

University of Pittsburgh

## Pittsburgh's Case for Driverless Busses

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Seminar in Composition: Service-Learning

ENGCOMP 0208-1040

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For years, public transportation has been revered by many for its great benefits to society. From reducing gasoline consumption to reducing the carbon footprint to saving households money and providing a form of transportation ten times safer than driving a personal car, it comes to no surprise that every year Americans take more than 10.1 billion public transportation rides.

Personally, as a student at the University of Pittsburgh, Pittsburgh's bus system, run by the Port Authority of Allegheny County, further allows me to connect with Pittsburgh's neighborhoods outside of Oakland. Most importantly, the bus system allows me to fulfill required volunteer hours for a course I enrolled in: Seminar in Composition: Service-Learning (SC-SL). Since my volunteer site is so far away, taking the bus allows me to arrive there in a quick manner without paying a cent.

Yet I was quite shocked when my SC-SL professor told me that it seemed like budget cuts seemed to attack Pittsburgh's public transit every year. He told me about Pittsburghers for Public Transit, a non-profit who aims to promote public transportation throughout the Pittsburgh area and demonstrate the importance mass transit has to the Pittsburgh population. The fact that such a nonprofit must exist showed me how dire the public transport situation truly is in Pittsburgh.

In 2017, state budget cuts would've taken \$350 million from Pennsylvanian transit agencies. In an official release, a Pittsburgh Port Authority spokesperson announced that such a cut would result in eliminating "half of its routes, [ending] weekend and evening, and a fare hike." Though the budget cuts did not go through, such changes would wreak havoc on

Pittsburgh's local economy and people, and Port Authority must find new ways of cutting costs to accommodate any future budget threat.

Though there currently are no proposed budget cuts, Port Authority still must take initiative minimize a budget crisis would cause, while greatly improving their services. This pre-emptive step begins with integrating driverless busses into their current system. A driverless bus system includes a wide variety of benefits, and the idea fits perfectly with Pittsburgh's culture.

1. Driverless busses cut employee costs
2. Riders will no longer have to face the "cranky" bus driver.
3. Pittsburgh is a hub for innovating technology, AI, and robotics.
4. A plethora of self-driving car companies call Pittsburgh their home.
5. Driverless vehicles have been shown to be safer than typical car drivers.
6. AI technology significantly reduces gas usage and emissions.

As we approach a new technical era, one exciting area that holds large potential seems to be Artificial Intelligence and its wide applications to human life. Pittsburgh, a city long known for its steel-related businesses and bridges, has recently taken off as a prominent leader in AI and robotic. Hilly slopes that adds unique variables to AI driving and great talent from a wide array of universities has attracted large national companies to set up shop right in Pittsburgh. For example, Uber Advanced Technology Group (ATG) is headquartered in Pittsburgh's westward neighborhood of Lawrenceville. Uber ATG's mainly focuses on driverless vehicles, and Pittsburgh residents have even been able to see the cars in action, driving on the streets. Another Pittsburgh company, Argo AI, has a similar mission of advancing driverless technology. In February of 2017, Argo AI was able to receive a \$1 billion investment from Ford Motor

company to continue working. Since October of that same year, Argo AI has begun testing their driverless technology in Pittsburgh, and today they operate in multiple cities across America.

With such great companies and resources nearby, the Port Authority of Allegheny County would have no trouble finding experienced workers to help them implement their own driverless busses. Obviously, creating a driverless bus present more logistical and technical difficulty than a driverless car. Current driverless tech mainly focuses on small cars, and navigating a bus and its large size is a glaring issue. But with so many robotic companies and bright university students concentrated in one area, developing this idea could probably be most feasibly done in Pittsburgh, especially compared to other cities.

With driverless cars already roaming the Pittsburgh area, Port Authority would also not have to worry about a negative reaction from the public. In fact, the public's response would more likely be positive than other areas, as many residents, myself included, have had many horror stories regarding the "cranky bus driver." Personally, I can recall one time when I was going home from my volunteer site and waiting for the 71B bus at my usual stop. After waiting 7-8 minutes, the bus finally showed up, but when I waved at the bus driver to pick me up, he instead shook his head angrily at me and drove past me. The bus wasn't even full, so there was no logical reason for the driver to skip me. As a result, I had to wait an additional 15 minutes to get back to Pitt, and ended up showing up to my next class late. Experiences like these are not uncommon, and most bus-riders I know have had an unpleasant run-in with a bus driver.

