Today’s Goals

- Learn about Amazon Mechanical Turk (MTurk)
- Learn how to launch and run your experiment on MTurk
- Keep in mind the necessary tasks post-launch
  - Worker qualifications
  - Bonusing workers
Amazon Mechanical Turk

“Artificial artificial intelligence”
Amazon Mechanical Turk (MTurk) is a crowdsourcing marketplace that makes it easier for individuals and businesses to outsource their processes and jobs to a distributed workforce who can perform these tasks virtually. This could include anything from conducting simple data validation and research to more subjective tasks like survey participation, content moderation, and more. MTurk enables companies to harness the collective intelligence, skills, and insights from a global workforce to streamline business processes, augment data collection and analysis, and accelerate machine learning development.

While technology continues to improve, there are still many things that human beings can do much more effectively than computers, such as moderating content, performing data deduplication, or research. Traditionally, tasks like this have been accomplished by hiring a large temporary workforce, which is time consuming, expensive and difficult to scale, or have gone undone. Crowdsourcing is a good way to break down a manual, time-consuming project into
Amazon Mechanical Turk – What is It?

- “MTurk”
- Marketplace for work/tasks (more than 100K workers, more than 2K active)
- Outsource computer labor to humans
  - Named after 18th century, “The Turk,” a chess robot that was actually controlled by a chess master
  - Used largely to create labeled data for machine learning
- Tasks range from several seconds (identify photo) to hour-long surveys (maybe yours!)
- Compensation ranges from $0.01/task to above minimum wage
- Open to almost anyone with an Amazon account
- Not really regulated

https://www.mturk.com/worker/help
MTurk – Vocabulary

- Workers and Requesters
- Human Intelligence Tasks, or “HITs”
- Reward (Show-Up/Completion Fee)
  - Baseline amount being offered for completion of a task
- Bonus
  - Additional compensation that can be based on performance
  - Payment can be primarily based on bonus
- Batch
  - Requester creates a batch of HITs
MTurk – Low Wages, High Fees

- Pay can be as low as $0.01/task
- Amazon takes (high) fees on everything
  - 20% on all rewards and bonuses
  - Additional 20% on batches with more than 10 assignments (i.e. almost all batches)
  - Additional fees for advanced worker restriction
- Research shows median wage ~$2/hour
  - 4% of workers making more than $7.25/hour
- Average requester pays $11/hour but posts far less work

https://requester.mturk.com/pricing
A Data-Driven Analysis of Workers’ Earnings on Amazon Mechanical Turk (2017)
Anyone with an Amazon account is eligible by default
- In the US, accounts are linked to social security numbers

May be machines trying to complete your HIT

Can restrict who takes your survey
- Only those in US
- No one who has taken one of my surveys before
- Only workers with a high HIT Approval Percentage (important)

Advanced qualifications and restrictions (expensive)
- MTurk Masters (additional 5%)
- Restrict by political affiliation ($0.40/worker)

https://requester.mturk.com/pricing
Workers are quick
- Can get hundreds of responses in a few hours
- Depends on your pay rate, survey, etc.

Tradeoff between quality and speed
- Ideally you want to restrict to workers with >99% HIT approval
- Noticeable difference between >95% and >99% (>97% seems okay)

Note that some people may be bad subjects (careless, machines)
- Incentive good performance (bonuses for getting certain questions right)
- Add questions to see if people are paying attention
MTurk – Who Takes My Survey?

- Workers qualifications
  - Existing ones include HIT Approval Percentage
- Can create your own
  - Label for previous workers will let you exclude people who have taken your survey before
  - Can create any label to filter towards or against certain workers you’ve had
- Prev_Worker and Eligible_Worker are very useful qualifications
  - Will show in demo

https://blog.mturk.com/tutorial-understanding-requirements-and-qualifications-99a26069fba2
MTurk – Demographics

