

**Assignment 5:**  
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Exercise 1 Teach your friend/parents without CS background the online learning from experts' setup, goals, and algorithms. Describe how you taught and the outcome of your teaching.

**Solution:**

To teach my father and mother about online learning, I first realized that I needed to break down the concepts into simple terms. Since they had no coding or computer science background, I used analogies and everyday examples to make the ideas more relatable.

**Here are the steps I followed while teaching my father and mother about online learning, goals, and algorithms:**

### **Understand Their Background**

- I recognized that they had no coding or computer science knowledge. I decided to avoid technical jargon and use analogies that were familiar to them, like cooking, gardening, or following instructions.

### **Introduce the Concept of Online Learning**

- I began by explaining online learning in simple terms. I used the example of learning from a teacher or mentor, where they practice a skill and improve over time. For instance, I compared it to learning how to cook by following a recipe.

### **Explain the Goals of Online Learning**

- I discussed the main goal of online learning: improving performance over time. I made it clear that just like learning a new skill (such as cooking), a computer system also gets better at tasks by receiving feedback and making adjustments.

### **Introduce Algorithms Using Simple Analogies**

- I introduced algorithms by comparing them to step-by-step instructions, like a recipe. I used a decision-making process as an example—choosing ingredients for a dish based on what you want to cook. This helped them understand that algorithms are rules for making decisions or solving problems.

### **Show How Algorithms Learn from Data**

- I explained how algorithms use data to "learn." I used the analogy of plants growing in a garden, where with time and care, they improve. Similarly, a system improves as it receives more examples and adjusts its responses.

I showed them a simple diagram of how a machine learning model is trained with data. I used real-world examples like recommendation systems (e.g., Netflix suggestions) to show how the technology works in their everyday life.

After the initial explanation, I encouraged them to ask questions and reflect on how they see this technology around them. This helped them think critically about how online learning and algorithms impact their daily life.

## Discuss Real-Life Applications

- To solidify their understanding, I shared real-world applications such as how algorithms predict shopping preferences or how GPS systems give directions, making the abstract concepts feel more tangible.

Here are three real-life applications of online learning and algorithms that I discussed with my parents to help them understand the concepts better:

### 1. Online Shopping Recommendations (e.g., Amazon, Netflix)

- **How it works:** When you shop online or browse movies, the system learns your preferences over time. For instance, if you often buy books on a certain topic or watch action movies, the system will recommend similar products or films.
- **Algorithm behind it:** The algorithm tracks your past behavior (such as what you buy or watch) and compares it to the choices of other users. This is a form of **collaborative filtering**, a method that learns from data to predict what you might like based on your past activities and the activities of others.
- **Impact:** This makes shopping or watching movies more personalized and saves time, helping you find what you like without having to search for it manually.
- **Demo & Teaching Moment:** I opened my Netflix account in front of them and showed how the homepage is different for every user. I asked my dad to search for an old action movie, and after that, I refreshed the homepage to show how it started recommending more action films. I explained that this is the algorithm learning from what we watched.
- **What I explained:** I told them this is called “collaborative filtering”—the system learns from what *you* and *others like you* watch to make better suggestions. I also showed them Amazon's "Customers who bought this also bought..." section to reinforce the idea.
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### 2. Spam Email Detection

- **How it works:** Email services like Gmail automatically detect and filter out spam emails. When you receive an email, the system checks for patterns (e.g., certain words, phrases, or sender behaviors) that are often associated with spam.
- **Algorithm behind it:** The algorithm uses **supervised learning**, where it has been trained on a dataset of known spam and non-spam emails. Over time, the system improves its accuracy by learning from new examples of spam and legitimate emails.
- **Impact:** This saves users time by preventing unwanted emails from cluttering their inbox and reduces the risk of falling for scams.
- **Demo & Teaching Moment:** I opened my mom's Gmail account and we looked at the “Spam” folder together. I clicked on a few spam emails and highlighted phrases like “Congratulations, you won!” and suspicious links. Then I compared them with regular emails in her inbox.
- **What I explained:** I told them Gmail's system learns from millions of emails labeled as spam or safe. When people mark emails as spam, the algorithm gets smarter. It's like teaching a child what's safe and what's not—after seeing enough examples, the child learns to recognize danger.

### 3. Navigation Apps (e.g., Google Maps, Waze)

- **How it works:** When you use a navigation app to get directions, the system constantly learns from traffic data, accidents, road closures, and the speed of other users. It then adjusts your route in real-time to avoid delays.
- **Algorithm behind it:** The app uses **real-time data analysis** and **pathfinding algorithms** to determine the fastest route. It learns from historical traffic patterns and user behavior, constantly improving its predictions as new data comes in.
- **Impact:** This helps drivers save time by finding the quickest route, reducing traffic congestion, and improving the overall travel experience.
- **Demo & Teaching Moment:** I took my dad's phone and opened Google Maps. I asked him to pick a route to the nearby grocery store. I showed him how it offered three different routes with estimated arrival times. Then, I turned on real-time traffic updates and showed how the app reroutes when traffic changes.
- **What I explained:** I told them Google Maps collects location and speed data from thousands of phones on the road. If many users suddenly slow down on a road, the system *learns* there's traffic and suggests a faster route. That's machine learning in action!

**Each of these examples shows how online learning and algorithms help improve our daily lives by making processes more efficient and personalized, all while learning from data to make better decisions over time.**

Finally, I asked them to explain back the concepts in their own words. This reinforced their learning and allowed me to clarify any misunderstandings.