Amazon Mechanical Turk – Hands on –

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MTurk Basic Concepts (1)



Source: https://requester.mturk.com/tour/how_it_works

- **Requester:** creates and submit tasks to the platform.
- Worker: person who solves the tasks.
- **HIT:** work unit.

MTurk Basic Concepts (2)



- **Project**: a graphical and functional template to create HITs.
 - The elements that stay the <u>same</u> in every HIT are denominated **template**.
 - The data that will <u>vary</u> from HIT to HIT are specified via **variables**.
- NOTE: If no variables are specified in the project, we will create a single HIT.
- Variables: allow creating several HITs in the project.

MTurk Basic Concepts (3)



- **Batch:** Group of HITs created by instantiating the variable(s) of a project.
- The values of the variables are specified in (CSV, TSV) files:
 - Each **column** corresponds to a variable
 - Each **row** is an instance -> HIT
 - Each file corresponds to a batch.
- We can create **several batches** for the same project.

MTurk Basic Concepts (4)



- **HIT:** Work unit. The same HIT can be solved by 1 or more workers (assignments).
- Assignment: How many workers should solve one exact same HIT.
- **Questions:** A single HIT may contain one or several questions.

MTurk Basic Concepts (5)



Total cost of the project = No. of HITs x No. of Assignments x (Reward per HIT + Fee)

MTurk Basic Concepts (6)

Example of Human Intelligence Tasks (HITs)

- Projects can be broken into smaller tasks called HITs
- A HIT represents a single work unit



No. of HITS = 900

MTurk Basic Concepts (7)

Example of Human Intelligence Tasks (HITs)

- Projects can be broken into smaller tasks called HITs
- A HIT represents a single work unit



MTurk Basic Concepts (8)

When creating a project or individual HITs, the **HIT properties** must be specified:

- General information: includes the title and description of the HIT, as well as keywords which are used by worker for searching HITs.
- HIT duration time: time allotted to solve the HIT (before it is given to another worker).
- HIT life time: how long will the HIT be available on the platform.
- **# Assignments:** number of different persons that will perform the exact same HIT.
- **Reward:** payment for correctly solving each assignment.

MTurk Workflow for Requesters



MTurk Sandbox

The Sandbox is a simulated MTurk environment to test HITs.

About the Sandbox

The Mechanical Turk Developer Sandbox is a simulated environment that lets you test your applications and Human Intelligence Tasks (HITs) prior to publication in the marketplace.

Benefits:

- Free to use for registered Mechanical Turk requesters. Fees will not be withdrawn and payments are not made to Worker accounts.
- · Has functional parity with the production website.
- Requires only a URL change to configure your application to work against the developer sandbox or the production website.



To access the sandbox, you will need a Mechanical Turk Requester account and, in order to access the sandbox programmatically, you will need an Amazon Web Services (AWS) account.

Requester Sandbox >

- Log in as **requester**: preview and test the interface of your HITs.
 - https://requestersandbox.mturk.com
- Log in as **worker**: solve your own HITs to test their functionalities and result output.
 - <u>https://workersandbox.mturk.com</u>
- **Best practice**: Always test your HITs before publishing them.

Managing HITs in MTurk

There are three different mechanism to manage your HITs in MTurk:





Hands On!

- Go to Mturk Sandbox as a **requester**:
 - <u>https://requestersandbox.mturk.com/</u>
- Click on Sign In
 - Email address: own_tp@gmx.li
 - Password: (To Be Announced)
- Now we are at "home"



1. Creating a Project

amazonmechanical turk	REQUESTER			
Home Create	Manage	Developer	Help	
New Project New Batch with an Exis	sting Project			Create HITs individually
Start a New Project				
Data Collection	Example of Cat	egorization		
Moderation of an Image				
Sentiment	Choose th	e best category	for this image	View Instructions↓
Survey Survey Link				Select the room location in home for this picture. Seating areas outside are outside not
Tagging of an Image				bedrooms. Bedrooms should contain a bed
Transcription from A/V				in the picture.
Transcription from an Image		and and a second		
Writing		hen		
Other	bath	18		
	⊖ bed ⊖ outs	side		
templates	You must AC	CEPT the HIT before yo	u can submit the results.	

