

Practical ML Tutorial

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SEEMAPLD2023, George Williams

Agenda

Part I

- AI Trends
- ML Basics
- Survival Analysis
- Hands-On Programming

Part II

- AI Hardware
- Computer Vision
- Hands-On Programming

AI Trends

Have You Been Living Under A
Rock Recently?

- ChatGPT
 - Stable Diffusion
 - Deep Fakes
 - Alpha Fold
 - Foundation Models
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OpenAI

ChatGPT Introduced





**STABLE
DIFFUSION**



DALLE 2



MIDJOURNEY

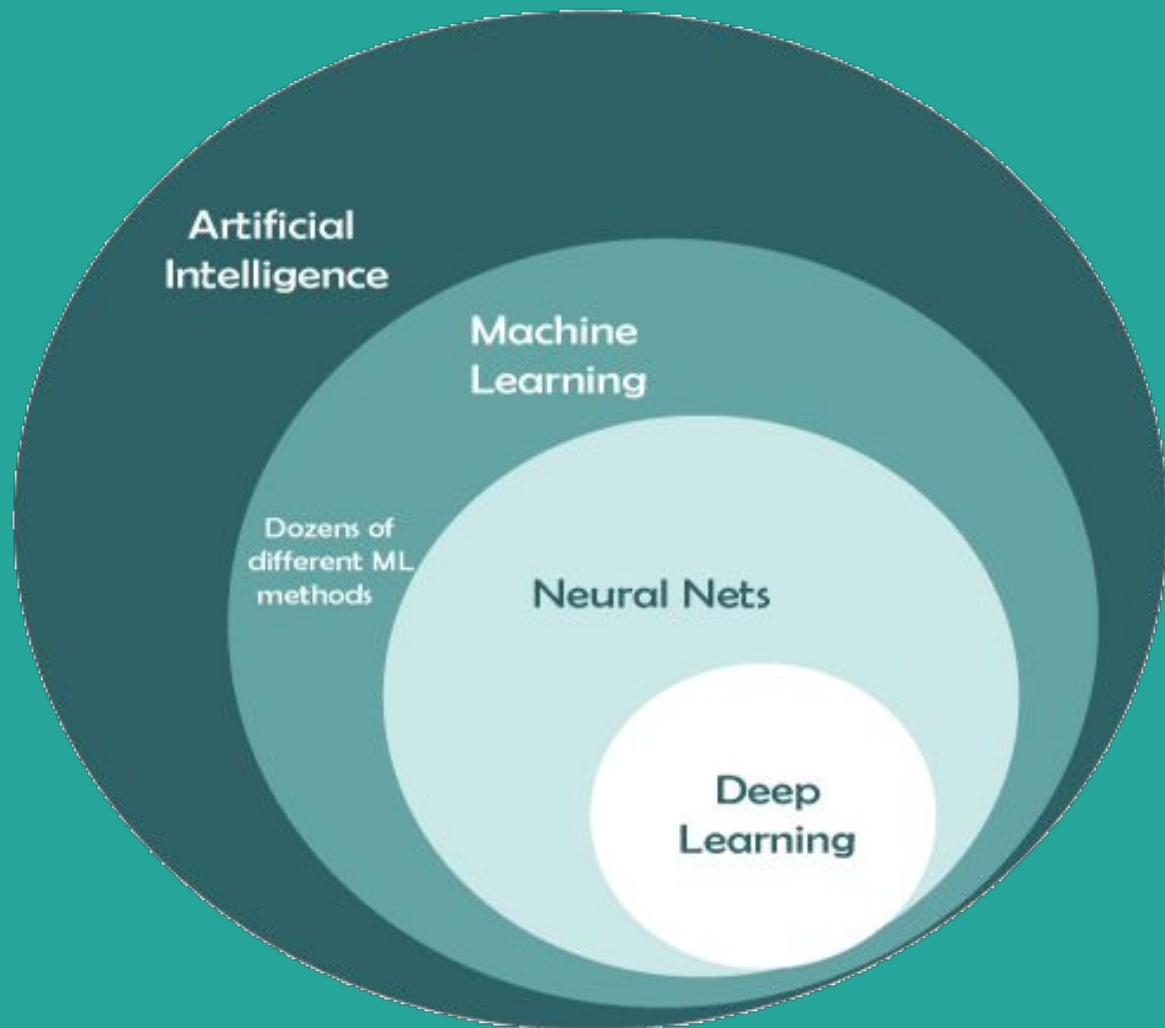
nature



DeepMind

Machine Learning Basics





Machine Learning Basics

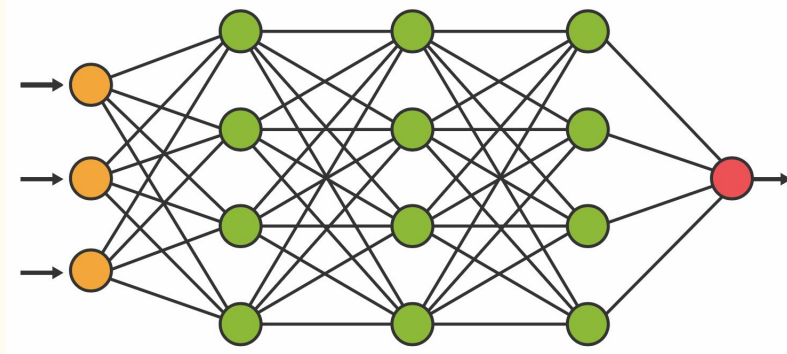


Data

Machine Learning Basics



Data

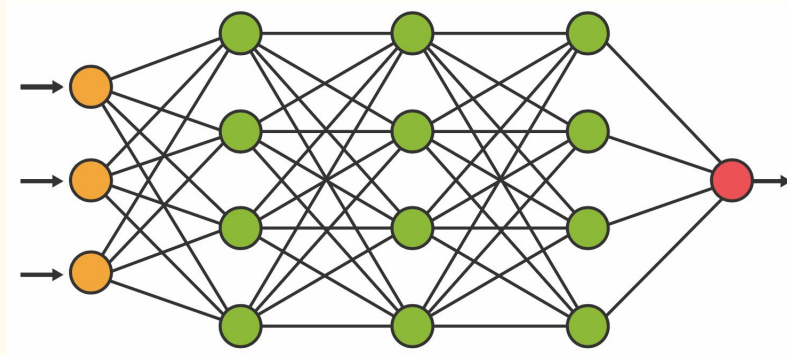


Model

Machine Learning Basics



Data

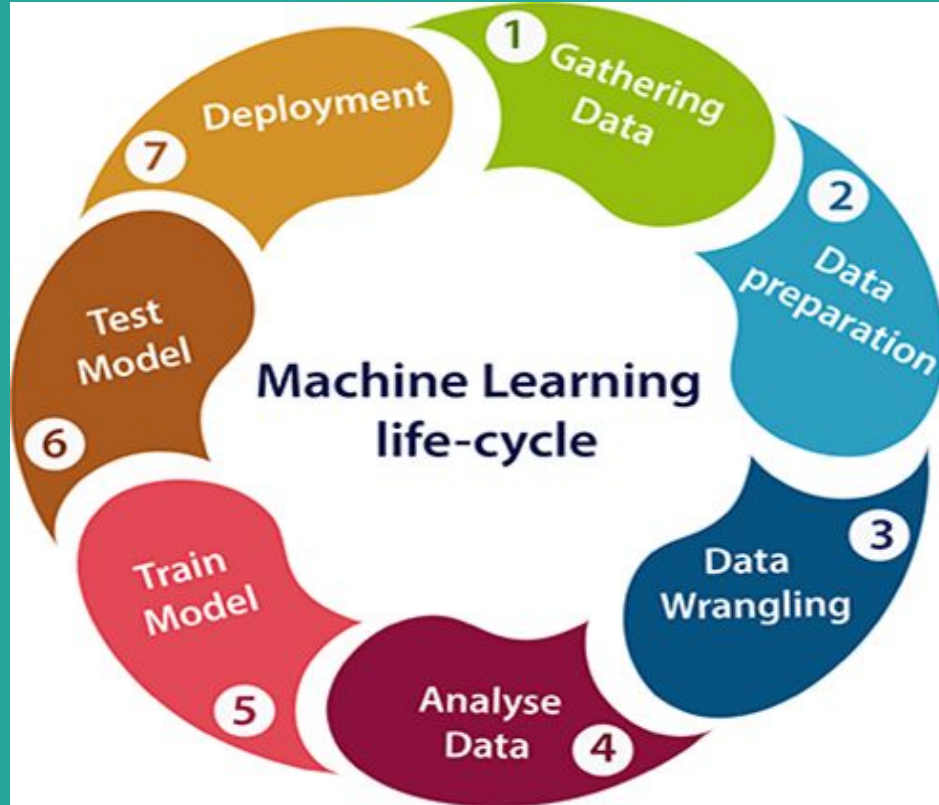


