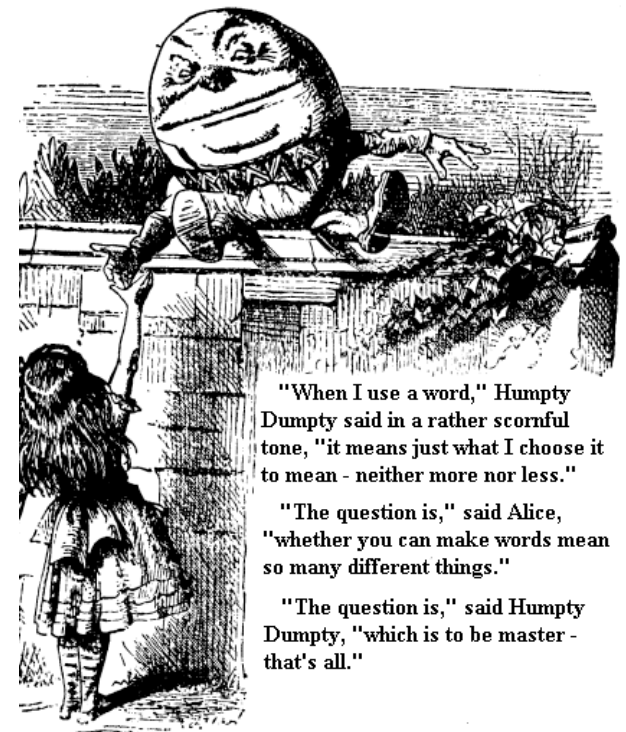


wot I done in AI

Alan Dix

note ...

- using 'intelligent' to include
 - traditional artificial intelligence
 - statistical methods
 - information retrieval techniques
 - neural nets
 - genetic algorithms
 - simple heuristics



"When I use a word," Humpty Dumpty said in a rather scornful tone, "it means just what I choose it to mean - neither more nor less."

"The question is," said Alice, "whether you can make words mean so many different things."

"The question is," said Humpty Dumpty, "which is to be master - that's all."

'intelligent' things ...

- submarine design
 - use genetic algorithms to solve constraints
- database interface: Query-by-Browsing
 - use decision trees to infer queries
- intelligent web interfaces
 - simple pattern matching + blackboard
+ appropriate interaction
- typing error analysis (for dyslexia)
 - iterative deepening search (variant of depth first)
to find most likely errors

Query by Browsing

- user chooses records of interest
 - ✓ tick for those wanted
 - ✕ cross for those not wanted
- system infers query
 - web version uses rule induction
 - variant of Quinlan's ID3

Data				
	Name	Title	Wage	Overdraft
<input checked="" type="checkbox"/>	Fred	Mr	12000	500
<input checked="" type="checkbox"/>	John	Dr	20000	10000
<input checked="" type="checkbox"/>	Sue	Ms	10000	0
<input type="checkbox"/>	Diane	Mrs	2000	0
<input type="checkbox"/>	Tom	Mr	15000	100
<input type="checkbox"/>	Jane	Ms	20000	-5000
<input type="checkbox"/>	Dick	Mr	10000	50

Query by Browsing what it looks like

user asks
system to
make a query

system infers
SQL query

query results
highlighted

The screenshot shows a web interface for "Query-by-Browsing on the Web" by Alan Dix. The page title is "meandeviation.com > qbb". The user has selected the database "qbb_ex1". The query entered is "SELECT * FROM qbb_ex1 WHERE Wage >= 15000". The "Make a Query" button is highlighted with a red circle and a mouse cursor. Below the query, there are three radio button options: "don't know / haven't decided", "yes I want it (click box)", and "no I don't (click twice)". The "Data" table shows the results of the query, with rows for John, Tom, and Jane highlighted in blue. Red arrows point from the text labels to the corresponding parts of the interface: from "user asks system to make a query" to the "Make a Query" button; from "system infers SQL query" to the query text box; and from "query results highlighted" to the highlighted rows in the "Data" table.

meandeviation.com > qbb

Query-by-Browsing on the Web

Alan Dix

Choose database: **qbb_ex1**

Query
SELECT * FROM qbb_ex1 WHERE Wage >= 15000

Make a Query

don't know / haven't decided
 yes I want it (click box)
 no I don't (click twice)

Data

	Name	Title	Wage	Overdraft
<input checked="" type="checkbox"/>	Fred	Mr	2000	500
<input checked="" type="checkbox"/>	John	Dr	20000	10000
<input checked="" type="checkbox"/>	Sue	Ms	10000	0
<input type="checkbox"/>	Diane	Mr	2000	0
<input checked="" type="checkbox"/>	Tom	Mr	15000	100
<input type="checkbox"/>	Jane	Ms	20000	-5000
<input type="checkbox"/>	Dick	Mr	10000	50

