PARKINSON’S DISEASE DIAGNOSES

Contents:

Abstract:

Parkinson's disease (PD) is a neurodegenerative disease and has a lot of important research ongoing to find its causes and use that to find a cure. It is a really interesting topic because after so much research the causes for this disease have not been identified by the medical community. I have modelled this disease as a Bayesian network of causes and symptoms. I have referred to medical information available online to find the various risk factors and symptoms of the disease and have modelled the network based on the same. The nodes and the corresponding Conditional Probability Tables (CPTs) are based on this information.

Features:

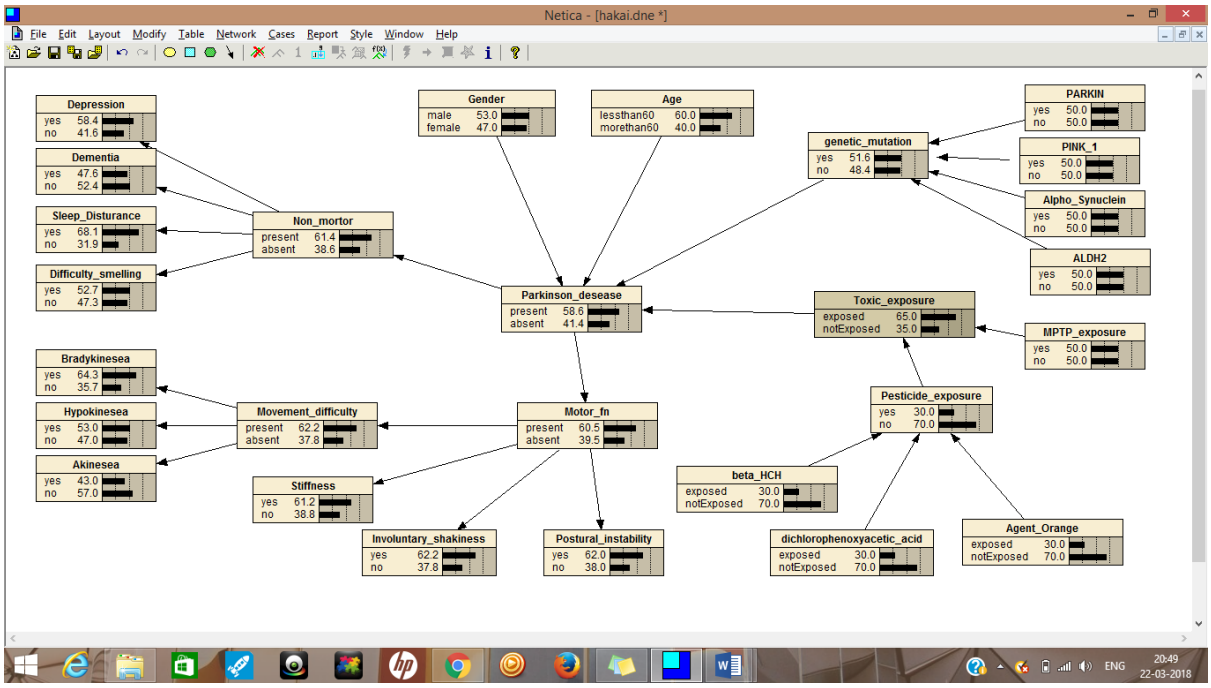
There are 27 nodes in total divided among causes and symptoms.

- The first dimension is the genetic mutation and the presence of genes which increase the chances of one getting PD (PARKIN, PINK-1, Alpho Synuclien, ALDH2).
- Then comes the substance, exposure to which may cause acceleration in chances of developing PD.
    1. Pesticides and insecticides like beta-HCH, 2-4 dichlorophenoxyacetic acid, Agent Orange.
    2. MPTP, which is found is synthetic opioid.
- Another dimension is age. People over the age of 60 have been found more prone to Parkinson's disease. It is estimated 1 in 100 person above 60 suffers from PD.
- Gender is also a deciding factor. Males are 50% more prone to PD than female.
- Now, the symptoms of PD, these symptoms affect various functions of the brain and can be divided into broad categories-
    1. Motar function like posture instability, involuntary shakiness, stiffness and difficulty in movement(Bradykinesea, Hypokinesea, Akinesea)
    2. Non motor functions like depression, dementia, sleep disturbance and difficulty in smelling.

Usage Manual:

Evaluating the Bayes network I have supplied the .neta file that contains this Parkinson's disease diagnosis network. You can open it in Netica and play around with it. You can also check the different CPTs by right clicking a node and going to the "Table". • Open the file in Netica. File > Open • Go to Network > Compile • Now the net is ready and you can play around with it by changing the probability values of the different nodes to check how the causes influence the presence of the disease. And also by setting values for the symptoms you can see how probable it is to get the disease for the non-causal direction.

When you compile the Bayes net you should see a network like this picture



For the nodes explanation, kindly check the corresponding CPTs to see how the values are achieved.