

# Intelligent Systems: Reasoning and Recognition

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Exercise 5

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You may answer questions in English or in French. Illustrate your answers with mathematics.

You are a political analyst. You have been asked to identify sectors of the population that can be targeted for a publicity campaign for an upcoming referendum. For this task you have conducted a survey composed of 5 questions. Each question has a fixed, finite set of possible answers. The questions and answers are as follows:

- 1) What is your age? A) 18-29, B) 30-39 C) 40-49 D) 50-59, E) 60 or higher
- 2) What is your gender? A) Male, B) Female
- 3) What is your most recent diploma? A) High school B) Bachelor, C) Master D) Doctor E) other
- 4) What is your annual Salary? A) < 15 000 B) 15 000 - 29 999 C) 30 000 - 60 000 D) more than 60 000.
- 5) How do you plan to vote? A) "Yes" B) "No" C) Undecided. D) Will not vote.

a) For the group who have responded A or B to question 5, Explain how to use a ratio of histograms to predict the most probable vote of a voter as a function of age?

b) Explain how to use a ratio of histograms to predict the response to question 5, given the responses to questions 1, 2, 3, and 4. How many responses to the survey do you need? How can you determine the probability of error for such a prediction?