Assessing Crowdsourcing Quality through Objective Tasks

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Overview

CrowedSourcing:

- Collect vast quantities of human assessments.
- Collect annotations rapidly without the need of an expert.
- Crowdsourcing: an alternative in creating resources for NLP.
- Obtaining reliable results from the crowd remains a challenge.

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- Investigate the impact of different factors and presentation methods.
- We run two different experiments using objective tasks: maths and general text questions
- We present our results comparing the influence of the different factors used.

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  1. Presentation method: free text vs radio buttons.
  2. Workers' base: US or India.
  3. Payment scale: an estimated $4, $8 and $10 per hour.

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- No limitation on the confidence rate (real workers and spammers).

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- In total we have 10 such questions. The questions vary in text length (min: 4, max: 75 and ave: 40 words).

Maths Question Example

Table: Short and an average example maths question.

What is double 80?
There was a fire in the building down the street. It was so large that our city had to call in 6 fire trucks. Each truck had 9 firemen riding on it. How many firemen arrived to fight the fire?

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- The questions fall in the travel and history categories (one correct answer).
- Not straightforward, the answer is not easily derivable from the text itself.
- Requires some general knowledge or the willingness to search the web.
- The length of the questions in average is 13 words with a maximum of 29 and a minimum of 3 words.

General Text Question Example

Table: Example of History and Travel questions

Genre	Questions	Answers
Travel	Which country is also called the Hellenic Republic?	(A)Sweden, (B)Denmark, (C)Greece, (D)Finland.
History	What U.S. president was born William Jefferson Blythe IV?	(A)Richard-Nixon, (B)Bill-Clinton, (C)Andrew-Johnson, (D)Grover_Cleveland.

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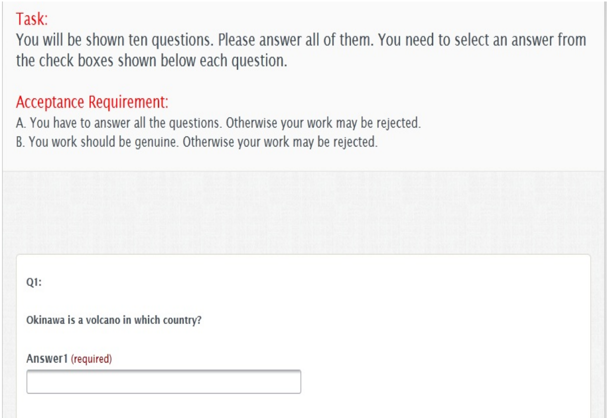
- In each HIT we show 10 questions and asked for 25 workers.
- Workers are supposed to write the answer or select one of the provided choices.

General Text Questions Design



Task:
You will be shown ten questions. Please answer all of them. You need to select an answer from the check boxes shown below each question.

Acceptance Requirement:
A. You have to answer all the questions. Otherwise your work may be rejected.
B. You work should be genuine. Otherwise your work may be rejected.

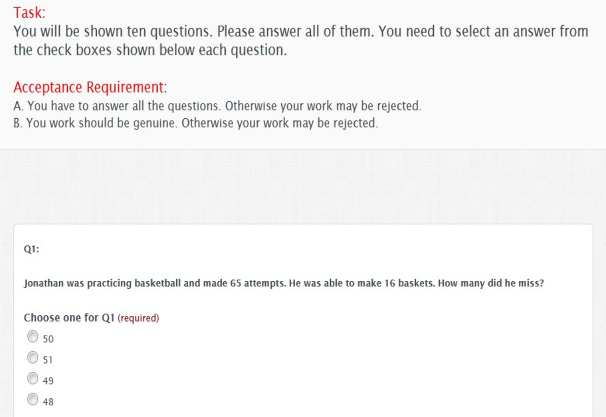
Q1:

Okinawa is a volcano in which country?

Answer1 (required)

Figure: Text questions with free text design.

Math Questions Design



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Q1:

Jonathan was practicing basketball and made 65 attempts. He was able to make 16 baskets. How many did he miss?

Choose one for Q1 (required)

○ 50

○ 51

○ 49

○ 48

Figure: Maths questions with radio button design.

Results

- In each experiment we count the number of correct answers.
- This means that every experiment has 25 such fields (different worker).

Math Question Results

USA	Average Score	India	Average Score
$4_RB	9.88	$4_RB	8.30
$8_RB	9.64	$8_RB	9.16
$10_RB	9.44	$10_RB	9.80
$4_TF	9.28	$4_TF	8.24
$8_TF	9.28	$8_TF	8.52
$10_TF	9.40	$10_TF	9.44

Table: Average scores of the math questions.

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$4_RB	9.25	$4_RB	8.23
$8_RB	9.30	$8_RB	7.69
$10_RB	9.07	$10_RB	9.42
$4_TF	9.32	$4_TF	8.12
$8_TF	8.88	$8_TF	9.40
$10_TF	9.00	$10_TF	9.29

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- When the radio button design is used the results can be significantly better.
- The payment incentives seem to have also a significant positive impact on the results.
- This does not confirm Mason and Duncan [2] (improved the quantity, but not the quality).

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- Only some significant impact of the country of origin.
- The payment tends to be a significant factor in the quality of the results.
- Participants tend to make more effort in solving the questions when higher payments are made

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- Average Score is high (very difficult questions?).
- Focusing at individual performance (get the best out of individuals).
- Serve as a baseline (comparison for future experiments).

Questions

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Experimental Pair
Impact of country of origin
nil
Impact of design
USA_4_TF – USA_4_RB
USA_8_TF – USA_8_RB
India_10_TF – India_10_RB
Impact of payment
India_4_TF – India_10_TF
India_8_RB – India_10_RB

Table: Results of the maths question. The significantly better (at level p < 0.05) results are on the right of "–". "nil" indicates the absence of any significantly different result. TF stands for text field design and RB for the radio button design. 4, 8 and 10 are the payments per hour in US dollars.

Experimental Pair
Impact of country of origin
India_4_TF – USA_4_TF
India_8_RB – USA_8_RB
Impact of design
India_8_RB – India_8_TF
Impact of payment
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