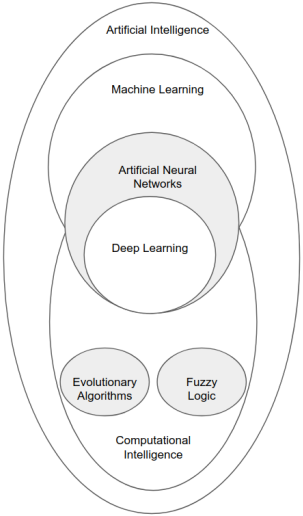
Introduction to Machine Learning

Jose Luis Paniagua Jaramillo
jlpaniagua@uao.edu.co

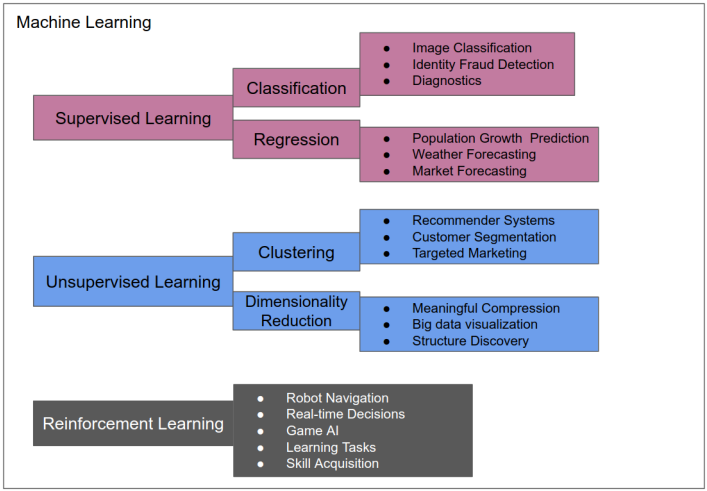
Outline

Artificial Intelligence I

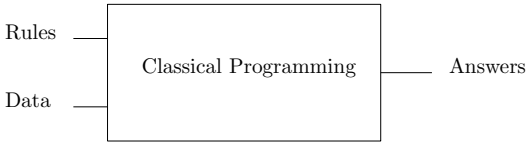


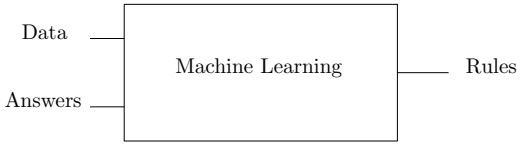
Machine Learning (Aprendizaje Automático) I

Machine Learning is the science (and art) of programming computers so they can learn from data[1].



Machine Learning (Aprendizaje Automático) II





- Los humanos introducen reglas (un programa) y datos para ser procesados de acuerdo con dichas reglas.
- Las respuestas se obtienen a la salida del programa.

- Los humanos introducen datos y las respuestas esperadas de dichos datos.
- Las reglas se obtienen a la salida del programa.
- Las reglas pueden ser luego aplicadas a nuevos datos.

Machine Learning (Aprendizaje Automático) III

Classical Programming

```
if (speed<4):
    status = WALKING
elif (speed<12):
    status = RUNNING
else:
    status = BIKING
```

```
if (speed<4):
    status = WALKING
elif (speed<12):
    status = RUNNING
else:
    status = BIKING
```

```
if (speed<4):
    status = WALKING
elif (speed<12):
    status = RUNNING
else:
    status = BIKING
```

Machine Learning

speed = 3
Label = WALKING

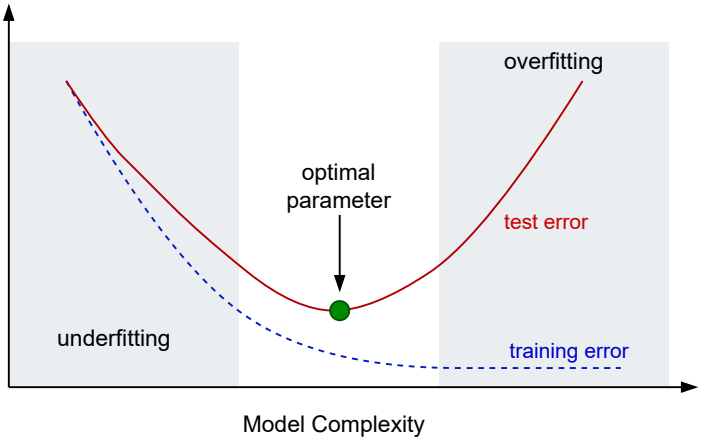
speed = 10
Label = RUNNING

speed = 20
Label = BIKING

Machine Learning Workflow I

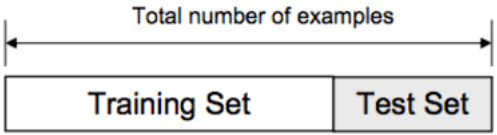
Exploratory Data Analysis - EDA

Model Complexity

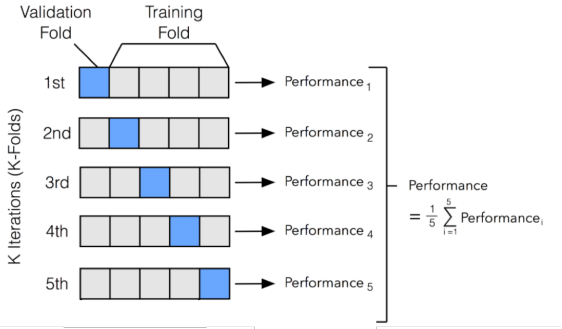


Model Evaluation

Train-Test-Split Validation



Cross-Validation



References

[1] Aurélien Géron. *Hands-on machine learning with Scikit-Learn, Keras, and TensorFlow: Concepts, tools, and techniques to build intelligent systems*. .ºReilly Media, Inc.", 2019.