

CS156 Yaser Abu-Mostafa Lecture 1

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Lecture 1 of 18 of Caltech's Machine Learning Course - CS 156 by Professor Yaser Abu-Mostafa
<https://www.youtube.com/watch?v=mbyG85GZ0PI&hd=1>

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1 Requirements for Machine Learning

- A pattern exists
- We cannot pin it down mathematically
- We have data on it

2 Components of Learning

- Input: \mathbf{x} , a d -dimensional vector
- Output: $y \in \{-1, 1\}$
- Target Function: $f : \mathcal{X} \rightarrow \mathcal{Y}$ (unknown)
- Data: $(\mathbf{x}_1, y_1), (\mathbf{x}_2, y_2), \dots, (\mathbf{x}_N, y_N)$ (historical records)
- Hypothesis: $g : \mathcal{X} \rightarrow \mathcal{Y}$ (known, because we created it. The goal is to find a hypothesis g that approximates f well, $g \approx f$).
- Learning Algorithm \mathcal{A}
- Hypothesis Set \mathcal{H} Set of candidate formulas.