QUARTZ

TELL ME WHY

If the US government can't explain AI's decisions it shouldn't use it

Dave Gershgorn October 23, 2017

It's not just about what technology can do, but also why. (AP Photo/J. Scott Applewhite)

Elementary school textbooks will tell you that the American experiment started with the phrase "No taxation without representation." If the British monarchy couldn't show the receipts for why taxes were levied, the colonies wouldn't pay them.

Nearly 250 years in, there's a new force at work on the North American continent whose decisions can't be explained: Artificial intelligence. A group of researchers called AI Now from New York University, Google Open Research, and Microsoft Research caution in an Oct. 18 report that "black box" algorithms now used in criminal justice, healthcare, and education should be phased out until they're better understood.

The authors are largely referring to deep learning, a subfield of AI research made popular by Google, Facebook, Microsoft, and Amazon, which uses millions of tiny computations to make a single decision, like recognizing a face in an image, in a way meant to imitate the

human brain. But just as our brains' signals are too complex to easily interpret, so are the machinations of a deep learning algorithm. Why did Facebook identify your face to tag it in a photo, but not your friends? They don't know with 100% certainty—only that it works with high accuracy.

While researchers are now backtracking to try and understand why this kind of AI makes the decisions it does, some government institutions are already blindly following the direction the algorithms give. A report by ProPublica found that an algorithmic system for criminal sentencing was biased against black people—not by understanding the color of their skin but by using flawed data correlated with race. Teachers in Texas recently won a case where their job performance was being evaluated by an algorithm—a circuit court found that the unexplainable software violated the teachers' 14th amendment rights to due process.

"The use of such systems by public agencies raises serious due process concerns, and at a minimum such systems should be available for public auditing, testing, and review, and subject to accountability standards," the AI Now report says.

The report also details how automated decision-making can be impacted by skewed data and homogenous architects—effects which are then masked by the algorithms' inscrutability.

Tech companies who helped bring the advent of this technology aren't safe from similar criticism: Facebook and Google, whose algorithms are given autonomy over what users see on their respective websites, are both entrenched in public battles over misinformation and propaganda gaming their systems.

BIG RIG

Everything you need to know about the Tesla Semi

Michael J. Coren | November 17, 2017

Keep on truckin'. (Twitter/Tesla)

Tesla released its new Semi truck at a launch event in Hawthorne, California, on Nov. 16. Tesla CEO Elon Musk orchestrated all the pizazz and performance of a typical Tesla launch, and touted how the Semi can accelerate from zero to sixty in just five seconds, and haul 80,000 pounds. Unlike other trucks, the Tesla Semi places the driver in the center of the front vehicle. Instead of the usual levers, two touchscreens are placed beside the steering wheel. It will also be semi-autonomous, capable of keeping lane and braking on its own.

Tesla
@Tesla

View from the cockpit

5:40 AM - Nov 17, 2017

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The truck will have a range of 500 miles when fully charged. Plugging into one of Tesla's

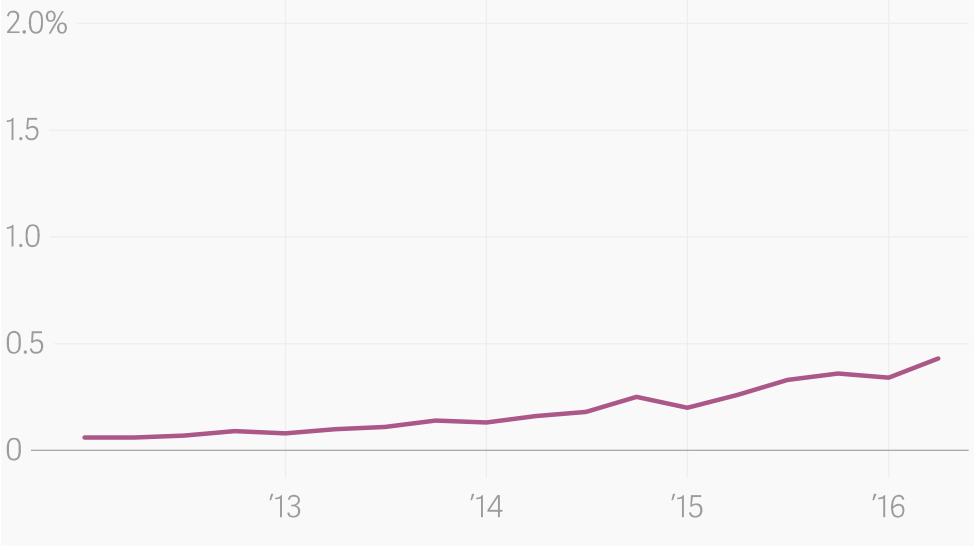
fast-chargers for 30 minutes will give the Semi a 400-mile range. The Semi will be built on a truck chassis with components from Tesla's Model 3 line, the mass-market vehicle the company plans to make in huge volumes (about 500,000 per year after 2018).