Model



Eval

Machine Learning “In The Wild”



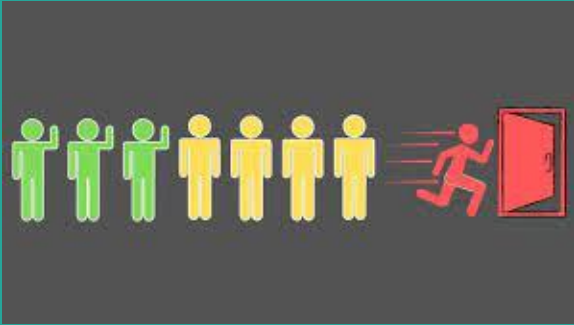
Survival Analysis

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When Will It End?

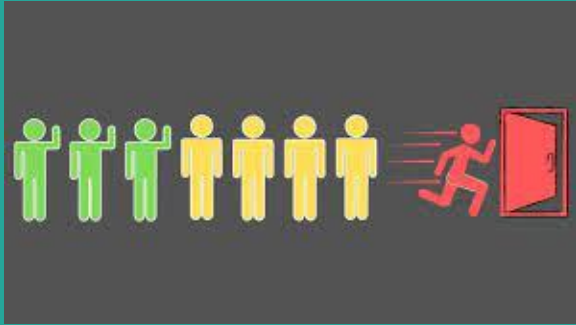
When Will *It* End?

When Will *It* End?



Customer Churn

When Will *It* End?

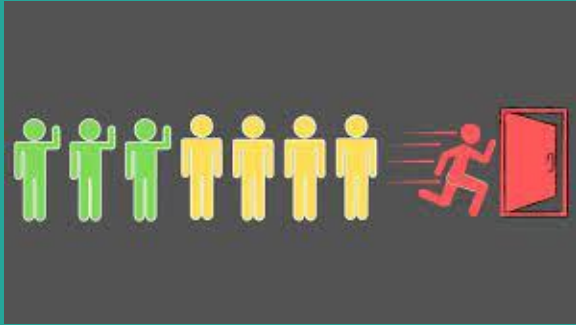


Customer Churn



Health Outcomes

When Will *It* End?



