Task 18 - Introduction to Machine Learning

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Compulsory Task 1

1. Answer the following in a document titled Intro_to_ML. Convert your answer document to a PDF before submitting it.
   - For each of the following examples describe possible inputs and outputs:
     - A self-driving car
     - Netflix recommendation system
     - Signature recognition
     - Medical diagnosis

Example: A Self-Driving Car

Inputs:

- Sensor data: Information from cameras, radar, and other sensors about the car's surroundings.
- GPS data: Location information for navigation.
- Maps and traffic data: Real-time updates on traffic, road information, and regulations.
- User input: Destination and passenger preferences.

Outputs:

- Control signals: Instructions for the car's acceleration, braking, steering, etc.
- Route planning: Determining the best path considering traffic, road conditions, and user preferences.
- Collision avoidance: Detecting and responding to obstacles, pedestrians, and other vehicles.
- Lane-keeping: Assisting in staying within lanes and following traffic rules.

Example: Netflix Recommendation System

Inputs:

- User profile: Viewing history, preferences, ratings, and interactions.
- Content metadata: Details about movies and TV shows (genre, actors, directors, release year, tags).
- Viewing context: Time, location, and device information.

Outputs:

- Personalized recommendations: Suggestions based on user interests and habits.
- Content ranking: Ordering recommendations based on predicted preferences.
- Similar content: Recommending titles similar to the user is watching or has enjoyed.
- Trending/popular content: Displaying currently popular shows and movies.

Example: Signature Recognition

Inputs:

- Image data: Scanned or captured signature images.

Outputs:

- Signature verification: Determining if a signature belongs to a specific person or is a forgery.
- Authentication decision: Classifying signatures as genuine or suspicious based on comparison to reference signatures.
- Confidence score: Indicating the system's certainty about the signature's authenticity.

Example: Medical Diagnosis

Inputs:

- Patient data: Medical history, symptoms, vital signs, and test results.
- Medical literature and research: Databases of medical knowledge, guidelines, and research papers.

Outputs:

- Diagnosis: Providing probable diagnoses or potential conditions based on patient data and medical knowledge.
- Treatment recommendations: Suggest appropriate treatments based on the diagnosed condition.
- Risk assessment: Evaluating potential risks associated with a condition or treatment plan.
- Prognosis: Predicting the likely course and outcome of a condition, considering various factors.