The first deliveries of the semi are expected in 2019, the same year production begins. In May, Musk said the truck will exploit manufacturing efficiencies of the Model 3, making it "a very compelling product that has low unit cost." According Musk math, on a 100-mile route, the Tesla Semi will average $1.26 per mile when operating costs are factored in to $1.51 for diesel trucks.

That's essential for Tesla, which is burning cash at a furious rate. The company reported its largest quarterly loss in November: a loss of $619 million on $2.98 billion in revenue. "At the current burn rate [Tesla] would be below its $1 billion operating cash target in two quarters," said Colin Langan, an auto analyst with UBS. The company is betting that delivering its Model 3 vehicles to customers will net it the cash it needs to support its operations, as well as the continued willingness of Wall Street to finance the company despite more than a decade of losses.

The big rig is Tesla's latest entrant into the electric vehicle market that has gone from fringe to mainstream in just a few matter of years. Car makers have moved with astonishing speed to embrace electric cars after years of listless pilots and prototypes. Major manufacturers from GM to Volvo have promised all-electric lineups in the coming years, although customers have not yet caught up: less than 0.5% of global car sales are now electric.

Electric vehicles' share of total global car sales



ATLAS Data: AlixPartners Share

Trucking has moved more slowly, but it may have even more potential, at least in the short

term. A few corporate fleets are piloting electric trucks: Ryder has deployed 125 e-vans from California startup Chanje and the United Parcel Service runs 300 electric trucks in its global fleet of 100,000 vehicles, reports PhysOrg. Those numbers could change quickly.

Commercial trucking fleet owners are extremely price sensitive. Margins in the $676 billion US industry are low (less than 5% in many cases). Electric vehicles offer enviable savings in fuel and maintenance. Despite higher upfront prices, payback periods range from two to five years, report manufacturers. That will shorten as battery prices continue their steep decline. It's likely that within a few years trucking's transition to electric will become imminent, as old trucks age out of the fleet and the cost advantages for all-electric vehicles for certain applications grows.

The most immediate applications are short-range trucking. Battery sizes become unwieldy as cargo size and trip distance increase (Siemens estimates lithium-ion batteries capable of powering a semi-truck for 500 miles (804 kilometers) would weigh 23 tons, half the weight of the truck itself). But electric trucks are ideal for short-range (< 100 miles), city traffic, and predictable routes, such as warehouses to retail establishments or distribution hubs. If the Tesla Semi is a success, this could be Tesla's sweet spot in a substantial market: trips of 100 to 200 miles represent 30% of all US trucking trips.

Brook Porter of G2VP, a spinoff of Kleiner Perkins' Green Growth Fund and backer of electric bus company Proterra, is betting that the pace of technology change will give companies like Tesla the edge. "The line is so steep for progress and innovation that it's just a matter of time before the Silicon Valley players will beat the incumbents," he wrote by email. "They are a decade behind and not structured to deal with the change that's coming."

Yet Tesla has struggled to ramp up its own manufacturing, and the incumbents are investing billions to stay ahead. German automaker Daimler AG, perhaps the only other company that makes heavy-duty and passenger vehicles, is releasing its own electric semi-truck, the Fuso eCanter. Indiana-based Cummins has the 100 mile-range Aeos. German firm Bosch is developing a class 8 hydrogen-electric truck with Nikola Motor Company for 2021. Commercial truck firm Navistar says it's working with Volkswagen, which is investing in $1.7 billion on electric power trains for trucks and buses. BYD and Proterra have already rolled out hundreds of electric buses on the road.

Michelle Krebs, executive analyst for Autotrader, warns that Tesla will have to fend off challengers who have already won trust and loyalty from commercial customers. Tesla only has a track record with passenger vehicles, and is known for delivering months late. That does not impress industrial buyers. "The priority for truck drivers and fleet operators is reliability and uptime," she wrote by email.

Ian Wright, a former vice president of vehicle development at Tesla and founder of electric truck company Wrightspeed, says Tesla is now entering a fundamentally different business that sidelines many of Tesla's advantages in the car market. "The people who buy big rigs are not doing it to make a fashion statement, they're doing it to make money," he wrote by email. "They're very sensitive to capital costs, operating costs, and payload… It's got to do the job and ultimately pay for itself—that's what they care about and that what you've got to prove."

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