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CHAPTER I: INTRODUCTION TO MACHINE LEARNING

Machine learning is about extracting knowledge from data.

Problems Machine Learning Can Solve

The most successful kinds of machine learning algorithms are those that automate decision-making processes by generalizing from known examples which is known as **supervised learning**

Examples of supervised machine learning tasks include:

i. Identifying the zip code from handwritten digits on an envelope
   Here the input is a scan of the handwriting, and the desired output is the actual digits in the zip code.

ii. Determining whether a tumor is benign based on a medical image
   Here the input is the image, and the output is whether the tumor is benign.

iii. Detecting fraudulent activity in credit card transactions
   Here the input is a record of the credit card transaction, and the output is whether it is likely to be fraudulent or not.

Unsupervised learning only the input data is known, and no known output data is given to the algorithm.

Examples of unsupervised learning include:

i. Identifying topics in a set of blog posts
   If you have a large collection of text data, you might want to summarize it and find prevalent themes in it. You might not know beforehand what these topics are, or how many topics there might be. Therefore, there are no known outputs.

ii. Segmenting customers into groups with similar preferences
   Given a set of customer records, you might want to identify which customers are similar, and whether there are groups of customers with similar preferences.

iii. Detecting abnormal access patterns to a website
   To identify abuse or bugs, it is often helpful to find access patterns that are different from the norm. Each abnormal pattern might be very different, and you might not have any recorded instances of abnormal behavior.
   Essential Libraries and Tools include jupyter notebook, Numpy, Scipy, matplotlib, pandas, scikit-learn

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