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[Tuesday, April 17, 2017](#)

**Bloomberg
Technology**

[Don't Worry, Driverless Cars Are Learning From Grand Theft Auto](#)

D. Hall, Apr 17, "In the race to the autonomous revolution, developers have realized there aren't enough hours in a day to clock the real-world miles needed to teach cars how to drive themselves. Which is why Grand Theft Auto V is in the mix.

The blockbuster video game is one of the simulation platforms researchers and engineers increasingly rely on to test and train the machines being primed to take control of the family sedan. Companies from Ford Motor Co. to Alphabet Inc.'s Waymo may boast about putting no-hands models on the market in three years, but there's a lot still to learn about drilling algorithms in how to respond when, say, a mattress falls off a truck on the freeway....The idea isn't that the highways and byways of the fictional city of Los Santos would ever be a substitute for bona fide asphalt. But the game "is the richest virtual environment that we could extract data from," said Alain Kornhauser..." [Read More](#) *Hmmmm... Well...we have a slightly different*

view of history wrt to GTA5. The 'Alain view' is that Chenyi Chen*16 independently started investigating the use of virtual environments as a source of Image - Affordances data sets to use as the training sets in a 'Direct Perception' approach to creating a self-driving algorithm. Images of the road ahead are converted into the instantaneous geometry that is implied by those image. An optimal controller then determines the the steering, brake and throttle values to best drive the car. The critical element in that process are the Image - Affordances data sets which need to be pristine. Chenyi demonstrated in his [PhD dissertation](#), summarized in the [ICCV2015 paper](#), that by using the pristine Image - Affordances data sets from an open-source game [TORCS](#) one could have a virtual car drive a virtual race course without crashing. More importantly, when tested on images from real driving situations, the computed affordances were close to correct.

This encouraged us to look for more appropriate virtual environments. For many reasons, including: "wouldn't it be amazing if 'Grand Theft Auto 5' actually generated some positive 'redeeming social value' by contributing to the development of algorithms that actually made cars safer; saving grief, injuries and lives". Consequently, in the Fall of 2015, Artur Filipowicz'17 began to investigate using GTA5 to train Convolutional Neural Networks to perform some of the Direct Perception aspects of automated driving. [With Jeremiah Liu, he continued](#) his efforts in this direction last summer which were [presented at TRB](#) in January. Yesterday, [he and Nyan Bhat'17](#) turned in their Senior Theses focused on this topic.

Indeed, GTA5 is a rich virtual environment that begins to efficiently and effectively address the data needs of Deep Learning approaches to safe driving. Alain



[A second life for open-world games as self-driving car training software](#)

D. Etherington, Apr 17, "A lot of top-tier video games enjoy lengthy long-tail lives with remasters and re-releases on different platforms, but the effort put into some games could pay dividends in a whole new way, as companies training things like autonomous cars, delivery drones and other robots are looking to rich, detailed virtual worlds to provide simulated training environments that mimic the real world.

Just as companies including Boom can now build supersonic jets with a small team and limited funds, thanks to advances made possible in simulation, startups like NIO (formerly NextEV) can now keep pace with larger tech concerns with ample funding in developing self-driving software, using simulations of real-world environments including those derived from games like Grand Theft Auto V. [Bloomberg reports](#) that the approach is increasingly popular among companies that are looking to supplement real-world driving experience, including Waymo and Toyota's Research Institute...." [Read More](#) *Hmmmm... Yup! Alain*



[Apple Gets Permit to Test Self-Driving Cars in California](#)

V. Goel, Apr 14, "Apple plans to start testing self-driving cars on California roads, the clearest signal yet that the world's most valuable technology company wants to design or build autonomous vehicle technology. On Friday, the California Department of Motor Vehicles granted Apple an official test permit that the agency said would allow the company to test autonomous driving technology in three 2015 Lexus RX 450h luxury hybrid sport utility vehicles. The permit authorizes six people to take control of the vehicles if necessary.... [Read More](#) *Hmmmm... Not much else to read. What's substantive is: Apple may actually have something that they want to put out on California roads. :-)* Alain

newgeography [Urban leaders should plan for the public transit of the future](#)

J. Niles, Apr 13, "... What's largely unappreciated yet important is that leaders in urban regions need to prepare for two separate, competitive streams of vehicle automation. One stream lets automation assist the driver. A second stream has no driver. Not recognizing the distinction can result in confused predictions and ineffective public policy...." [Read More](#) *Hmmmm... I claim there are 3 streams: **Safe-Driving Cars** that iaren't Self-driving but have automate safety features that automatically take over and keep cars from crashing, going way too fast, tailgating and all of the other bad things that we do when we drive, in addition to **Self-Driving & Driverless**. I agree: "Not recognizing the distinction can result in confused predictions and ineffective public policy" ! I also agree with his streams (except, of course, the need for "impeccable up-to-date digital mapping" and absolutely agree with the need for "well-maintained lane markings and signage" (but more to help all of the conventional human drivers and not as much for the Deep Learning algorithms). Alain*



