

## Tutorial 1: What is Machine Learning?

In this tutorial, we will discuss your impression of machine learning and what you will learn in this course. Please enter your responses (per group) in the link below.

<https://forms.office.com/e/q9khFNhKGV>

Spend the next 15 minutes discussing the following questions. Come up with collective answers within your group.

- What tools, software, or websites have you used that might involve machine learning?
- What ingredients are involved in developing these systems?
- Based on the ingredients, can you piece together the development process of these systems?
- How do we ensure the correctness of a piece of software? How do we ensure the correctness of a machine learning system?

Below is one potential answer.

- video recommendation on YouTube
- ingredients needed to implement video recommendation
  - data (what have people watched)
  - a model (that can predict what a user might want to watch given what the user has watched)
  - programs that show the videos recommended by the model
  - programs that collect user data
  - programs that format data for training
  - programs that train models
  - programs that evaluate models
  - scientists who design and prototype the model
  - engineers who write, run and deploy the above programs
- a process for developing video recommendation
  - A new set of data comes in.

- A new training set is formed.
  - A new model is trained.
  - A new model needs to be evaluated.
  - A new model passes the evaluation and can be deployed.
  - A new model is deployed.
  - Rinse and repeat
- Regular software can be proved to be correct; regular software can have unit tests. Machine learning systems need to be evaluated on an unseen data set (also known as a test set); machine learning systems are rarely, if at all possible, to be 100% correct.

Spend the next 5 minutes discussing the following question. Come up with a collective answer within your group.

- Name as many concepts of machine learning that any one of you in the group already know something about.

You all have different background and might know different aspects of machine learning already. Below are the concepts that you might already know.

- linear regression
- principal component analysis
- classification
- logistic regression
- the differences of a training set, a development set, and a test set
- the act of training
- gradient descent
- accuracy
- backpropagation

Spend the next 10 minutes discussing the following questions. Come up with collective answers within your group.

- Based on the discussion above, what is machine learning?
- Based on the ingredients you have listed, what do you think we will focus on in this course?
- What would you want us to focus on in this course?

Have a look at the calendar page of the course.

<https://homepages.inf.ed.ac.uk/htang2/mlg2023/calendar.html>

Spend the next 20 minutes comparing answers among the groups.