Customer Churn



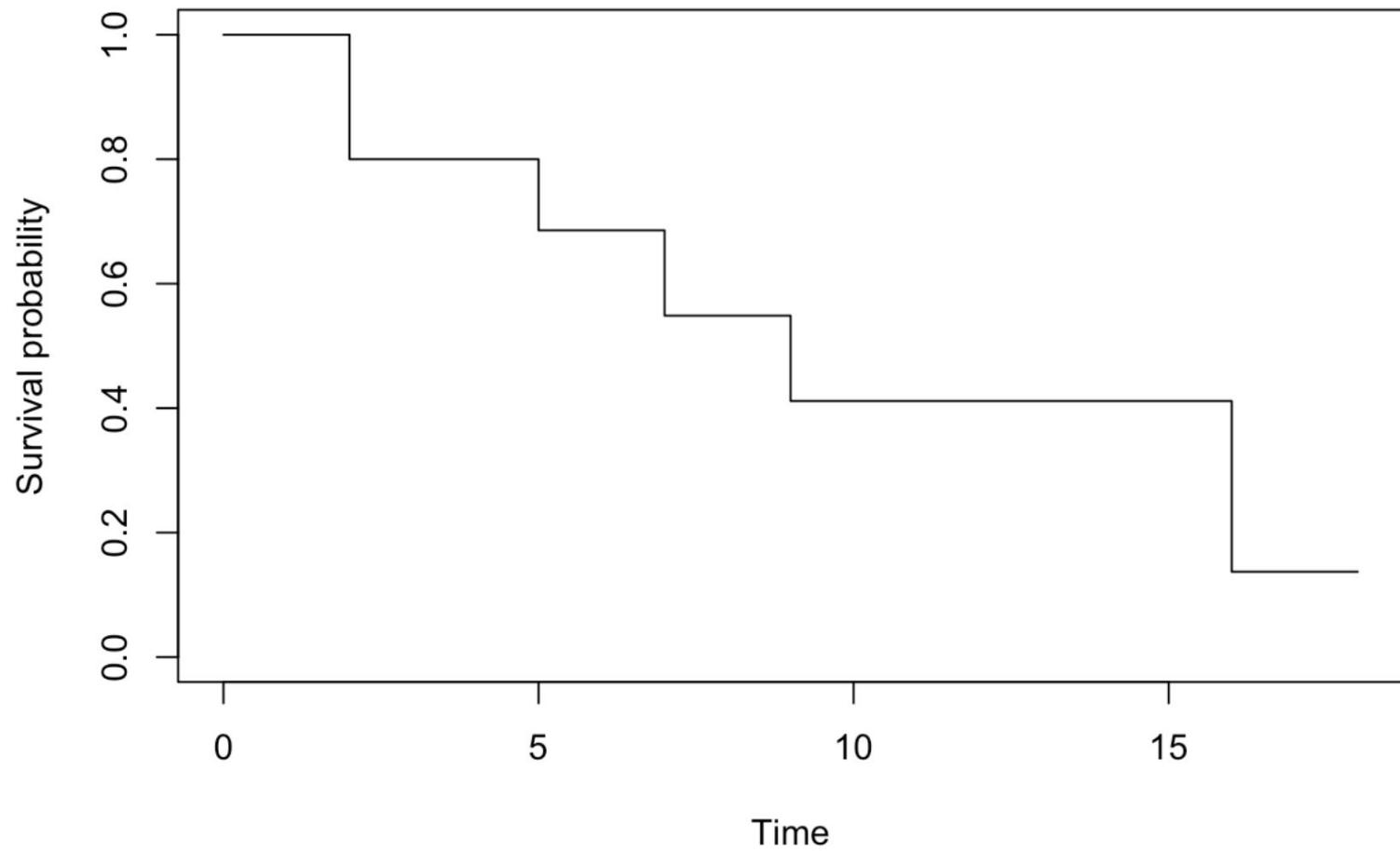
Health Outcomes



Machine Failure

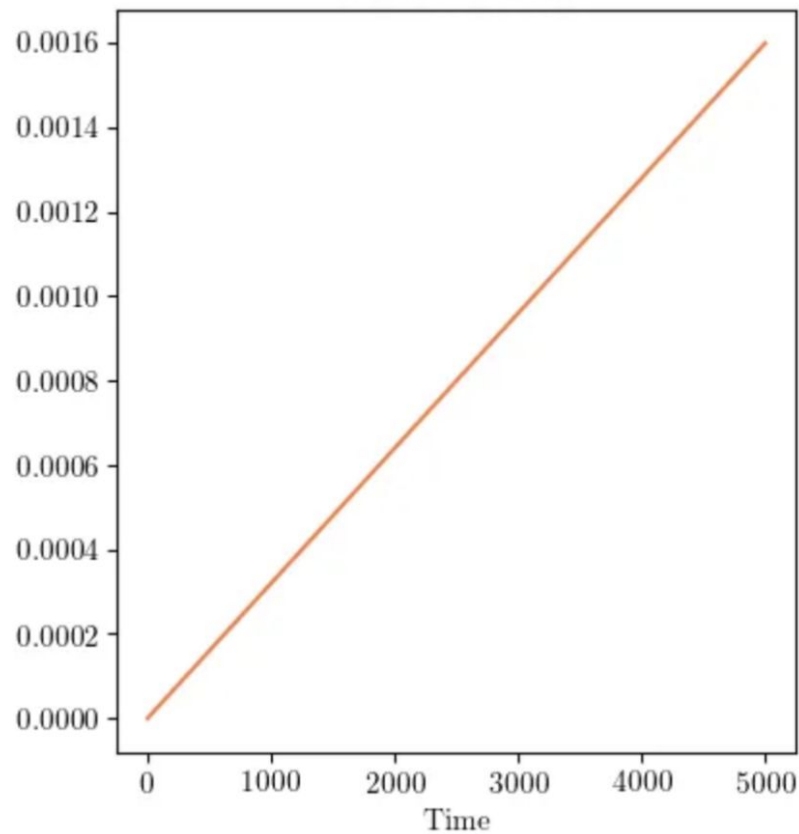
censoring
period^{free}
time
event

Survival^{drops}
follow-up
observed
follow
probability^{interest}
loss^{right}
censoring
observation

