CSC 384 Summer 20 - A4 - Q2

This component of A4 is worth 30% of the mark on A4. Your last submission will be the one that is marked.

If you encounter any problems with the assignment, please email the A4 TA, Parsa, at p.mirdehghan at gmail.com with [CSC384 A4] in the subject.

*Required

teach.cs ID *

zhanzhir

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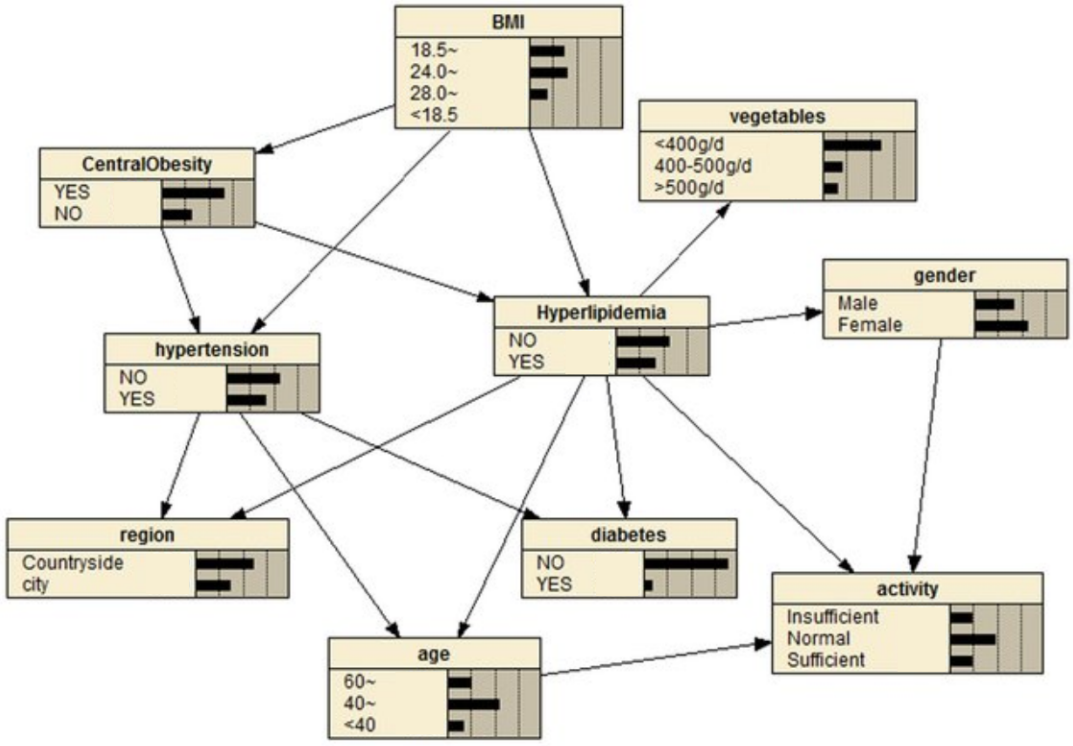
Question 2(a)

Show a case of conditional independence in the Medical Diagnosis Network (below) where knowing some evidence item V1 makes another evidence item V2 irrelevant to the probability of some third variable V3. (Note that conditional independence requires that the independence hold for all values of V1, V2 and V3).

Medical Diagnosis Network



V1 *

Hyperlipidemia

V2 *

Hypertension

V3 *

Gender

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Question 2(b)

Show a case of conditional independence in the Medical Diagnosis Network where two variables (V1 and V2) are independent given (V3 and V4) but dependent given evidence at V5.

V1 *

Gender

V2 *

Age

V3 *

Hyperlipidemia

V4 *

Diabetes

V5 *

Activity

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Question 2(c)

Show a sequence of accumulated evidence items V1 = d1,...,V5 = d5 (i.e., each evidence item in the sequence is added to the previous evidence items) such that each additional evidence item *increases* the probability of some variable V0 having value d0. (That is, the probability of V0 = d0 increases *monotonically* as we add the evidence items). Note that by monotonically increasing, we mean non-decreasing.

V0 *

BMI

d0 *

~24.0

V1 *

Central Obesity

d1 *

N0

V2 *

Hypertension

d2 *

YES

V3 *

Vegetables

d3 *

<400g/d

V4 *

Region

d4 *

Countryside

V5 *

Hyperlipidemia

d5 *

YES

What is P(V0=d0|V1=d1,V2=d2,V3=d3,V4=d4,V5=d5)? *

0.484516647

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Question 2(d)

Show a sequence of accumulated evidence items V1 = d1,...,V5 = d5 (i.e., each evidence item in the sequence is added to the previous evidence items) such that each additional evidence item decreases the probability of some variable V0 having value d0. (That is, the probability of V0 = d0 decreases *monotonically* as we add the evidence items). *Same as Question 2(c), but decreasing instead of increasing* Note that your answer here should be different than your answer for 2(c).

V0 *

BMI

d0 *

~18.5

V1 *

Central Obesity

d1 *

NO

V2 *

Hypertension

d2 *

YES

V3 *

Vegetables

d3 *

<400g/d

V4 *

Gender

d4 *

Male

V5 *

Hyperlipidemia

d5 *

YES

What is P(V0=d0|V1=d1,V2=d2,V3=d3,V4=d4,V5=d5)? *

0.445915156

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