Microtask Crowdsourcing: Fundamentals (Part II)

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Quality Control

Quality Control

- Extremely important part of the experiment
- Approach as “overall” quality; not just for workers
- Bi-directional channel
  - You may think the worker is doing a bad job.
  - The same worker may think you are a lousy requester.
  - Do check the worker forums!

CrowdFlower has an option to directly chat with a live worker !

Quality Control

- Approval rate: easy to use, & just as easily defeated
- Mechanical Turk Masters (since June 2011)
  - Only for specific tasks
- Qualification test
  - Pre-screen workers' ability to do the task (accurately)
- Assess worker quality as you go
  - Trap questions with known answers ("honey pots")
  - Measure inter-annotator agreement between workers

Qualification tests: pros and cons

- Advantages
  - Great tool for controlling quality
  - Adjust passing grade
- Disadvantages
  - Extra cost to design and implement the test
  - May turn off workers, hurt completion time
  - Refresh the test on a regular basis
  - Hard to verify subjective tasks like judging relevance
- Try creating task-related questions to get worker familiar with task *before* starting task in earnest

Methods for measuring agreement

- What to look for
  - Agreement, reliability, validity
- Inter-agreement level
  - Agreement between judges
  - Agreement between judges and the gold set
- Some statistics
  - Percentage agreement
  - Cohen's kappa (2 raters)
  - Fleiss' kappa (any number of raters)
- With majority vote, what if 2 say relevant, 3 say not?
  - Use expert to break ties
  - Collect more judgments as needed to reduce uncertainty

Quality Control & Assurance

- Filtering
  - Approval rate (built-in but defeatable)
  - Geographic restrictions (e.g. US only, built-in)
  - Worker blocking
  - Qualification test
    - Con: slows down experiment, difficult to “test” relevance
    - Solution: create questions to let user get familiar *before* the assessment
  - Does not guarantee success
- Identify workers that *always* disagree with the majority
- Ask workers to rate the difficulty of a task

Other quality heuristics

- Justification/feedback as quasi-captcha
  - Should be optional
  - Automatically verifying feedback was written by a person may be difficult (classic spam detection task)
- Broken URL/incorrect object
  - Leave an outlier in the data set
  - Workers will tell you
  - If somebody answers “excellent” for a broken URL => *probably* spammer

Dealing with bad workers

- Pay for “bad” work instead of rejecting it?
  - Pro: preserve reputation, admit if poor design at fault
  - Con: promote fraud, undermine approval rating system
- Use bonus as incentive
  - Pay the minimum $0.01 and $0.01 for bonus
  - Better than rejecting a $0.02 task
- If spammer “caught”, block from future tasks
  - May be easier to always pay, then block as needed

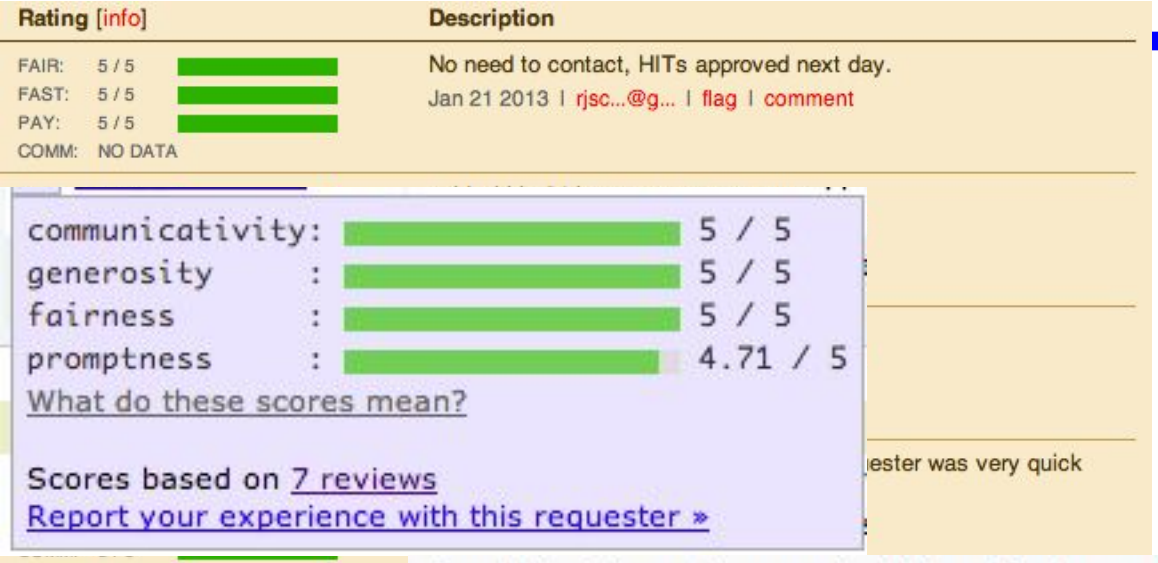
Answer justification

- Why settle for a label?
- Let workers justify answers
- Has to be optional for good feedback

