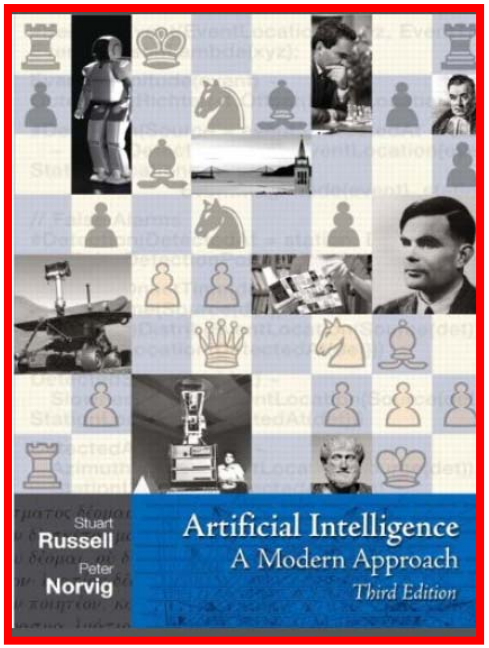
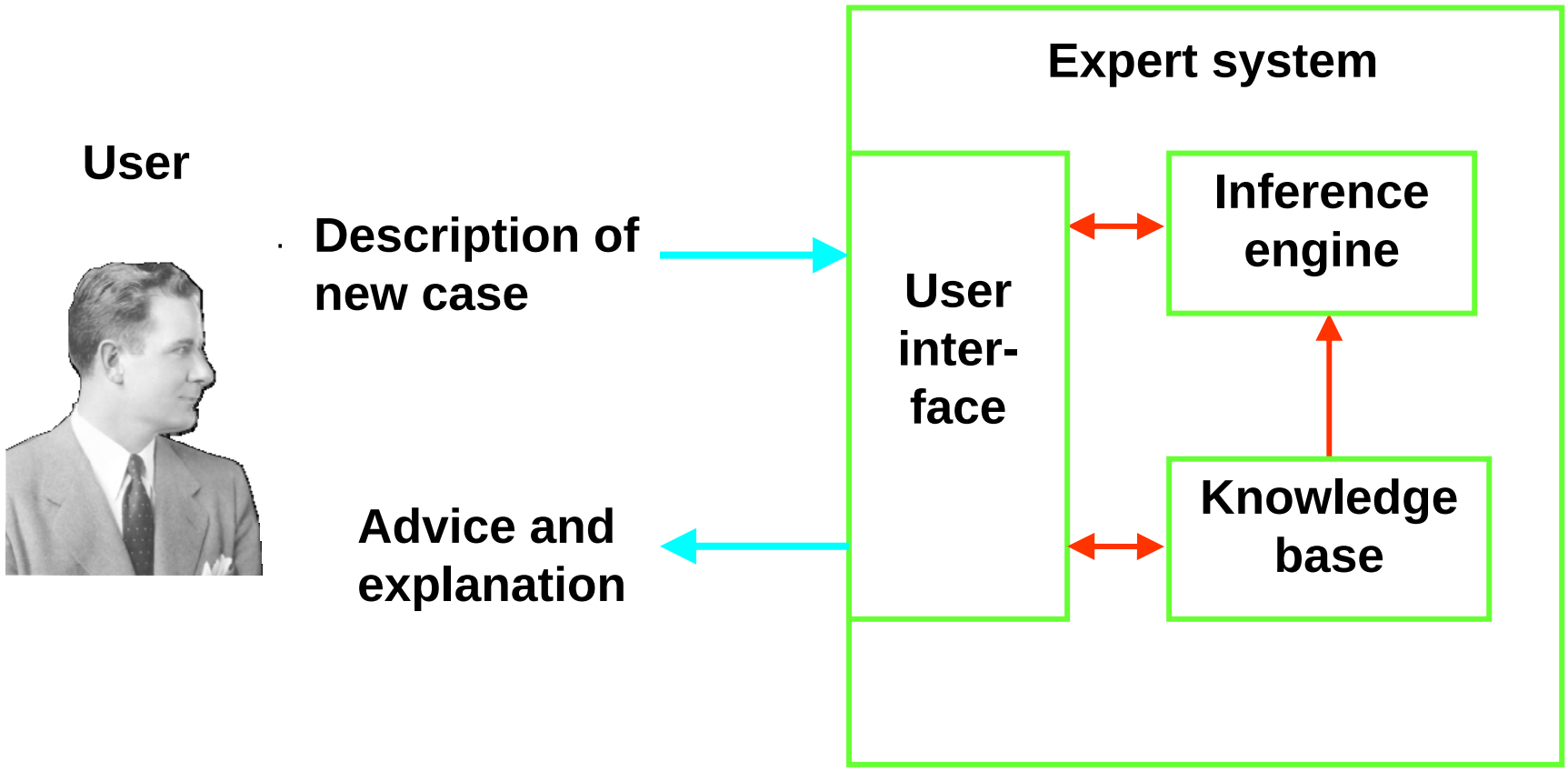


Expert Systems

Yanmei Zheng

Expert Systems

- A simple sketch of an expert system:



Expert Systems

The knowledge base usually contains a large set of rules.

