

## CS 514 – Applied Artificial Intelligence

Fall 2017

Project 4

Nickname

Skynet

Project

Braking and Lane Change Decision Support System

Domain

Autonomous Driving

Description

The project builds up from project 3 adding two decision nodes and two utility nodes for braking and lane change decisions respectively.

Braking Utility node is defined as follows:

braking	desiredSpeedMet	Collision	Braking_Utility
yes	yes	yes	10
yes	yes	no	-5
yes	no	yes	10
yes	no	no	-30
no	yes	yes	-80
no	yes	no	20
no	no	yes	-80
no	no	no	10

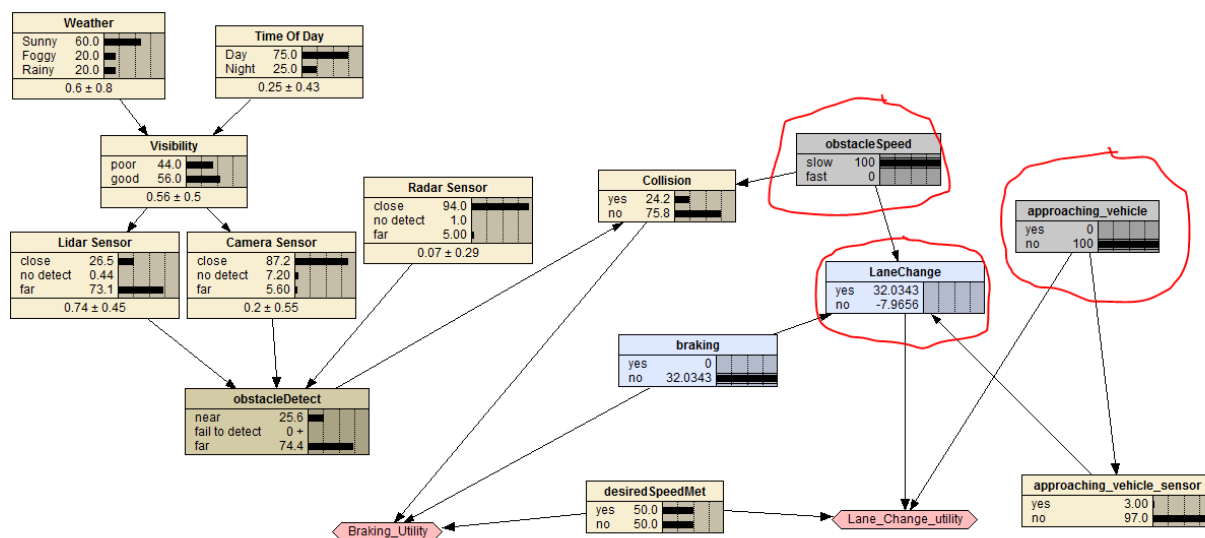
If there is danger of collision and no brake is applied, lowest utility of -80 is obtained. Also, braking while there is no danger of collision has negative utility penalizes the decision. The utility is worse if the desired Speed has not been yet met. However, application of brake when there's detection of collision leads to positive utility. The utility is highest when there is no danger of collision, brake is not applied and desired speed has been met.

Lane Change Utility node is defined as follows:

approachi...	LaneChan...	desiredSp...	Lane_Chan...
yes	yes	yes	-80
yes	yes	no	-80
yes	no	yes	0
yes	no	no	0
no	yes	yes	40
no	yes	no	40
no	no	yes	20
no	no	no	-20

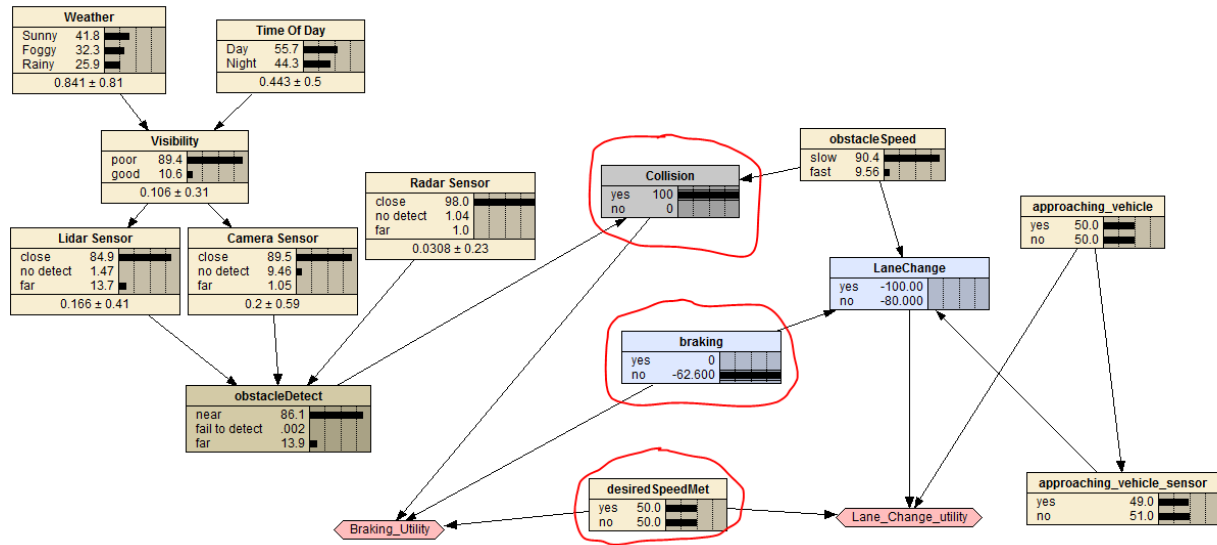
Here if lane change is attempted when there is vehicle approaching, it leads to lowest utility (-80). Also, if lane change is made when there is no approaching vehicle, positive utility is awarded. If there is approaching vehicle and no lane change is attempted, it leads to 0 utility regardless of desired speed being met or not.

### Test Case #1



Here if we observe that the obstacle ahead is slow and there is no approaching vehicle, the decision node suggests lane change has higher utility.

### Test Case #2



Here no matter if desired speed is met, braking has higher utility (0 ; others negative) when there is certainty of collision.