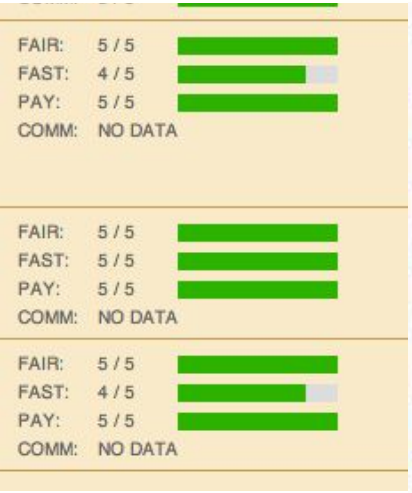
Build Your Reputation as a Requestor

- Word of mouth effect
  - Workers trust the requester (pay on time, clear explanation if there is a rejection)
  - Experiments tend to go faster
  - Announce forthcoming tasks (e.g. tweet)

Crowd Worker Communities



Turkopticon.com
Mturkforum.com
Turkernation.com



Small batch and mega bubbles. Not sure if I'm going in....

Title: Which is the most appropriate type?
Requester: Philippe Cudre-Mauroux [A28PIN9Y6KHR3H] (TO)
Description: Please read the text and select the most appropriate description for each of the proposed entities.
Reward: $0.10
Qualifications: HIT abandonment rate (%) is less than 51, HIT approval rate (%) is greater than 25, Location is US
Link: https://www.mturk.com/mturk/preview?groupId=2ZSQUQIHPCGJ2FZIT6N51H1LQYU60M

Powered by non-amazonian script monkeys ◆◆

To many bubbles but YMMV with your patience level.


"best collective decisions are
result of disagreement,
not consensus or compromise"
James Surowiecki

BINARY WORLD

7 MYTHS ABOUT HUMAN ANNOTATION

One truth: knowledge acquisition for the semantic web assumes one correct interpretation for every example

All examples are created equal: triples are triples, one is not more important than another, they are all either true or false

Disagreement bad: when people disagree, they don't understand the problem

Experts rule: knowledge is captured from domain experts

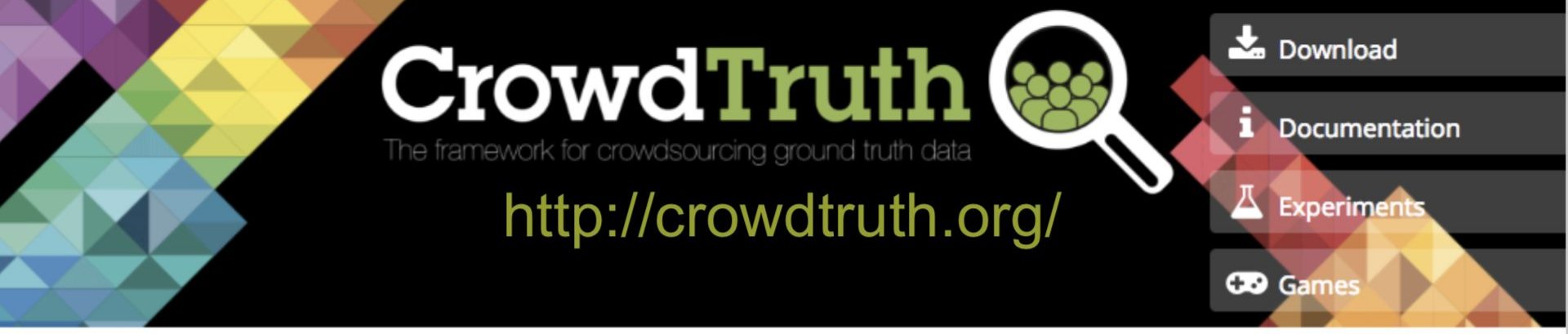
One is enough: knowledge by a single expert is sufficient

Detailed explanations help: if examples cause disagreement - add instructions

Once done, forever valid: knowledge is not updated; new data not aligned with old

"Truth is a Lie: 7 Myths about Human Annotation", *AI Magazine 2014*, L. Aroyo, C. Welty

disagreement = *signal*



disagreement is signal
for the natural **ambiguity** of language and
diversity & **perspectives** of human interpretation

Lora Aroyo, Chris Welty: **Truth is a Lie: 7 Myths about Human Annotation**, AI Magazine 2014.