- Primarily workers in US and India
- Fairly even gender split
- Tend to be a bit younger than US population
- Fairly even married/single split
- Demographics tracker (below) lets you look at several demographic characteristics, overall and by US/India

http://demographics.mturk-tracker.com
<table>
<thead>
<tr>
<th>Requester</th>
<th>Title</th>
<th>HITs</th>
<th>Reward</th>
<th>Created</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shopping Receipts</td>
<td>Extract Data From Shopping Receipt</td>
<td>287</td>
<td>$0.01</td>
<td>15s ago</td>
<td>Preview</td>
</tr>
<tr>
<td></td>
<td>squares</td>
<td></td>
<td>$0.03</td>
<td>16s ago</td>
<td>Preview</td>
</tr>
<tr>
<td>Panel</td>
<td>Identify if two receipts are the same</td>
<td>1</td>
<td>$0.05</td>
<td>13s ago</td>
<td>Preview</td>
</tr>
<tr>
<td>James Billings</td>
<td>Market Research Survey</td>
<td>10,116</td>
<td>$0.01</td>
<td>20s ago</td>
<td>Preview</td>
</tr>
<tr>
<td>Crowdsurf Support</td>
<td>Review, edit, and score the transcription of up to 35 seconds of media - Earn up to $0.02</td>
<td>2,371</td>
<td>$0.02</td>
<td>21s ago</td>
<td>Preview</td>
</tr>
<tr>
<td>str11223344</td>
<td>Tell us how much this item would cost to replace - General Contents - Batch ID #1</td>
<td>50</td>
<td>$0.20</td>
<td>12s ago</td>
<td>Preview</td>
</tr>
<tr>
<td>Emily Wilson</td>
<td>Continue a conversation with a chatbot</td>
<td>3</td>
<td>$0.10</td>
<td>38s ago</td>
<td>Preview</td>
</tr>
<tr>
<td>CopyText Inc.</td>
<td>Type the text from the images, carefully. Productivity and bonuses guaranteed.</td>
<td>21</td>
<td>$0.01</td>
<td>43s ago</td>
<td>Preview</td>
</tr>
</tbody>
</table>
MTurk – Example HIT

Extract purchased items from a shopping receipt
HIT Reward $0.03 for all receipt items. Hit Add Row for next Item

Enter Retailer Name *
If there is no Retailer Name on the receipt, mark receipt as "Not a receipt or not readable."

Retailer name

If no full address then only supply what is shown on the receipt. Leave fields with no entries empty.

Phone
#
#
Street
Street
City
e.g. Californ
State
Zipcode
Date (Use 4-digit year)*
mm/dd/yyyy
Time
HH:MM/a/p

Please enter entire Item Description including UPC/Item number.
Pounds etc. should be added to the Item Description, for example a valid Item Description can be "Bananas 2.88lb @ 0.99/lb".
# MTurk – Worker View

## HIT Groups (1-20 of 904)

<table>
<thead>
<tr>
<th>Requester</th>
<th>Title</th>
<th>HITs</th>
<th>Reward</th>
<th>Created</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor Experiment20</td>
<td>Compensation HIT for A1NM7ZPZ3NH412 (~ 1 minute)</td>
<td>1</td>
<td>$22.25</td>
<td>28m ago</td>
<td>Preview</td>
</tr>
<tr>
<td>AB Lab - University of Calgary</td>
<td>Compensation HIT (~ 1 minute)</td>
<td>1</td>
<td>$20.00</td>
<td>19d ago</td>
<td>Preview</td>
</tr>
<tr>
<td>SurveyComet</td>
<td>Make predictions about political events $16. (~ 120 minutes)</td>
<td>25</td>
<td>$16.00</td>
<td>24m ago</td>
<td>Preview</td>
</tr>
<tr>
<td>SurveyComet</td>
<td>Make predictions about political events $16. (~ 120 minutes)</td>
<td>25</td>
<td>$16.00</td>
<td>24m ago</td>
<td>Preview</td>
</tr>
<tr>
<td>SurveyComet</td>
<td>Make predictions about political events $16. (~ 120 minutes)</td>
<td>25</td>
<td>$16.00</td>
<td>25m ago</td>
<td>Preview</td>
</tr>
<tr>
<td>SurveyComet</td>
<td>Compensation HIT for A1EBQ9X6IN5OZC (~ 1 minute)</td>
<td>1</td>
<td>$16.00</td>
<td>3d ago</td>
<td>Preview</td>
</tr>
<tr>
<td>SurveyComet</td>
<td>Make predictions about political events $16. (~ 120 minutes)</td>
<td>25</td>
<td>$16.00</td>
<td>10/24/2019</td>
<td>Preview</td>
</tr>
<tr>
<td>TAP Lab FSU</td>
<td>Understanding people's prior experiences</td>
<td>1</td>
<td>$15.00</td>
<td>2d ago</td>
<td>Preview</td>
</tr>
<tr>
<td>TAP Lab FSU</td>
<td>Understanding people's prior experiences</td>
<td>1</td>
<td>$15.00</td>
<td>3d ago</td>
<td>Preview</td>
</tr>
<tr>
<td>Peter Gault</td>
<td>Four part English language study - part three (~ 60 minutes)</td>
<td>2</td>
<td>$15.00</td>
<td>1h ago</td>
<td>Preview</td>
</tr>
<tr>
<td>UserBob</td>
<td>Upload 25 minute screen cast of an Android app</td>
<td>1</td>
<td>$13.75</td>
<td>8d ago</td>
<td>Preview</td>
</tr>
</tbody>
</table>
MTurk – Creating a Batch

