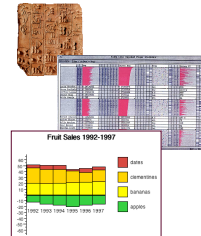


interactive visualisation

Alan Dix
Lancaster University, UK
www.hcibook.com/alan/teaching/delos

overview

- static visualisation
 - (very) brief history
- interactive visualisation
 - existing systems
 - make your own
- design heuristics



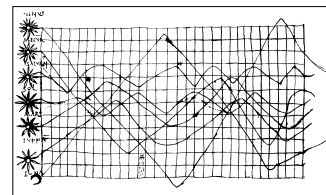
static visualisation from clay tablets to Tufte

- Mesopotamian tablets



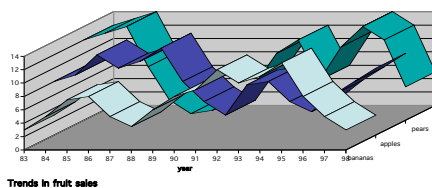
static visualisation from clay tablets to Tufte

- Mesopotamian tablets
- 10th Century time line



static visualisation from clay tablets to Tufte

- Mesopotamian tablets
- 10th Century time line
- Excel etc.



static visualisation

- read Tufte's books ...
 - *The Visual Display of Quantitative Information*
 - *Envisioning Information*
 - *Visual Explanations*



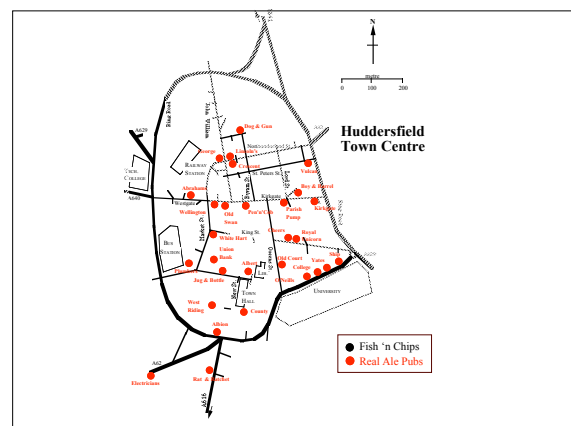
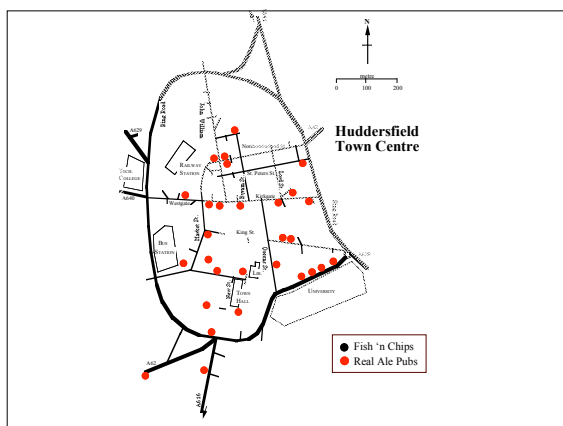
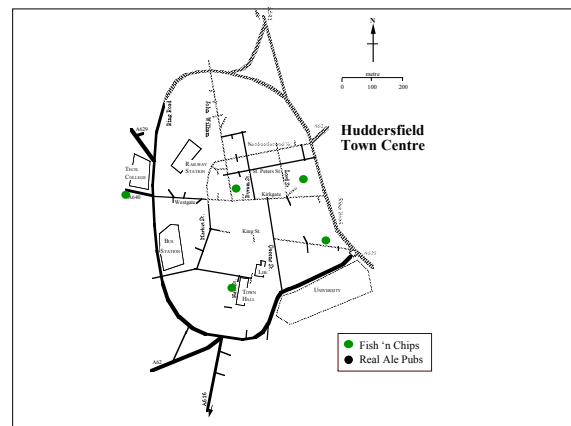
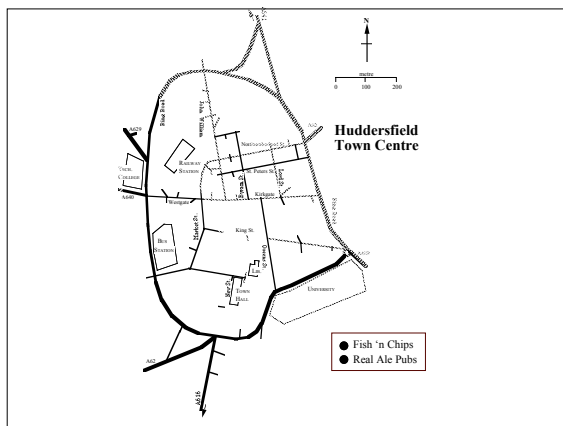
interactive visualisation

- computation allows interaction
- interaction
 - allows exploration
 - improves comprehension
- many existing examples
- can make your own!

