What is machine learning?

Machine learning is the idea that there are generic algorithms that can tell you something interesting about a set of data without you having to write any custom code specific to the problem. Instead of writing code, you feed data to the generic algorithm and it builds its own logic based on the data.

Supervised learning(Spam classification and face recognition) and Unsupervised learning(Recommender systems and grouping user logs). Explain using cats and dogs examples.

Regression: This is a type of problem where we need to predict the *continuous-response* value (ex : above we predict number which can vary from -infinity to +infinity)

Some examples are

- what is the price of house in a specific city?
- what is the value of the stock?
- how many total runs can be on board in a cricket game?

etc… there are tons of things we can predict if we wish.

Classification: This is a type of problem where we predict the *categorical response* value where the data can be separated into specific "**classes**" (ex: we predict one of the values in a set of values).

Some examples are :

- this mail is spam or not?
- will it rain today or not?
- is this picture a cat or not?

Basically 'Yes/No' type questions called **binary classification.**

Other examples are :

- this mail is spam or important or promotion?
- is this picture a cat or a dog or a tiger?

This type is called **multi-class classification.**

Reinforcement learning:

RL, known as a semi-supervised learning model in machine learning, is a technique to allow an agent to take actions and interact with an environment so as to maximize the total rewards. RL is usually modeled as a Markov Decision Process (MDP).

Imagine a baby is given a TV remote control at your home (environment). In simple terms, the baby (agent) will first observe and construct his/her own representation of the environment (state). Then the curious baby will take certain actions like hitting the remote control (action) and observe how would the TV response (next state). As a non-responding TV is dull, the baby dislike it (receiving a negative reward) and will take less actions that will lead to such a result(updating the policy) and vice versa. The baby will repeat the process until he/she finds a policy (what to do under different circumstances) that he/she is happy with (maximizing the total (discounted) rewards).