# CSC 462 – Machine Learning

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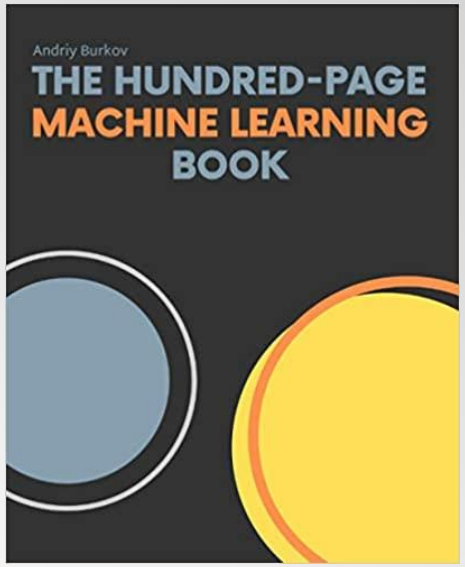
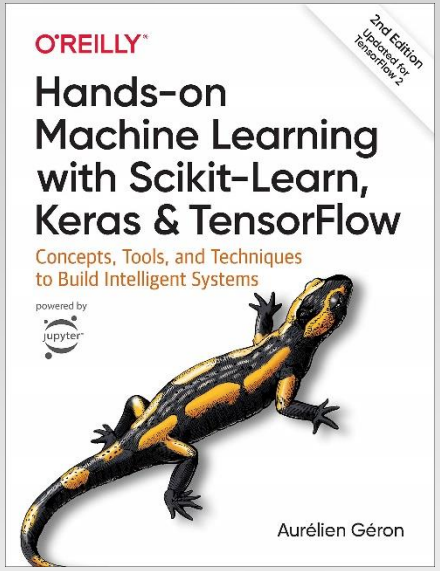
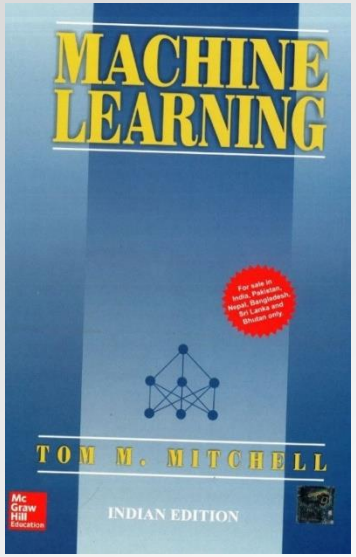
SPRING 2024