The inference engine uses inference rules to evaluate the information entered by the user (remember?).

Typically, it will dynamically generate a series of questions for the user.

Often, the choice of the next question will depend on the user's previous answers.

After giving its diagnosis and advice, the expert system has to explain to the user how it came to its conclusions.

Expert Systems

This way expert systems can support decision making by "other" experts.

Example: The system MYCIN assists doctors in choosing antibiotics for patients with bacterial infections.

Sample rule:

If (i) the infection is meningitis
and (ii) organisms were not seen in the stain of the culture
and (iii) the type of infection may be bacterial
and (iv) the patient has been seriously burned
then there is suggestive evidence that Pseudomonas aeruginosa is one of the organisms that might be causing the infection.

Expert Systems

The simplest way of building expert systems is based on decision trees.

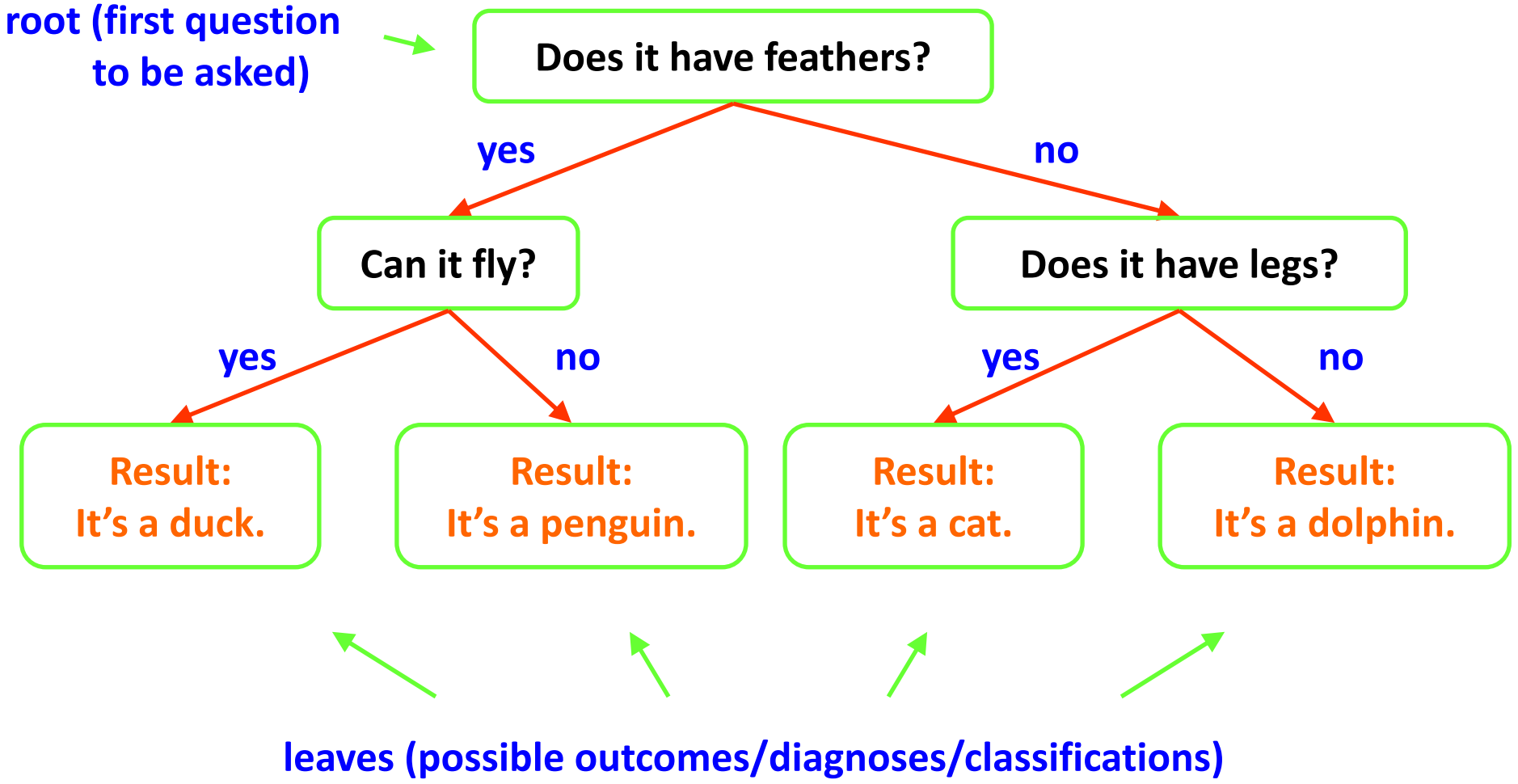
In a decision tree, each inner node corresponds to a question and has an outgoing branch for each possible answer/decision.

