Know your audience

Money is not everything! A good design enable to:

- Facilitate entry of new users,
- Maintain a large community,
- Improve efficiency and quality of the results,
- Motivate workers to provide a good answer,
- Manage both competition & community aspects.

Amazon Mechanical Turk

- Small tasks
- Small reward
- Typically classification, translation & texts,
- Increasingly popular in sociology & psychology.

Demographics of Mech. Turk

(Ipeirotis, 2010)

Demographics of Mech. Turk

(Ipeirotis, 2010)
Demographics of Mech. Turk

- Mechanical Turk is a primary source of income for low-income workers.
- Gender distribution varies across countries.

(reports, 2010)

Demographics of Mech. Turk

- Nationalities and gender distribution across different countries.
- Breakdown of demographics in India and the United States.

(Ross et al., 2010)

reCAPTCHAs

- “Completely Automated Public Turing test to Tell Computers and Humans Apart.”
- Purpose: Prevent abuse from bots, help digitize books.

(von Ahn et al., 2008)

Breaking CAPTCHAs

1. Hypothesize locations of letters in the image.
2. Extract strings that form candidate words.
3. Choose the most likely word(s).

Success rate ranging between 80% and 95%.

(Mori and Malik, 2003)

- OCR cannot recognize 30% of the words.
- 1 word digitizes difficult words.
- 1 word for control.
- 750,000,000 users (>10% of humanity).

(von Ahn et al., 2008)
Usability/Difficulty trade-off

- Text-based CAPTCHAs can be difficult for foreigners.
- Color, font, and string length can impact security and usability.

Fully secure CAPTCHAs are possible but one must consider the time required to solve it.

(Yan and El Ahmad, 2008)

Visual vs. Audio CAPTCHA

<table>
<thead>
<tr>
<th></th>
<th>Visual</th>
<th>Audio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success rate of</td>
<td>~85%</td>
<td>~45%</td>
</tr>
<tr>
<td>(original) CAPTCHA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

But a simple re-design of the Audio CAPTCHA interface boosted the success rate to 65%!

Designing Audio CAPTCHAs

Designing Audio CAPTCHAs

Human-computation Games

200,000,000 of web users play online games once a week.

Casual games are the most popular and characterized by:
- Low level entry (design & setup)
- Simple mechanics,
- Non-punishing,
- Fast-paced game,
- Gender-neutral & non-violent.

(Igda, 2008)

Game With a Purpose

(Kaserlik et al., 2012)
Demographics of casual games

- Motivations: Relax, pass time, socialize, achieve goals,
- Do not see themselves as "gamers",
- Do not spent money on specialized hardware,
- Majority of 30-45 yo female playing puzzle, cards, words.

Demographics are essential to define potential & objectives.

GWAP are games, and a game must be fun!

(CGA, 2008)

Citizen science

Workers:
- Highly motivated workers,
- Limited by lack of knowledge.

Scientists:
- Need large dataset,
- Must simplify the human task.

Workers gain knowledge

- Variant of the 20 question game used to train classifier.
- Task routing is heavily used to determine which question will be the most informative.

(Branson et al., 2010)

Citizen-science UI

Avoid bias in data collection due to:
- over-estimation of easy targets,
- over- or under-report of measurements.

(Sullivan et al., 2008)

Learning by doing

Learn a language and translate the web.
- Free!
- Use image tagging, sentence translation, etc.
- Applicable to any knowledge field.

Duolingo

Learning by doing

Long involvement and motivated users: The system has time to estimate the expertise of users and see evolution over time.

Challenges:
- How to select lessons?
- When does the system "teach" or "query"?
- How to estimate the expertise of users?
- How to design the UI to promote learning?
- Can we pair users? With which benefit?
Temporary market

In case of emergencies, crowdsourcing techniques could quickly engage a large population… for a short time. How to build such systems?

Supporting workers

• Search for the best task,
• Information to decide to do a task vs. another one,
• Monitor progresses and productivity,
• Communicate problems,
• Understand competition,
• Find support within the community,
• Express opinions.

Supporting requesters

• Automate and optimize task design,
• visualize workers’ expertise and progresses,
• Meet deadlines,
• Meet budget,
• Understand competition with other requesters,
• Express opinion about workers.

New trends

Mechanical turk will no longer be the primary resource for crowdsourcing applications?

• Query language for databases (Parameswaran & Polyzotis, 2011)
  \[ \text{travel}(I) := r\text{Jpeg}(I), h\text{Clean}(I), h\text{Beach}(I), \text{aLarge}(I) \]
• Integration inside word processors (Bernstein et al., 2010)

Reference

Human Computation
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