2. Setting up the HIT Properties (1)

	hanical tu	rk REQUES	TER		
Home	Create	Manage	Developer	Help	
w Project	New Batch with	n an Existing Project			Create HITs individually
dit Proje	Ct perties that are	common for all of th	he HITs created using	g this project.	
U Enter Pro	perties	Design Layout	I Preview and Fin	lish	
Project Name	e: Other		This name is not displayed	d to Workers.	
Project Name Describe you	e: Other ur HIT to Work	ters	This name is not displayed	d to Workers.	
Project Name Describe you Title	e: Other ur HIT to Work Your title he Describe the task	ters ere	This name is not displayed	d to Workers.]
Project Name Describe you Title	e: Other ur HIT to Work Your title he Describe the task	ters ere to Workers. Be as specific a	This name is not displayed	d to Workers. urvey about movies", instead of "short survey", so Workers know what to expect.	
Project Name Describe you Title Description	e: Other ur HIT to Work Your title he Describe the task Your descri	ters ere to Workers. Be as specific a ption here	This name is not displayed	d to Workers. urvey about movies", instead of "short survey", so Workers know what to expect.]
Project Name Describe you Title Description	e: Other ur HIT to Work Your title he Describe the task Your descri Give more detail a	ters ere to Workers. Be as specific a ption here ubout this task. This gives W	This name is not displayed as possible, e.g. "answer a su Vorkers a bit more information	d to Workers. urvey about movies", instead of "short survey", so Workers know what to expect.	
Project Name Describe you Title Description Keywords	e: Other ur HIT to Work Your title he Describe the task Your descri Give more detail a keywords	ters ere to Workers. Be as specific a ption here ubout this task. This gives W	This name is not displayed as possible, e.g. "answer a su Vorkers a bit more information	d to Workers. urvey about movies", instead of "short survey", so Workers know what to expect.	

2. Setting up the HIT Properties (2)

amazonmechanical turk	REQUESTER
Setting up your HIT	
Reward per assignment	\$ 0.05 Tip: Consider how long it will take a Worker to complete each task. A 30 second task that pays \$0.05 is a \$6.00 hourly wage.
Number of assignments per HIT	1 How many unique Workers do you want to work on each HIT?
Time allotted per assignment	1 Hours + Maximum time a Worker has to work on a single task. Be generous so that Workers are not rushed.
HIT expires in	7 Days + Maximum time your HIT will be available to Workers on Mechanical Turk.
Results are automatically approved in	7 Days + After this time, all unreviewed work is approved and Workers are paid Very IMPORTANT:
HIT properties	Set up quality mechanisms Advanced » Masters are selected by default

Design Layout

Save

3. Selecting Qualifications

amazonmechanical turk REQUESTER	
Advanced	
	Worker requirements «
Worker requirements: Customize Worker Requirements Specify ALL the qualifications Workers must meet to work on your Masters remove HIT Approval Rate (%) greater than or equal to \$ 95 Number of HITs Approved \$ greater than or equal to \$ 100 volume of HITs Approved to volume of \$ Assers Categorization Masters Photo Moderation Masters	<pre># # # # # # # # # # # # # # # # # # #</pre>
Masters Only System Qualifications Y HIT submission rate (%) Location HIT rejection rate (%)	Aasters expect higher rewards
HIT Approval Rate (%) Number of HITs Approved	/Turk charges 20% for masters

