

Feature engineering

What is Feature Engineering?

Feature Engineering is the process of **creating new input features** or **transforming existing ones** to improve the performance of machine learning models.

Think of it as:

"Turning raw data into useful input for a model."

✓ ✂ Domain-Specific Transformations

You use **domain knowledge** to create features.

◆ Examples:

| Domain | Raw Feature | Engineered Feature |
|------------|----------------|---|
| Finance | Salary, Debt | Debt-to-Income Ratio |
| Health | Height, Weight | BMI = $\text{weight} / \text{height}^2$ |
| E-commerce | Purchase Date | Day of Week, Season |
| Text | Review Text | Word Count, Sentiment |

Helps **capture real-world meaning** from raw data.

✔ Feature Extraction

You convert **complex raw data** (like text, images, dates) into **useful numerical features**.

| | | |
|-------|---------------|-------------------------------|
| Date | 2023-07-15 | Day, Month, Weekend? |
| Text | "Bad product" | Sentiment Score = -0.9 |
| Image | RGB values | Color Histogram, Edge Density |