

AITA - Exercise Sheet 9

The aim of this exercise session is to gain some experience in the practical aspects of building an Expert System. You should have your lecture notes from week 9 at hand to guide you. Question 1 is a past exam question which should be easily answerable using your lecture notes. Question 2 is a practical exercise.

Question 1 (Based on Question 4 in May 2003 AI Techniques Exam)

- (a) Give a definition of “Expert System”. [2%]
- (b) Outline how Expert Systems can be distinguished from more conventional computer systems. [4%]
- (c) In the context of Expert Systems, describe what the term “knowledge acquisition” covers. [4%]
- (d) Outline some of the main technical problems that one has to overcome when trying to build a successful Expert System for a new domain. [5%]

Question 2 (Practical Exercise: *Expert System Building*)

The plan is to split into small groups (of about 4 to 5 people) containing ‘experts’ and ‘knowledge engineers’. The ‘knowledge engineers’ will use their knowledge elicitation skills to extract knowledge/expertise from the ‘experts’, and build up, via an appropriate intermediate representation, a small rule based Expert System.

First, choose a suitable problem domain to work with. Given the limited time available, you should try to pick something “simple”, for example:

1. Where to go on holiday
2. How to supplement one’s income
3. Where to go for a night out in Birmingham
4. Which computer to buy
5. How to find a good husband/wife/boyfriend/girlfriend
6. How to pass your AI Techniques exam

It will be assumed that the ‘knowledge engineers’ are already familiar with the technical terminology and jargon associated with the problem domain. We shall soon find out how much, or little, expert knowledge the ‘experts’ actually have.

Think about the goals for your system, and the steps that will lead to them. Think about the different outputs your system should be able to produce. Clearly, how the Expert System should respond at each stage will depend on many different things (such as the age, sex, affluence, tastes, intelligence, skills, mood, etc. of the user), and appropriate rules will need to be built into the system so that it responds appropriately to each potential user in each potential situation.

The 'knowledge engineers' should build up an appropriate intermediate representation that their 'expert' can help them refine. Think about what kind of intermediate representation would be most appropriate for your chosen problem – a semantic network, or decision tree maybe?

You should also consider whether your system needs to be capable of reasoning with uncertain or fuzzy information, and if so, how in practice you could do this.

You clearly won't have time to convert your intermediate representation into a fully functional expert system, but you should think about how you would go about doing it if you did have the time.

You should aim to consider as many different aspects of Expert System building as you can, rather than concentrating on one aspect in detail.

Students who have thought about this exercise in advance will get to choose their own problem domain/group/role. The rest will get assigned them randomly (in a manner which maximises the amusement of the lecturer!).