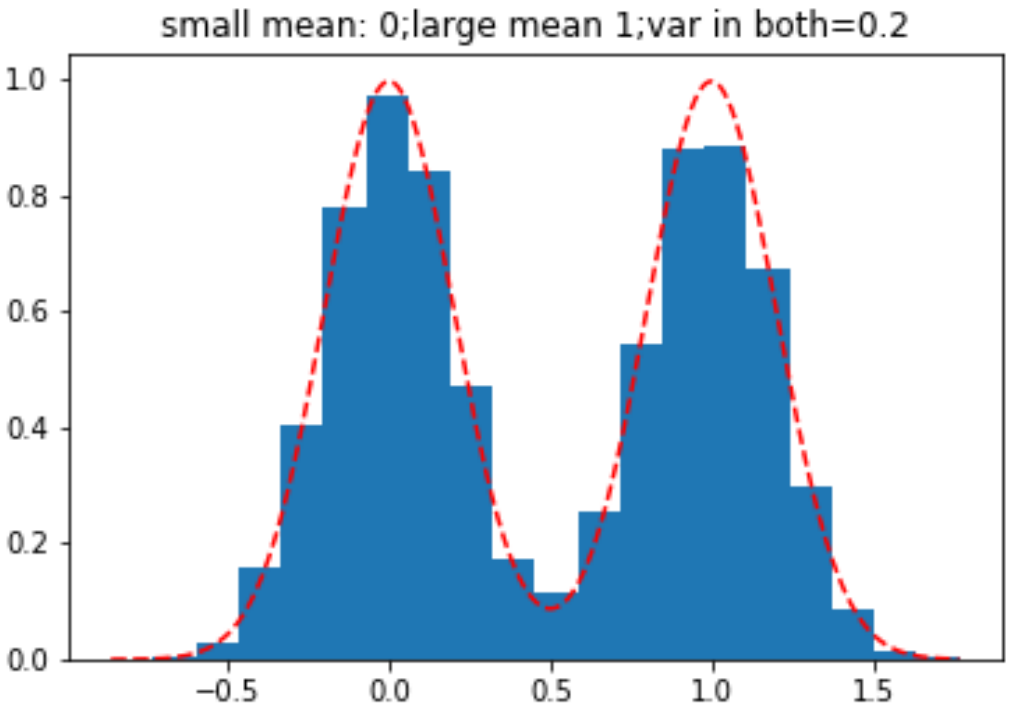

Figure 2: Mixed Gaussian for sampling delta

b) Optimal scheduling policy

For optimal policy we try various thing:(logarithmic interval,truncated Gaussian, regular size interval. Graphs of few are here:

i) Shoving at end

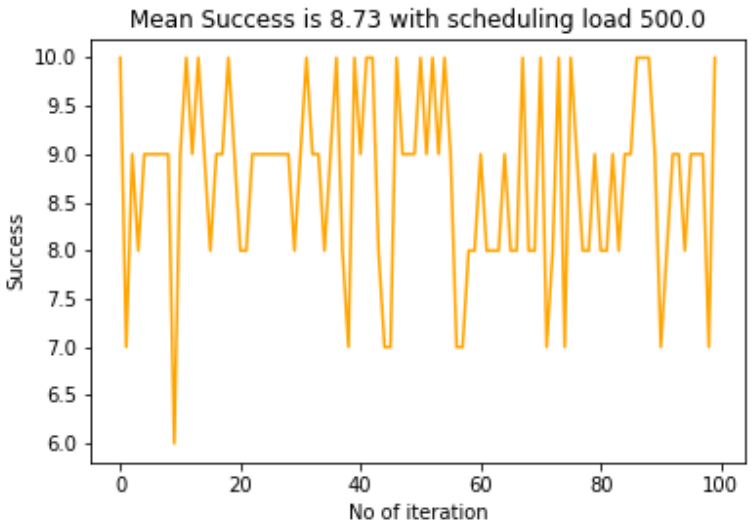

Figure 3: Shoving all at end

ii) Logarithmic Interval

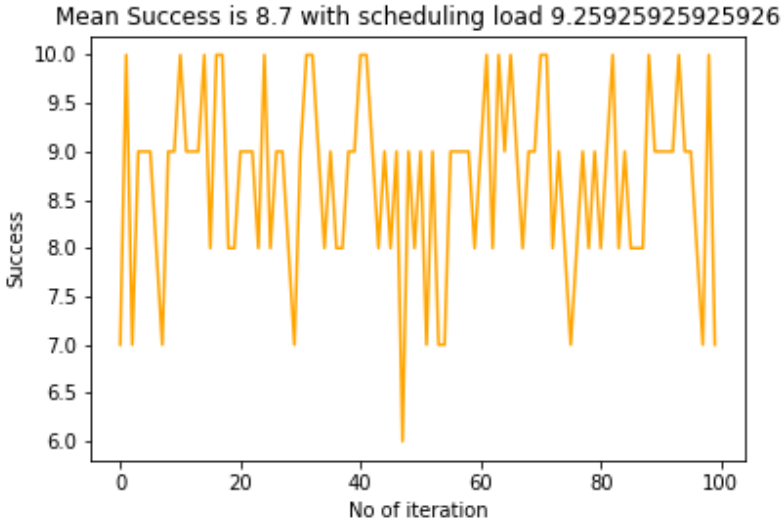

Figure 4: logarthmic$_{i}nterval$

iii) Optimal Policy

For optimal policy,main goal was to maximize median of difference.We shove first five at regular interval of 100 starting from 1 and last 5 at the end(496 to 500)
optimal schedule=[1, 100, 200, 300, 400, 495, 496, 497, 498,499]
This will make median around 100, and scheduling load will be around 5