The leaves of the decision tree indicate the possible outcomes of making a specific series of decisions.

Expert Systems

On the course homepage you will find the program expert.exe and a sample tree file sample.txt.
Please download both files to a PC into the same directory and start expert.exe.
Tell it that you want to load a file and then enter the name sample.txt.
Choose menu option 2 to start the system.
You can try out all menu options to build, modify, and save your own expert systems.
Of course this program is very simple – it only uses yes/no questions to build a binary decision tree.

Example: Identification of Species



Example: Identification of Species

Now imagine that you are seeing a dog and, since you do not know what a dog is, want the system to identify this species.

The system will actually tell you that it is a cat.

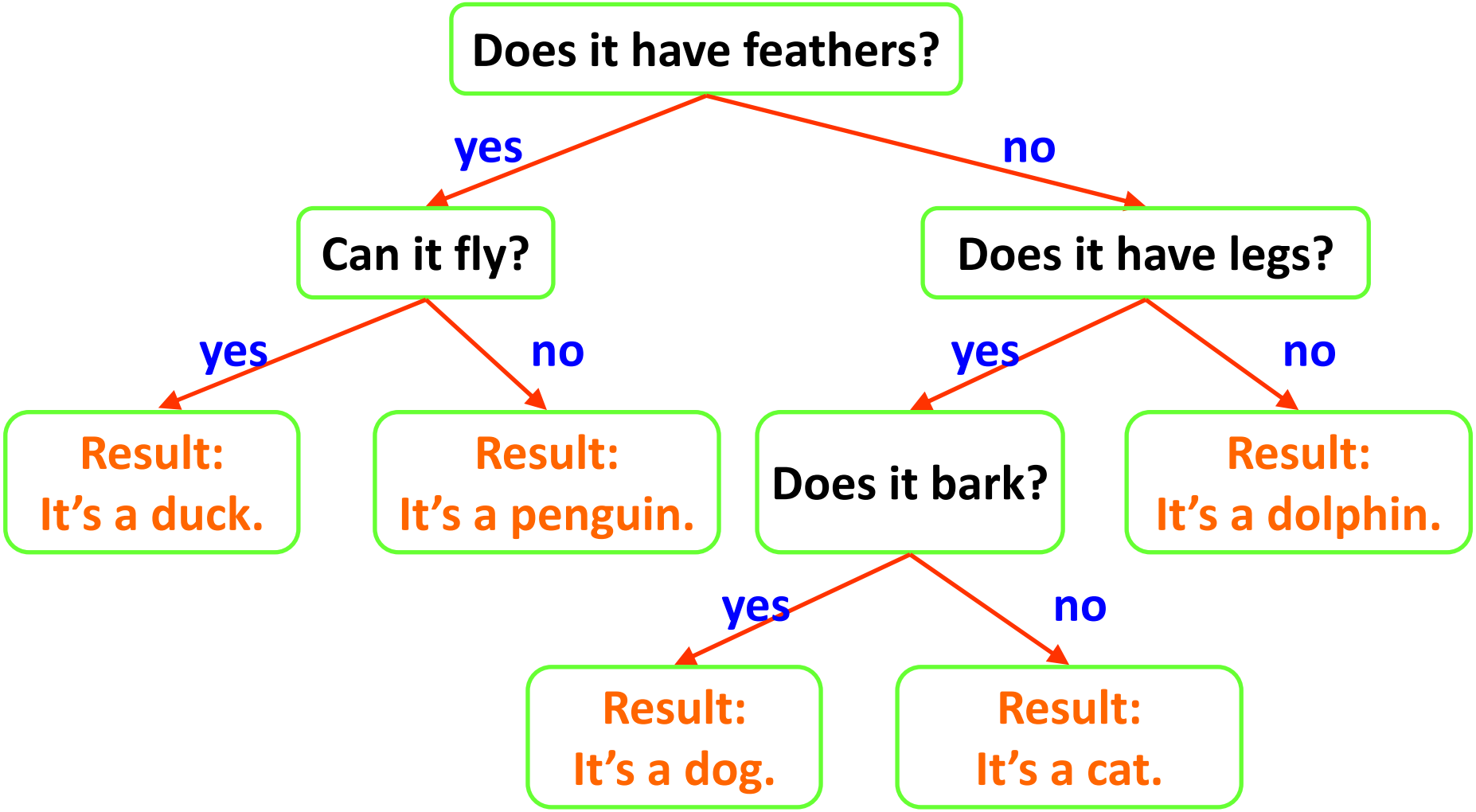
However, you are sure that it is not a cat, and so you consult an expert.

The expert identifies it as a dog and tells you that the easiest way to tell a dog from a cat is that dogs bark.

Expert.exe will ask you to provide the new species and the question whose answer differentiates the new species from the system's previously chosen one.

It will expand the binary decision tree as follows:

Example: Identification of Species



Thank you

End of

Expert Systems

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