Thomas J. Boucher

Dr. Young Park

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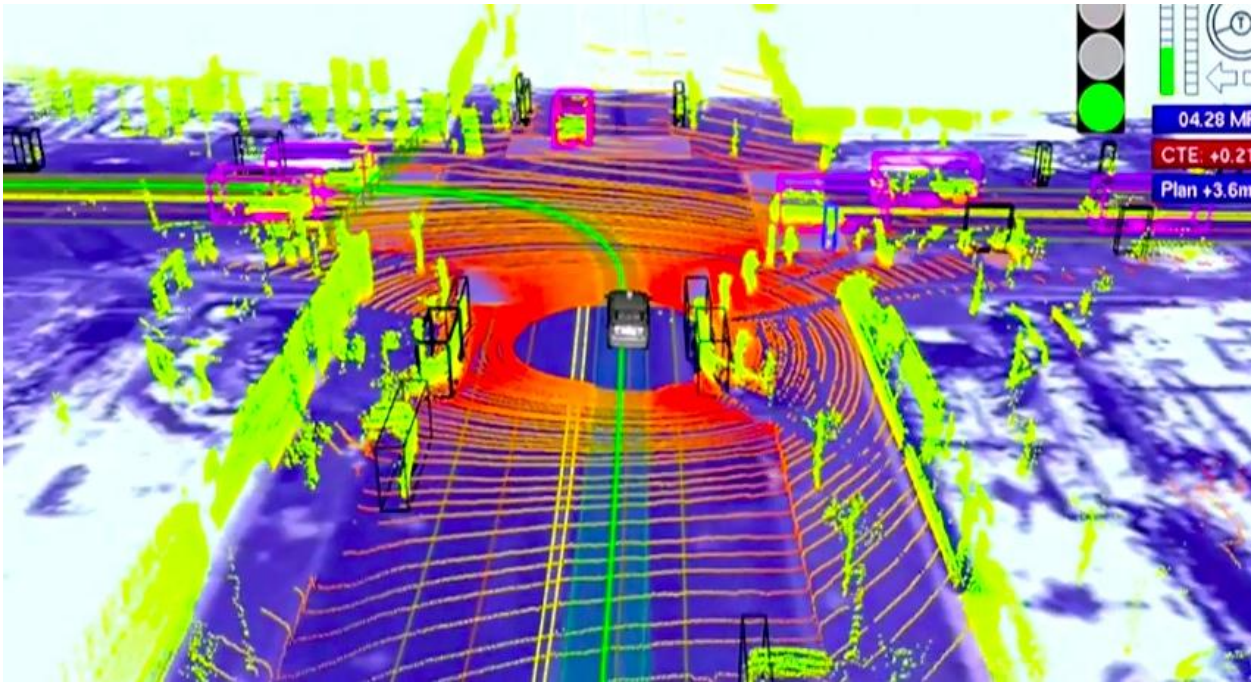
The Google Smart Car

Google was founded by Larry Page and Sergey Brin in 1997. Larry and Sergey met in 1995 at Stanford and were both Computer Science grad students. Together they collaborated on a search engine named “Backrub” which operated on Stanford’s campus for over a year before being taken out of service. In 1997 “Backrub” was renamed to “Google” which derived from the mathematical term “googol” for the number represented by the numeral 1 followed by 100 zeros (Our history, 1). They believed this term was a reflection of their mission to organize an infinite amount of information on the web.

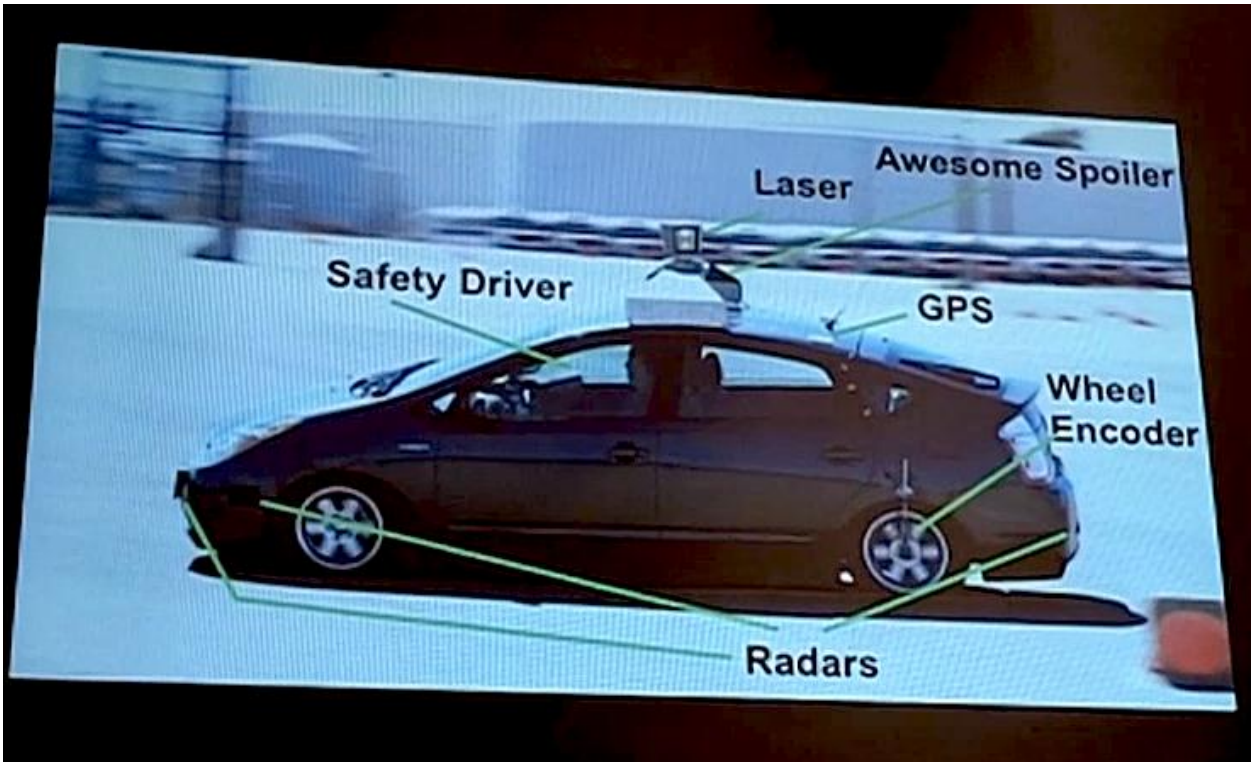
Over the years Google has been involved in a variety of products and services to include Google Docs, Google Maps, Instant Preview, and Gmail. On October 9, 2010 Google posted on their official blog stating that Larry and Sergey founded Google in order to solve real problems through the use of technology. Their current problem was to lower or downright eliminate the amount of deaths every year caused by automobile accidents. It is estimated that there are 34,000 deaths annually as a result of automobile accidents most of which are caused by human errors. Thus their current project was to develop a new technology which allowed cars to drive themselves. They believed they would remove the most unreliable part of operating car, the driver themselves. In their 2010 blog post they reported having logged over 140,000 miles in their fleet of self-driving cars. These cars were being driven initially on their Mountain View campus in upstate California but were soon released into the real world and were being driven to the Santa Monica office and down Hollywood Boulevard (Official Google Blog, 1).