[information and articles on QbB](#)
[download web code \(php/mysql/unix\)](#)
[download MAC demonstrator](#)
[conditions of use](#)

Query by Browsing dual representation

query (intensional)
for precision

listing (extensional)
for understanding

The screenshot shows a web interface for "Query-by-Browsing on the Web" by Alan Dix. It features a database selection dropdown set to "qbb_ex1", a query input field containing "SELECT * FROM qbb_ex1 WHERE Wage >= 15000", and a "Make a Query" button. Below the query field is a legend for selection: an empty checkbox for "don't know / haven't decided", a checked checkbox for "yes I want it (click box)", and an 'X' checkbox for "no I don't (click twice)". To the right, a "Data" table lists results with columns for Name, Title, Wage, and Overdraft. The table includes rows for Fred, John, Sue, Diane, Tom, Jane, and Dick, with checkboxes in the Name column indicating selection status. Red arrows point from the text above to the query field and the data table.

meandeviation.com > qbb

Query-by-Browsing on the Web

Alan Dix

Choose database: **qbb_ex1**

Query
SELECT * FROM qbb_ex1 WHERE Wage >= 15000

Make a Query

don't know / haven't decided
 yes I want it (click box)
 no I don't (click twice)

Data

	Name	Title	Wage	Overdraft
<input checked="" type="checkbox"/>	Fred	Mr	12000	500
<input checked="" type="checkbox"/>	John	Dr	20000	10000
<input checked="" type="checkbox"/>	Sue	Ms	10000	0
<input type="checkbox"/>	Diane	Mrs	2000	0
<input checked="" type="checkbox"/>	Tom	Mr	15000	100
<input type="checkbox"/>	Jane	Ms	20000	-5000
<input type="checkbox"/>	Dick	Mr	10000	50

[information and articles on QbB](#)
[download web code \(php/mysql/unix\)](#)
[download MAC demonstrator](#)
[conditions of use](#)

Query by Browsing how it works

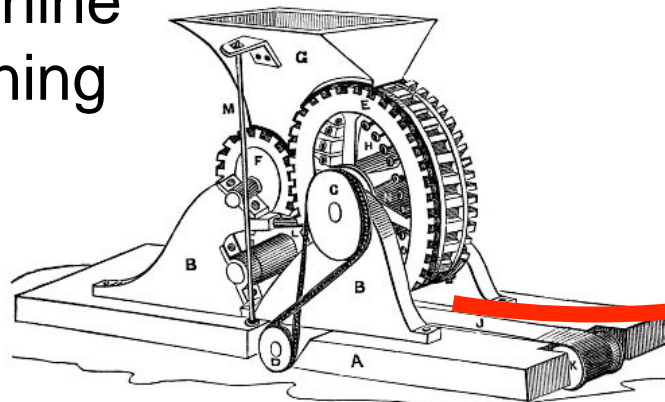
examples

Data				
	Name	Title	Wage	Overdraft
<input checked="" type="checkbox"/>	Fred	Mr	12000	500
<input checked="" type="checkbox"/>	John	Dr	20000	10000
<input checked="" type="checkbox"/>	Sue	Ms	10000	0
<input type="checkbox"/>	Diane	Mrs	2000	0
<input checked="" type="checkbox"/>	Tom	Mr	15000	100
<input type="checkbox"/>	Jane	Ms	20000	-5000
<input type="checkbox"/>	Dick	Mr	10000	50

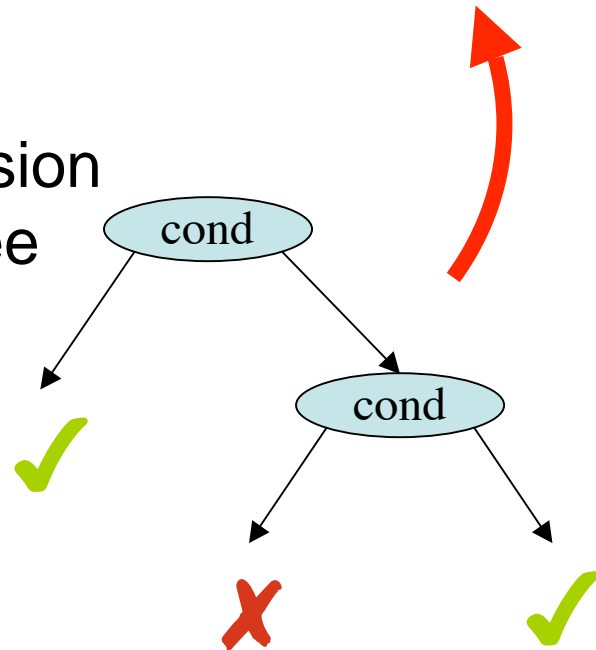
SQL query

```
Query  
SELECT * FROM qbb_ex1 WHERE Wage >= 15000
```

machine learning

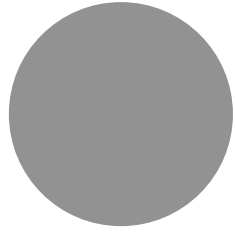


decision tree



Query by Browsing keywords

- knowledge representation
 - uniform attribute-value data
simple values (numbers, strings)
- rule representation
 - decision tree
- algorithm
 - variant of ID3 - inductive learning



intelligent user interfaces

- have had a bad history!
- why?
 - often focused on clever techniques
 - forget wider interaction

e.g. intelligent menus:

- monitor command use
- reorder so most frequent on top 😊
- but order keeps changing ☹️

Boxes

Fiona
Esther
Miriam
Colin
Tom
Devina
Gordon
Geoff

...

appropriate intelligence

- often simple heuristics
- combined with the right interaction

rules of standard AI interfaces

1. it should be right as often as possible
2. when it is right it should be good

good for demos
look how clever it is!

rules of appropriate intelligence

1. it should be right as often as possible

2. when it is right it should be good

3. when it isn't right ...
it shouldn't mess you up

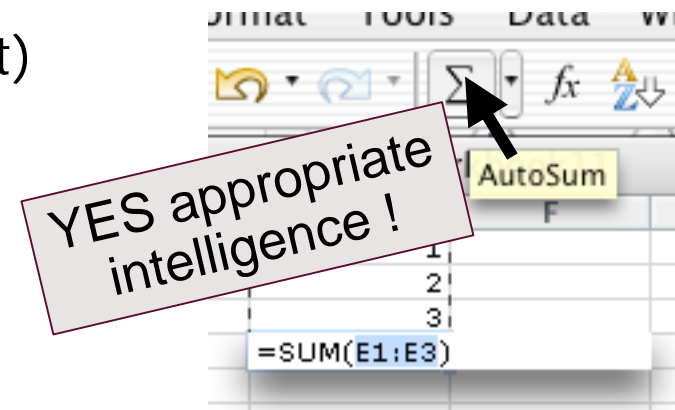
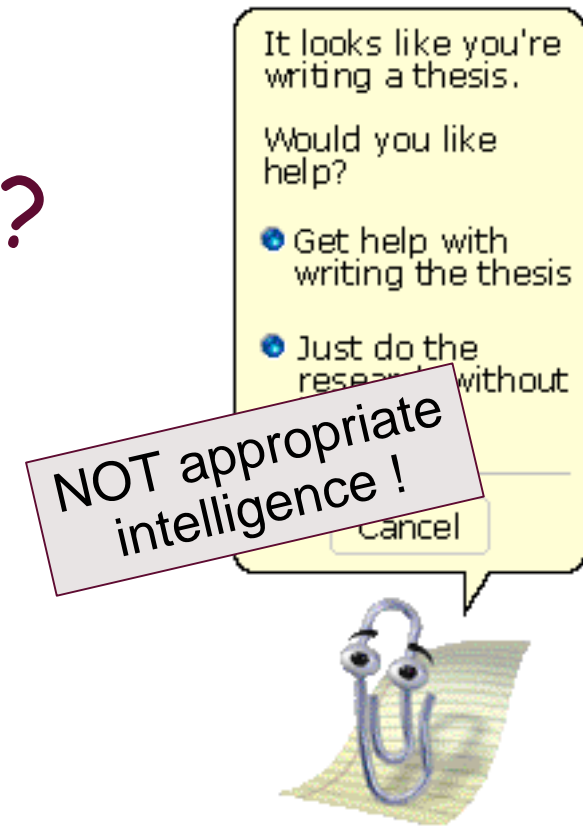


what makes
a system
really work!

Hit or a Miss?

- ✗ paper clip
 - can be good when it works
 - but interrupts you if it is wrong

- ✓ Excel 'Σ' button
 - guesses range to add up
 - very simple rules
(contiguous numbers above/to left)
 - if it is wrong ...
simply select what you would
have anyway



... for menus

- small number of most popular at top
quick when it gets it right
- alphabetic below
still easy to scan when it isn't

Boxes

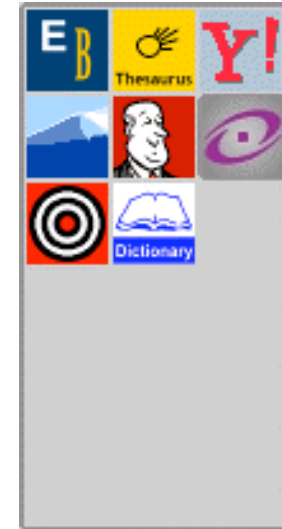
Fiona
Miriam
Esther

Adrian
Andy
Brian
Charlotte
Colin
David
Devina

...