# Textbook

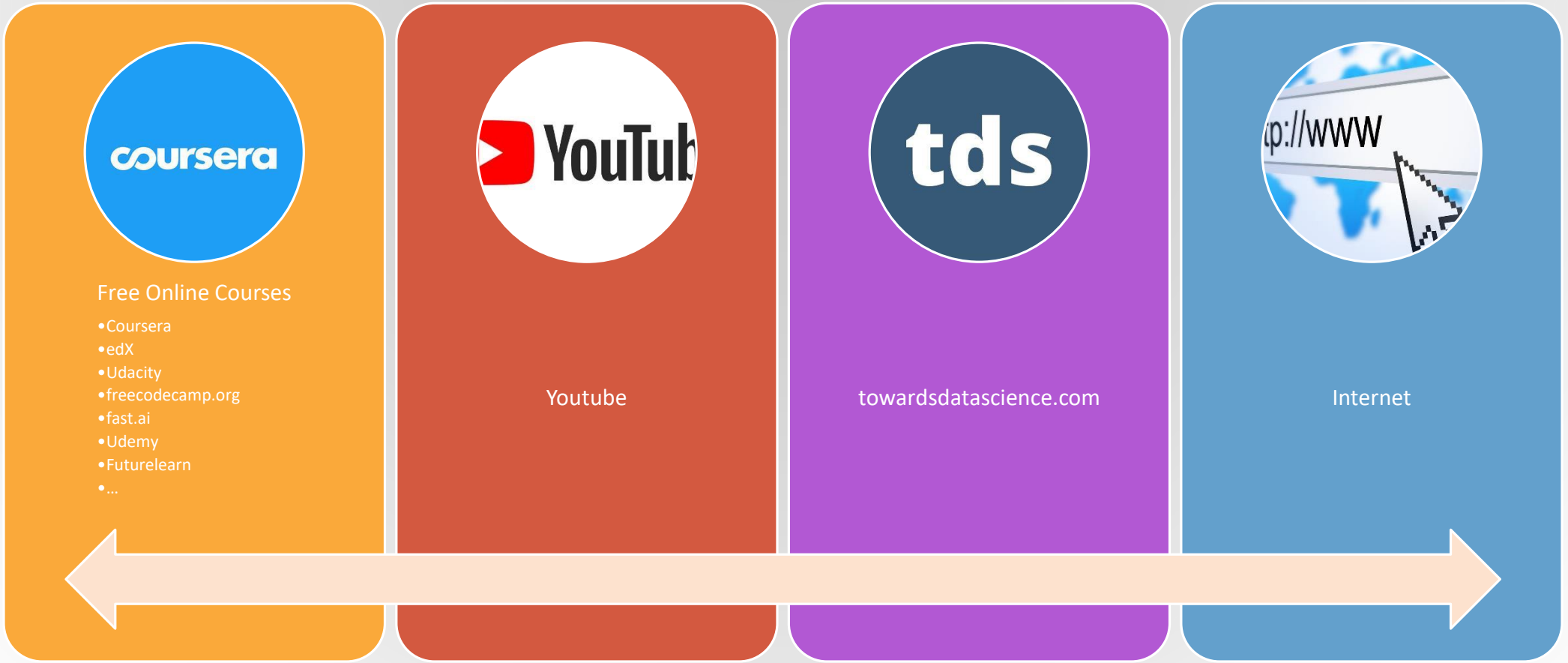
- The Hundred-Page Machine Learning Book by Andriy Burkov.
- Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow by Aurélien Géron
- Machine Learning, Last edition, by Tom M. Mitchell. McGraw Hill.



# Resources


coursera
Free Online Courses
•Coursera
•edX
•Udacity
•freecodecamp.org
•fast.ai
•Udemy
•Futurelearn
•…
YouTub
Youtube
tds
towardsdatascience.com
Internet

# Plan

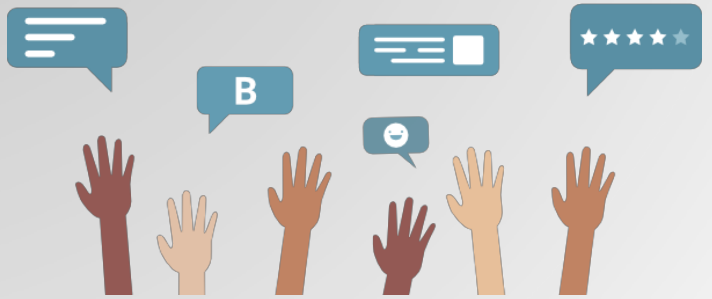
| Chapter # | Topic |
|---|---|
| 1 | Introduction to machine learning |
| 2 | Notation and Definitions |
| 3 | Ch3: Fundamental Algorithms (Linear Regression, Logistic Regression, Decision Tree Learning, Support Vector Machine, k-Nearest Neighbors) |
| 4 | Anatomy of a Learning Algorithm |
| 5 | Basic Practice (Feature Engineering, Learning Algorithm Selection, Datasets, Underfitting and Overfitting, Model Performance Assessment, Hyperparameter Tuning) |
| 6 | Neural Networks and Deep Learning |
| 7 | Problems and Solutions (Multiclass Classification, One-Class Classification, Multi-Label Classification, Ensemble Learning) |
| 8 | Advanced Practice (Imbalanced Datasets, Combining Models, Multiple Outputs, Transfer Learning, Working With Text in ML, Large Language Model (LLM), AutoML, Cloud Computing ML Services) |
| 9 | Unsupervised Learning (Clustering, PCA) |