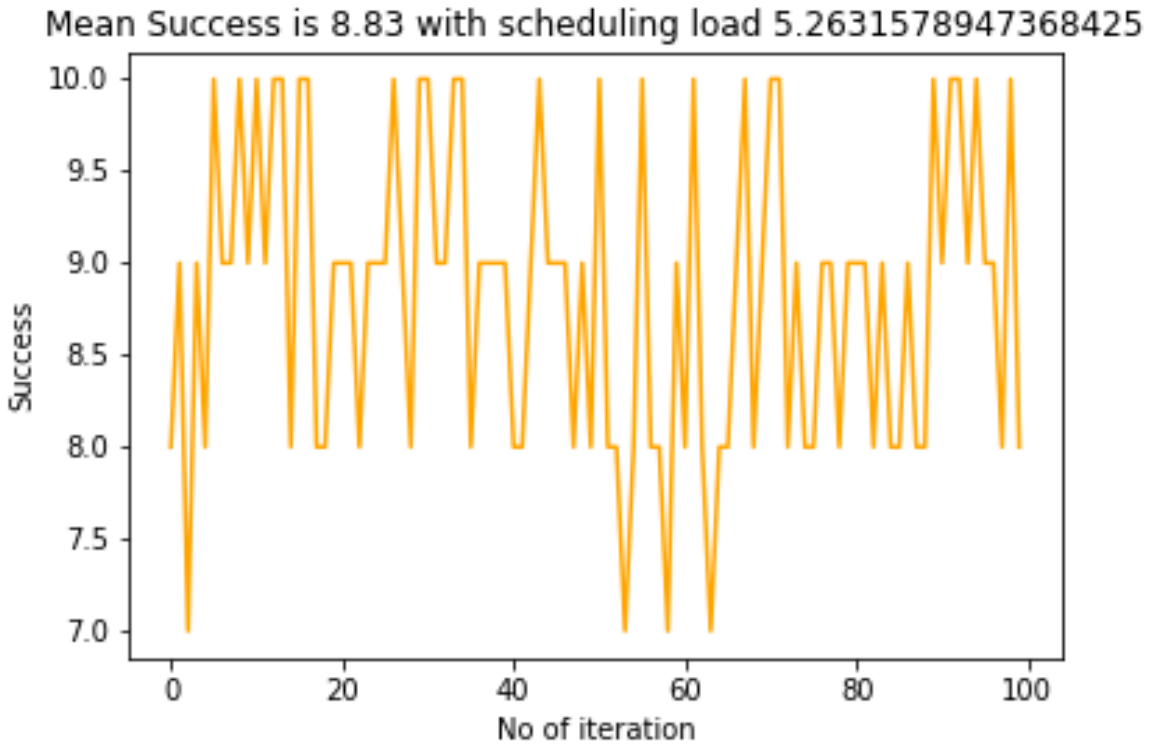

Figure 5: optimal policy

Question 3:

We fit Gaussian mixture model with two components on values of delta, which use expectation maximization.At retrieval time we sample from learned mixture model.

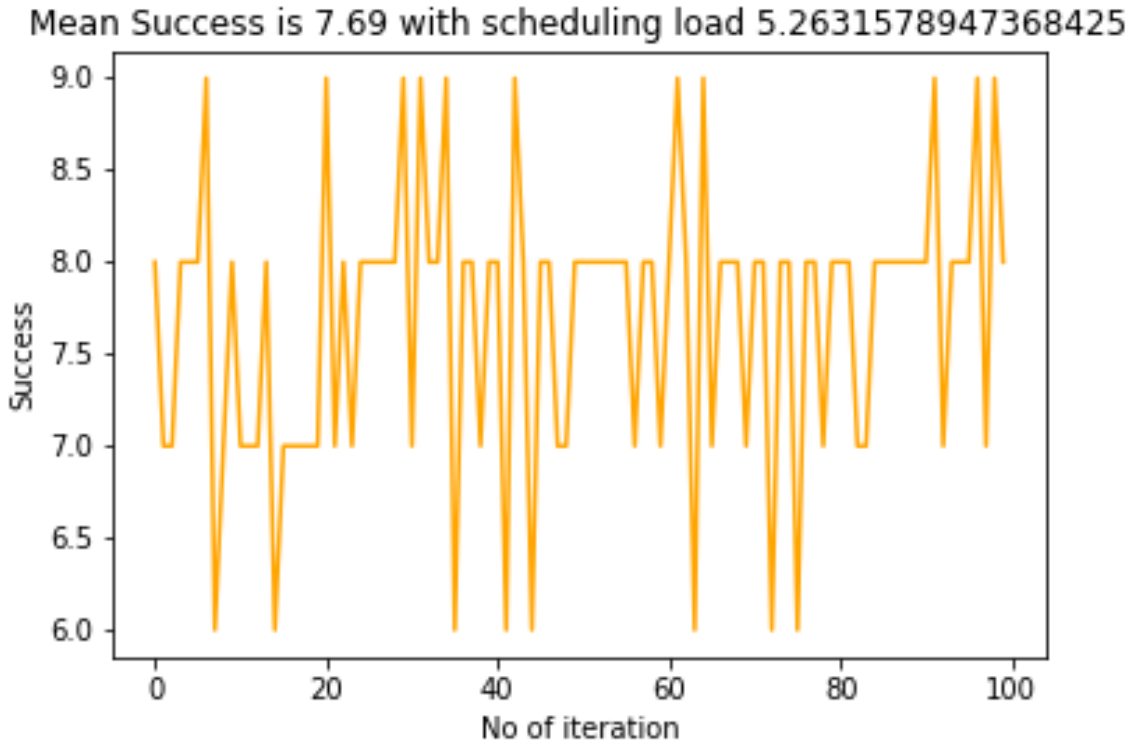

Figure 6: With learned parameter