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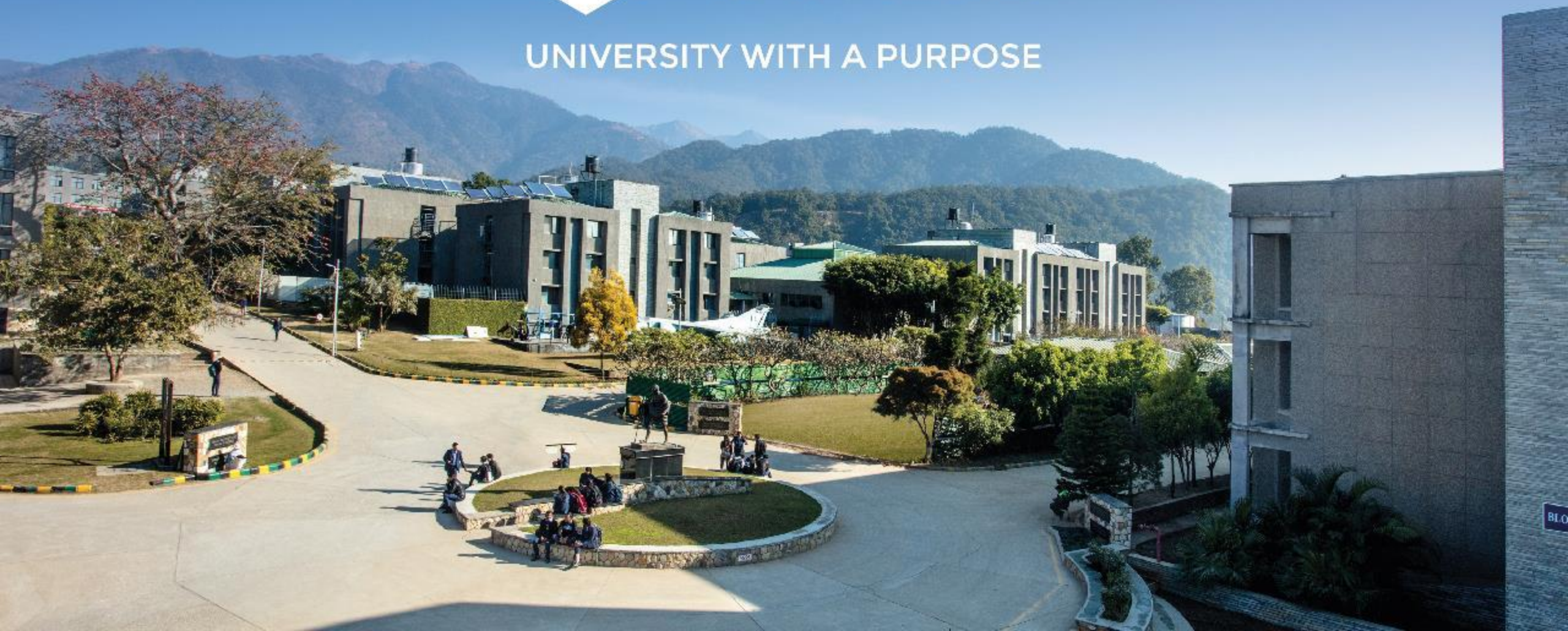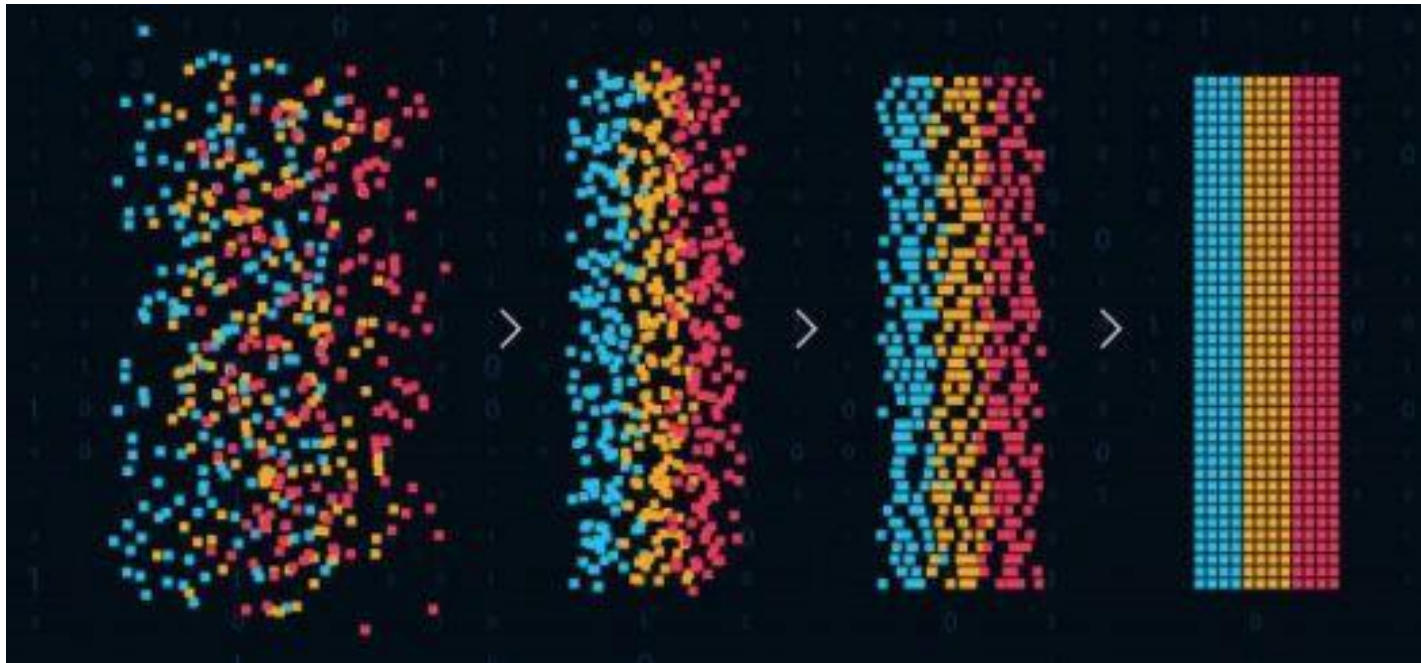
UNIVERSITY WITH A PURPOSE