# Assessment Methods

| | |
|---|---|
| Homework & Participation | 20% |
| Course Project | 10% |
| Midterm Exam | 30% |
| Final Exam | 40% |

# Fill the Survey

- https://forms.gle/XKB31EgagdUEjDJy7



# Optional Bonus Activity

- Complete one of these online courses (In this semester)
- Extra 2 credits
- Proof of completion including a quiz will be required to earn the extra credits
- Deadline: 5 May 2024

**Intro to TensorFlow for Deep Learning**

- https://www.udacity.com/course/intro-to-tensorflow-for-deep-learning--ud187

**Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning**

- https://www.coursera.org/learn/introduction-tensorflow

**Convolutional Neural Networks in TensorFlow**

- https://www.coursera.org/learn/convolutional-neural-networks-tensorflow

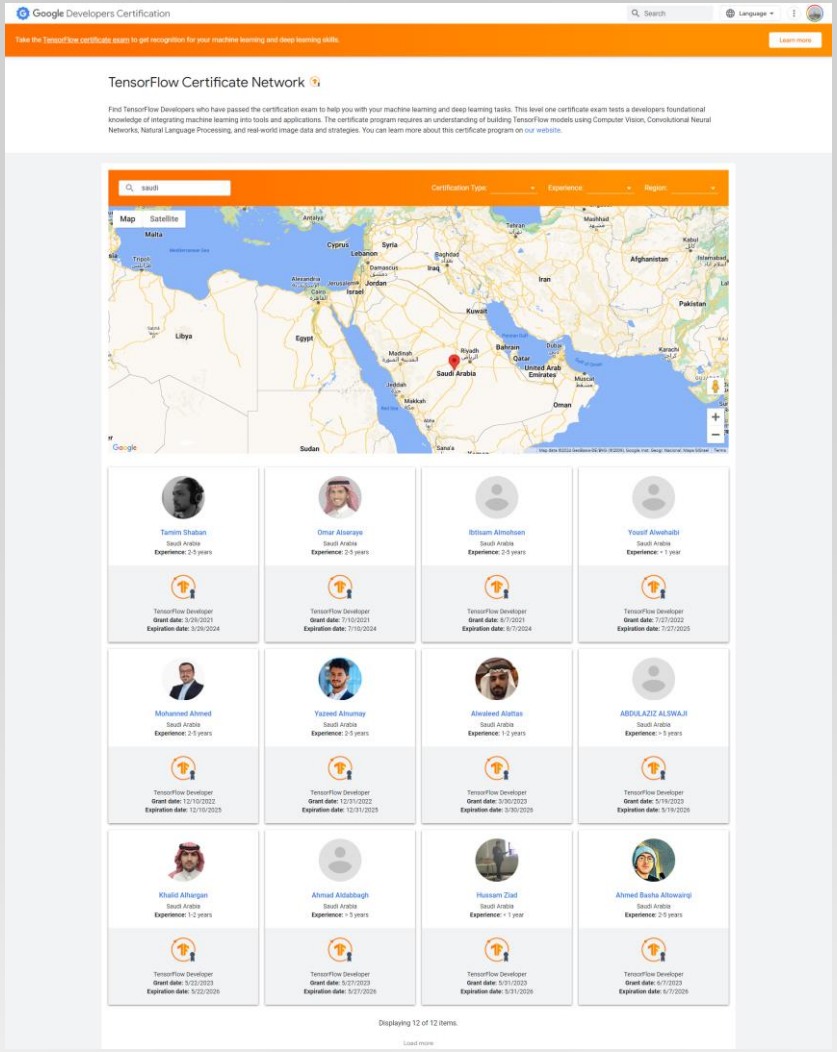
**Natural Language Processing in TensorFlow**

