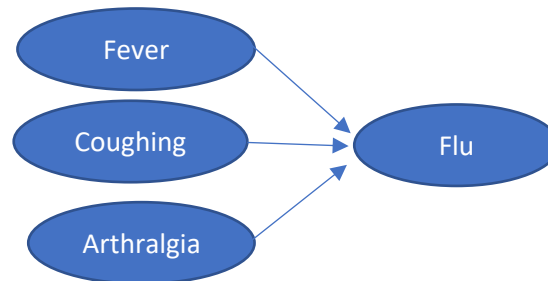


Project 3 Wrapper

James Root - CS 3600 - Spring 2021

Question 1



There are many advantages and disadvantages for each of the Bayes networks. For this naïve bayes model, the client is able to better discern what specific symptoms they may have with a disease. If they were to have the flu, then some combination of fever, coughing, and arthralgia are likely to occur. On the other Bayes network given, we see a wider yet more complex picture. Having this complex network of nodes allows for clients to see more of the probability side of these causal relationships. For example, if someone has a fever, they could have the Flu OR a Cold, it is not entirely certain which disease they may have. For implementation over a diagnosis system, this Bayes network would be a richer choice.

Question 2

SICK(T-2)	SICK(T-1)	$P(\text{SICK}(T) = T \mid \text{SICK}(T-1, T-2))$	$P(\text{SICK}(T) = F \mid \text{SICK}(T-1, T-2))$
T	T	.25	.75
T	F	.4	.6
F	T	.7	.3
F	F	.5	.5

SICK(T)	COUGH(T) = T	COUGH(T) = F
T	.8	.2
F	.1	.9

Question 3

There are underlying instinctual decisions made with human brains that cannot be accurately portrayed in these models. These AI systems are very useful for throwing flags about patients, but it becomes risky to entirely trust the judgement of the systems. One situation in which the faultiness of these Bayes network systems could be exposed is if a patient is to deal with the severity of one's symptoms. For example, if a patient were to have what a medical professional would consider a severe cough but for the patient they were to think it as mild and give that to the system, the doctor may lean more towards a throat or respiratory issue while the Bayes network would consider other issues. In this case, having another set of trained ears and eyes is very useful. In another case, the patient could have large congestion in the lungs which would need to be observed by a doctor with a stethoscope. The patient may not have these tools or skills to observe some symptoms crucial for diagnosis.

Question 4

Providing diagnosis likelihoods would serve a negative impact on human behavior. As we discussed in the previous question, it is important for trained professionals to observe patients as well. If a patient were to be given a 99% likelihood of symptoms exhibiting a simple cold or seasonal allergies but a 1% likelihood of early-stage lung cancer, the patient would probably just assume it being a cold. Most times, this would probably not have an impact, however, for that 1% that may assume their symptoms reflect a cold or seasonal allergies it is vital for this disease (along with others) to be caught early in order to ensure survival.