Inferencing From Bayesian Networks
Lab 5

Aditya Gupta   Milan Chaudhary

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1   Introduction

In this Lab exercise ....

2   Variable Elimination

In this section of program, first a container with all the conditional probability tables from each node instantiated by the evidence varaibles were collected. Then for each hidden variable, all the factors with that variable in it was collected and joined together. This process was repeated until all hidden variables were joined (and summed). The result was thus the required row (after normalization) of the factor formed from joining all the remaining factors.

2.1   Reduce

For each row the index (in binary) was masked with 1 for all non-evidence variables. This leaves behind only the evidence variables and all must thus have same transformed value since evidence are given. Thus comparison was done and required rows were collected.

2.2   Join

In this operation the resultant factor will have union of all variables in both the factors, further the order of the variables is important. First the com-

mon variables were collected then the remaining variables from first then second factor. Both the tables were sorted by creating weights (for common variables) and performing a stable sort (for the remaining variables). The sort involved sorting indices instead of the whole table and then for each set of values for common variables, taken as a block, and the remaining variables's value from both factors for each block were taken and the result were calculated for each block by two nested loops.

2.3   Sum

We note that for summing over a variable's particular value, the value of the variable in the factor only changes periodically; the period was found out and then a hopping loop summed the probabilities for each value, thus finally eliminating the variable.

2.4   Normalize

The sum of the probabilities should be one, thus each row in the resultant factor was divided by the sum of probabilities of the whole factor.

3   Rejection Sampling

In this section of program, it will n ..

3.1   Convergence of the probabilities as function of number of samples generated