- https://www.coursera.org/learn/natural-language-processing-tensorflow

# TensorFlow Developer Certificate

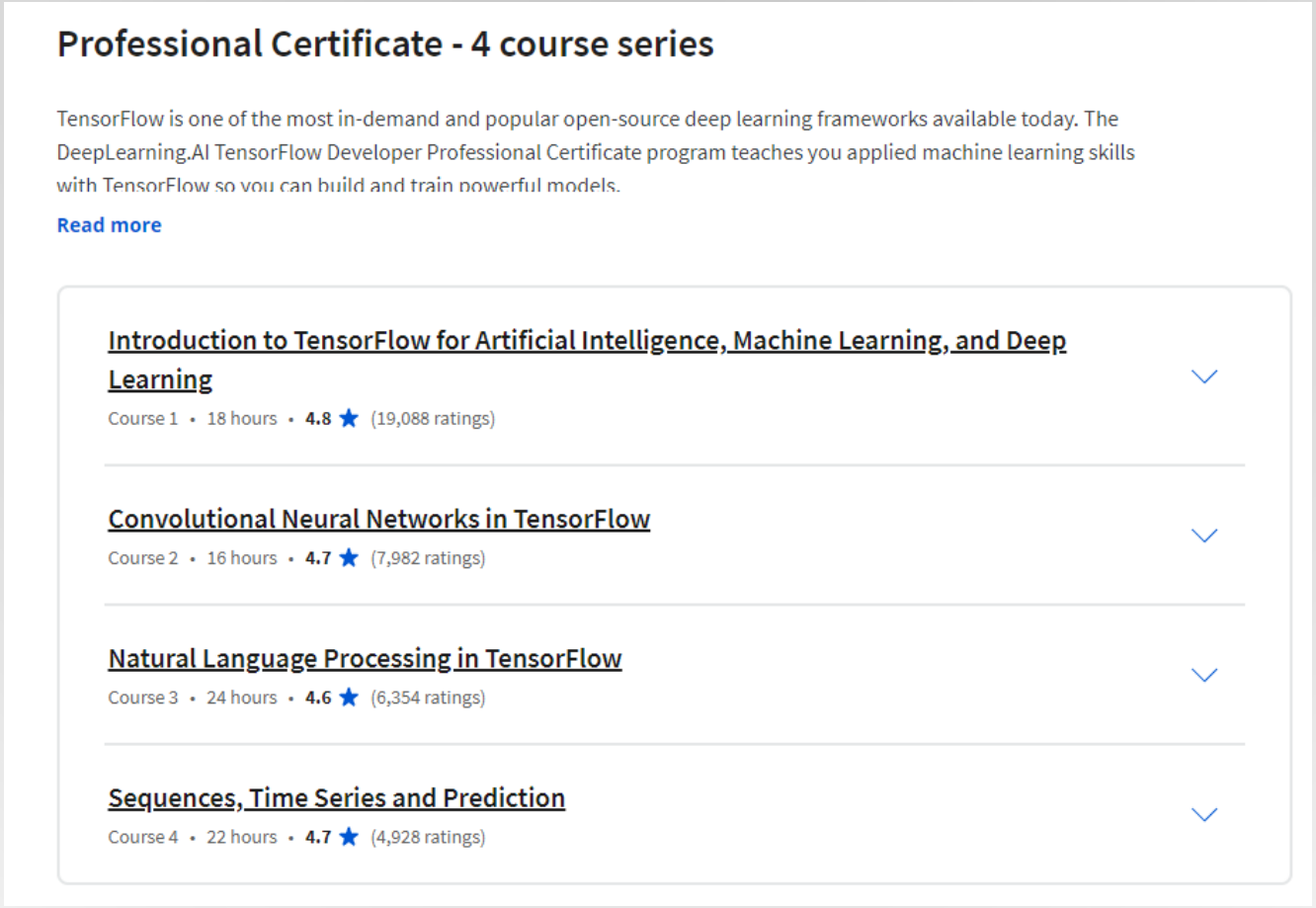
- Demonstrate your proficiency in using TensorFlow to solve deep learning and ML problems. Get recognized for your skills and join Google Certificate Network.
- TensorFlow Developer Certificate program overview
  - Exam ($100 USD)