[By 2030, 25% of Miles Driven in US Could Be in Shared Self-Driving Electric](#)

[Cars](#)

Press release, Apr 10, "By 2030, around a quarter of all miles driven in the US could be in shared autonomous electric vehicles, which will offer consumers in large cities the lowest-cost, most convenient form of transportation, according to new research by The Boston Consulting Group (BCG).

BCG's key insight is that the convergence of three trends—ride sharing (services such as Uber and Lyft), autonomous driving, and vehicle electrification—create a far more compelling economic case than any of these forces alone. Due to their ability to cut travel costs by 60%, shared autonomous electric vehicles (SAEVs) could shift about 25% of miles traveled from private automobiles—creating enormous benefits for consumers as well as causing major disruption to the automotive industry..." [Read More](#) *Hmmmm... It would be much more believable if the BCG called these '**Driverless** Electric cars' It is the Driverless aspect that makes then both manageable (to eliminate empty repositioning miles as much as possible AND to assign vehicles to take advantage of ridesharing opportunities as they naturally emerge as well as are encouraged through progressive pricing initiatives) and affordable. Uber & Lyft simply have neither sufficient control over their drivers nor sophisticated enough vehicle-ride matching algorithms to do any meaningful ride-sharing or minimizing of empty miles. The 2 Keys are: **Driverless** vehicles (they allow/require the fleet owner to have total control over which trips are*

*served, at what price, by which vehicle, when thus enabling the 'minimization' of empty miles and 'maximization' of vehicle occupancy.) and **Electrification** because it is cheap and the fleet operator has no range anxiety (during much of the day many vehicles are not being used, thus they can be recharging.)*

By the way, we've estimated that today's person-miles could have been served by vehicles traveling about half that distance (Average Vehicle Productivity (AVP = Person-miles demand/ Vehicle-miles traveled) =2.0). Alain

Los Angeles Times

[When car ownership fades, this parking garage will be ready for its next life](#)

R. Vincent, Apr 16, "One of the country's biggest apartment developers is working on plans for a grand residential complex in downtown Los Angeles that includes what appears to be an ordinary garage. There will be row upon row of lined stalls at street level and two floors underground to store nearly 1,000 cars of tenants and visitors to the trendy Arts District, where parking is relentlessly hard to find.

But when it's completed in about four years, the ample garage will be one of the first of its kind in Los Angeles: It's designed to eventually serve other uses.

AvalonBay Communities Inc. has planned the garage for a time when ride-sharing services such as Uber and self-driving taxis whittle down car ownership until parking places become expendable..." [Read More](#) *Hmmmm... Very interesting! Alain*

Harvard Business Review

[Hard Questions on Our Transition to Driverless Cars](#)

A. Khanna, Apr 11, "...In combination with the sharing economy, driverless vehicles are likely to be deployed in fleets, benefiting higher utilization in urban settings. This portends a dual-track future. While sharing and driverless will converge for the 1.7 billion population living in sizable cities, the remainder of the population will also benefit, but largely from the safety advantages of self-driving cars that they will own..." [Read more](#) *Hmmmm... Some of these questions are hard questions but they have been around for a while. I do applaud the strong distinction between Self-driving and Driverless; however, fleet-managed will be able to penetrate lower density communities so that sharing and driverless mobility potential is more far-reaching. Also, much of the existing public transportation infrastructure can become even more relevant because it can be fed (solves the "first and last 1-> '10' miles" problem). Also, existing public transportation serves only 2% of the daily trips in the US so it really can't become much more irrelevant. Finally, 'connected vehicles' (beyond what cell phones can and will do) have few embraceable opportunities. Alain*



[Securing Driverless Cars From Hackers Is Hard. Ask the Ex-Uber Guy](#)

[Who Protects Them](#)

