Final Homework (Project)

Deadline: Monday December 18th 10:00 AM

Please submit your solutions to Harvey.

You can use any software or programming language.

If you have any questions, please feel free to ask me: mahdi-khodayar@utulsa.edu

Question 1) Implementing a Directed Graphical Model:

See the following websites to find an interesting machine learning problem (a dataset) with at least 5 random variables (features):

https://archive.ics.uci.edu/datasets

https://www.kaggle.com/datasets

If you find your dataset using other sources, you can use your own dataset.

For that dataset:

1) Draw a directed graphical model (DGM)
2) Write at least 4 conditional independence rules for the proposed DGM
3) Show the Markov Blanket of 3 nodes in your graph
4) Train your model using the dataset
5) Do inference in your model. Show the probability density of your query random variable(s) given your evidence random variable(s).
6) Write a variable elimination node order for your DGM and show variable elimination.

Question 2) Implementing an Undirected Graphical Model:

Find another dataset (you can use the websites mentioned in question 1).

For that dataset:

1) Draw an undirected graphical model (UGM).
2) Write at least 4 conditional independence rules in your graph.
3) Train the model using the dataset (train the potential functions of the cliques).
4) Do inference in your model. Show the probability density of your query random variable(s) given your evidence random variable(s).
5) Write a junction tree for your graph.
6) Write a variable elimination node order for your UGM and show variable elimination.