designing appropriate intelligence onCue

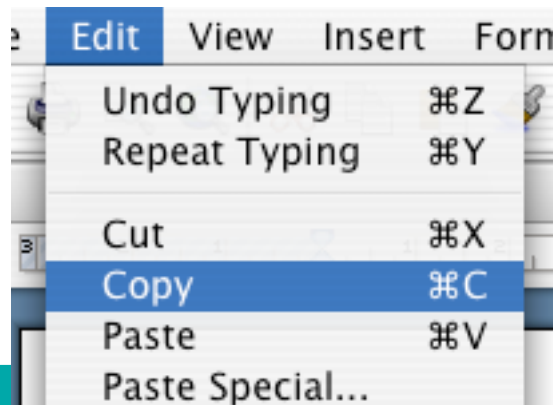
- intelligent toolbar
- sits at side of the screen
- watches clipboard for cut/copy
- suggests useful things to do with copied data





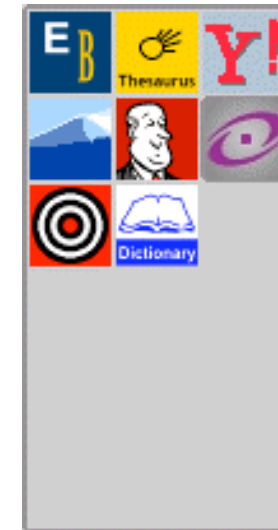
onCue in action

user selects text



and copies it to clipboard

```
20      21  
25      24  
7       7       3       7  
the dancing histograms very useful a  
ing out some of the textile sites yo  
x's page at http://www.hiraeth.com/
```



slowly icons fade in

onCue appropriate?

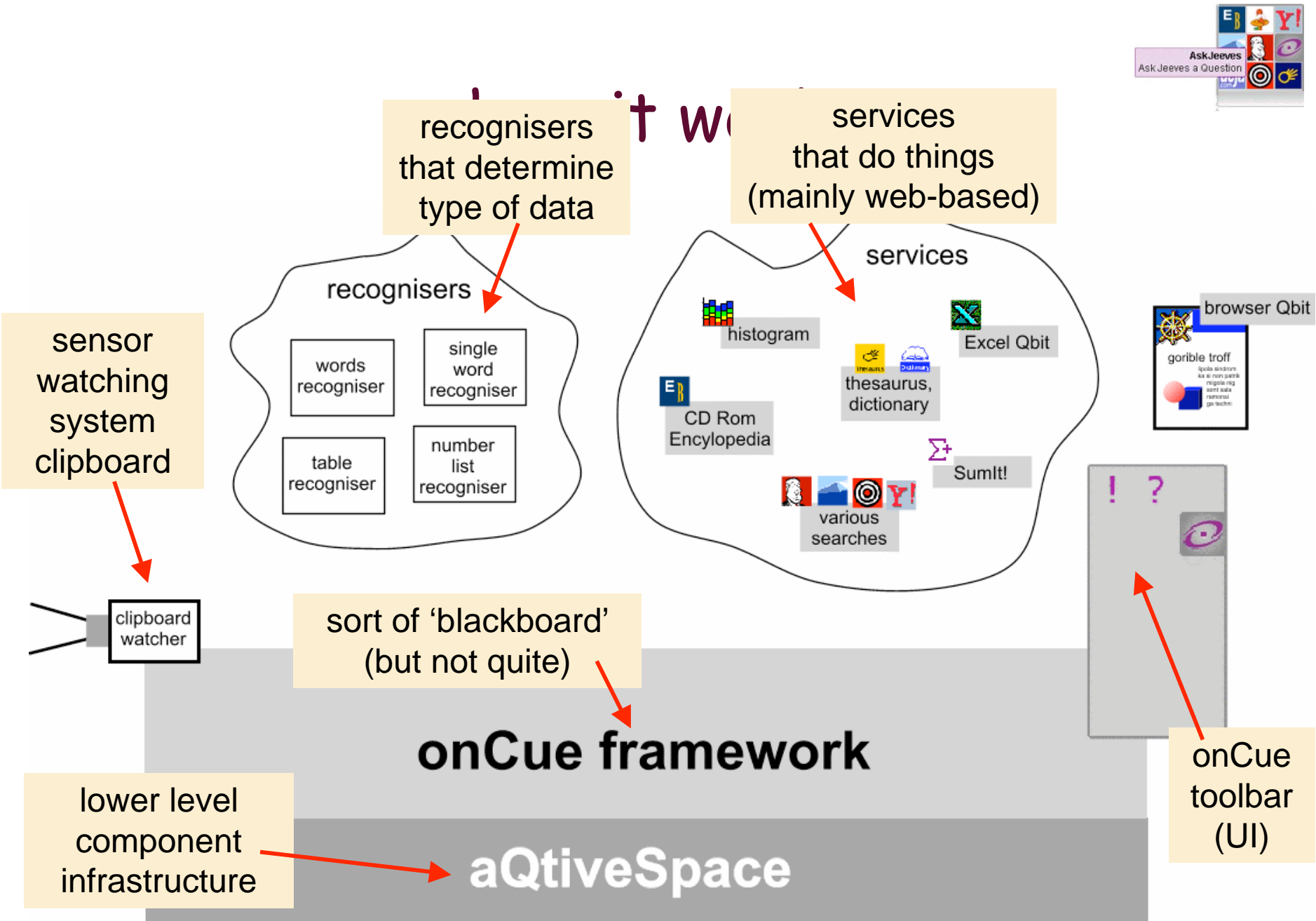
1. it should be right as often as possible
 - uses simple heuristics:
e.g. words with capitals = name/title
2. when it is right it should be good
 - suggests useful web/desktop resources
3. when it isn't right it shouldn't mess you up
 - slow fade-in means doesn't interrupt