A. Greenberg, Apr 12, "...Miller couldn't talk about any of the specifics of his research at Uber; he says he moved to Didi in part because the company has allowed him to speak more openly about car hacking. But he warns that before self-driving taxis can become a reality, the vehicles' architects will need to consider everything from the vast array of automation in driverless cars that can be remotely hijacked, to the possibility that passengers themselves could use their physical access to sabotage an unmanned vehicle.." [Read More](#) *Hmmmm... I include this because I don't appreciate this issue as much as I probably should. I simply can't understand why anyone would waste their time trying to hack one of these cars? If one wants to use it as a remote control bomb delivery system, isn't it easier to simply recruit a suicide driver? If one wants to be cute and just cause a crash, isn't it trivial to freak-out a human driver and cause them to cross into on-coming traffic? Is hacking a car, or even all of the cars, anywhere near the top of anyone's bucket list? Even Russian hackers must have way better things to do with their time!*

Today we all behave, else there would be total carnage on today's roads. We're also all going to need to behave with this new technology. Alain



[Auto Insurers Chase an Elusive Motorist: The Uber Driver](#)

Dow Jones, Apr 10, "...These plans are designed to fill insurance gaps that could affect drivers and their vehicles. Traditional auto policies won't provide coverage during the periods a driver is providing transportation services for pay, and policies provided by ride-sharing companies aren't always as comprehensive as a driver's own plan....Even though drivers are often confused about what coverage applies during what periods, interest in these ride-sharing products is growing, insurance companies say. At Allstate, 65% of drivers who acknowledge working for a ride-sharing company buy extra insurance in the states that it is available, and the company has sold about 9,000 ride-sharing policies. The additional coverage costs \$15 to \$20 a year.. [Read More](#) *Hmmmm... I don't understand??? Are we arguing about "\$15 to \$20 a year" ??? Alain*

Some other thoughts that deserve your attention



[Fury Road: Did Uber Steal the Driverless](#)

[Future From Google?](#)

M. Chafkin, Mar. 16 "...Then, last summer, Uber became the first company to operate a fleet of autonomous taxis, in downtown Pittsburgh. On the day it announced that service, Uber also said it had acquired Otto, a self-driving truck startup founded in January 2016 by a former Google employee, Anthony Levandowski. The 37-year-old engineer was an original member of Google's car team and a protégé of its creator, Sebastian Thrun...." [Read more](#) *Hmmmm... Not rehashing, but I finally saw this article which is much better than the one I originally included on this topic which hasn't gone away. Alain*

[What's Behind Slowing Car Sales and Stalled \(Auto\) Stock Prices](#)

Maryann Keller, Apr 17, "While stock market averages close to all time highs that isn't the case for the shares of car companies and car dealers, which have gone in reverse (mostly) for over a year now. Since stocks reflect future expectations, the lackluster performance is traceable to the simple fact that after the last two years of 17+ million sales, vehicle demand will decline this year and take profit margins in the same direction...

The combination of tighter financing and falling used car values will put a damper on new car sales...and especially for borrowers with large negative equity positions in late model vehicles and those in lower credit tiers. The effects will likely include lower total new vehicle sales, a shift by consumers to less expensive models, and pressure on the profits of automobile manufacturers, dealers and lenders especially the captive finance subsidiaries." [Read more](#)
Hmmmm... If improved technology creates an even bigger value gap between new and used, does that help, hurt or is irrelevant?? Alain

[On the More Technical Side](#)

<http://orfe.princeton.edu/~alaink/SmartDrivingCars/Papers/>

Half-baked stuff that probably doesn't deserve your time



[Self-driving car testing on Triangle Expressway hinges on federal funding](#)

A. Douglas, Apr 12, "Budget negotiations in Congress later this year could determine whether North Carolina and eight other states begin federally-funded on-road testing of self-driving cars..." [Read more](#) *Hmmmm... Really? Self-driving cars are being tested throughout California, Arizona and Pittsburgh without any of the Swamp's \$\$\$\$. Why does N. Carolina need Washington \$\$\$ (Oh, there once was a pipeline; never mind!). Alain*

[C'mon Man!](#) (These folks didn't get/read the memo)



[Autonomous vehicles will not prevent half of real-world crashes](#)

A. Thomas, Mar-Apr 2017, "The case for autonomous vehicles (AVs) is usually made by saying 90% of crashes are caused by driver error, so remove the driver and you avoid 90% of crashes..." [Read more](#) *Hmmmm... No! Nobody makes that case. It is regularly discounted to "50%" and applied only to equipped vehicle, not not conventional vehicles. Otherwise your arguments are good and especially part of the last line: "While a 43% safety gains would be more than welcomed." [C'mon Man!](#) nothing else comes even close! Alain*

Calendar of Upcoming Events:



[AV Policy Series](#)

April 25, 2017

**American Institute of Architects,
1735 New York Ave. NW, Washington, D.C.**



[Princeton SmartDrivingCar Summit](#)

May 17 & 18, 2017

Princeton University

Princeton, NJ

[Save the Date](#)