Markov_chain_Example

Jaemin Park

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Personal device prediction

There is 2 big personal device maker. Apple and Samsung. Both company has their own phone and tablet products. Customers can use two personal devices as the same company's products or they can mix them. Since using same company devices is more compatible between devices, probability of using same company device after 1 year is 0.9. It is uncomfortable to use phone and tablet as different company, there are more probability to make devices as same company. Detailed probabilities are shown in the diagram.
Apple's devices are slightly more expensive than Samsung, so using both Samsung products cost 100, both Apple 120, mixed 110 per year.
Assume that you're early adopter, you must change your phone and tablet every year.

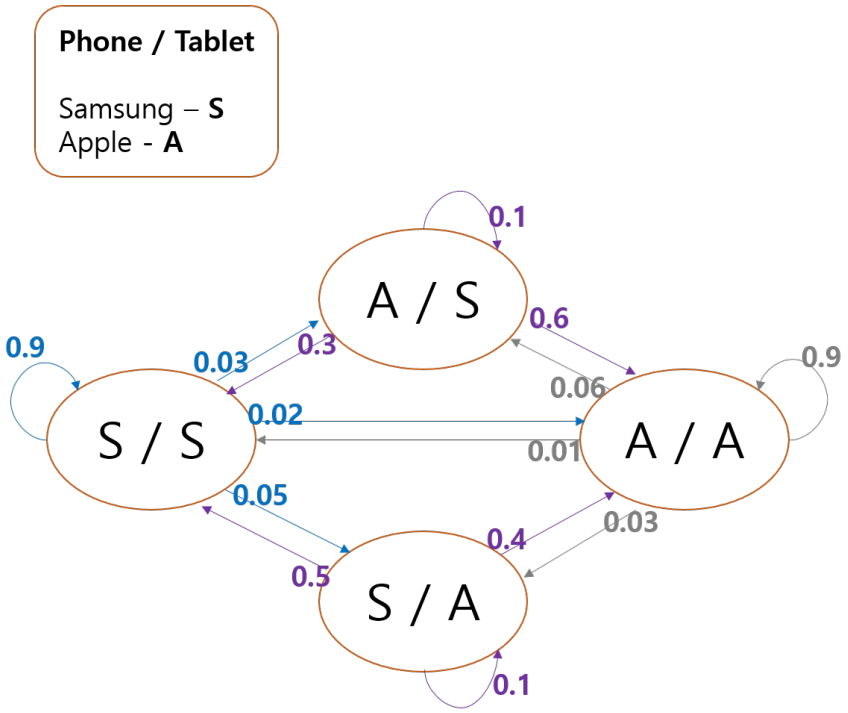

Figure 1: transition

State space - {S/S, A/S, S/A, A/A}
Reward - {-100,-110,-110,-120}
Transition Matrix

$$P = \begin{pmatrix} 0.9 & 0.03 & 0.05 & 0.02 \\ 0.3 & 0.1 & 0 & 0.6 \\ 0.5 & 0 & 0.1 & 0.4 \\ 0.01 & 0.06 & 0.03 & 0.9 \end{pmatrix} \tag{1}$$

Questions

1. If I'm using Samsung phone and tablet, after 10 years, what is the probability of using both Apple devices?

2. If I'm using Apple phone and tablet, How much on average I spend on personal device for 20 years?

3. What is satationary distribution?