## Prédictive Machine Learning

## Classification & Regression

These types of algorithms take two inputs

X \_ The features of different samples

The value of a target quantity for each sample

The goal is to output a Model that can predict the target quantity from features of the sample.

Model

In this section, we will briefly talk about some of the well-know algorithms for this type of machine learning. But before that let's talk about Regression & classification and their differences.

For reg. Y is a (bunch of) continous varible: YEIR or YEIR.

But for classification Y is discrete and Categorical. It means that we want the model to be able to determine the type of something.

Keg.

· Prediction of temperature . Is a state entangled? From Black-Body radiation. Is an object a conductor?

15 a news fake ?

· Prédiction d'arrelation in a state.

## Classification (CLF)

This has similarly to both Clustering & Reg.

Consider the 2-D data bellow

X2 X

X

X

X

X

X

X

X

X

The idea is to find a model that, based on the value of X, can predict whether y = x or  $y = \bullet$ .

Coming from Reg. one approach could be to find a function of such that,

$$f(\vec{x}) > 0 \longrightarrow x$$

$$f(\vec{x}) \leftarrow 0$$

There are other ways that well talk about.

Probably the simplest models we can consider are Poly(n) functions. We talked about this in the introduction.

tor regression

X: [ns, ne] W: [nf, 1]

tor ploy(n) we can take X & generate

 $\dot{X} = \begin{bmatrix} \dot{X} & \dot{X} & \dot{X} & \dot{X} \\ \dot{X} & \dot{X} & \dot{X} & \dot{X} \end{bmatrix}$ 

Note that if ns (np or ns (np xn this (linear) who cross terms

would not give good results.

lhe Solution

 $W = (X^T, X)^T \cdot X^T \cdot Y$ , while simple has a big flaw.

Consider a noise data & a poly (n>)

This model starts to lit the noise. See the nb.

But why is that a bad thing?

The trend is the general pattern of extends to other prediction samples power

but not the noise.