Select a customizable template to start a new project

Survey
Survey Link
Survey
Vision
Image Classification
Bounding Box
Semantic Segmentation
Instance Segmentation
Polygon
Keypoint
Image Contains
Video Classification
Moderation of an Image
Image Tagging
Image Summarization
Language
Sentiment Analysis
Intent Detection
Collect Utterance
Emotion Detection
Semantic Similarity
Audio Transcription

Survey Link Instructions (Click to collapse)

We are conducting an academic survey about social networks. We need to understand your opinion about social networks. Select the link below to complete the survey. At the end of the survey, you will receive a code to paste into the box below to receive credit for taking our survey.

Make sure to leave this window open as you complete the survey. When you are finished, you will return to this page to paste the code into the box.

Template note for Requesters - To verify that Workers actually complete your survey, require each Worker to enter a unique survey completion code to your HIT. Consult with your survey service provider on how to generate this code at the end of your survey.

Survey link:  http://example.com/survey345.html

Provide the survey code here:
e.g. 123456

You must ACCEPT the HIT before you can submit the results.
MTurk – Creating a Batch

Edit Project

1. Enter Properties
2. Design Layout
3. Preview and Finish

Project Name: Presentation Batch
This name is not displayed to Workers.

Describe your survey to Workers

Title
Answer a survey about your opinions

Describe the survey to Workers. Be as specific as possible, e.g. “answer a survey about movies”, instead of “short survey”, so Workers know what to expect.

Description
Give us your opinion about our products

Give more detail about this survey. This gives Workers a bit more information before they decide to view your survey.

Keywords
survey, demographics

Provide keywords that will help Workers search for your tasks.
<table>
<thead>
<tr>
<th>Setting up your survey</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reward per response</strong></td>
</tr>
<tr>
<td>$</td>
</tr>
<tr>
<td>This is how much a Worker will be paid for completing your survey. Consider how long it will take a Worker to complete your survey.</td>
</tr>
<tr>
<td><strong>Number of respondents</strong></td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>How many unique Workers do you want to complete your survey?</td>
</tr>
<tr>
<td><strong>Time allotted per Worker</strong></td>
</tr>
<tr>
<td>1 Hours</td>
</tr>
<tr>
<td>Maximum time a Worker has to complete the survey. Be generous so that Workers are not rushed.</td>
</tr>
<tr>
<td><strong>Survey expires in</strong></td>
</tr>
<tr>
<td>7 Days</td>
</tr>
<tr>
<td>Maximum time your survey will be available to Workers on Mechanical Turk.</td>
</tr>
<tr>
<td><strong>Auto-approve and pay Workers in</strong></td>
</tr>
<tr>
<td>3 Days</td>
</tr>
<tr>
<td>This is the amount of time you have to reject a Worker's assignment after they submit the assignment.</td>
</tr>
</tbody>
</table>
MTurk – Creating a Batch

Worker requirements

Require that Workers be Masters to do your tasks (Who are Mechanical Turk Masters?)