# TensorFlow Certificate Network




https://developers.google.com/certification/directory/tensorflow

# DeepLearning.AI TensorFlow Developer Professional Certificate




https://www.coursera.org/professional-certificates/tensorflow-in-practice

# Schedule

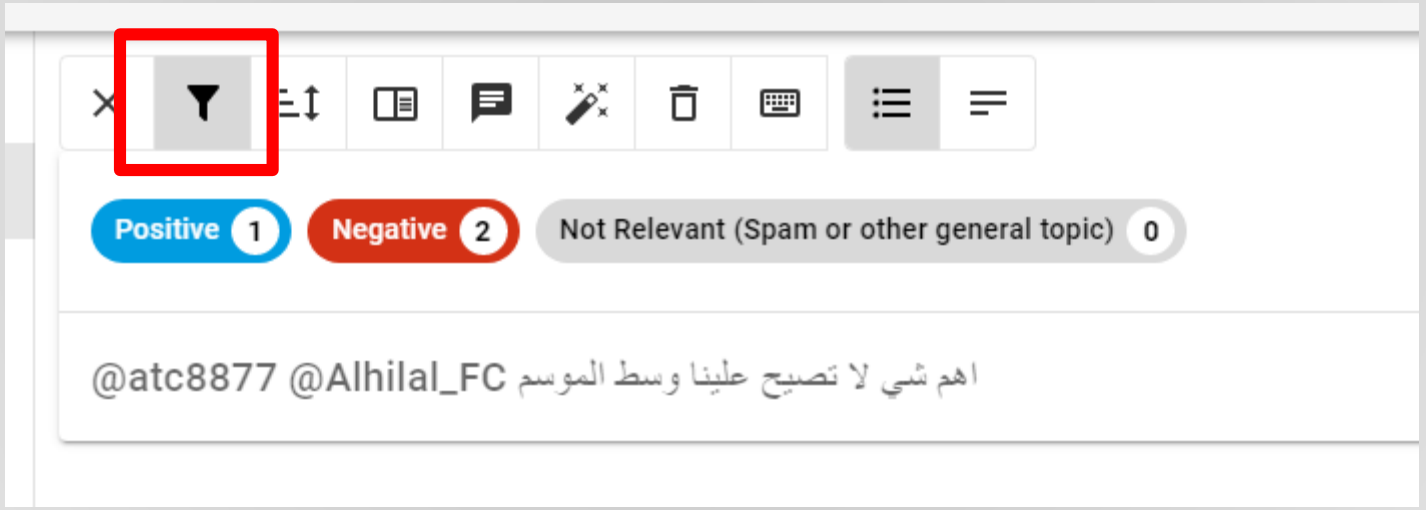
https://docs.google.com/spreadsheets/d/1EkeVvIH6NWVfQlOLBUOiWk54jxpqQUGL