kinds of data

- short text - search engines
- single word - thesaurus, spell check
- names - directory services
- post codes - maps, local info
- numbers - SumIt! (add them up)
- custom - order #, cust ref ...
- tables - ...






how it works 3

1 user copies text

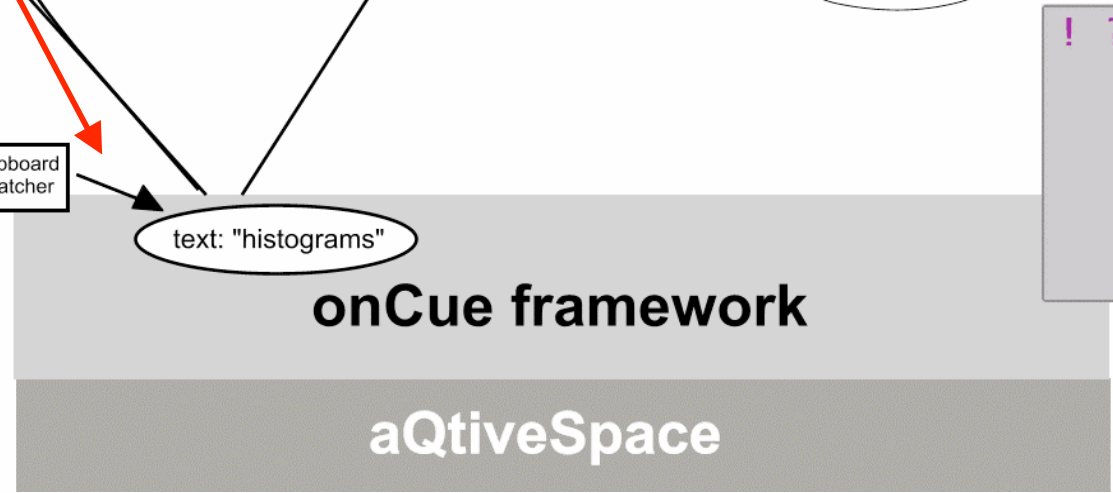
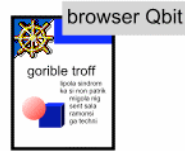
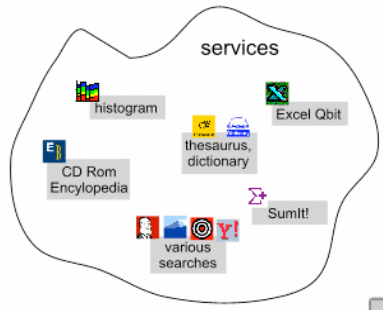
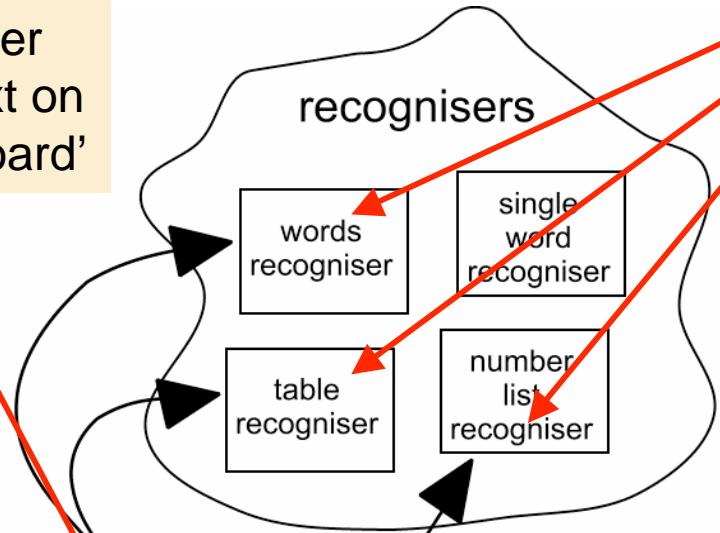
2 clipboard watcher puts text on 'blackboard'

