Jordan Black

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Professor Lakshmi Prayaga

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**1. Describe in your own words what is machine learning?**

Computers equipped with machine learning can learn and improve their performance in certain tasks from experience and data without having to explicitly program the task. Machine learning is the application of algorithms to discover patterns, forecast, or provide information. For instance, a machine learning algorithm can suggest Amazon products based on a user's previous purchase. Another example is spotting spam emails based on patterns and keywords. So, machine learning is essentially enabling systems to learn as more data comes in.

**2. Provide another visualization to depict the interrelationships among CS, DS, ML, AI, and DM.**

**Imagine a set of nested circles to represent their interrelationships:**

At the center is Machine Learning (ML) as it focuses on algorithms that learn from data. Surrounding ML is Data mining (DM), which overlaps but is less autonomous, focusing on identifying patterns in data.  Encircling DM and ML is Artificial Intelligence (AI), which encompasses all techniques that simulate cognitive abilities. Around AI is data science (DS), which includes methods for extracting knowledge from data and incorporating AI and ML as tools. **The largest outer circle is Computer science (CS),** the umbrella field covering all the above disciplines and more, from algorithms to programming systems and design. The viewpoint demonstrates how these areas are interrelated, with CS being the broadest field and ML being a specific and vital component.

**3. Provide two example scenarios where ML is applicable and why you would need ML and not just a computer program.**

**Scenario 1: Spam email section**

A program might use fixed rules to flag emails with specific keywords as spam. However, this approach fails to adapt to spam patterns or avoid false positives. Machine learning could enable systems to analyze data from previous spam examples and learn to distinguish spam from legitimate emails by identifying subtle patterns beyond predetermined rules. This would make the system much more efficient and adaptive.

**Scenario 2: Personalized Movie Recommendations**

Machine learning systems (e.g., Netflix) can use a user's past and interest to recommend movies or TV shows to them. Unlike an undifferentiated computer program with strict rules, ML systems can continuously change according to user preferences and offer more appropriate recommendations that satisfy users.