COMP 516
Research Methods in Computer Science

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Lecture 4: Choosing or proposing a project

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Questions

1. What sources of information could be used to devise a research-oriented project?
2. Given a collection of proposals for research-oriented projects, what criteria could you use to select the most suitable one?

Sources of Information

- Proposals by academic staff or departments
- Past projects
- Brainstorming
- Your own goals and learning objectives
- Reading about / working in the subject area
- Systematic analysis of the subject area
  - Research Territory Maps
    Show how topics related to each other
  - Relevance Trees
    Break down a particular subject or research question into lower and lower levels of detail
  - Spider Diagrams
    Combines features of Research Territory Maps and Relevance Trees

Research Territory Maps: Example

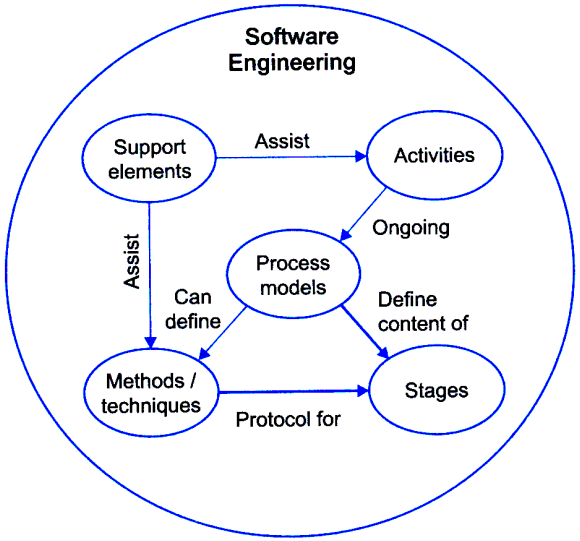

Figure 3.1 A high-level RTM for the field of *software engineering*

Relevance Trees: Example

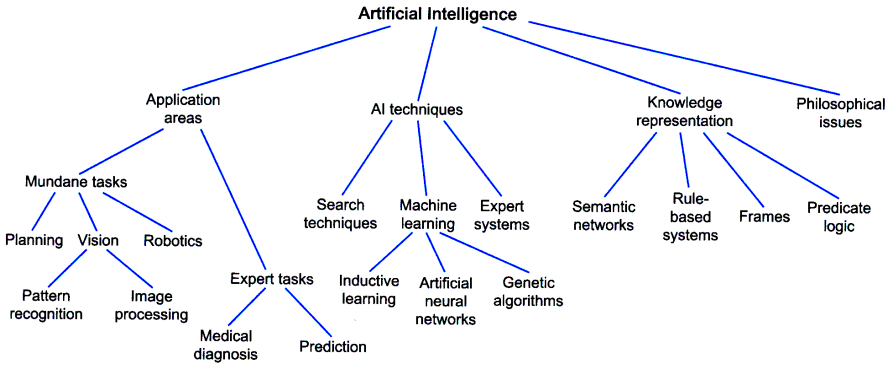

Figure 3.2 An example relevance tree for the field of *artificial intelligence*

Spider Diagrams: Example

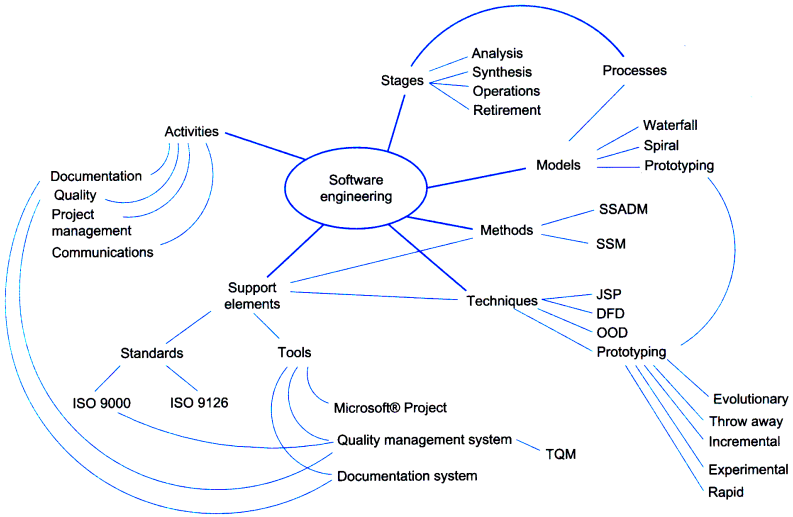

Figure 3.3 An example spider diagram for the field of *software engineering*

Choosing a Project

- The project needs to be within your capabilities
- The project needs to have sufficient scope
- The project needs to interest you
- The project needs to have a serious purpose
- The project needs to have a clear outcome
- The project needs to be related to your degree programme
- The resources required are available or can be obtained

Iq Noble Prize

- awared since 1991, for achievements that ”first make people laugh, and then make them think”
- 2006 Chemistry: ”Ultrasonic Velocity in Cheddar Cheese as Affected by Temperature”.
- 2006 Mathematics: for calculating the number of photographs that must be taken to (almost) ensure that nobody in a group photo will have their eyes closed.
- 2007 Linguistics: for determining that rats sometimes can’t distinguish between recordings of Japanese and Dutch played backward
- 2010 Physics: for demonstrating that, on icy footpaths in wintertime, people slip and fall less often if they wear socks on the outside of their shoes.

