Introducción a la Programación en Python

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Introduction

> 🔥 Work in Progress
>
> This is a Work in Progress project. The idea is to summarize all ML topics and how I see and understand them.

Machine learning is a rapidly growing field that enables computers to learn from data, without being explicitly programmed. The goal of machine learning is to build models that can make predictions or take actions based on input data, and improve their performance over time through experience.

> ℹ️ Note
>
> Note that there are five types of callouts, including: `note`, `warning`, `important`, `tip`, and `caution`.

> 💡 Tip With Caption
>
> This is an example of a callout with a caption.

> 🔥 Expand To Learn About Collapse
>
> This is an example of a 'folded' caution callout that can be expanded by the user. You can use `collapse="true"` to collapse it by default or `collapse="false"` to make a collapsible callout that is expanded

by default.

Overview of Machine Learning:

Machine learning is a subfield of artificial intelligence that involves the development of algorithms and statistical models that allow computers to learn from data. There are three main types of machine learning: supervised learning, unsupervised learning, and reinforcement learning.

Supervised learning is the most common type of machine learning, in which a model is trained on a labeled dataset to make predictions about new, unseen data. Examples include linear regression, logistic regression, and decision trees.

Unsupervised learning involves discovering patterns in unlabeled data, such as clustering and dimensionality reduction.

Reinforcement learning involves training an agent to make decisions in an environment to maximize a reward.

Applications of Machine Learning

Machine learning has many applications in various industries, including:

- Healthcare: for example, identifying potential health risks, diagnosing diseases, and creating personalized treatment plans
- Finance: for example, detecting fraudulent transactions, predicting stock prices, and identifying potential investment opportunities
- Retail: for example, personalizing product recommendations, optimizing pricing strategies, and improving supply chain efficiency
- Manufacturing: for example, predictive maintenance, quality control, and optimization of production processes

- Transportation: for example, traffic prediction, autonomous driving, and fleet management
- Cybersecurity: for example, intrusion detection, anomaly detection, and threat intelligence

Key Concepts and Terminology

Machine learning is a complex field with many technical terms and concepts. Some key terms and concepts that will be covered in this book include:

- Model: a representation of the relationships between input data and output predictions or actions
- Training: the process of fitting a model to a dataset
- Testing: the process of evaluating a model on new, unseen data
- Overfitting: when a model is too complex and performs well on the training data but poorly on the test data
- Regularization: a technique for preventing overfitting by adding a penalty term to the model's objective function
- Gradient descent: an optimization algorithm for finding the minimum of a function
- Neural networks: a type of model that is inspired by the structure and function of the human brain
- Convolutional neural networks (CNNs): a type of neural network designed for image recognition
- Recurrent neural networks (RNNs): a type of neural network designed for sequential data such as time series and natural language.

Versions Used in this Book

```
import sys
print("Python version: {}".format(sys.version))
import pandas as pd
print("pandas version: {}".format(pd.__version__))
import matplotlib
print("matplotlib version: {}".format(matplotlib.__version__))
import numpy as np
print("NumPy version: {}".format(np.__version__))
import scipy as sp
print("SciPy version: {}".format(sp.__version__))
import IPython
print("IPython version: {}".format(IPython.__version__))
import sklearn
print("scikit-learn version: {}".format(sklearn.__version__))
```

```
Python version: 3.9.13 (main, Aug 25 2022, 23:26:10)
[GCC 11.2.0]
pandas version: 1.5.3
matplotlib version: 3.6.3
NumPy version: 1.23.5
SciPy version: 1.10.0
IPython version: 8.9.0
scikit-learn version: 1.2.1
```

Part I.

Introducción a la Programación

1. Unsupervised Learning

1.1. Clustering

1.2. Dimensionality Reduction

1.3. Anomaly Detection

2. Conclusion

In summary, this book has no content whatsoever.