INTRODUCTION TO THE COURSE

LECTURE 0

SECTION 1

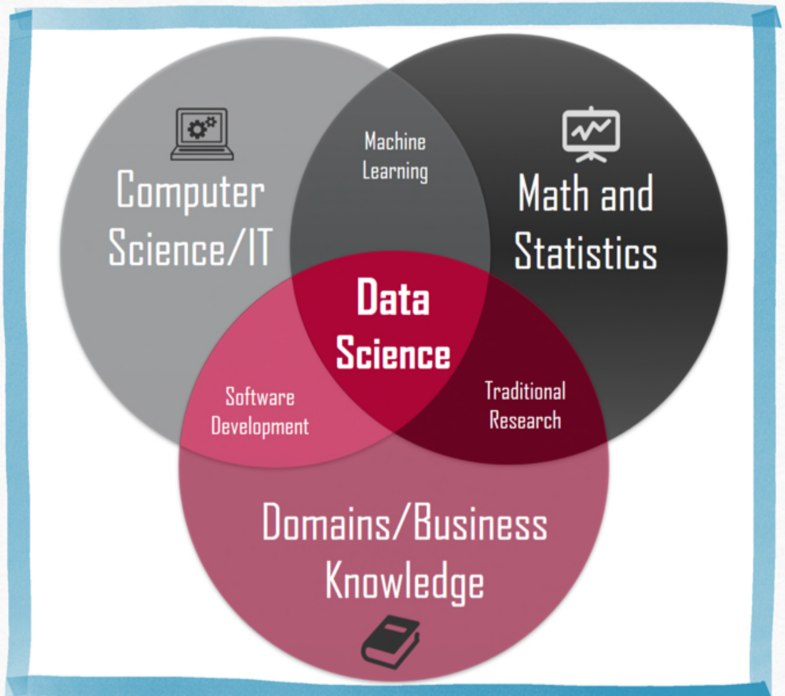
JUNE 1ST

IACS
INSTITUTE FOR APPLIED COMPUTATIONAL SCIENCE
AT HARVARD UNIVERSITY

UNIVERSITY of RWANDA

WHAT IS MACHINE LEARNING & DATASCIENCE?

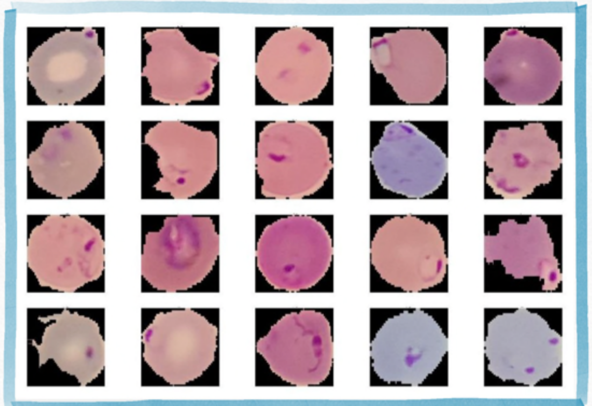
In both data science and machine learning we extract patterns and insights from data.



- Inter-disciplinary
- Data and task focused
- Resource aware
- Adaptable to changes in the environment & needs

THE POTENTIAL OF MACHINE LEARNING:

Disease Diagnosis



Detecting malaria from blood smears

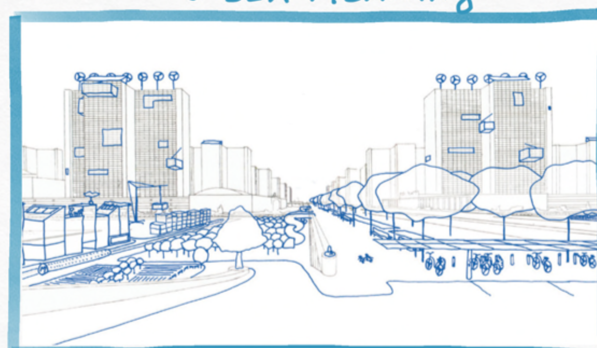
Agriculture

Precision agriculture for changing climate

Drug Discovery

Quickly discovering new drugs for COVID

Urban Planning



Predicting and planning for resource needs

THE POTENTIAL OF MACHINE LEARNING:

Gender Bias

Some ML models for evaluating job applications show bias in favour of male candidates.

Racial Bias

Risk models used in U.S. courts have been shown to be biased against non-white defendants.

GOAL OF THE COURSE:

Theory	Practice	Impact
1. Key ML concepts 2. Important metrics for evaluation 3. Handling different kinds of data 4. Extracting insights from analysis of ML models	1. Implementing ML models using python libraries 2. Using free online tools & resources for ML and data science	1. Mapping real-life problems to ML concepts 2. Evaluating the social impact of ML

WHO ARE YOUR INSTRUCTORS?

Weiwei Pan
Post-Doctoral Fellow
Harvard University

Melanie P. Fernandez
Post-Doctoral Fellow
Harvard University

Pavlos Protopapas
Scientific Director
Institute of Applied Computational Sciences,
Harvard University

FORMAT OF THE COURSE:

This is a flipped-classroom course.

Before Class

- watch lecture videos
- Study course readings

During Class

- Discuss concepts from videos and readings in groups
- Complete coding exercises in groups

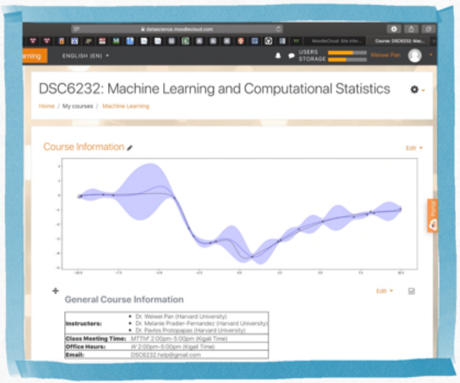
COURSE COMPONENTS:

There are 4 graded components of the course.

Before Class	During Class	Outside Class
• Three concept quizzes (Each day)	• Participation in discussions (Each day) • In-class practical exercise (Each day)	• Homework (2 total)

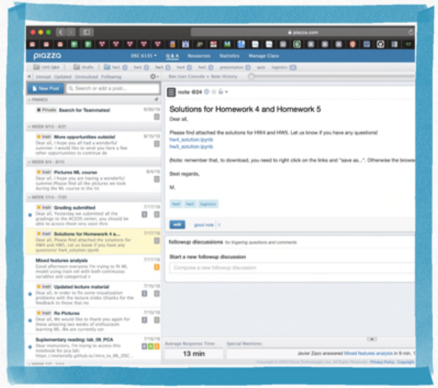
TOOLS FOR THE COURSE:

Moodle



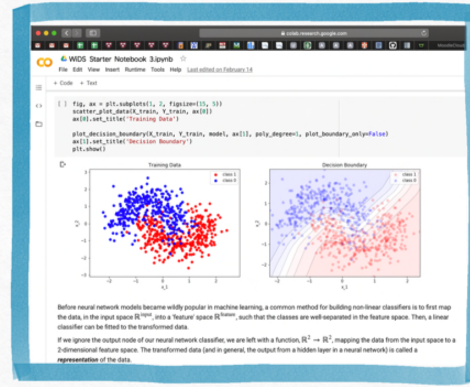
- Syllabus, schedule
- Lecture videos
- Readings
- Quizzes
- Assignments
- Grades

Piazza



- Questions and answers about course related topics
- Discussions with instructors and peers

Colab



- Implementing and running your ML models