

Introduction to Machine Learning



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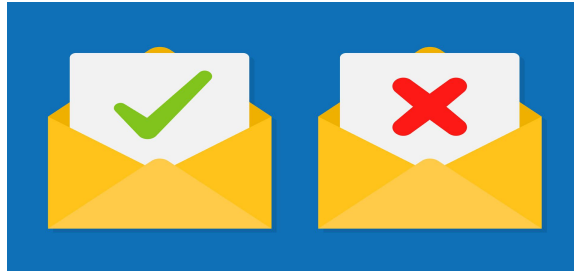


- Machine Learning is about building programs with **tunable parameters** (typically an array of floating point values) that are adjusted automatically so as to improve their behavior by **adapting to previously seen data**.
- It can be considered a subfield of **Artificial Intelligence** since those algorithms can be seen as building blocks to make computers learn to behave more intelligently by somehow generalizing rather than just storing and retrieving data items like a database system would do.

Why Machine Learning?



- During the initial phases of "intelligent" applications, numerous systems relied on manually crafted rules involving "if" and "else" decisions for data processing
- For instance, consider a spam filter tasked with sorting incoming email messages. One could establish a blacklist of words that, if detected, would lead to the categorization of an email as spam.



Why Machine Learning?

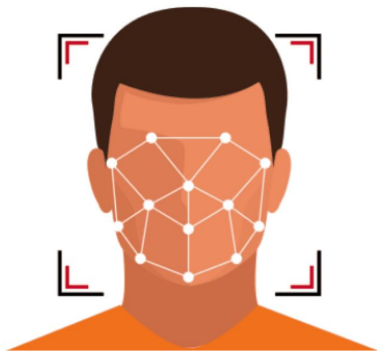


- Using handcoded rules to make decisions has two major disadvantages:
 - The logic required to make a decision is **specific** to a **single domain** and **task**. Changing the task even slightly might require a rewrite of the whole system.
 - Designing rules requires a **deep understanding** of how a decision should be made by a human expert.

Why Machine Learning?



- One example of where this handcoded approach will fail is in detecting faces in images.



Why Machine Learning?



- Using machine learning, however, simply presenting a program with a large collection of images of faces is enough for an algorithm to determine what properties are needed to identify a face.