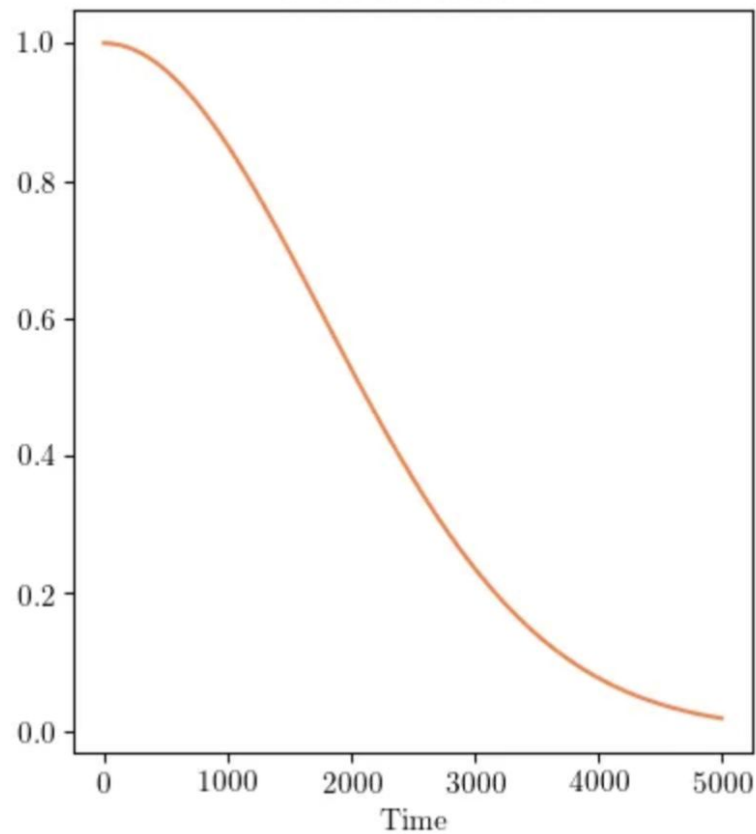


$$S(t) = \Pr(T > t)$$

Hazard Function

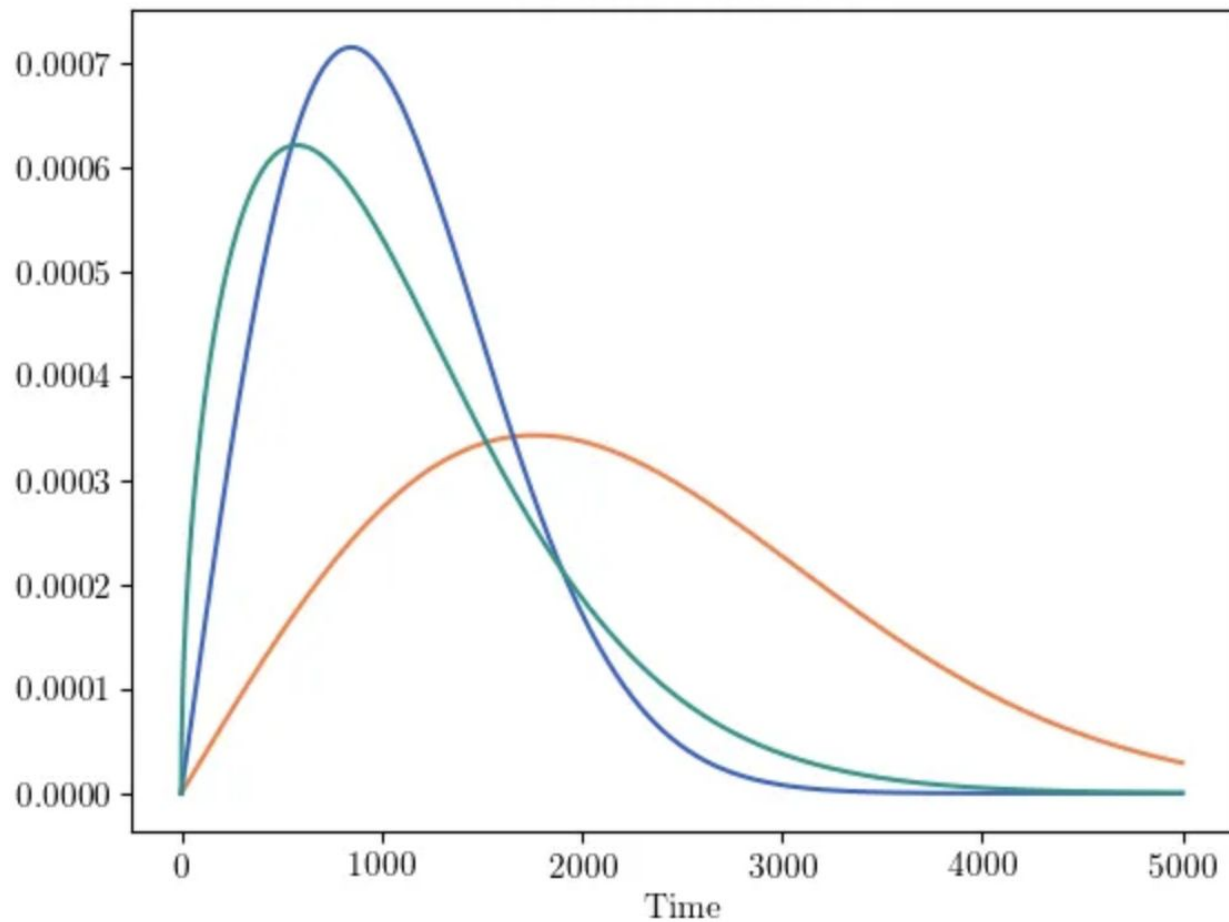


Survival Function



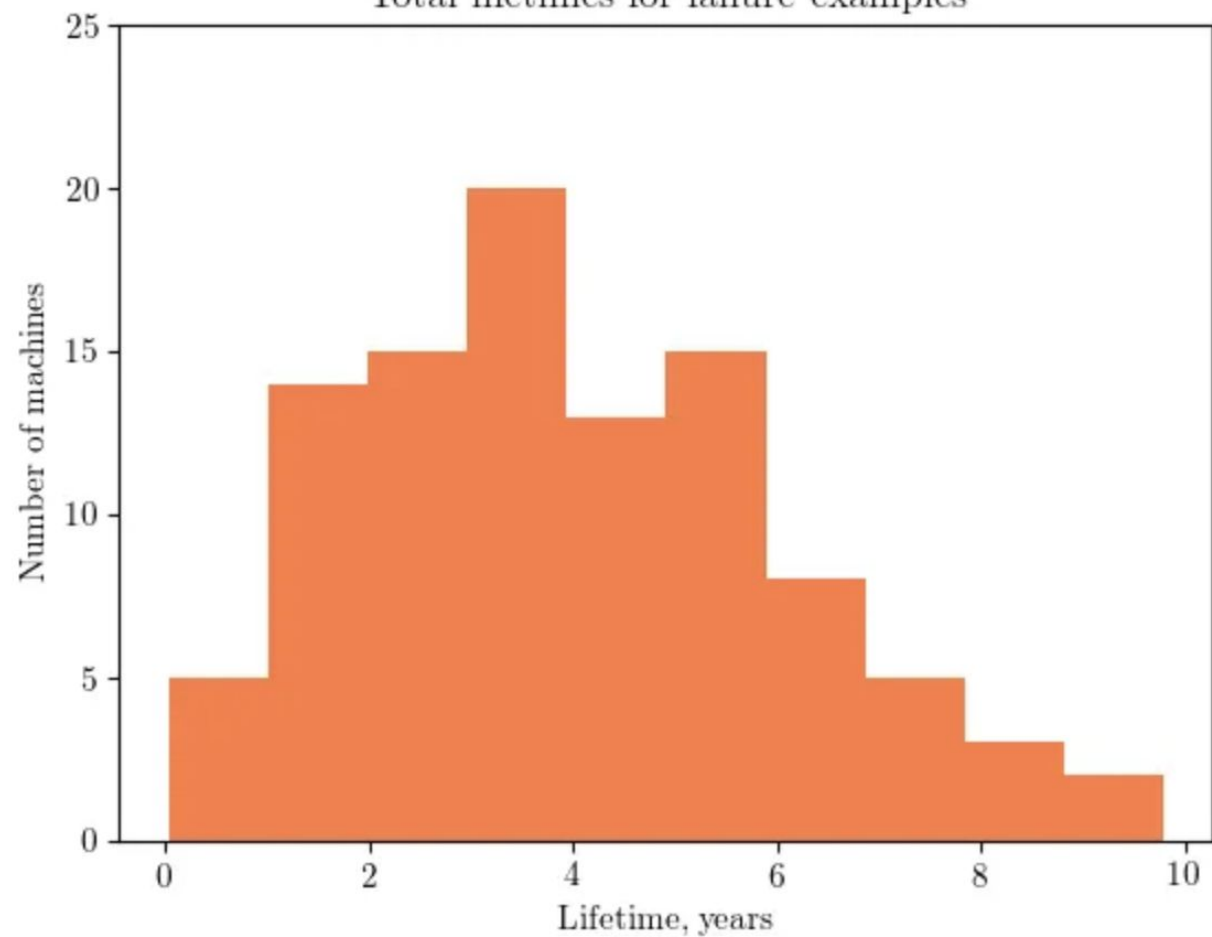
would like to use observed data in order to predict the remaining life for each of a group of machines. To understand how this can be done, it's easiest