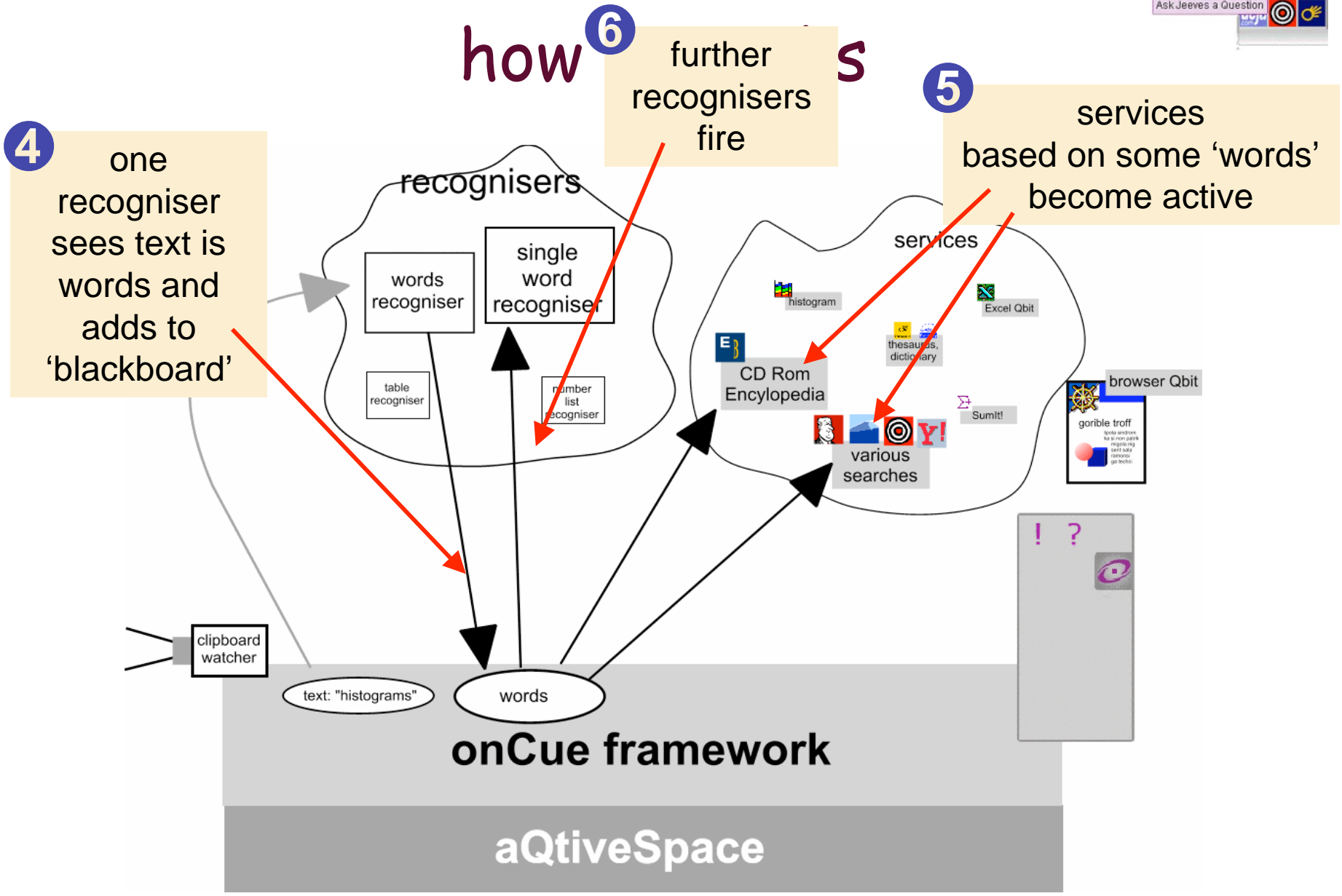
recognisers that deal with raw text fire



20	21	22	23
25	24	20	17
7	7	3	7

the dancing histograms very useful a
ing out some of the textile sites yo
x's page at <http://www.hiraeth.com/>





