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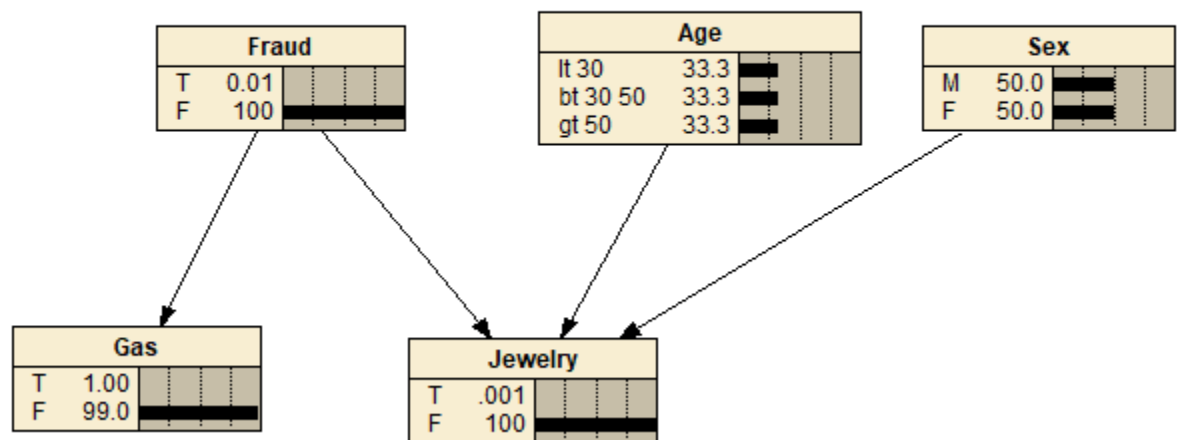
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CPSC 57100 – Artificial Intelligence 1

Spring 1, 2019

MP4

1. Bayesian network definition



a.

	Age < 30				Age 30-50				Age > 50			
	Sex M		Sex F		Sex M		Sex F		Sex M		Sex F	
	Jewelry T	Jewelry F	Jewelry T	Jewelry F	Jewelry T	Jewelry F	Jewelry T	Jewelry F	Jewelry T	Jewelry F	Jewelry T	Jewelry F
Fraud-T	5	95	5	95	5	95	5	95	5	95	5	95
Fraud-F	0.0001	99.9999	0.0005	99.9995	0.0004	99.9996	0.002	99.998	0.0002	99.9998	0.001	99.999

Fraud-	Gas	
	T	F
	20	80
Fraud-F	1	99

2. Minimizing/Maximizing Fraud

- Minimum values – {0.008%, 99.992%}
 - No gas, no jewelry, male < 30
 - No gas, no jewelry, female < 30
 - No gas, no jewelry, male 30-50
 - No gas, no jewelry, female 30-50
 - No gas, no jewelry, male >50
 - No gas, no jewelry, female >50
- Maximum values – {99%, 0.99%}

i. gas, jewelry male < 30

3. Probabilities

- a. $P(\text{Fraud} | \text{gasPurchase}, \text{jewelryPurchase}) = \{93.5\%, 6.54\%\}$
- b. $P(\text{Fraud} | \text{gasPurchase}, !\text{jewelryPurchase}) = \{0.19\%, 99.8\%\}$
- c. $P(\text{Fraud} | !\text{gasPurchase}, \text{jewelryPurchase}) = \{36.6\%, 63.4\%\}$
- d. $P(\text{Fraud} | !\text{gasPurchase}, !\text{jewelryPurchase}) = \{0.008\%, 99.992\%\}$