Design Layout

Save

4. Defining the Task (with Variables)

nazonme	chanical tu	rk REQUEST	FER		
Home	Create	Manage	Developer	Help	
New Project	New Batch wit	h an Existing Project		Create HITs individually	
Edit Project Use the HTML editor below to design the layout of your HIT. This layout is common for all of the HITs created with this project. You can define variables for data that will vary from HIT to HIT (Learn more). The name is not displayed to Workers. Project Name: Writing This name is not displayed to Workers. WYSIWYG HTML editor					
Frame Helg	iht 400	Height in pixels of the frame	e your HIT will be displayed in to V	Workers. Adjust the height appropriately to minimize scrolling for Workers.	
Write a brief	description of	a website.			
 Write sh Click the Your su No awa Your wr 	ort article summar e link below to revi bmission must be rd will be given for iting must be origin	izing what a website is a ew the website and brow at least 50 words long bu submissions of less that nal and can not simply b	about and their products and wse the products and service ut no more than 100 words. n 50 words. e a copy of part of the websi	services. as. <u>same</u> in every HIT te.	
Website nume: \${name} Variables: data that will vary from HIT Website lik: \${link} to HIT. Are denoted as follows: \$ {var_name}					

5. Previewing the Template

This is how your HIT will look to Mechanical Turk Workers. Before you publish these HITs, any variables in the HIT will be replaced with the input data that you provide when you publish the HIT. You can download a sample of the input file for this project or learn morphabout acceptable file formats (Download sample)

① Enter Properties ② Design Layout	③ Preview and Finish			
Project Name: Writing	This name is not displayed to Workers.	This is	what the work	kers will see
Avrite a short summan/	/			
Requester: Maribel Acosta Qualifications Required: Masters has been granted		Reward: \$1.0 per HIT	HITs available: 0	Duration: 1 Days
	HIT PI	review		
Write a brief description of a webs	ite.			
 Write short article summarizing what a web Click the link below to review the website a Your submission must be at least 50 words I No award will be given for submissions of le Your writing must be original and can not si 	ite is about and their products and servi ind browse the products and services. ong but no more than 100 words. ess than 50 words. imply be a copy of part of the website.	ices.		
Website nar.e: \${name} Website link : \${link }				

6. Creating Batches



7. Previewing the HITs

azonme	chanical tu	rk REQUES	TER				
Home	Create	Manage	Developer	Help			
ew Project	New Batch wi	th an Existing Proje	zt				Create HITs individually
Preview	HITS Dur HIT will look	to Workers. Make	sure that any variab	les in the HIT ar	Selecter correctly replaced by your input d	t HIT Template 💿 Upload Input D	Data 🔋 Preview Oconfirm and Publish
M_Writing1	Test						
Write a short su equester: Mari ualifications Re asters has bee	mmary bel Acosta equired: n granted				Reward: \$1.0 per HIT	HITs available: 3	Duration: 1 Days
					HIT Preview		
Write a	brief descri	ption of a webs	ite.				
 Writ Clic You No : You 	te short article sum k the link below to ir submission must award will be give ir writing must be	marizing what a websit review the website and the at least 50 words lo for submissions of le original and can not sin	te is about and their produ I browse the products and ong but no more than 100 ss than 50 words. aply be a copy of part of t	ucts and services. d services. words. the website.			
Website na Website lin	ante: Hit1_nam nk Hit1_link_(e_data data			Variables data fron	are replaced n the input fil	l with the e

8. Publishing the HITs

Batch	Summary
Batch Name: M_WritingTest 1	Description: Write a short summary
HITs	
Number of HITs in this batch:	3 Summary of the project:
Number of assignments per HIT:	× 1 • # of HIIs ——— • Rewards
Total number of assignments in this batch:	 Total payment
Cost	Account balance
Reward per Assignment:	\$1.000
	x 3
Estimated Total Reward:	\$3.000
Estimated Fees to Mechanical Turk:	+ \$0.900 blance when you click "Publish HITs")
Estimated Total Cost:	\$3.900
Your Projected Balance: \$9,996.100 (after clickin	g "Publish HITs")



9. Retrieving the Results

MTURK COMMAND LINE TOOLS

List of Commands

[HITs]

Make template Load HITs Delete HITs Update HITs Extend HITs

[Results]

Get result Approve/reject work Review results Generate result summary Grant bonus Block/unblock worker

[Qualification types]

Create qualification type Update qualification type Get qualification results Evaluate qualification request Approve/reject qualification request Revoke qualifications Update qualification score

[Account]