☐ Yes  ☐ No

Specify any additional qualifications Workers must meet to work on your tasks:

(+1 Add another criterion (up to 5)

(Premium Qualifications incur additional fees, see Pricing Details to learn more)

Project contains adult content (See details)

☐ This project may contain potentially explicit or offensive content, for example, nudity.
MTurk – Creating a Batch Demo
MTurk – Best Practices

- Give a decent wage
  - Some researchers argue that you should pay what you would in a lab
  - I usually recommend to researchers pro-rating $7.25/hr (federal minimum wage)
- Pay workers in a timely fashion
  - Use a quick auto-approve setting
  - Workers can see how long you take to pay on average
Be responsive
- Workers can reach out with questions, comments, mistakes

Be mindful that workers have communities
- reddit.com/r/mturk
- See https://github.com/leogoldman/Qualtrics_MTurk_Guide for helpful links
MTurk – Managing Results

- Batch progress/results
- Approve workers
  - ”Approving” workers pays out their reward
  - Bonus must be done separately
- Update worker qualifications
  - Keep track of who has taken your experiments and who is eligible
  - Useful if you don’t want people to take your survey again, or if you want to allow only certain people to participate in another round.
MTurk – Managing Results

Manage Batches

Click on the name of the batch to see more details

- Batches in progress (0)
- Batches ready for review (4)

<table>
<thead>
<tr>
<th>Created:</th>
<th>June 07, 2019</th>
<th>Assignments Completed:</th>
<th>200 / 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Elapsed:</td>
<td>7 days</td>
<td>Estimated Completion Time:</td>
<td>COMPLETE</td>
</tr>
<tr>
<td>Batch Progress:</td>
<td>100% submitted</td>
<td>100% published</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Created:</th>
<th>May 31, 2019</th>
<th>Assignments Completed:</th>
<th>200 / 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Elapsed:</td>
<td>7 days</td>
<td>Estimated Completion Time:</td>
<td>COMPLETE</td>
</tr>
<tr>
<td>Batch Progress:</td>
<td>100% submitted</td>
<td>100% published</td>
<td></td>
</tr>
</tbody>
</table>
MTurk – Managing Results

Manage Batches > Review Results

Review Results

Select the check boxes on the left to approve or reject results. You only pay for approved results. To evaluate results offline, select Download CSV.

For additional batch information, view batch details.

<table>
<thead>
<tr>
<th>Customize View</th>
<th>Filter Results</th>
<th>Upload CSV</th>
<th>Approve All</th>
<th>Download CSV</th>
</tr>
</thead>
</table>

0 of 200 assignments (FILTER APPLIED: only show assignments that are in 'Submitted' status)

No results match your filter

0 of 200 assignments (FILTER APPLIED: only show assignments that are in 'Submitted' status)
Manage Workers

The Workers who have completed work for you are listed below. Select a Worker ID to bonus, block, unblock, assign a Qualification, or revoke a Qualification. To block, unblock, or change Qualification settings for multiple Workers, select Download CSV. Select Customize View to change which Qualification Types are displayed in the table below.

<table>
<thead>
<tr>
<th>Worker ID</th>
<th>Lifetime Approval Rate for Your tasks</th>
<th>Qual: Prev_W...</th>
<th>Block Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% (1/1)</td>
<td>100% (1/1)</td>
<td>1</td>
<td>Never Blocked</td>
</tr>
<tr>
<td>100% (1/1)</td>
<td>100% (1/1)</td>
<td>1</td>
<td>Never Blocked</td>
</tr>
<tr>
<td>100% (1/1)</td>
<td>100% (1/1)</td>
<td>1</td>
<td>Never Blocked</td>
</tr>
<tr>
<td>100% (1/1)</td>
<td>100% (1/1)</td>
<td>1</td>
<td>Never Blocked</td>
</tr>
<tr>
<td>100% (1/1)</td>
<td>100% (1/1)</td>
<td>1</td>
<td>Never Blocked</td>
</tr>
<tr>
<td>100% (1/1)</td>
<td>100% (1/1)</td>
<td>1</td>
<td>Never Blocked</td>
</tr>
<tr>
<td>100% (1/1)</td>
<td>100% (1/1)</td>
<td>1</td>
<td>Never Blocked</td>
</tr>
</tbody>
</table>
MTurk – Managing Workers