Lora Aroyo, Chris Welty: **The Three Sides of CrowdTruth.** J. Human Computation. 1(1). 2014.

Oana Inel, Khalid Khamkham, Tatiana Cristea, Arne Rutjes, Jelle van der Ploeg, Lora Aroyo, Robert-Jan Sips, Anca Dumitrache and Lukasz Romaszko: **Crowd Truth: Machine-Human Computation Framework for Harnessing Disagreement in Gathering Annotated Data**. ISWC-RBDS 2014.

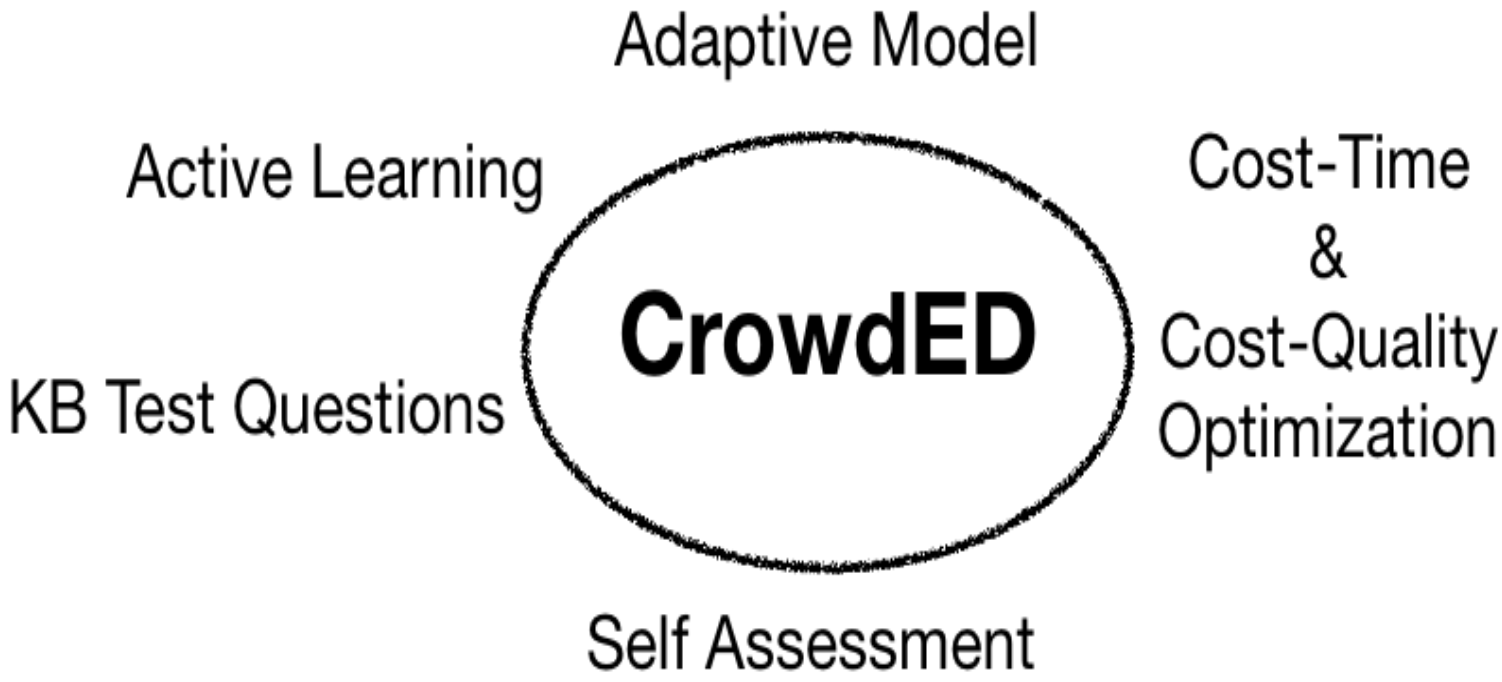
CrowdED

Can we a-priori estimate optimal workers and tasks' assignment to obtain maximum accuracy on all tasks?

CrowdED

a two-staged statistical **Crowd**sourcing **E**xperimental **D**esign

CrowdED



CrowdED offers a two-staged statistical model to estimate ***a-priori*** worker and task assignment to achieve maximum accuracy.

