Machine *Learning*
Customer Requirements

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Customer Requirements

- "**Customer Requirements** refer to the needs, expectations, and specifications of the customers"
- "**Problem Definition**: Customer requirements involve a clear understanding of the problem that the machine learning solution aims to solve with its input and output"
- "**Data Requirements**: specifying the types of data that are available or required for the solution. This includes the format, structure, size, quality, and **sources** of data. It also considers any **privacy or legal restrictions** related to the data."
- It is very important in the above points to be very clear, well written and signed

Performance Metrics

- **KPI** (Key Performance Indicator) refers to specific metrics or measures used to assess the performance and effectiveness of machine learning models or systems. These metrics help evaluate how well a machine learning solution is performing and whether it is meeting the desired objectives
- Some metrics are machine learning based (e.g. precision, recall, FPR) and others are business based (e.g. total revenue)
- It requires negotiation skills as stakeholders push for higher performance (e.g. FPR 0.01%) while we as ML developers must be sure we can deliver such performance!
    - This is VERY critical or the customer will reject the product delivery!

Requirements Types

- Functional Requirements
  - Tasks such as classification, regression, anomaly detection, recommendation, natural language processing, image recognition, etc.
  - Based on the domain, there can be more details of sub-tasks
  - We evaluate using the metrics we discussed (e.g. accuracy)
- Non-Functional Requirements
  - Non-functional requirements are constraints or **qualities** that describe how the machine learning system should perform or behave. They focus on system attributes, such as performance, reliability, scalability, maintainability, usability, security
  - in machine learning include factors like response time, computational efficiency, model interpretability, robustness to noise or outliers, scalability to handle large datasets, ease of deployment and integration, user-friendly interfaces, data privacy and security measures
  - Evaluation is ad-hoc based on the criteria (e.g. response time can be measured in milliseconds)

Task - Requirements for Hands-off wheel Detection

- Given a stream of frames coming from a camera, the customer would like to detect if hands are on or off the steering wheel
- Think and brainstorm about:
  - Proper task definition (what is hands off?)
  - Functional requirements
  - Non-Functional requirements
  - KPI metrics

"Acquire knowledge and impart it to the people."

"Seek knowledge from the Cradle to the Grave."