AI Club

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Survival Analysis

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What is survival analysis ?

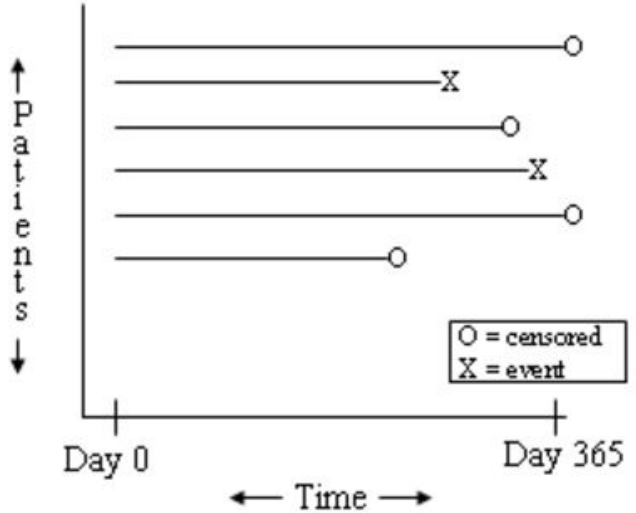
- **Definition:** A set of tools and techniques for analyzing and predicting the time until a specific event happens.
- **Examples of events:** Machine failure, disease recovery, or customer churn.

Core Focus - Time-to-Event

- **Main Objective:** Predict *when* an event will occur, not just if it will.
- **Importance:** Helps in planning and decision-making by anticipating future events.

Key Concept - Censoring

- **Definition:** Some subjects don't experience the event during the study.
- **Example:** Patients in a trial who haven’t relapsed by study end.
- **Solution:** Techniques to handle incomplete data and make full use of available information.



Common Survival Models

- **Kaplan-Meier Estimate:**
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  - **Visualization:** Often displayed as a step chart.

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- **Deep Survival Model:**
  - **Purpose:** Improve prediction accuracy for when events will happen by handling complex patterns, using large datasets, and combining different types of information like pictures and text.
  - **Feature:** Use powerful neural networks to find patterns in data, adjust to different types of information over time, automatically pick out important details, and predict better than old methods.

Incorporating Time-Dependent Covariates

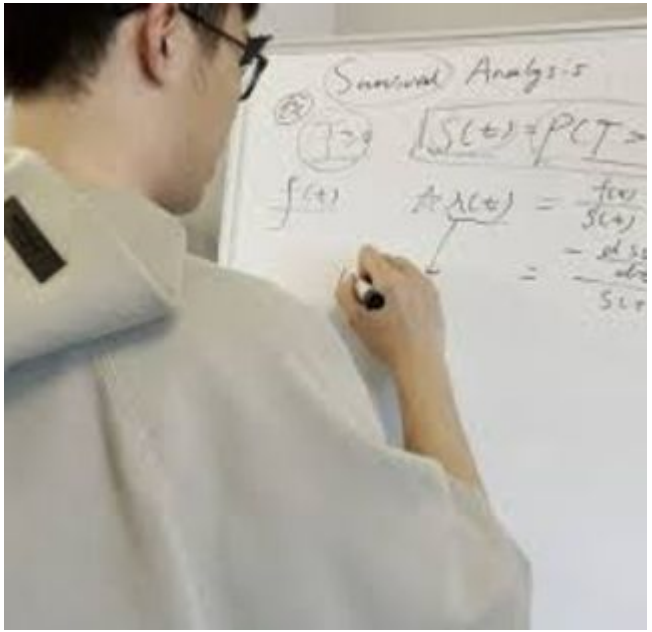
- **Real-world Scenarios:** Factors affecting risk can change over time.
- **Solution:** Models account for these variations to improve prediction accuracy.

Use Cases of Survival Analysis

- **Healthcare:**
  - Predict patient survival times or disease recurrence.
  - Improve treatment planning and resource allocation.
- **Engineering:**
  - Estimate lifespan of machinery and plan maintenance schedules.
- **Business:**
  - Predict when a customer might leave or switch services.
  - Enhance customer retention strategies.

Output - The Survival Function

- **Definition:** Probability the event has not occurred by a given time.
- **Importance:** Helps quantify risk and make informed decisions.



Benefits of Survival Analysis

- Provides nuanced insights into time-dependent phenomena.
- Facilitates actionable predictions for better strategic planning.
- Versatile applications across various sectors.

THANK YOU

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