CrowdED

Stage 1:

- Train all workers
- On a proportion of tasks
- Identify best workers &
- Hard tasks

Stage 2:

- Assign best workers to
- Hard tasks
- Remaining tasks
- Calculate Overall Accuracy

CrowdED

Stage 1:

- Train all workers
- On a proportio of tasks
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Stage 2:

Assign best orkers to

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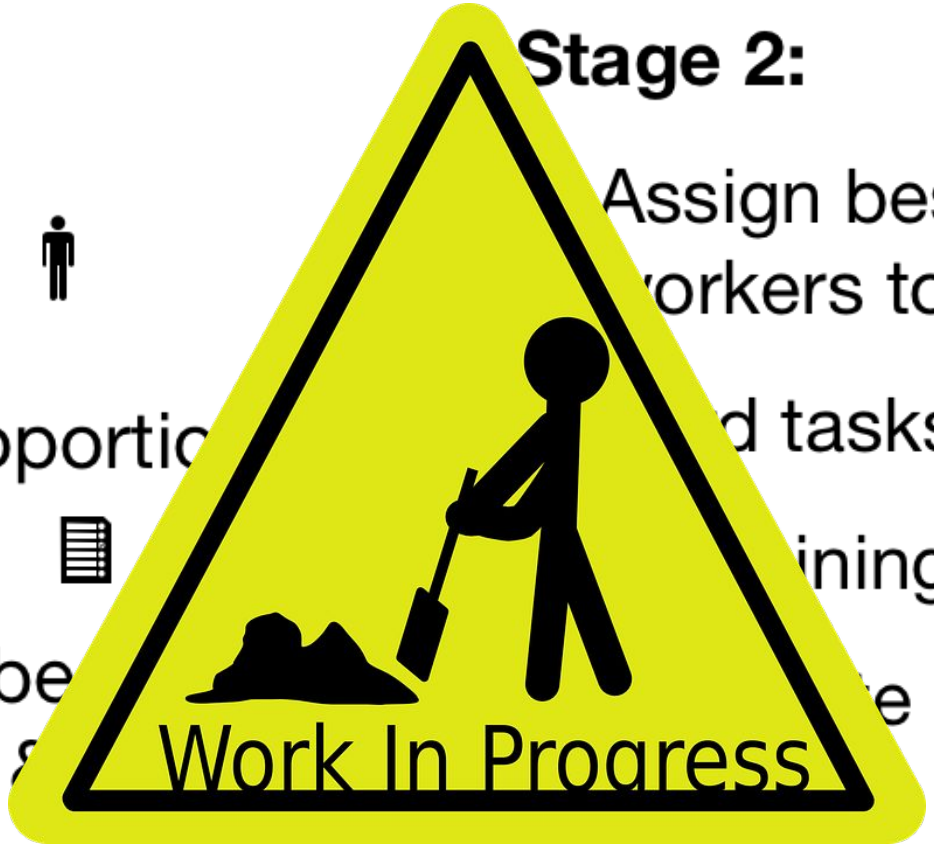
Accuracy



Recommendations

- Reputation system for workers
- More than financial incentives
- Recognize worker potential (badges)
  - Paid for their expertise
- Train less skilled workers (tutoring system)

Recommendations

- Promote workers to management roles
  - Create gold labels
  - Manage other workers
  - Make task design suggestions (first-pass validation)
- Career trajectory (based on reputation):
  1. Untrusted worker
  2. Trusted worker
  3. Hourly contractor
  4. Employee
- Platforms logs
  - Which kind of tasks attract skilled workers

Summary

- Things that work
  - Qualification tests
  - Honey-pots
  - Good content and good presentation
  - Economy of attention
- Things to improve
  - Manage workers in different levels of expertise including spammers and potential cases.
  - Mix different pools of workers based on different profile and expertise levels.

Summary

- Enforce Quality:
  - Task design
  - Iterate
  - Crowd incentives
  - Know your crowd: Model workers

Acknowledgements

Slides adapted from the tutorial “Microtask Crowdsourcing to Solve Semantic Web Problems” by Gianluca Demartini, Elena Simperl, and Maribel Acosta at ISWC 2013.
Source: https://github.com/maribelacosta/crowdsourcing-tutorial

Hands-on II: Executing a task on CrowdFlower (Figure Eight)

https://www.figure-eight.com/

Crowdsourcing Settings

Group	Task	# Workers (Redundancy)	Contributor Level	Total Project Time
1	Data categorization	2	1	~10 min
2	Data categorization	3	2	
3	Data categorization	3	3	
4	Image annotation	2	1	
5	Image annotation	3	2	
6	Image annotation	3	3	