



# Stanford eCorner

## Humans, Machines and Data

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Video URL: <http://ecorner.stanford.edu/videos/3106/Humans-Machines-and-Data>

Entrepreneur and technology sage Tim O'Reilly uses examples from Google's autonomous car project to highlight the developing changes and interactions in the relationship between humans, machines and data.



### Transcript

So, there is another lesson that's sort of implied in all of those just last examples, which is really to think differently about man-machine symbiosis. One of the key ideas that I had when I was sort of promulgating the idea of Web 2.0 was that it was about harnessing collective intelligence. What distinguished the apps that survived the dot-com bust from those that didn't was that, companies like Google and Amazon were really good at figuring out how to get their users to contribute to what they did. I could go into that in great detail, but over the last decade we found more and more interesting ways to do that and there was a wonderful paper by JCR Licklider written in 1960 called the Man-Machine Symbiosis, I updated it called Human-Machine Symbiosis, since we are not quite so sexist now, although we still have a long way to go. But, he was just talking about this possibility of connecting humans and computers in new ways. And so, a really a great example of this that I can't pass by is the Google Autonomous Car. What I find so fascinating about this project is that in 2005 it was, we had the DARPA Grand Challenge and the winner went seven miles in seven hours. Six years later Google says oh, we have a car that's driven hundreds of thousands of miles in ordinary traffic. What happened? What was different? And there was a wonderful line from Peter Norvig, he said we don't have better algorithms, we just have more data. And what was that data? It turns out it was Google Street View vehicle.

So the difference is the recorded memory of humans who drove those roads. You equip humans with sensors, very, very detailed sensors that measured everything, that photographed everything, collected all that data, stored it in the global brain and then return it for use by that car. That's a brilliant rethinking of Man-Machine Symbiosis, Human-Machine Symbiosis. Similar examples in robotic surgery, but really fascinating Peter made the comment it's a fairly hard AI problem to pick a traffic light out of a video stream, it's a trivial eye problem to figure out if it is red or green if you already know that it is there. And that's really one of the key insights that went into that vehicle and again so that's something you ought to think about.