Cognitive Biases

The human brain is capable of incredible things, but it's also extremely flawed at times. Science has shown that we tend to make all sorts of mental mistakes, called "cognitive biases", which can affect both our thinking and actions. These biases can lead to us extrapolating information from the wrong sources, seeking to confirm existing beliefs, or failing to remember events the way they actually happened.

Humans tend to think in certain ways that can lead to systematic deviations from making rational judgments. These tendencies usually arise from:

- Information processing shortcuts
- The limited processing ability of the brain
- Emotional and moral motivations
- Distortions in storing and retrieving memories
- Social influence

Cognitive biases have been studied for decades by academics in the fields of cognitive science, psychology, and philosophy; nonetheless, they are especially relevant in today's information-packed world. They influence the way we think and act, and such irrational mental shortcuts can lead to all kinds of problems.

Below is a list of five common cognitive biases:

- **Anchoring :**

When making decisions, Anchoring is a bias which involves factoring in one piece of information too heavily. Anchoring occurs when a person overly relies on, or anchors to, a specific piece of information. Once the so-called anchor has been established, there is a bias towards the anchor.

- **Confirmation Bias :**

Confirmation Bias is selective thinking where information that confirms a preconception is: (1) automatically noticed (2) actively sought (3) overvalued and (4) accepted without reservation. On the other hand, information that contradicts the preconception is (1) automatically ignored (2) not sought (3) undervalued and (4) rejected out of hand.

- **Good Looking People Bias :**

In decision-making and reasoning, Good Looking People Bias is the tendency to place more weight on the views of good-looking people than average-looking or ugly people.

- **Ambiguity effect :**

The ambiguity bias is known as the tendency to avoid options for which the probability of a favorable outcome is unknown.

- **Negativity Bias :**

Negativity Bias is the tendency to give more weight to negative experiences or information than to positive ones.

We would like to think that AI-based machine learning systems always produce the right answer within their problem domain. However, in reality their performance is a direct result of the data used to train them. The answers in production are only as good as that training data.

But data collected by human means, such as surveys, observations, or estimates can have built-in human biases, such as the confirmation bias or the representative bias. Even seemingly objective measurements can be measuring the wrong things, or can be missing essential information about the problem domain.

The effects of biased data can be even more insidious. AI systems often function as black boxes, which means that technologists are unaware of how an AI came to its conclusion. This can make it particularly hard to identify any inequality, bias, or discrimination feeding into a particular decision.

This presentation explains how AI systems can suffer from the same biases as human experts, and how that could lead to biased results. It examines how testers, data scientists, and other stakeholders can develop test cases to recognize biases, both in data and the resulting system, and how to address those biases.

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