research and innovation

analysing existing work

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STRUCTURE + DIVERGENCE = INNOVATION

analysing existing work

• structuring
  - themes, criteria, classification, etc.

• understanding
  - why, why, why, why ... and why not?
  - deconstructing

structuring

• themes
• criteria
• classifications
• taxonomies
• multiple perspectives

structure what

• whole papers/documents
• issues, topics within docs
• things described
  - software/hardware systems
  - methods/techniques
• application areas
• observed behaviour

themes

• recurrent topics, issues, problems
  e.g. power usage in ubicomp

• how to find them?
  - you have 2 minutes
  - tell a friend about the area
  - what would you say?

criteria

• mostly for things
  - software, methods, etc.

• often binary
  - can it do X - yes or no

• may be multi-choice
• or qualitative
  - does it support X - positive, negative, a bit
the instant thesis

- choose an area
- gather literature
- see what criteria each uses
- apply criteria to all systems/methods

classification and taxonomies

😊 standard subject classification
😊 problem specific classification

- boundary cases
  - is a platypus a mammal, bird or reptile?
  - boundaries are constructs
  - hard cases tell us most

finding classes - attributes

- topic:
  - genetic algorithms for fingerprint identification
- possible classes:
  - recognition techniques:
    - genetic, statistical, annealing
  - recognition domains:
    - fingerprint, face, voice

finding classes - comparisons

- in what ways are they similar?
- in what ways are they different?

the easy way?

- look in:
  - conference proceedings
  - books
  - special journal issues
  - workshops
  - what classifications do they use?
    ... steal them!

hard cases

- boundary cases
  - is a platypus a mammal, bird or reptile?
  - boundaries are constructs
- outside classification
  - extend classes
- hard cases tell us most
why multiple classifications?

- **taxonomy:**
  - things
    - circles
      - red circles
      - yellow circles
    - squares
      - red squares
      - yellow squares

multiple classification

- shapes
  - circles
  - squares
- colours
  - red
  - yellow

similarities clear:

similarities obscured:

tell you in what ways things are similar and in what ways they differ.

an example groupware on the web

- shared data - where is it?
  - local - on users’ own machines
  - remote - on a central server
- but it moves
  - where is it stored?
  - where is it used?

the data matrix

- usage
  - local
  - remote
- storage
  - local
    - replicas
    - supercomputers
  - remote
    - caching
    - client-server

what about code?

- applets a bit like cached data?

the code matrix

- usage/execution
  - local
    - download helper plugin
  - remote
    - SQL?
  - applet
    - CGI etc.
code and data

- can be stored sep

attribute spreading

- topic: applications of technique X in area Y
- look at:
  - applications of technique X to other areas
  - applications of other techniques to area Y