

CSL452 : Artificial Intelligence

Lab-5

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We have implemented Variable Elimination and Rejection Sampling in La5.

Variable Elimination is an exact inference which provides the exact probability. The complexity is large but depends on the tree-width of the Bayesian Network given.

Rejection Sampling is a sampling technique in which the Samples generated which are not in sync with the observed readings are rejected and the probability is calculate by the remaining samples. Good way to approximate but samples must be large to get an accurate probability.

The Code which has to run is : Solution.py

Please provide the two files in the command line :

- 1. Bayesian network file in the format given in the question**
- 2. Query file in the format given in the question**

Run the code using the following command :

python Solution.py bayesian.txt query.txt

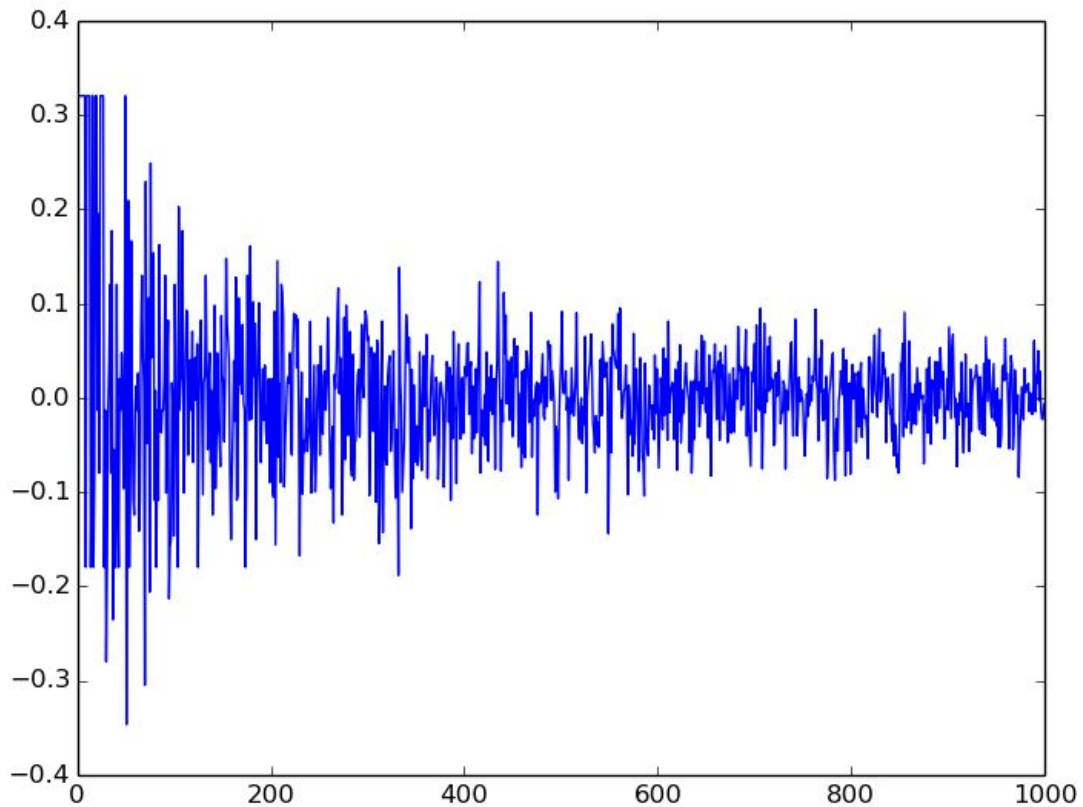
The Variable Elimination is implemented in VE.py and Rejection Sampling is implemented in RS.py

The final output comes in Answer.txt

“Please *DELETE* the contents of Answer.txt before running Solution.py for each time as the readings will get appended.”

We have observed that larger the number of samples, the better will be the accuracy to the correct answer. I have used 1000 samples here but one may use any good number of samples to get the answer.

Analyzing convergence of probability to the actual answer with the number of samples taken.



This is the beautiful result after the analysis. Y axis shows the number of samples and x axis shows the deviation from the reading. We can clearly see the convergence as the number of samples increase.

**The analysis code is named as Analysis.py and this image name is figure_1.png
Convergence will increase as the number of samples increase.**