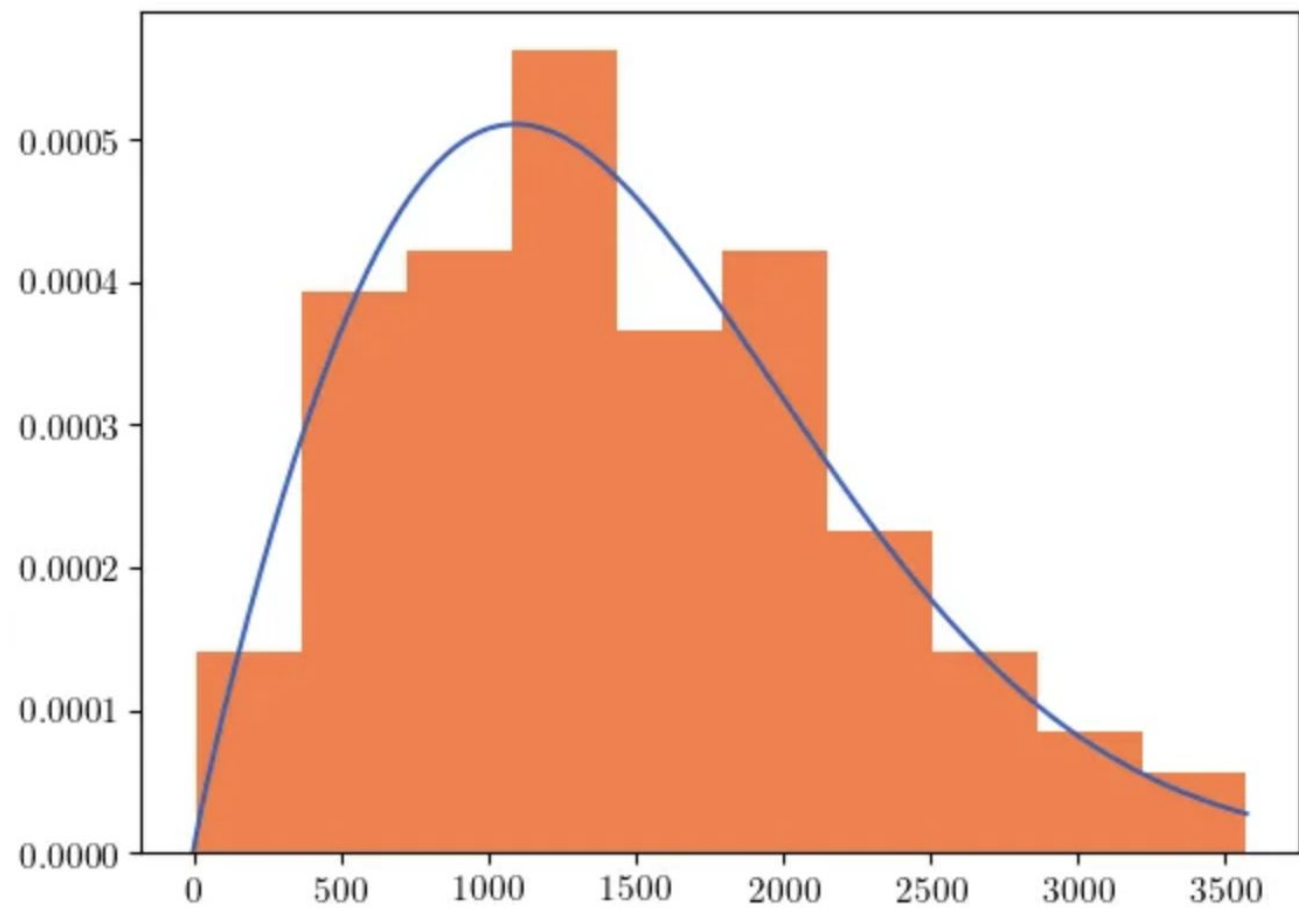
Weibull distributions



Shape
Scale

Total lifetimes for failure examples





Machine Learning Approach

Beyond Curve-Fitting

- Handle real-world data
- Multiple underlying distributions
- Censored data

Let's Start Coding!

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