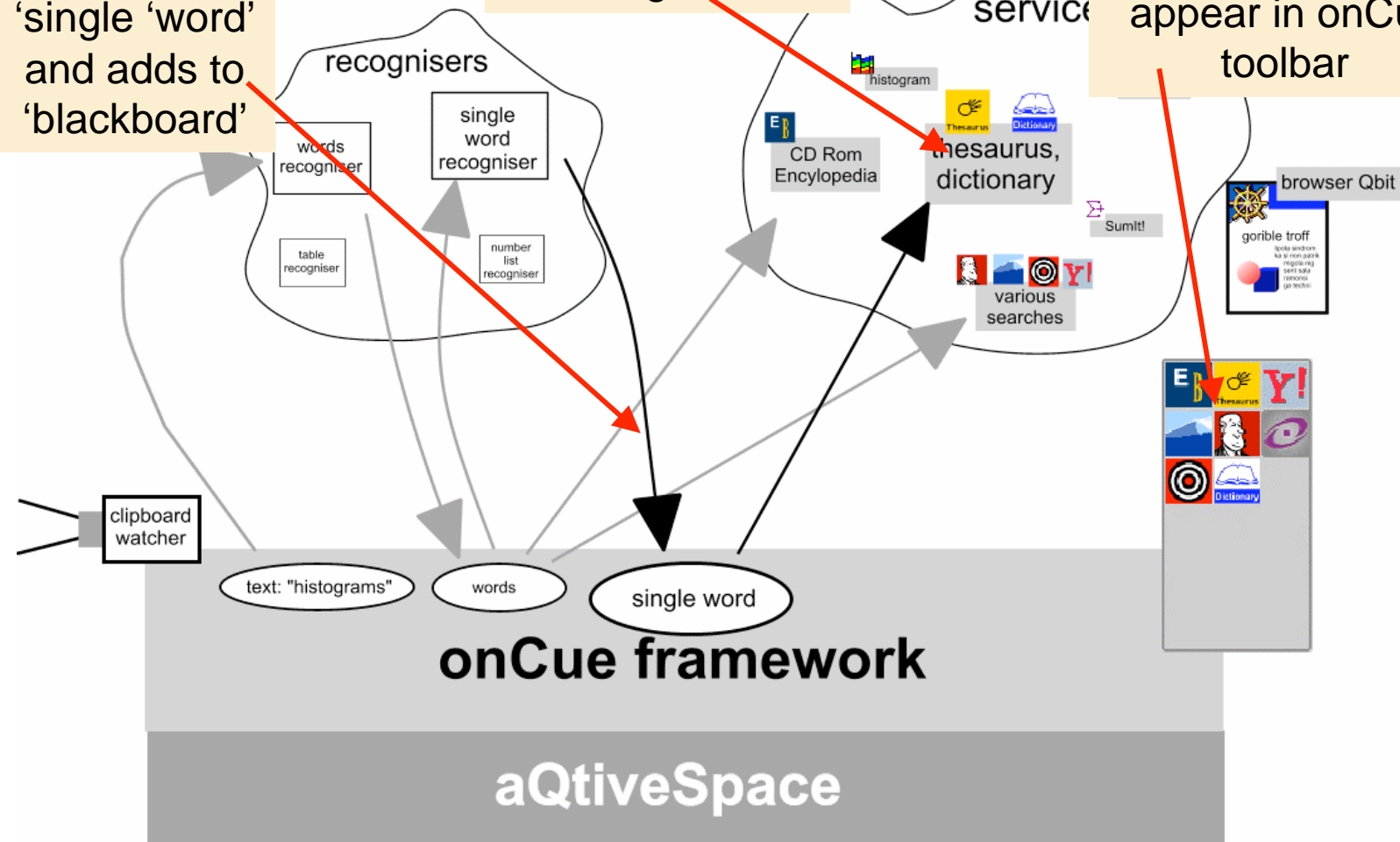


how it works

7 recogniser sees it is 'single word' and adds to 'blackboard'

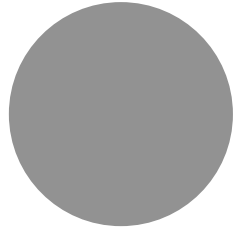
8 more services activate for 'single word'

9 active services appear in onCue toolbar



onCue keywords

- knowledge representation
 - heterogeneous attribute-value / frame
- rule representation
 - regular expressions
 - sort of production rule
 - hand-crafted heuristics
- algorithm
 - multi-agent blackboard, emergent behaviour
 - pattern matching - text mining





