1- What is semi-supervised learning?

It’s a combination between supervised and unsupervised learning, where we use both labeled an unlabeled data.

It’s used for because getting labeled data is hard in many ways (could be time wise or budget wise or other), so it uses a small amount of labeled data and lots of unlabeled data which turns out to be a lot cheaper and more effective than using only one type of data without the other.

-example: Getting unlabeled data (large dataset of cat and dog photos), you’ll manually label some of them (classifying some photos to cat and dog categories), then we’ll use our labeled data as a training set for our model, finishing the first portion using supervised learning.

Now we use our model to predict on the remaining of unlabeled data, then take these predictions and label each piece of unlabeled data with the individual output predicted for them. This process is called “pseudo labeling”.

After that, we train our model on the full dataset both the labeled and unlabeled data.

2- What is reinforcement learning ?

It’s a type of machine learning that learns to solve problems by trial and error.

It starts with an agent interacting with an environment. The environment has a state which the agent can observe to make an action that will have an influence in the environment, then the agent receives reward signals as it moves closer to its goal.

-example: our agent will be a self-driven car and our environment will be the road. The state given can be your current location, the road conditions and location of other vehicles. The car will take the action of driving taking a right, left, etc. The influence the car will have is its position in the environment and it can have its effect colliding with an object or other car. The car gets reward signals by giving it points as it gets closer to its destination and subtracting points for breaking traffic laws or colliding with objects.

3- What is ensemble learning?

Ensemble learning is a technique that involves combining multiple models to improve the overall performance of the system.

There are two popular types of ensemble learning: Bagging and Boosting.

Bagging: is a process of using more than one model taking the mean or the maximum count of all the models getting the last most accurate prediction

Boosting: is a process of generating a model, then improving its prediction generating a new model using this prediction. Then doing it over and over getting the last most accurate prediction

4,5- Done and installed.