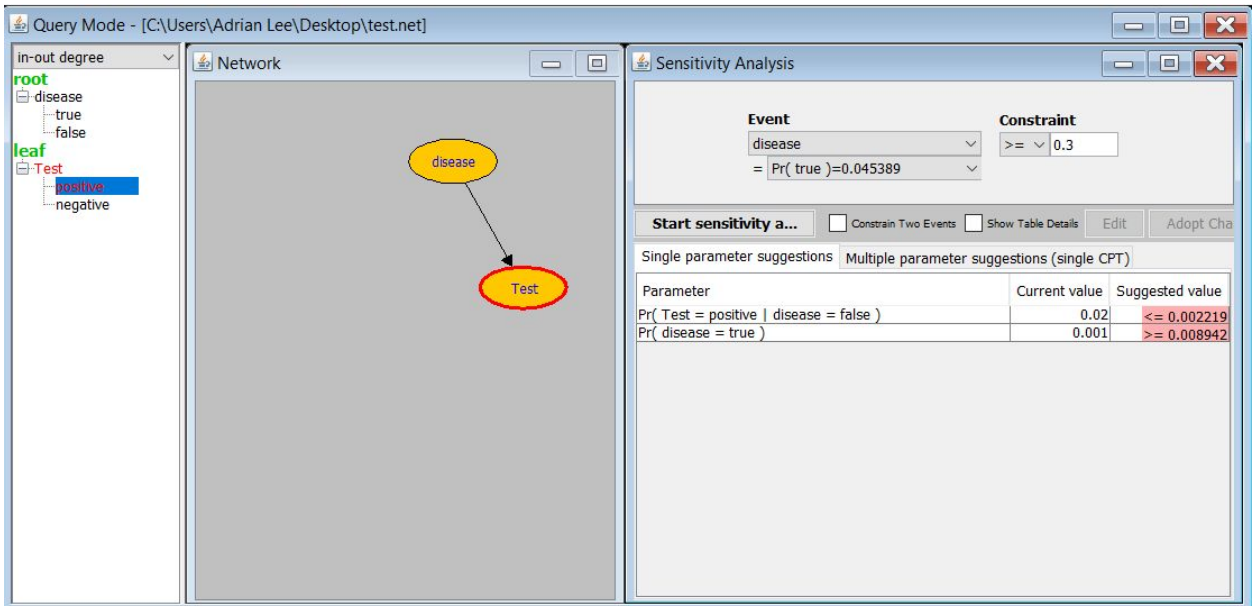
1.

	Constraint to ensure Pr(D|T)>=0.3
The prior probability of having the disease	Pr(disease=true)>=0.008942
The false positive for the test	Pr(Test=positive|disease=false)<=0.002219
The false negative for the test	No suggestions



2.

Variable	Value1	Value2
ExpectingGuests	Yes	No
FamilyHome	Yes	No
SoundSensor	On	Off
LightSensor	On	Off
HearableBarking	Yes	No
Battery	OK	Dead
SoundSensorHealth	OK	Broken
LightSensorHealth	OK	Broken