- Might have to update worker qualifications between every batch
  - For example, if you don’t want people taking your survey twice
- Paying out bonuses is done individually if done on the website
  - Use MTurk developer to pay out bonuses in bulk
MTurk – Managing Workers Demo
MTurk – Paying Bonuses

- Workers should get a survey code or some kind of ID in from your experiment.
### MTurk – Paying Bonuses

#### Qualtrics

<table>
<thead>
<tr>
<th>DN</th>
<th>DO</th>
<th>DP</th>
<th>DQ</th>
<th>DR</th>
<th>DS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q167</td>
<td>Q60</td>
<td>Random ID</td>
<td>Create New</td>
<td>TreatmentNum</td>
<td></td>
</tr>
</tbody>
</table>

There is In general, Random ID | Create New | TreatmentNum

:: "Export" | "Import" | "Importid" | "Importid" | "TreatmentNum"

<table>
<thead>
<tr>
<th>Importid</th>
<th>Importid</th>
<th>Importid</th>
<th>TreatmentNum</th>
</tr>
</thead>
<tbody>
<tr>
<td>8723325</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8625861</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9035965</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1404854</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4348471</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4449691</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5627748</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5039411</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6192382</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1048752</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7354452</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### MTurk

<table>
<thead>
<tr>
<th>AA</th>
<th>AB</th>
<th>AC</th>
<th>AD</th>
<th>AE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Answer.surveycode</td>
<td>Approve</td>
<td>Reject</td>
</tr>
</tbody>
</table>

100% (1/1) | I agree | 6904478 |
100% (1/1) | I agree | 7854627 |
100% (1/1) | I agree | 4348471 |
100% (1/1) | I agree | 5653640 |
100% (1/1) | I agree | 4449691 |
100% (1/1) | I agree | 4324067 |
100% (1/1) | I agree | 4723315 |
100% (1/1) | I agree | 6563157 |
100% (1/1) | I agree | 1668177 |
100% (1/1) | I agree | 5135763 |
100% (1/1) | I agree | 6658082 |
Once you’ve downloaded both the Qualtrics results and MTurk results, have to link workers to their Random ID:

- Excel VLOOKUP or INDEX/MATCH
- Stata merge
- R merge or which( )
Use to avoid paying out bonuses individually

Requires Amazon Web Services (AWS) account
- Free, easy to set up

Can use a variety of languages
- Command line (Terminal)
- Python

Simplify using AWS services, including MTurk, in your applications with an API tailored to your programming language or platform. These SDKs are designed to work with all AWS services.

- **Browser**
  - Install »
  - Documentation »
  - Learn more »

- **Java**
  - Install »
  - Documentation »
  - Learn more »

- **.NET**
  - Install »
  - Documentation »
  - Learn more »

- **Node.js**
  - Install »
  - Documentation »
  - Learn more »

- **PHP**
  - Install »
  - Documentation »
  - Learn more »

- **Python (Boto)**
  - Install »
  - Documentation »
  - Learn more »

- **Ruby**
  - Install »
  - Documentation »
  - Learn more »

- **C++**
  - Install »
  - Documentation »
  - Learn more »

- **AWS Command Line Interface**
  - Install »
  - Documentation »
  - Learn more »

https://requester.mturk.com/developer
Once you connect your AWS account, you can do most things from Developer:

- Paying bonuses in bulk
- Assigning qualifications more easily
Thank You!

Come to CELSS consulting hours!

https://celss.iserp.columbia.edu/

Wednesdays 2:30-5pm

Thursdays 10:30am-1pm

leo.goldman@columbia.edu