Suitability Tests for Projects

- ‘So what?’ test
  Is the topic meaningful?
  Will it be of value for anyone?
  What contribution will it make?
- Justification
  Can you explain your project and justify it in simple terms?
- Estimating your understanding
  Can you put a figure on what you know about your chosen subject?
- Contacts
  Are the contacts you require for your project (including your supervisor) available, accessible, and willing to help?
- Project proposal
  Can you write a substantive proposal for your project?

Preparing a Project Proposal: Implicit Content

- Introduction to the subject area
  - Sets the context for the project
  - Should motivate the relevance of the subject area
- Overview of current research in the area
  - Demonstrates current activities in the subject area
  - Shows your understanding of current research
- Identify a gap
  - Identify a need for further investigation or re-interpretation
- Identify how your work fills the gap
  - Explain how your project fills the gap
- Identify risks and solutions
  - Highlight the benefits that can be derived from your project
  - Account for the risks to your project

Preparing a Project Proposal: Explicit Structure (1)

- Title
  Clear, Concise, Preferably no acronyms
- Aims and Objectives

Aims:	Broad statement(s) of intent Identify the project’s purpose
Objectives:	Identify specific, measurable achievements Quantitative and qualitative measures by which completion of the project can be judged

- Expected outcomes/deliverables
  Identify what will be produced/submitted in the project
- Keywords
  Identify the topic areas that the project draws on

Preparing a Project Proposal: Explicit Structure (2)

- Introduction/Background/Overview
  - Overview of the project (Identification of research questions and hypotheses, elaboration of aims)
  - Motivation for the project
  - Motivation for you conducting the project
- Related Research
  Identifies other work and publications related to the topic
- Methods
  Identifies the research methods and project methods that will be used (e.g. theoretical investigation, case study)

Preparing a Project Proposal: Explicit Structure (3)

- Research Requirements
  Identifies the resources that will be needed for the project (e.g. hardware, software, data, personnel)
- Project Plan
  - More or less detailed 'timetable' for the project
  - Deadlines for deliverables

Conclusion

- Choosing the right project is an important stage crucial to your success
- There are a number of techniques that can assist you
- In a project proposal or project specification
  - stick to the required structure and
  - address all the guiding questions as precisely as possible

Further reading:
Sharp et al. (2002) proposes five questions that might help you to choose a project supervisor; see (Dawson 2005; p. 52).

The Presentation

Presentation & short bibliography on an agreed subject (15%)

- subject to be agreed by Friday 19 October 2012
- slides and bibliography due by 17:00 Friday 2 November 2012
- accounts for 15% (estimate 20 hours to complete)
- presentation: 3 slides, 5 minutes talk each + 1 minute for questions
- all of them take place during the 8 lectures between the 5th and 20th of November
- the order will be chosen randomly, 7 speakers per lecture
- the starting point for your essay (55%)
- the topic can be changed if really necessary

The Presenation and Essay

- any current research topic or current technological development in Computer Science
- a good essay will
  - help the reader to gain an understanding of the concepts involved in the subject area of the essay
  - provide an overview of the current state, possibly together with some historical information of the subject area
  - cover debates, different points of views, open questions, directions of future research and development in the subject area
- especially good are topics where there is debate between two sides holding opposing views, e.g. pros and cons of software patents
- in such a case the essay should present both sides and try to evaluate their arguments

Example topics

- Advances in the Optimization of Network Data Traffic
- Data Mining and Privacy
- E-Voting
- The GNU General Public License
- The Modern GPU
- more topics at
  `https://cgi.csc.liv.ac.uk/~dominik/teaching/comp516/topics.html`

Academic English Classes

- for all international students and staff members
- Monday 1st October - Friday 14th December 2012
- no need to register for these classes (but take your student card)
- e.g. every Monday 13.00- 14.00 Grammar & Vocabulary in MATH-105 and repeated Tuesday 12.00-13.00 in GHOLT-H223
- many more classes: Academic Writing, Academic Reading, Academic Speaking & Pronunciation, Academic Listening, Britain Today

`http://www.liv.ac.uk/english-language-centre/academic_english_classes_for_all_international_students_and_staff/`

or click “Useful resources for COMP516” at
`https://cgi.csc.liv.ac.uk/~dominik/teaching/comp516`