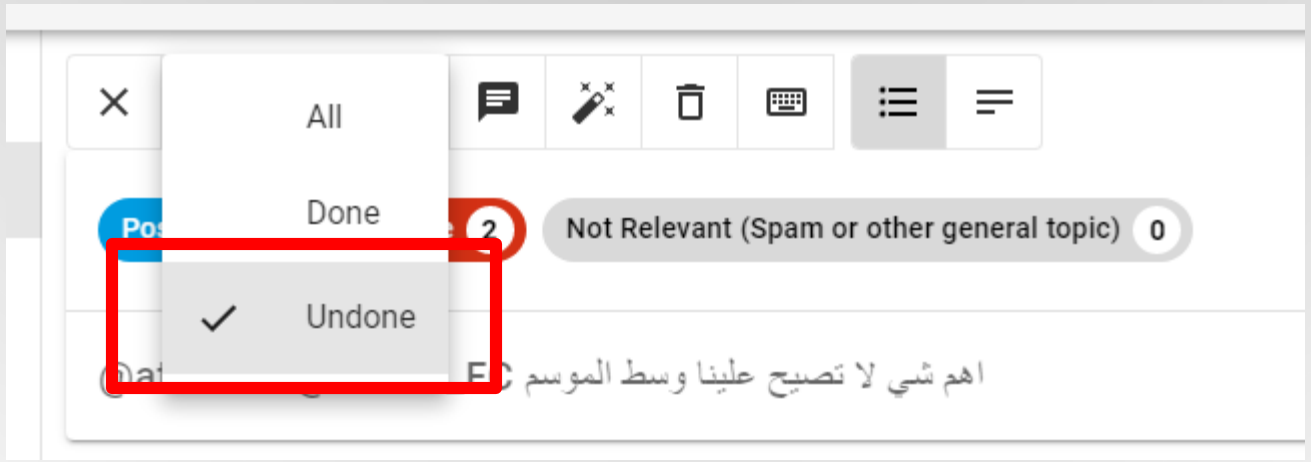
# Homework 1

- **Firstly**, read Chapter 1 of the "The Hundred-Page Machine Learning Book" and summarize it.
  - The summary must be two pages maximum.
  - Submit the summary as a **PDF** file in the LMS.
- **Secondly**, you are responsible to annotate different types of data:
  - **Task 1:** label Tweets into corresponding classes (Positive, Negative, Not Relevant)
  - **Task 2:** annotate images containing camels to detect them.
- **Deadline:** 11 February 2024 (8am)

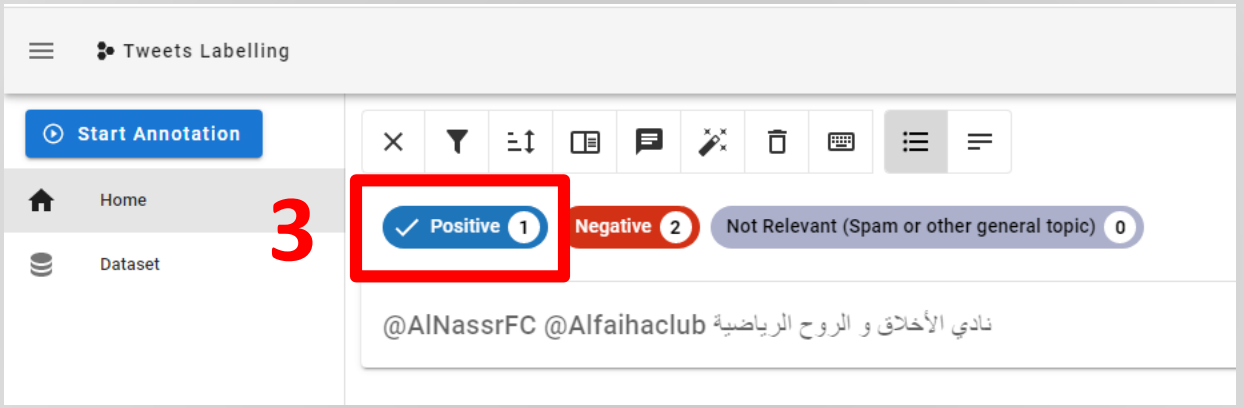
1. Open the data annotation tool. Use any of these links:
   - www.crowdata.us
2. Login to the site
   - Username: Your University ID #
   - Password: the password you chose in the survey (consist of 10 digits)
3. Choose the Task (Task 1 or Task 2)
4. Press "Start Annotation"
5. Annotate only samples with "In progress" status. You need to complete the annotations for both tasks per the following:
   - Task 1: 200 tweets
   - Task 2: 20 images