Reset account Get balance

Creating HITs with CLT

- 1. Configuring the connection to the platform
- 2. Setting up the HIT properties
- 3. Defining the task
- 4. Creating the batch
- 5. Publishing the HITs
- 6. Retrieving the results

1. Configuring the connection to the platform

- Configure the ./bin/mturk.properties file
- Add the keys to access your MTurk account

Information to access the MTurk account.
access_key=
secret_key=

• Specify the service to use (Sandbox or production site)

If you want to use the Sandbox use the following service_url
service_url=https://mechanicalturk.sandbox.amazonaws.com/?Service=AWSMechanicalTurkRequester

If you want to use the Sandbox use the following service_url #service_url=https://mechanicalturk.amazonaws.com/?Service=AWSMechanicalTurkRequester

2. Setting up the HIT Properties

• Create a HIT properties file myhits.properties

title: Information about artists.
description: Help us to select the most representative picture of an artist.
keywords:pictures, artists, comparison, images, famous people
reward: 0.04
assignments: 3
annotation:artist#pictures

this Assignment Duration value is calculated based on the number questions. assignment duration: 600

```
# this HIT Lifetime value is 60*60*24*15 = 15 days
hitlifetime:1296000
```

this Auto Approval period is 60*60*24*15 = 15 days
autoapprovaldelay:1296000

Qualifications can be defined in the properties file instead of in code.
You can add multiple qualifications for this HIT by simply increasing the # suffix.
i.e. qualification.2: XXXXX
qualification.comparator.2:greaterthan

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3. Defining the Task (1)



3. Defining the Task (2)

Question data structures

[QuestionForm]

Describes one or more questions for a HIT, or for a Qualification test.

Elements: QuestionIdentifier, DisplayName, IsRequired, QuestionContent, AnswerSpecification

[HTMLQuestion]

Describes the HIT with HTML code, without running an external website.

Elements: HTMLContent, FrameHeight

[ExternalQuestion]

Displays a web page from your website in a frame.

Elements: ExternalURL, FrameHeight

[HITLayout]

Reusable template to provide HITs. It is created by creating a project on the website (MTutk Web Interface).

4. Creating a Batch

- Create an input file myhits.input:
 - Use **tab** as separator (very sensitive)
 - First row corresponds to the variables used in the task template. In this example: \${artist}, \${image1} and \${image2}

	I ■ I ■ I ■ III ■ IIII ■ IIIIIIIIIIIII
1	artist image1 image2
2	Elvis Presley http://upload.wikimedia.org/wikipedia/commons/9/99/Elvis_Presley_promoting_Jailhouse_Rock.jpg ht
3	Madonna http://upload.wikimedia.org/wikipedia/commons/e/e7/Madonna_%C3%A0_Nice_17_edit.jpg http://upload.wikimedi
4	The Beatles http://upload.wikimedia.org/wikipedia/commons/d/df/The_Fabs.JPG http://upload.wikimedia.org/wikipedia/

• Each line contains the input data to generate the tasks

5. Publishing the HITs

• Run the loadHits command. In the example:

./loadHITs.sh -label ../samples/mturk_demo/myhits
 -input ../samples/mturk_demo/myhits.input
 -question ../samples/mturk_demo/myhits.question
 -properties ../samples/mturk_demo/myhits.properties

- The following output files are generated:
 - Success file: Contains identifiers to the HIT that were created. This information is used to retrieve the results of these HITs.
 - Failure file: Contains the rows of the input files that could not be published in the platform.

6. Retrieving and Reviewing the Results

- The results are retrieved with the getResults command. In the example:
 - ./getResults.sh -successfile .../samples/mturk_demo/myhits.success
 -output .../samples/mturk_demo/myhits.results

Success file containing the identifiers of the HITs created with loadHITs

- The output file contains a column named "reject" which should be marked in case the assignment should be rejected.
- To approve/reject HITs execute the reviewResults command. In the example:

./reviewResults.sh -resultsfile ../samples/mturk_demo/myhits.results



Select a Programming Language





http://aws.amazon.com/code/SDKs/922





http://aws.amazon.com/code/SDKs/923

Java API: 1. Pre-requisites

- Download the MTurk SDK for Java
 - <u>http://sourceforge.net/projects/mturksdk-java/files/latest/download</u>
- Include all the *.jar files from the /lib and /lib/build in your classpath
- Set up the mturk.properties file
- Include the following classes:
 - com.amazonaws.mturk.service.axis.RequesterService: Establishes the connection to the platform
 - com.amazonaws.mturk.util.ClientConfig: Connection specifications (path to the mturk.properties files)
 - com.amazonaws.mturk.service.exception.ServiceException: Handles the exceptions when contacting the platform
 - com.amazonaws.mturk.requester.HIT: Class for HIT management.

Java API:

2. Setting up the connection

- Create a RequestServiceObject
- Specify the configurations with a PropertiesClientConfig object. This class has two different constructors with the following arguments:
 - No arguments: the configuration is set up using the methods setAccessKeyId, setSecretAccessKey, setServiceURL.
 - String specifying the path to the property file mturk.properties

service = new RequesterService(
 new PropertiesClientConfig("./mturk.properties"));

Java API: 3. Creating HITs (1)

There are different ways to create HITs using the Java API:

- Reading certain information about the HITs from CSV files (properties, question, input) – same files used in the CLT example.
- Specifying certain the information about the HITs using Java objects
 - This method is more suitable –specially for the input specification– when consuming data directly from other applications, for example, the results of a SPARQL query.
- 3. Combining 1. and 2.

Java API: 3. Creating HITs (2)

1. Reading from CSV Files

```
// Locations of files containing HIT information.
String inputFile = "./src/site_category/site_category.input";
String propertiesFile = "./src/site_category/site_category.properties";
String questionFile = "./src/site_category/site_category.question";
...
```

```
// Reading the information from each file.
HITDataInput input = new HITDataCSVReader(inputFile);
HITProperties props = new HITProperties(propertiesFile);
HITQuestion question = new HITQuestion(questionFile);
```

// Specification of output files.

```
HITDataOutput success = new HITDataCSVWriter(inputFile + ".success");
HITDataOutput failure = new HITDataCSVWriter(inputFile + ".failure");
```

// The method service.createHITs publishes the HITs in the platform.
HIT[] hits = Service.createHITspinput, props, question, success, failure);

Creates bulk of HITs

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Java API: 3. Creating HITs (2)

2. Creating Java Objects

// Specification of a question (String). It could be any form of Mturk questions: // QuestionForm, ExternalQuestion, HTMLQuestion or even a simple question // created with RequesterService.getBasicFreeTextQuestion("question here") String question = "<HTMLQuestion xmlns=...>...</HTMLQuestion>";

```
// Specification of the properties.
String title = "Information about artists.";
String description = "Help us to select the most representative picture of an artist.";
double reward = 0.04;
int assignments = 3;
```

// The method createHIT creates and publishes a single HIT using default values
// for the HIT properties not specified in the parameters.
// There are two createHIT methods with different arguments.
HIT hit = service.createHITCtitle, description, reward, question, assignments);

Create an individual HIT

// We need to keep track of success/failure while publishing the HIT.
// Print in success file: hit.getHITId() + "\t" + hit.getHITTypeId();

Java API: 3. Creating HITs (2)

3. Combining 1. and 2.

```
// Specification of a question (String). It could be any form of Mturk questions:
// QuestionForm, ExternalQuestion, HTMLQuestion or even a simple question
// created with RequesterService.getBasicFreeTextQuestion("question here")
String question = "<HTMLQuestion xmlns=...>...</HTMLQuestion>";
```

```
// Reading the specification of the properties from a file.
String propertiesFile = "./src/site_category/site_category.properties";
HITProperties props = new HITProperties(propertiesFile);
```