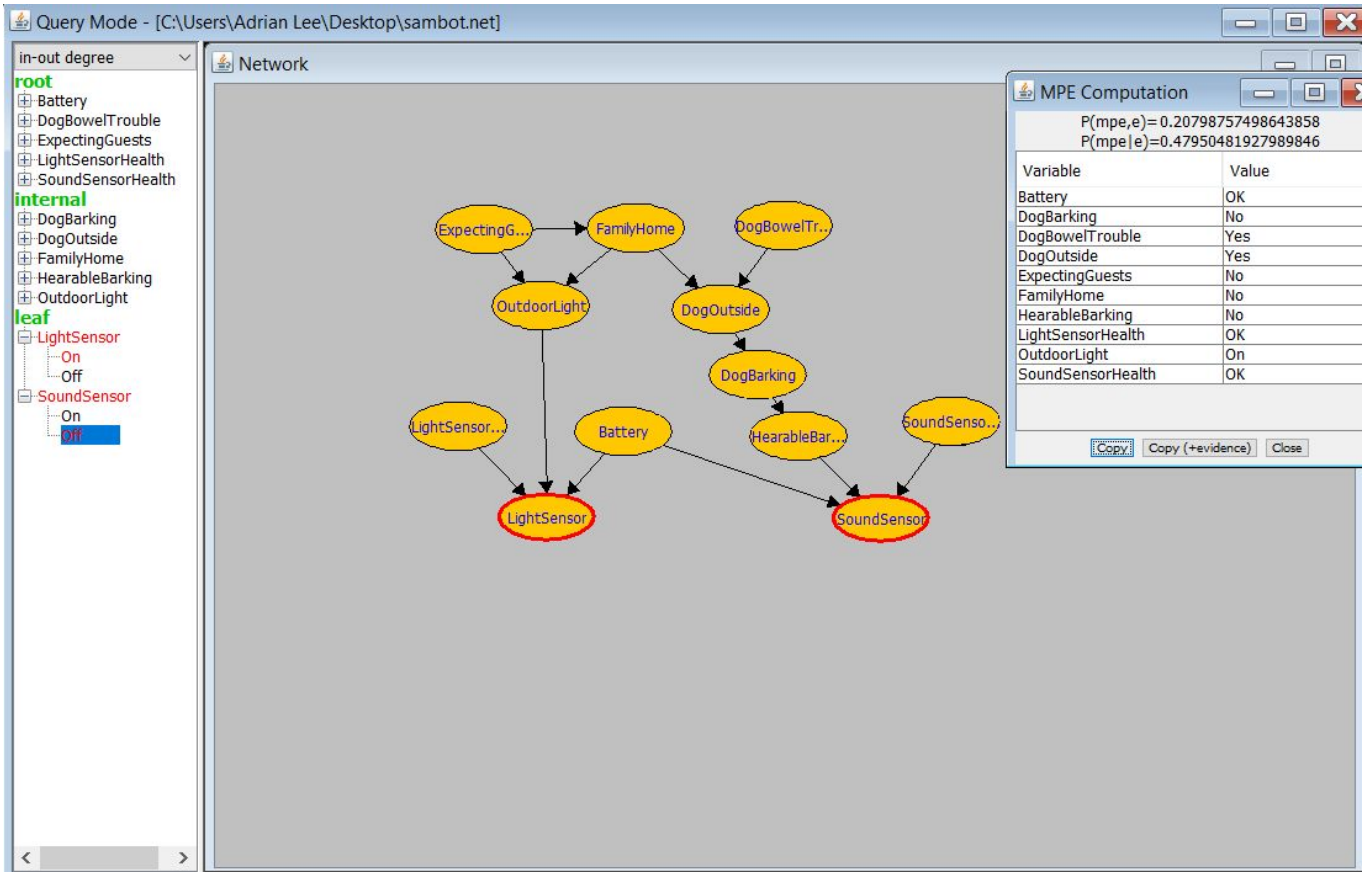
DogBarking	Yes	No
DogOutside	Yes	No
OutdoorLight	On	Off
DogBowelTrouble	Yes	No

I interpreted DogBarking as to whether any dog is barking, and it could be Sambot's dog barking or any other dogs barking.
I interpreted HearableBarking as whether Sambot hears any barking from his dog or other dogs.
I interpreted DogOutside as Sambot's dog being in the backyard or not.
I also interpreted ExpectingGuests as whether Sambot's wife is expecting guests at home.
FamilyHome: Yes, if Sambot's wife is home. No, if Sambot's wife is not home.
SoundSensor: On, if the sound sensor detects the barking of dogs. Off, if the sound sensor doesn't detect the barking of dogs.
LightSensor: On, if the light sensor detects outdoor lights. Off, if the light sensor doesn't detect outdoor lights.
Battery: OK, if the battery is good. Dead, if the battery is dead.
SoundSensorHealth: OK, if the sound sensor is good. Broken, if the sound sensor is broken.
LightSensorHealth: OK, if the light sensor is good. Broken, if the light sensor is broken.
OutdoorLight: On, if the outdoor light is on. Off, if the outdoor light is off.
DogBowelTrouble:Yes, if the dog has bowel trouble. No, if the dog does not have bowel trouble.

The causal structure that I constructed is shown below together with the MPE.

