

From a thousand learners to a thousand markers: Scaling peer feedback with Adaptive Comparative Judgement

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@NomadWarMachine

A method of ranking artefacts by making relative judgements, rather than absolute ones

An alternative name:

Adaptive Pairwise Ranking?

- The **software** has been built, tested, and used; and by more than one person / organisation. (Also done for conference talk refereeing at UofG.)
- A major **experiment** has been done and published, using professional markers; supporting the key claims (Pollitt, 2012).
- This paper additionally reports an important qualitative datum: that the markers were highly sceptical (did the experiment for the money, at standard professional rates for marking) but came to see it as **better as well as faster** than their traditional way of doing marking).

<https://learn.gla.ac.uk/acjdemo/>

This demonstration lets you try out ACJ by comparing photographs of wildlife and flowers. (It uses a development version of the software that doesn't require a login)



*Functional
Programming
in Haskell:
Supercharge
Your Coding*



- Futurelearn MOOC (n=1000)
- COMPSCI4021 (n=80)



Students received:

1. problem spec (to implement)
2. quality guidelines (to assess)
3. ranking (afterwards)
4. sample solution (afterwards)

Sample solution

```
-- | The 'wordPhrase' function spells out an individual word
-- For example, "a is for apple"
wordPhrase :: String -> String
wordPhrase x = (head x) : " is for " ++ x

-- | The 'speller' function generates text for a spelling book
-- from a list of words
speller :: [String] -> String
speller [] = []
speller [x] = wordPhrase x
speller [x,y] = xPhrase ++ ", and " ++ yPhrase
  where
    xPhrase = wordPhrase x
    yPhrase = wordPhrase y
speller (x:xs) = wordPhrase x ++ ", " ++ speller xs
```

Our ACJ Implementation: the software

- A simple IMS LTI (NGDLE) application that can be linked from Moodle, Futurelearn or any other LTI host.
- Submissions can be text, source code, PDFs, images or YouTube URLs.
- Submissions can be added by staff for a review only exercise, or by each student.
- Like *Moodle Workshop* and *Aropä*, it has separate submission and review phases

Our ACJ Implementation: the algorithm

- Sorting done in ‘rounds’
- New pairing allocated at start of each round
- Three different ‘scoring’ methods as sort improves
- A simulation (using random errors in comparison) was used to refine the algorithm



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40	39	41	42	44	43	38	37	32	31	33	34	36	35	45	46	55	54	56	57	59	58	53	52	48	47	49	50	51	30	29	9	8	10	11	13	12	7	6	2	1	3	4	5	14	15	24	23	25	26	28	27	22	21	17	16	18	19	20	0
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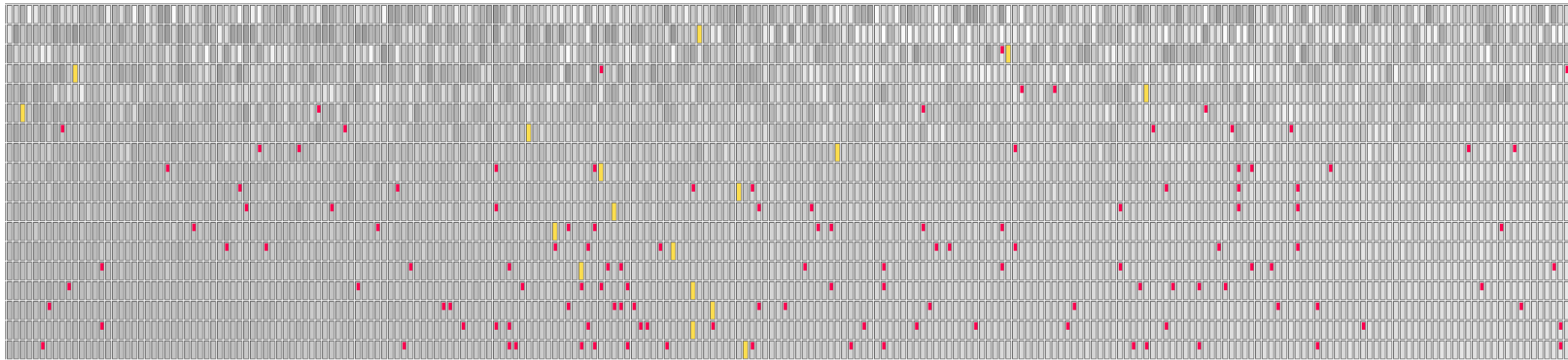


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Scaling

- The same simulation with 600 'artefacts'
- After 17 round sorting is very good
- (Image shows middle $\sim 1/3$ with one 'artefact' highlighted)



- I can see different ways of thinking and I try to understand which one is better(more efficient) and I hope that I will be able to make my own codes more efficient in the future.
- The approach forces you to think differently. This can only be trained by doing it.
- Being able to compare your own work against lots of others lets you see roughly how well/poorly you are progressing in the course compared to your classmates as a whole.
- I think that it is a very useful exercise (both writing a code and comparing the codes of other students) and it is organised in a great way. I would like to thank the course educators.
- As you start comparing you can see the different approaches students started using and everything could be compared faster.

- Method “**scales**”
- Compelling **naturalness**
- Can be used with sets of markers
- Can be used for **peer review**
- Can easily mark **cross-media**
- Can easily be used for/with unusual, subjective, and implicit **marking criteria**
- Can be used by **matching against exemplars**
- <http://www.psy.gla.ac.uk/~steve/apr/apr.html#usp>

- Still a development / pilot tool
 - Further refinement possible
- Could this be useful in your teaching?
 - Scholarship / research
 - Not a ‘Service’

- Glass, R.L., 2003. About Education, in: Facts and Fallacies of Software Engineering. Addison-Wesley, Boston, MA.
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