With bus drivers out of the equation, these bad experiences will no longer occur. On a driverless bus, riders will pay the fee and board the bus without having to deal with an irate bus driver. I don't blame Port Authority for hiring the drivers or the driver themselves, but there is only one solution to this problem. Many drivers can be pleasant, but after hours of driving the

same loop over and over again, it is hard to blame the drivers for being so grumpy. If the driver were to be eliminated altogether, then the grumpy bus driver often associated with the Port Authority will quickly dissipate as well.

If Port Authority were to begin research or investment into a driverless bus system, an uprising from Port Authority drivers and workers against automation is almost guaranteed to occur. Driverless bus lines would result in thousands of lost jobs, which would quickly anger workers and civilians alike. Current trends have indicated that automation will be dominating nearly all work industries, while leaving workers behind. A recent Pew Research study found that almost all AI experts agreed that today's workers must learn new skills that nurture skills AI cannot replicate, like creativity, abstract or critical thinking, social or emotional intelligence, and programming roles related to AI systems. In a broader sense, history has shown that workers adapt to technological progress. People thought the Automation and Industrial Revolution would destroy jobs, but instead the labor needs simply transformed. In that same vein, by focusing on automation so early, Port Authority will have time to provide their workers training in areas that demand human labor and better equip their employees for future jobs.

Removing drivers also makes financial sense for the Port Authority. According to the Port Authority of Allegheny County's yearly budget book for the Fiscal Year 2018, more than \$300 million is spent on "Wage & Salaries" and "Pensions & Employee benefits." Eliminating drivers would mean that less of Port Authority's budget would have to be focused on these two areas and would leave Port Authority more prepared for any budget cuts. Though the \$300 million spent encompasses more than just bus drivers, being able to cut any unneeded expense possible is essential for the Port Authority to continue serving Pittsburghers quality public transportation despite budget cuts.

In Port Authority's same budget book, "Provision & Injury" was reported to have cost the company \$8 million in expenses that year. Driverless technology will be able to greatly reduce these costs. Last year, there were an estimated 40,000 traffic fatalities in the US alone, and more than 90% of them were caused by human error. Unlike humans who can see only what's in their front and peripheral area, driverless cars can see 360 degrees at the same time. This wide range of vision allows the driverless cars to be much more aware of impending accidents and in most cases prevents the accident from even happening. Though, accidents with driverless cars have occurred, the rate is far lower and, in most cases, if it were a human driving the car, the same situation would've occurred.

A problem briefly addressed in the previous few paragraphs was the fact that after working for several hours, bus drivers will naturally get tired. Tired drivers in general are less able to pay attention to the road and experience worse decision-making skills with slowed reaction times. The National Highway Traffic Safety Administration reported that in 2013, drowsy driving caused an estimated 72,000 crashes. However, AI drivers are physically incapable of getting tired. A constant level of high alertness means the driverless vehicles are almost always safe and with safer busses. Port Authority would be able to minimize costs in damages each year.

The potential benefits of driverless technology are alluring and widespread. One especially enticing aspect being its benefits to the environment. The features that most driverless cars and connected vehicles -vehicles that communicate with drivers and other cars on the road- use allow the vehicles to communicate with roadside infrastructure like traffic lights and road congestion, and then use this information to curtail fuel consumption and emissions significantly.

If similar technology was applied to busses, Port Authority would have extremely gas efficient vehicles, and would be able to further save money on fuel, which costs them around \$12 million.

Although a fully driverless bus system may take several decades to show its true benefits, the Port Authority must find ways to protect itself budget cuts and innovate its current system to match the rest of society's quickly advancing pace. If Port Authority were to treat this seriously, I could imagine current workers being incredibly unsettled and potential societal uproars. However, Port Authority and the rest of Pittsburgh must decide if they want to live with the current system and constantly fear disastrous budget cuts that will cause a decline in service, or spend several tough years working and developing a new clean, sustainable and safe solution to Pittsburgh's current public transit crisis.

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