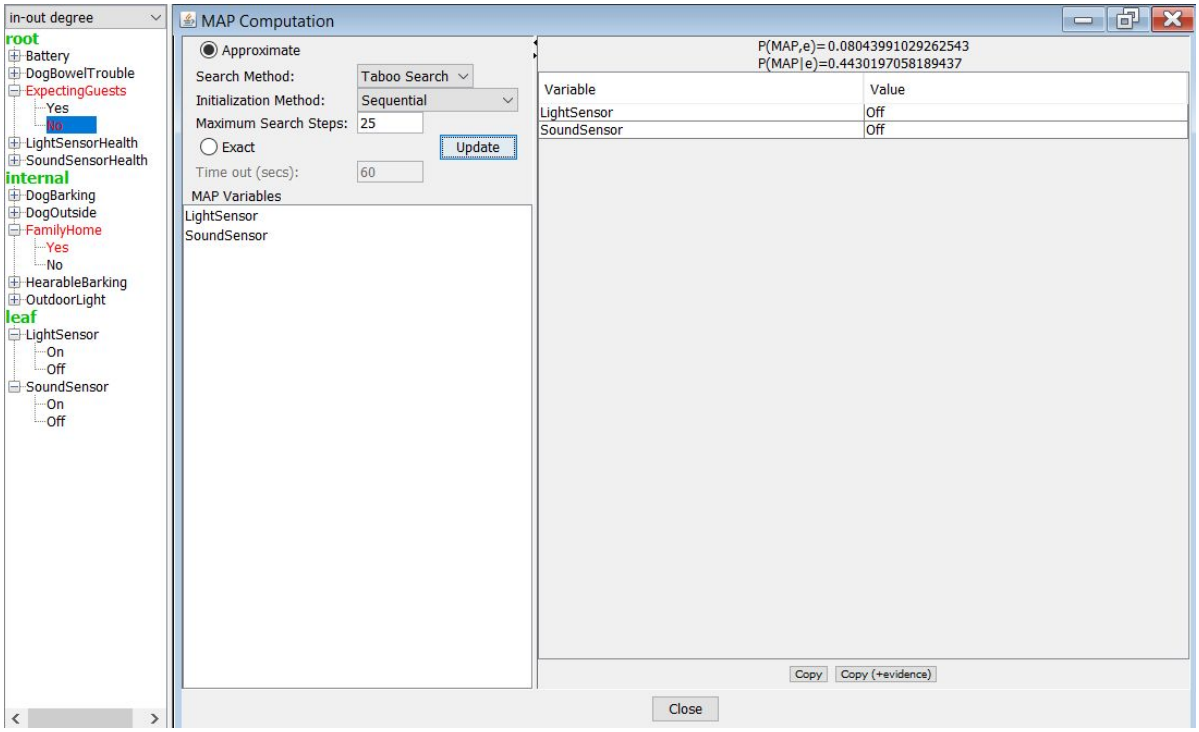
➜ I used the MPE tool in SamIam to obtain the most likely instantiation of all variables given LightSensor=On, SoundSensor=Off.

Variable	Value
Battery	OK
DogBarking	No
DogBowelTrouble	Yes
DogOutside	Yes
ExpectingGuests	No
FamilyHome	No
HearableBarking	No
LightSensorHealth	OK
OutdoorLight	On
SoundSensorHealth	OK



➜ I used the MAP tool in SamIam to obtain the most likely instantiation of LightSensor and SoundSensor given ExpectingGuests=No, FamilyHome=Yes.

Variable	Value
LightSensor	Off
SoundSensor	Off



➜ **Z={Battery, HearableBarking}**, so that **Z** is the smallest set of variables in my network such that LightSensor and SoundSensor are independent given **Z**. Battery is a divergent valve connecting LightSensor and SoundSensor. If Battery is known, the divergent valve is closed. So the path LightSensor-Battery-SoundSensor is blocked in the network. HearableBarking is a sequential valve between SoundSensor and Dogbarking. If HearableBarking is known, the sequential valve is closed, and thus the other path between LightSensor and SoundSensor is closed. Since every path between LightSensor and SoundSensor is blocked by **Z**, dsep(LightSensor,**Z**,SoundSensor), and I(LightSensor,**Z**,SoundSensor). Thus, the two sensors are independent given **Z**.

➜ I constructed a **multiply-connected network**, since the associated undirected graph contains loops.