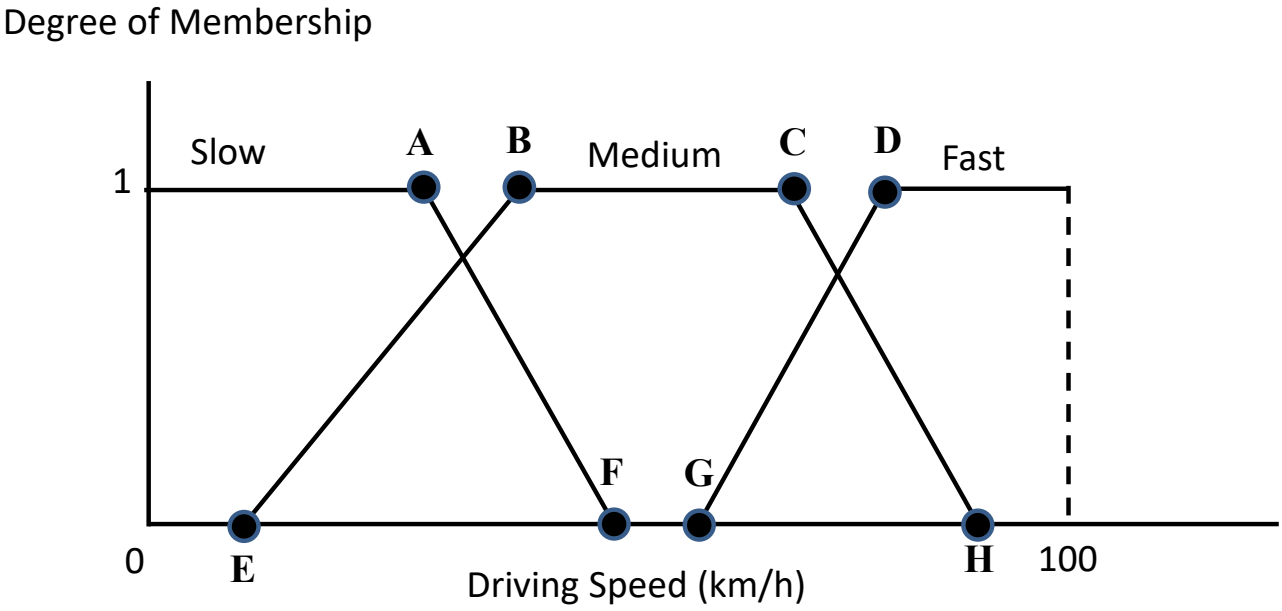
Tutorial 12 Fuzzy Logic

Introduction

In this tutorial, you will gain better understanding about Fuzzy Logic. Refer to Lecture 09 handout for completing this tutorial.

Task 1. Fuzzification and Defuzzification

The membership functions for converting the driving speed into the membership values of 3 fuzzy sets: slow, medium, fast are shown in the following graph:



A: (30,1) B: (40,1) C: (70,1) D: (80,1)
E: (10,0) F: (50,0) G: (60,0) H: (90,0)

(a) What are the degrees of membership for the 3 fuzzy sets under the following driving speed?
  (i) Driving speed = 22 km/h
  (ii) Driving speed = 85 km/h

(b) Assume that the characteristic driving speed for each fuzzy set is obtained by the average of the minimum value and maximum value at which the function returns 1 (Approach 3 in slide 9 of Lecture 09).
  (i) What is the characteristic driving speed for each fuzzy set?
  (ii) If the degrees of membership for slow, medium and fast are 0.6, 0.4, 0.1 respectively, and we are to blend each characteristic point based on its corresponding degree of membership (Refer to slide 10 of Lecture 09), what would be the driving speed after defuzzification?

(c) Are these 3 fuzzy sets slow, medium, fast mutually exclusive?

Task 2. Complete the Canvas Quiz

Complete the quiz “Tutorial 12” on the Canvas course page (Assignments > Tutorial 08) before the posted deadline.