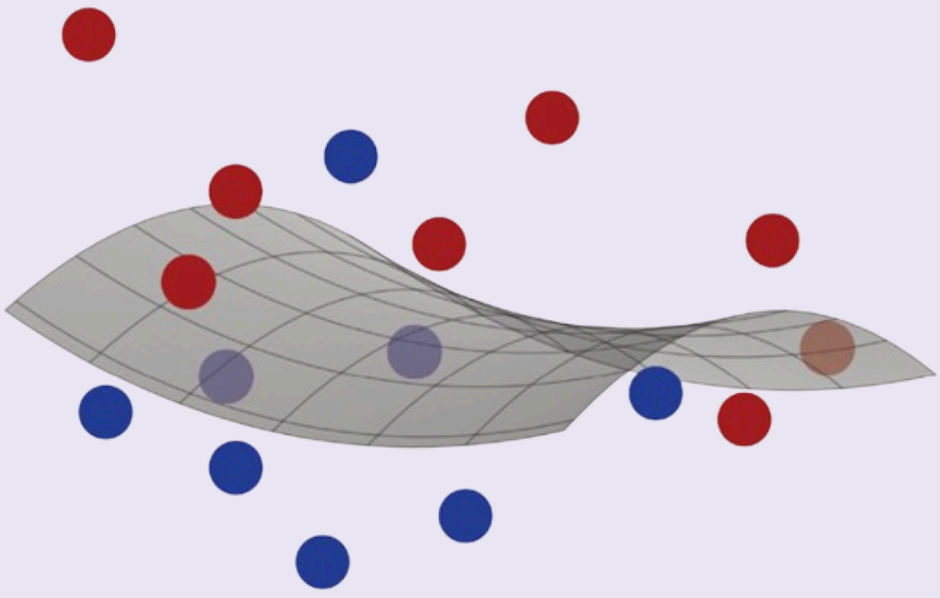
Foundations of Machine Learning

DAY - 2

What Kind of Problems Can ML Solve?



What Kind of Problems Can ML Solve?

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Predicting the label of a document is just one example. ML can be used for many different tasks — here are just a few major areas:

1. 🔡 Text / Document Classification
   - ML can automatically assign a topic to a document (like classifying emails as “Work”, “Social”, or “Spam”).
   - Also used to detect inappropriate content or fake news.
2. 💬 Natural Language Processing (NLP)
   - Machines learning to understand human language.
   - Examples:
     - Part-of-speech tagging: Labeling words as noun, verb, etc.
     - Named-entity recognition: Finding names of people, places, companies in text.
     - Parsing: Structuring sentences into trees for deeper understanding.
   - These are structured prediction problems → outputs have structure (like sequences or trees), not just single answers.
3. 🎤 Speech Processing

   ML helps in:
   - Converting speech to text (speech recognition)
   - Creating speech from text (synthesis)
   - Identifying or verifying who’s speaking
   - Modeling different accents, sounds, etc.
4. 👁️ Computer Vision
   - ML allows computers to "see" and understand images.
   - Tasks include:
     - Recognizing objects/faces
     - Reading text from images (OCR)
     - Finding people’s body positions (pose estimation)
     - Searching images based on content

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5. 🧬 Computational Biology
    - Predicting how proteins behave
    - Analyzing relationships in genes
    - Discovering patterns in biological data
6. 🕵️ Other Cool Uses
    - Detecting fraud in banks, telecom, or insurance
    - Playing complex games (like chess or Go)
    - Self-driving cars or robot navigation
    - Medical diagnosis (identifying diseases from symptoms or scans)
    - Recommendation systems (like Netflix or Amazon)
    - Search engines and extracting important info from the

Basically, almost any problem involving predictions or patterns in data can be approached using ML. And the list of ML applications keeps growing fast. This book/subject will help you learn techniques to solve such problems — even though it won't go deep into each specific domain.