Pattern and Anomaly Detection

B. Tech., CSE + AI/ML

Dr Gopal Singh Phartiyal

18/08/2021

Source: Edureka

Bayesian Probabilities

- Sofar in probability: Classical or frequency representation
- Another way: Bayesian view: Probabilities provide a quantification of uncertainty
- Example: Uncertain event: Climate change: Polar ice cap melting
  - Constraint with classical representation: Cannot be repeated to have notion of probability laws.
  - The information on how quickly the ice is melting with help us take corresponding actions.

Bayesian Probabilities

- In such circumstances, we would like to be able to quantify our expression of uncertainty and make precise revisions of uncertainty in the light of new evidence, as well as subsequently to be able to take optimal actions or decisions as a consequence.

- This can all be achieved through the elegant, and very general, Bayesian interpretation of probability.
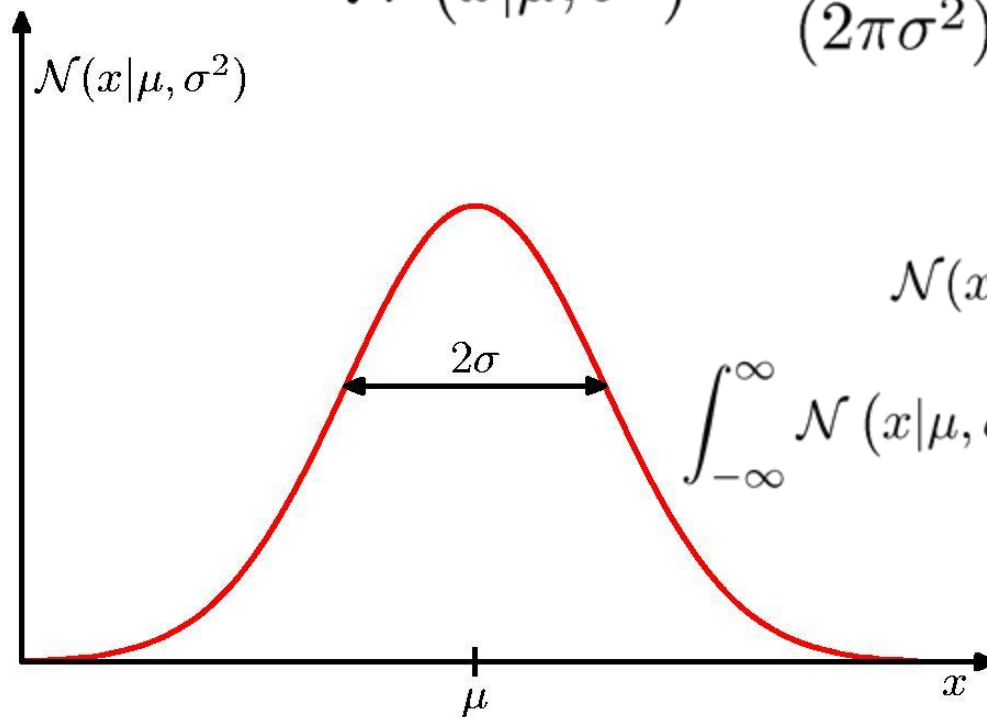
Bayesian Probabilities

Bayesian probabilities are quantities (axioms or properties) that behave precisely according to rules of probability.

Reasonable expectation (quantitative) of a belief, state of knowledge

The Gaussian Distribution

$$\mathcal{N}\left(x|\mu,\sigma^2\right) = \frac{1}{(2\pi\sigma^2)^{1/2}} \exp\left\{-\frac{1}{2\sigma^2}(x-\mu)^2\right\}$$

$\mathcal{N}(x|\mu,\sigma^2)$

$$\mathcal{N}(x|\mu,\sigma^2) > 0$$

2σ

$$\int_{-\infty}^{\infty} \mathcal{N}\left(x|\mu,\sigma^2\right)\,\mathrm{d}x = 1$$

μ

x

Thank You