

# Intelligent Systems, Group 9 Project Proposal

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## 1. Motivation

We formulated two questions during our learning to this point: What would a Bayes network look like if the DAG constraint were loosened to allow undirected and possibly cyclical graphs? Further, we wondered if there were a way to resolve the absolute nature of first order logic with the uncertainty of real-world problems.

In our exploration related to these questions, we came across a 2006 publication by Richardson and Domingos which describes the notion of a Markov logic network. MLNs expand the idea of Markov random fields with first-order logic to provide a way to model knowledge in ways that a Bayesian network cannot.

## 2. Proposal

We would like to implement and test a MLN against the “Heart Disease” data set from UCI (found here: <http://archive.ics.uci.edu/ml/datasets/Heart+Disease>). We would like to compare the results of that implementation against other more standard methods, such as a decision tree and a Bayesian network, to provide perspective into how well the model performs.

It is our hope that during the research and implementation of the MLN, we will achieve better insight about these kinds of models, and that insight will lead to a novel alteration to the model or implementation detail that would be worthy of note.