These cars are still being manned by trained operators which are ready to step in and take action should the car attempt to do anything questionable or unsafe. There is a trained safety driver behind the wheel ready to intervene and a trained software operator in the passenger seat to monitor the software (Official Google Blog, 2). Ultimately the car operates similar to cruise control available on most modern day vehicles. If the operator behind the wheel presses on the brakes or attempts to steer the car themselves, then the computer is disengaged and the operator has full control of the vehicle. Ultimately though it has nothing to do with the car itself but in reality it is the technology applied to an already existing automobile. What is meant by this is Google did not have to go out and redesign a whole new car in order to make one be "self-driven". Instead they developed new technology and installed it in a pre-existing vehicle. The chosen vehicles were primarily a Toyota Prius but also attempted installation in an Audi TT for a sports car and a Lexus RX450h hybrid car for their crossover SUV model.

As stated before, the technology is the real heart of the project and is what pulls it all together. As with any technology you have to consider both the hardware and the software. On the hardware side of things Google is using video cameras, radar sensors, a laser range finder, and detailed maps. The laser range finder mounted on top of the vehicle is the key component in making the project successful. Google engineers used a Velodyne 64-beam laser (estimated at $80,000) which spins to generate a detailed 3D map of the environment.



This combined with the high resolution maps of the area produce a variety of different types of data models. Mounted on the front and rear bumpers are four radars which allow the car to “see” far enough ahead of it in order to prepare for and accommodate fast traffic on the interstate. Mounted near the rear view mirror is a camera which detects traffic lights and relays the information back to the primary control system so the car knows whether or not to stop or proceed through an intersection. All of these combined with a Global Positioning System (GPS), inertial measurement unit (used to monitor speeds to stay in accordance with traffic laws), and a wheel encoder (which is used to monitor the vehicles movements and determine its location) are what makes the car a possibility to revolutionize the automobile industry in the future.



Many people would argue what the purpose of the smart car is. Why is it essentially beneficial and not just an excuse to be lazy? The first justification would have to be reiterating the fact that 34,000 people died last year in car crashes, primarily as a result of human error. The simple fact is that a computer, properly programmed, can think faster than a human, does not get tired, does not get angry, does not panic, and does not even blink. If computer controlled cars were to replace standard driving and become the norm than the cars would drive closer together and increase road efficiency and reduce traffic jams. Not to mention the ease of access this car would allow for people with disabilities i.e. physically, blind, etc. The primary arguments against smart cars are the fact they lack common sense and the ability to make a split second decision in the event something unexpected were to happen (Coming Soon, 1). Even with all this taken in to consideration, however, engineers and auto executives still

project the manufacturing of self-driving cars to take place around the year 2020. Providing they can find a means to reduce the price of the fully equipped vehicle. The combination of the standard vehicle combined with the high end sensors and other components could result in the cars value being well over $300,000.

Additional scenarios and things to be considered are what are the various implications that arise from having such a vehicle? For instance, eventually some type of computer glitch will happen resulting in an accident. When this does happen, who will be responsible for the damages? This question applies to both private property and human lives alike. Would it be the person in the car for not overriding the vehicle? Would it be the can manufacturer? Or possibly even the technology firm that produced the software for that particular vehicle? Laws will need to be put in place in order to deal with these situations and will result in additional vehicle investigations. One idea was to put black boxes (similar to those in airplanes) in the vehicle so that they might record what went wrong (Coming soon, 3). Additional testing still has to take place in regards to various weather conditions (i.e. hydro planning and black ice), temporary construction zones, etc. Other issues I have personally thought of are in regards to the car parking and knowing the difference between handicapped and regular parking spaces, fire zone / restricted parking (yellow curbs), and potentially attempting to park in valet parking lanes.

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