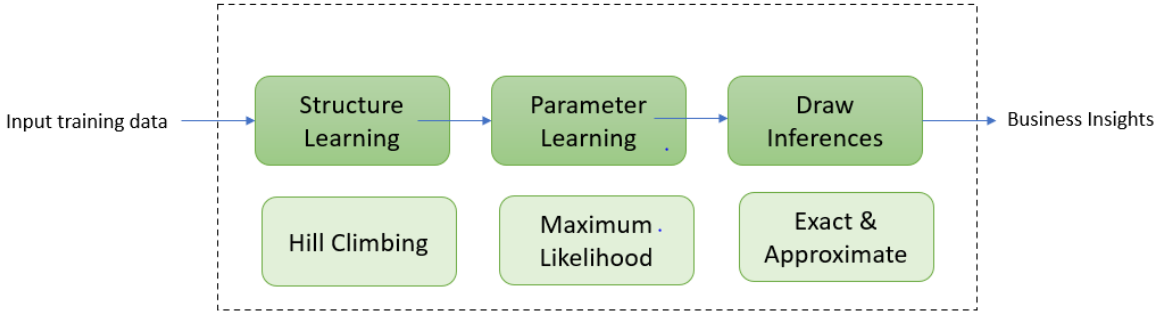
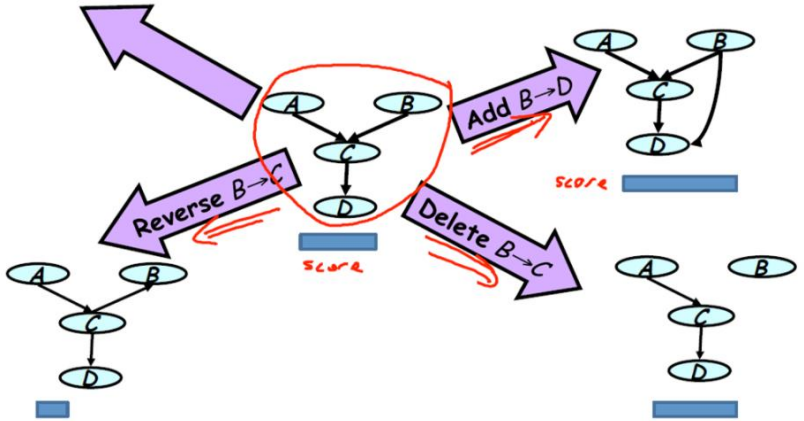
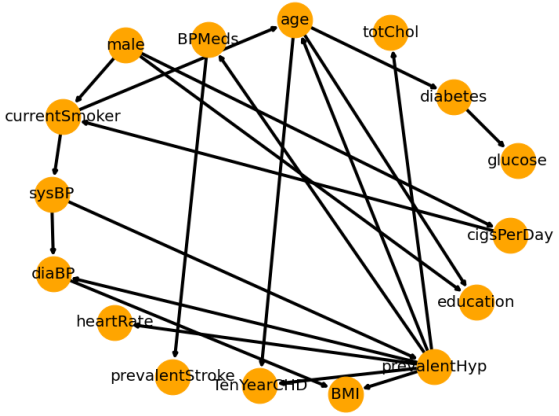
How to learn the Bayesian structure?



Probabilistic Graphical models






```
hc = HillClimbSearch(df, scoring_method=BicScore(df))
best_model = hc.estimate()

edges = list(best_model.edges())
model = BayesianModel(edges)

# Fitting the data to the model using Maximum Likelihood Estimator
model.fit(df, estimator=MaximumLikelihoodEstimator)

# Doing exact inference using Variable Elimination
infer = VariableElimination(model)
```

Prevalent Hypertension change over age distribution

```
print(infer.query(variables=['prevalentHyp'], evidence={'age': bin_age[0]}))
print(infer.query(variables=['prevalentHyp'], evidence={'age': bin_age[1]}))
print(infer.query(variables=['prevalentHyp'], evidence={'age': bin_age[2]}))
```

```
Finding Elimination Order: : 100%|
Eliminating: BPMeds: 100%|
Finding Elimination Order: : 100%|
Eliminating: BPMeds: 100%|
Finding Elimination Order: : 100%|
Eliminating: BPMeds: 100%|
```

prevalentHyp	phi(prevalentHyp)
prevalentHyp(0)	0.8445
prevalentHyp(1)	0.1555

prevalentHyp	phi(prevalentHyp)
prevalentHyp(0)	0.6649
prevalentHyp(1)	0.3351

prevalentHyp	phi(prevalentHyp)
prevalentHyp(0)	0.4938
prevalentHyp(1)	0.5062

- Network constructed using pgmpy
- Pre-requisite: discrete features
- Binning Methods: EqualFrequencyDiscretiser (divides continuous numerical variables into intervals that contain approximately the same proportion of observations)
    - Other options: EqualWidthDiscretiser (creates equidistant intervals) and KBinsDiscretizer

Source