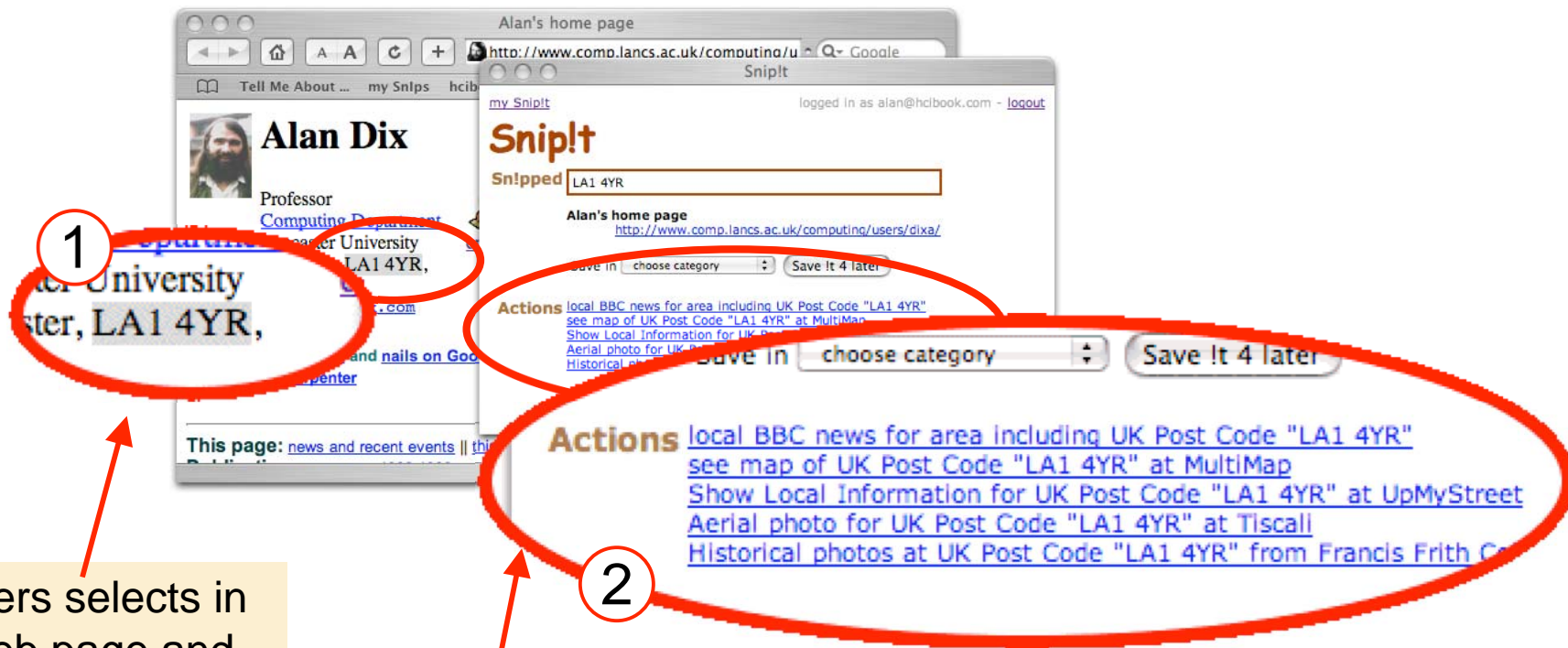
Snip!t

web version of onCue





Snip!t



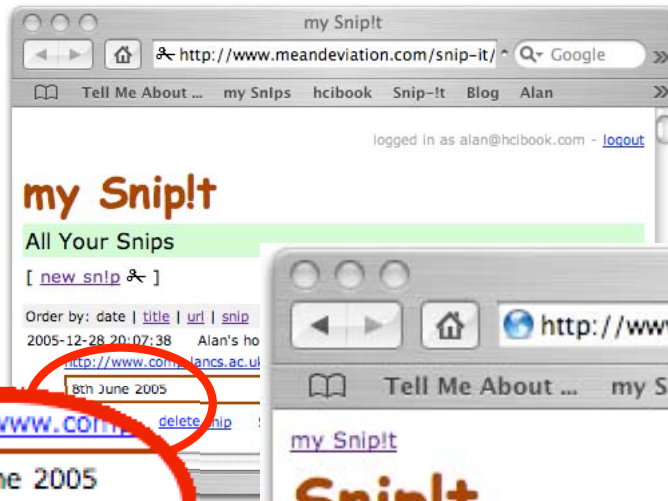
1
users selects in web page and presses "Snip!t" bookmarklet

2
Snip!t pops up page with suggested things to do with the snip (and saves it for later, like bookmark)



Snip!t

ask for demo later
www.snipit.org



recognises
various things
e.g. dates



bringing it together

Kinds of recogniser:

- syntactic - regular expression / patterns / structure
e.g. post code, email address
- lexicon - large look up tables
e.g. countries, internet TLD
- hybrid - popular first names => full name
- +context - telephone number ... what country??



architecture

- server-side 'intelligence'
- recognisers + services again
- different kinds of recogniser chaining:
 - from semantics to wider representation
e.g. postcode suggests look for address
 - from semantic to semantic
e.g. domain name in URL
 - from semantic to inner representation
e.g. from Amazon author URL to author name

representation
vs. semantics
very important



provenance

when you have a recognised term:

- where did it come from
 - text char pos 53-67
 - transformed from Amazon book URL
- how confident are you
 - 99% certain Abraham Lincoln is a person
- how important
 - mother-in-law's birthday