Introduction to Machine Learning

resources: https://github.com/LakshithaSenavirathna/MachineLearningTutorial

What is Machine Learning?

learn from data

Imagine teaching a small child to recognize cats.

You don’t give written rules like:

- Two eyes
- Four legs
- Tail

- Instead, you show many cat pictures(data).
- After seeing many examples(modeling),
- the child learns to recognize a new cat(prediction/decision).

data ⇒ model ⇒ predictions/decisions

No Hard-Coded Rules

- **Without Machine Learning**
- Programmer writes rules:
- If email contains
  - ‘win money’ → Spam
- If email contains
  - ‘offer’ → Spam
- Problem:
  - Spammers change words → rules fail.

With Machine Learning

We give:

- Thousands of spam emails
- Thousands of normal emails

Computer learns patterns itself.

So we don’t manually write rules.

Data → Model → Prediction

Step 1 – Data

Past information.

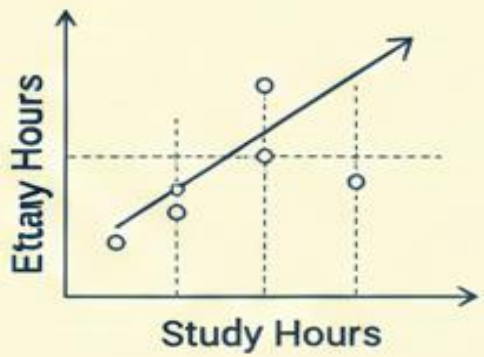
- Study hours
- Exam marks

Study hours	Exam marks
10	65
20	80

Step 2 – Model

Computer learns relationship.

More study → More marks



Step 3 – Prediction

Now predict new student marks

→ **Study hours: 15**
Predicted Marks: ?

So: Data → Learning → Prediction

Example — Learning to cook rice

1. You watch your mother cook many times → Data
2. You learn the method → Model
3. You cook alone → Prediction/output

Example — Learning to cook rice

You → Model → Prediction

Step 1 – Data

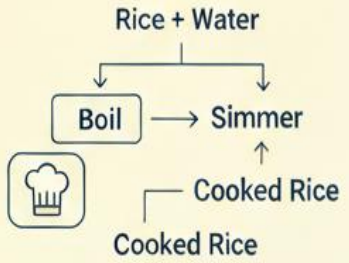
Past information.

- Watch many times
- Ingredients
- Steps

Step 2 – Model

Computer learns relationship.

You learn the method



Step 3 – Output

You cook alone

So: Input → Model Output

Machine Learning Examples in Everyday Life

Data → **Model** → **Prediction**

YouTube / recommendations

They learn what you watch and suggest similar content.

Face recognition

Your phone learns your face from photos and automatically.

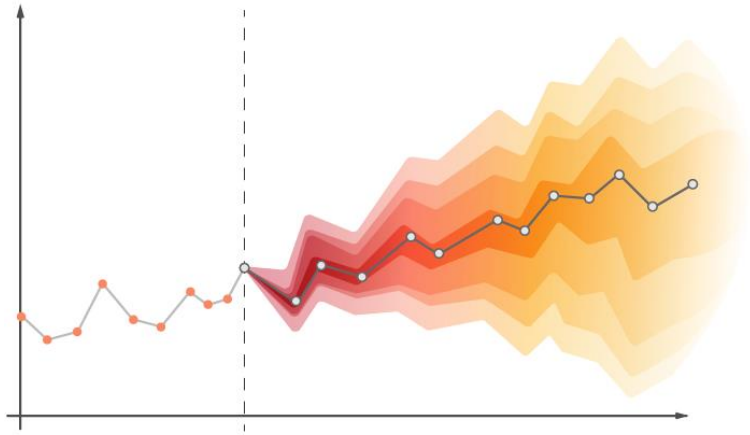
Google Maps traffic

It learns past traffic patterns to predict travel time.

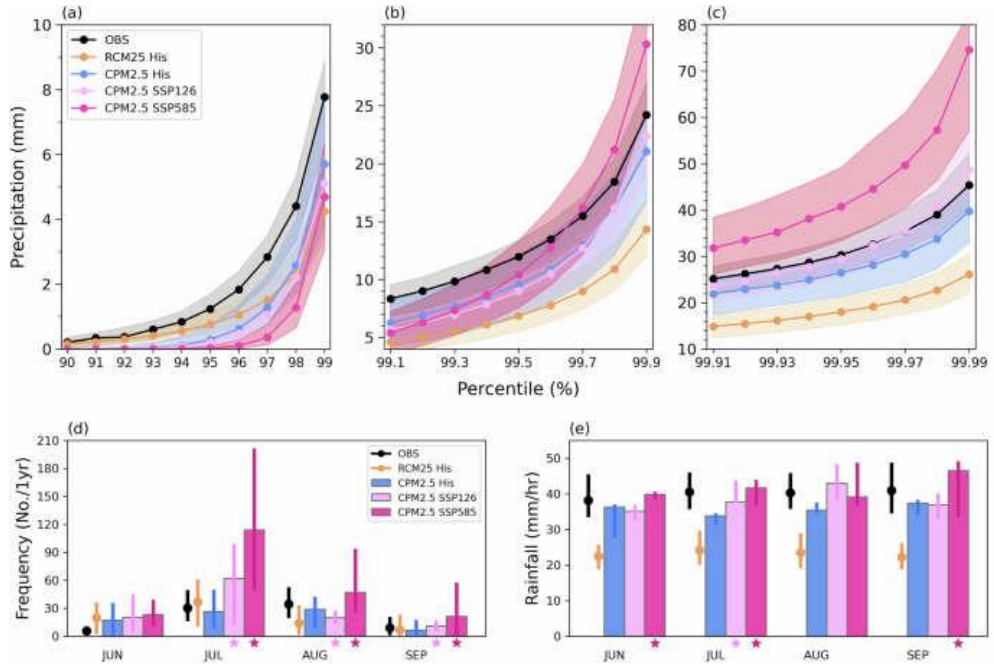
Language tools

PREDICTION/FORECAST

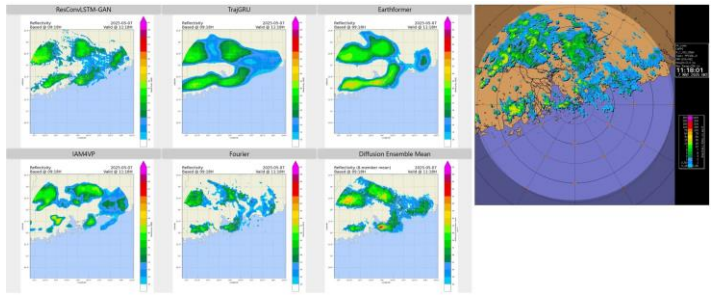
SATELLITE IMAGES TO FORECAST RAINFALL



MODEL



DATA



SUMMARY:

Machine Learning is

giving data to computers =>

so they can learn patterns and =>

make smart decisions automatically.