Java API: 4. Retrieving the Results

```
// Read from the success file the id of the HITs which were effectively published.
// Each row of the success file is as follows: HITid \t HITTypeID.
String successFile = "./src/site category/site category.success";
HITDataInput success = new HITDataCSVReader(successFile);
// Read each line of the success file to get the hitId.
for (int i = 1; i < success.getNumRows(); i++) {</pre>
    // Retrieve the information of submitted (completed) assignments for the HIT.
    Assignment[] a = service.getAllSubmittedAssignmentsForHIT(success.getRowValues(i)[0]);
   // Iterate over each assignment to get the answer.
   for (Assignment assignment : a) {
        // Print the results and the id of the assignment in the .results file.
        // The results of each assignment are stored in assignment.getAnswer();
        // The API offers methods to parse the XML answer.
    }
}
```

Java API: 5. Approving/Rejecting a Work

```
// Read from the output file the assignements to accept/reject.
String resultsFile = "./src/site_category/site_category.results";
HITDataInput results = new HITDataCSVReader(resultsFile);
// Read each line of the results file.
for (int i = 1; i < results.getNumRows(); i++) {</pre>
    Map<String,String> row = results.getRowAsMap(i);
    String reject = (String)row.get("reject");
   // If the column reject is not marked -> accept assignment.
   // Otherwise -> reject assignment and submit a new (available) assignment.
   if (reject.equals("")) {
        service.approveAssignment(row.get("assignmentid"), "Thank you");
    } else {
        service.rejectAssignment(row.get("assignmentid"), "Sorry");
        HIT hit = service.getHIT(row.get("hitid"));
        service.extendHIT(row.get("hitid"), hit.getNumberOfAssignmentsPending()+1, (long)3600.00);
    }
```

SUMMARY

Project/HIT Creation & Design (1)

- The requester is able to create **projects** or **individual HITs**
- Then, the **HIT properties** must be specified:
 - General information: includes the title and description of the HIT, as well as keywords which are used by worker for searching HITs.
 - HIT duration time: time allotted to solve the HIT (before it is given to another worker).
 - HIT life time: how long will the HIT be available on the platform.
 - # Assignments: number of different persons that will perform the same HIT.
 - Reward: payment for correctly solving each assignment.

Project/HIT Creation & Design (2)

• Selection of **MTurk quality control** mechanisms:

Worker

requirements

High quality workers

- Masters
- Photo moderation masters
- Categorization masters Masters expect higher rewards MTurk charges 20% for masters

System qualifications

- Location by country
- HIT submission rate (%)
- HIT approval/rejection rate (%)
- (Absolute) Number of HITs approved

• Qualification types

- Simply granted or attributed via customized tests
- These filters are automatically performed by the platform

HIT Test

- Best practice: Always test your HITs before publishing them
 - 1. Perform **technical tests** (both as requester and worker) in the MTurk Sandbox environment.

About the Sandbox

The Mechanical Turk Developer Sandbox is a simulated environment that lets you test your applications and Human Intelligence Tasks (HITs) prior to publication in the marketplace.

Benefits:

- Free to use for registered Mechanical Turk requesters. Fees will not be withdrawn and payments are not made to Worker accounts.
- · Has functional parity with the production website.
- Requires only a URL change to configure your application to work against the developer sandbox or the production website.



To access the sandbox, you will need a Mechanical Turk Requester account and, in order to access the sandbox programmatically, you will need an Amazon Web Services (AWS) account.

Requester Sandbox 🕨

Source: https://requester.mturk.com/developer/sandbox

2. Publish a small subset of tasks in the production site to test **usability** and **responsiveness**.

Run live HITs

• HIT publication:

Make the HITs available to the workers

• Review of the results:

- Monitor the submitted assignments constantly
- Download the results
- Accept/reject assignments
- Block spammers (optional)

• Update HIT/Project:

- Extend/expire HITs or modify other HIT properties
- Add additional assignments

References

- AMT. Getting Started Guide. API Version 2012-03-25 http://s3.amazonaws.com/awsdocs/MechTurk/latest/amt-gsg.pdf
- The Mechanical Turk Blog
 <u>http://mechanicalturk.typepad.com/</u>
- MTurk Java API

http://people.csail.mit.edu/glittle/MTurkJavaAPI/

BACK-UP SLIDES

MTurk Platform Requirements