existing systems (i) tourist map

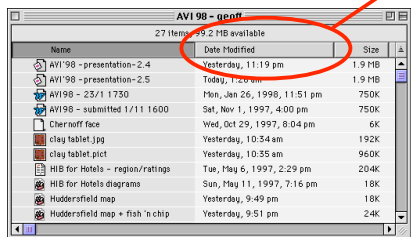
- (often found at the seaside)
- revealing information

example



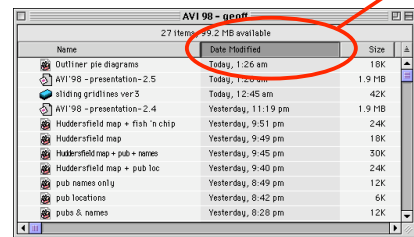
existing systems (ii) filesystem folder

- initially ordered by name



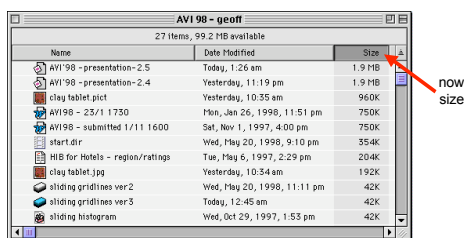
existing systems (ii) filesystem folder (b)

- now ordered by date



existing systems (ii) filesystem folder (c)

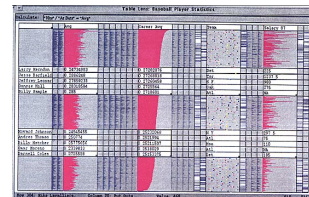
- reordering 'softens' design constraints



existing systems (iii) TableLens (a)

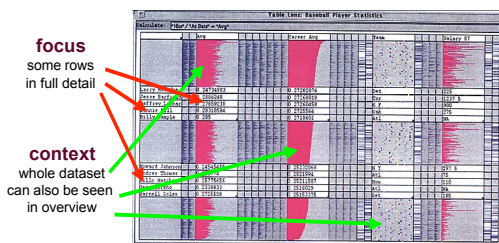
like a 'spreadsheet' ...

... but some rows squashed to one pixel high
numbers become small histogram bars



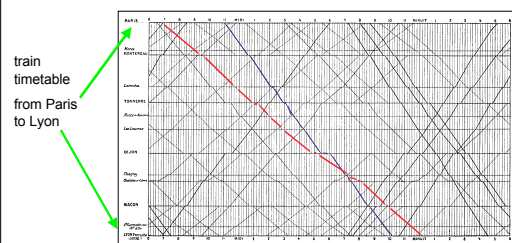
existing systems (iii) TableLens (b)

N.B. also an example of focus+context



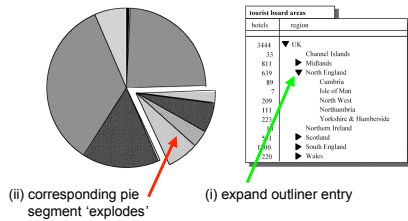
make your own (i) highlighting

scatter plots, line graphs ...



make your own (ii) parallel change

- tie outlier to pie chart
- example of **temporal fusion**



make your own (iii) relaxing constraints

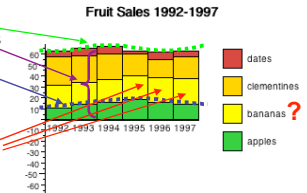
- normal stacked histogram

- good for:

- overall trend
- relative proportions
- trend in bottom category

- bad for others

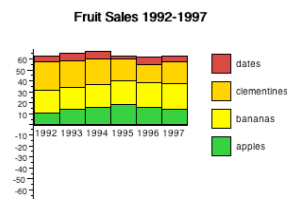
- what is happening to bananas?



make your own (iii) relaxing constraints

- interactive stacking histograms ...
or ... **dancing histograms**

- normal histogram except ...

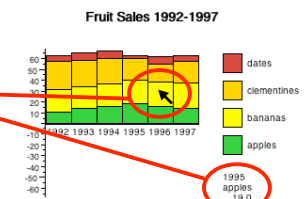


make your own (iii) relaxing constraints

- interactive stacking histograms ...
or ... **dancing histograms**

- normal histogram except ...

- hover over cell to show detail



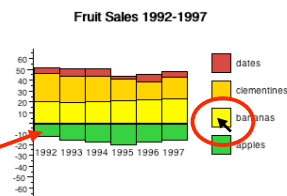
make your own (iii) relaxing constraints

- interactive stacking histograms ...
or ... **dancing histograms**

- normal histogram except ...

- hover over cell to reveal detail

- click on legend to change baseline



demonstration

design heuristics (i) choosing representations

- visualisation factors

- visual affordances

- what we can see

- objectives, goals and tasks

- what we need to see

- aesthetics

- what we like to see

design heuristics (ii) trade-off

- visualisation factors
 - visual affordances
 - objectives, goals and tasks
 - aesthetics
- static representation $\Rightarrow$ trade-off
- interaction reduces trade-off
 - stacking histogram, overview vs. detail, etc. etc.

design heuristics (iii) kinds of interaction

- highlighting and focus
- drill down and hyperlinks
- overview and context
- changing parameters
- changing representations
- temporal fusion