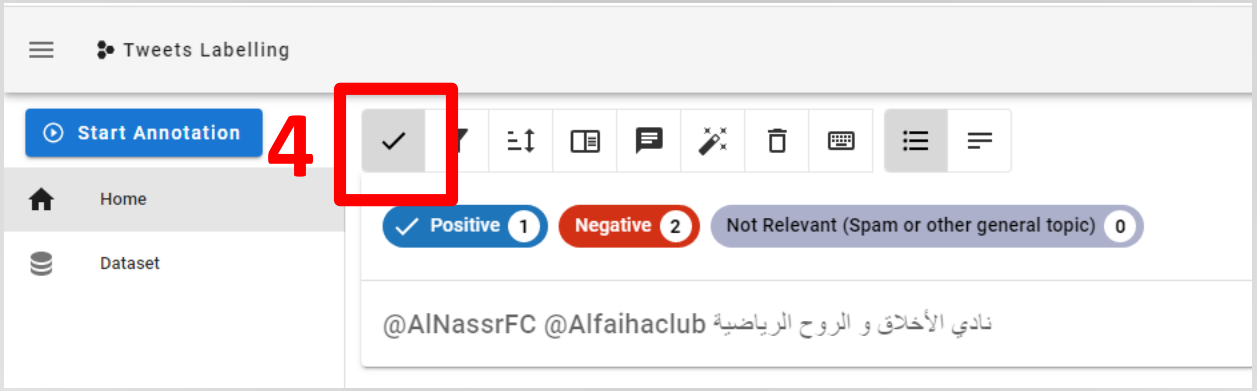
**Task 1 Example**

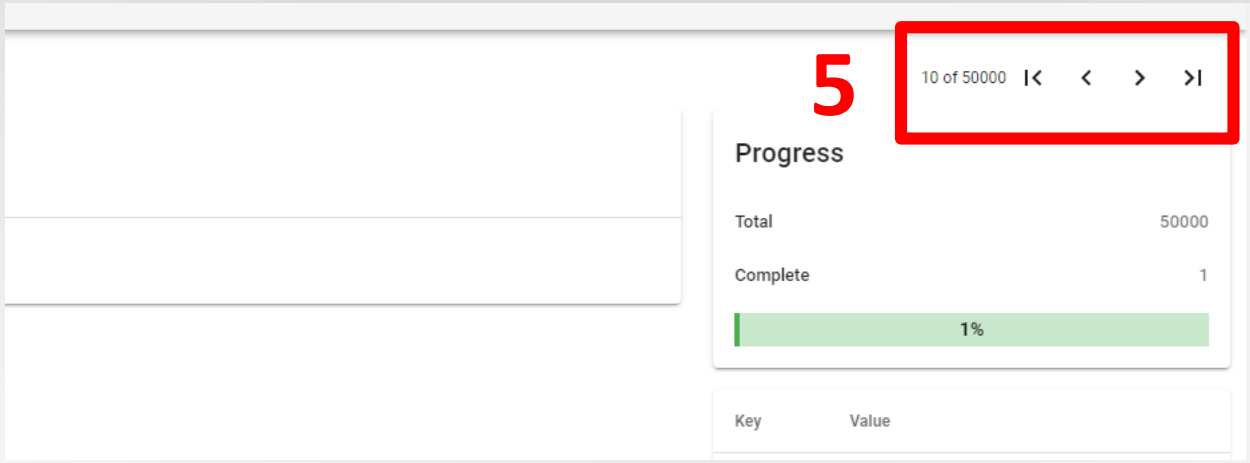


## Task 1 Example

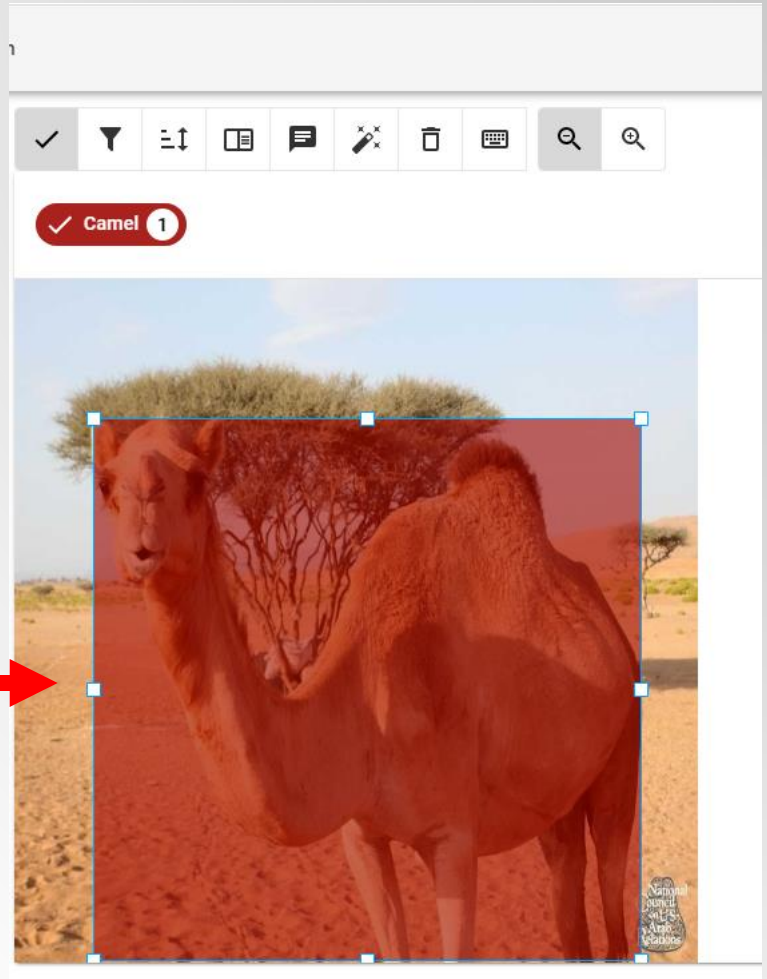


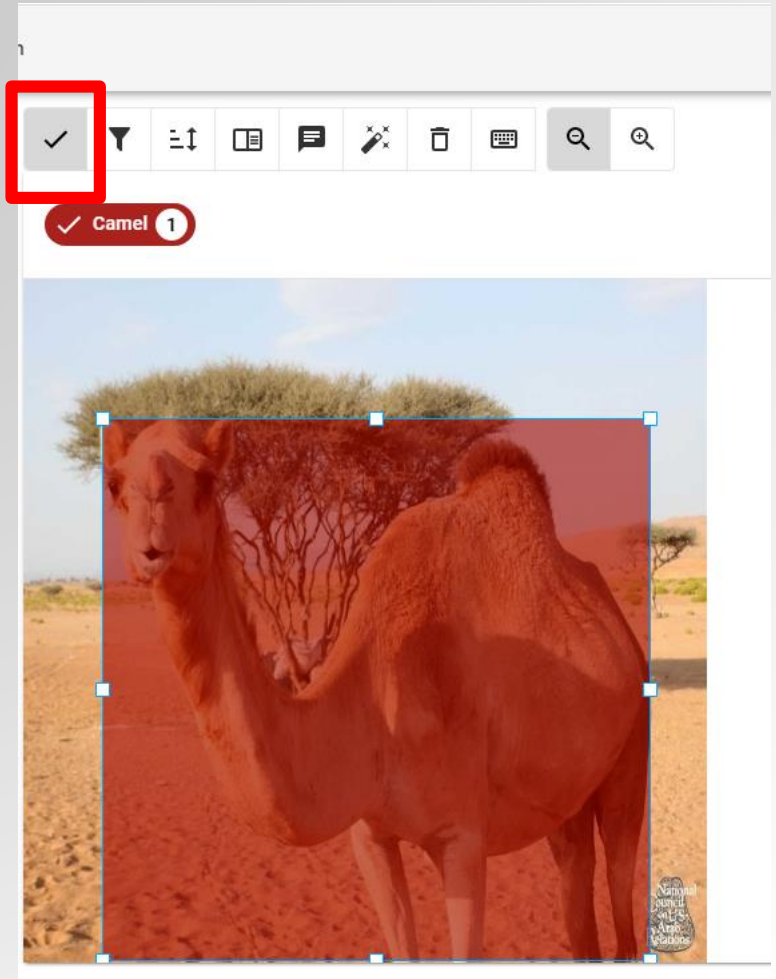



# Task 2 Example

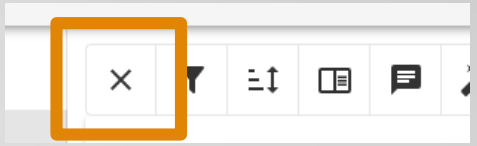
1 & 2 steps are similar to Task 1



# Annotate only samples with “In progress” status

In progress



Finished

**Note:** do not annotate samples with “Finished” status. Make sure that the sample is unchecked: