Twitter Thread by Carlos E. Perez

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Nice to discover Judea Pearl ask a fundamental question. What's an 'inductive bias'?

> Help! What precisely is "inductive bias"? Some ML researchers are in the opinion that the machine learning category of \u2018inductive biases\u2019 can allow us to build a causal understanding of the world. My Ladder of Causation says: "This is mathematically impossible". Who is right? 1/
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> — Judea Pearl (@yudapearl) February 14, 2021

I crucial step on the road towards AGI is a richer vocabulary for reasoning about inductive biases.

@yudapearl explores the apparent impedance mismatch between inductive biases and causal reasoning. But isn't the logical thinking required for good causal reasoning also not an inductive bias?

An inductive bias is what C.S. Peirce would call a habit. It is a habit of reasoning. Logical thinking is like a Platonic solid of the many kinds of heuristics that are discovered.

The kind of black and white logic that is found in digital computers is critical to the emergence of today's information economy. This of course is not the same logic that drives the general intelligence that lives in the same economy.

Digital computers do not have the inductive biases to navigate the complex and messy world of life. Look around, have you seen a machine with the autonomy of a honey bee? They simply have no grounding in life.

General intelligence emerges out of things that are alive. To construct a synthetic general intelligence requires the kind of algorithm that organically grows itself from the inside out.

Which requires the kind of inductive biases that are organic in nature. https://t.co/64gYeKBtI2

So what this reveals is that an inductive bias is an emergent feature of a complex process. Just like the wetness of water. It is interesting to identify these biases, but they aren't the process themselves. They are how we describe the process.

Things that our brains can identify are things that exhibit recurring patterns. We feel the wetness of water because that wetness repeats itself every time we feel water. This causation invariance in nature forges the causality reasoning necessary for navigating a messy world.

An inductive bias is the identifiable recurring thought process (i.e. habits) the brain has developed in the process of its own constructive development while growing into this world.

This said one should never mistake the map from the actual territory. A cognitive bias developed by too many is to confuse the two.

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