There is a great analogy from Donald Kennedy who was the president of Stanford and a neurobiologist. He is said to have asked, "imagine a bunch of Martians trying to analyze and understand the game of baseball (as played by the Houston Astros) from way up in their spaceship."

"One approach would be to cut a hole in the top of the Astrodome and drop a microphone all the way down to a single fan in the stands and record what the band is saying. The Martians hear "kill the umpire" or "hotdog over here." You can imagine how hard it is to understand baseball from what one person says."

"Another way is they take a global pattern and analyze it. The Martians note "Gee it's usually 2 o'clock on Saturday and there's a big crowd in by 5 o'clock they leave." They keep analyzing the population flow around the stadium or the general noise level at certain times of the day and they try to understand what baseball is."

"This corresponds to the two traditional ways of exploring the brain. There is single unit recording where you try to record from one neuron. Alternatively, one can use EEGs where you record the mass activity of millions of neurons but you don't know what any of them does."

Do you understand the game of baseball any better than when you started?

Vicken Khachadourian's note:

This analogy explains how Oracle projects are failing all over the world. Oracle engineers have no idea if they are improving the baseball game or improving hot dog transactions.

On many occasions they spend hundreds of millions of dollars and end up improving hot dog transactions in very impressive ways, but they lose the ball game.

This analogy also applies to many areas of the modern incarnation of Artificial Intelligence / Machine Learning. Massive amounts of data gets collected from a diverse set of sources. For example, a TESLA's autopilot is collecting data from multiple sources. If it mislabels the game, accidents will be inevitable.