Signal Processing using Scipy, Numpy & matplotlib.

* **SIGNAL PROCESSING :-**

→ field that deals with analyzing, modifying & extracting information from signals.

- signals are data / information that can be measured & analyzed, like sound waves, electric signals or images.

* Key concepts in signal Processing :-

1) Time domain :-

↳ this is how signals are usually captured, wrt. time.

eg: sound wave of a song over time.

2) Frequency domain :-

↳ focuses on the different frequencies that make up the signal.

eg: how much of the signal is low-pitched vs high-pitched sounds.

3) Transformation :-

↳ SP often involves converting signals from the time domain to the frequency domain using techniques like Fourier Transform, & vice versa using inverse fourier transform. This helps analyzing & modifying signals more efficiently.

4) Smoothing the signal :- seperating the useful part of a signal from the noise. Filters can remove unwanted frequencies from a signal.

5) Extracting information :- extracting important features & patterns from the signal. eg: detecting beats in a music track / identifying edges of an img

* **Continuous Signals :-**

- These signals exist over a continuous range of time. Imagine a smooth curve, this is how most natural signals exist. such as sound of your voice or temp over a day.

eg: the sound wave of a song could be continuously described from start to end.

* key Points of Continuous Time Signals :-

- They exist for every moment in time within a certain interval.
- They can have ∞ no of values within any time interval, making them smooth & unbroken.

* BASICS OF SIGNAL PROCESSING SYSTEM: