AUTOMATED VEHICLE

BY JDK

CONCEPT:

We use m any Intelligent Instrument/Machine in our Daily Life.

These instrument give us reliability and many other benefit.

Driving is the Biggest need of our daily life. Almost all the person travel and move one point to other through a Vehicle. Vehicle are use in every field of life.

Driving now became Autonomous. autonomous means having the power for self-government. Every task performed related to driving done by automatically.

NEED OR REQUIREMENT OF AUTOMATED VEHICLE

It is our need to use automated Vehicle which is intelligent and fully automatic.

Stop traffic jams and make traffic Smooth.

Now a days time is money and automated vehicle save our time.

Make us full safety in bad situations.

Expert , Unexperienced , better and Rough Driver are all on the road. This is the vehicle responsibly to make optimal solution of all situations.

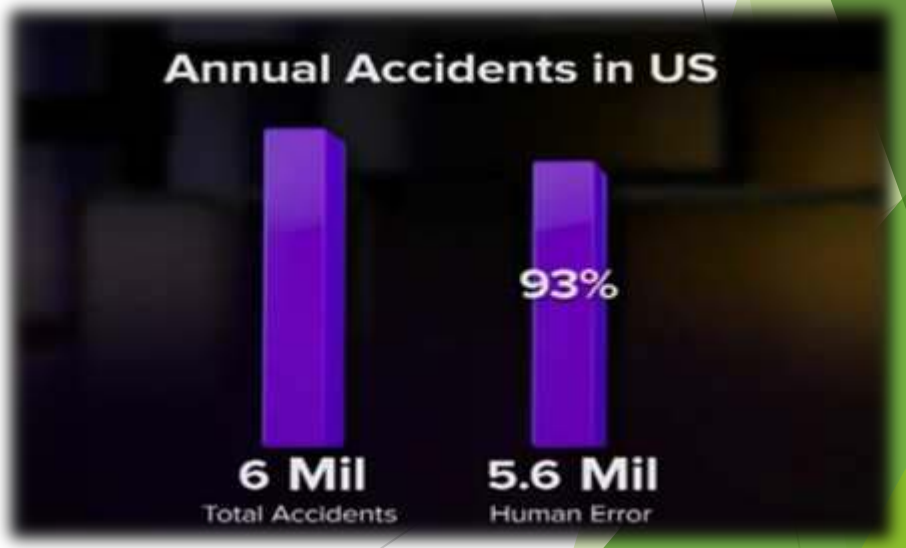
NEED OR REQUIREMENT OF AUTOMATED VEHICLE

Prevent from Accident

More than 1.24 million people die worldwide as a result of road traffic accidents each year, according to the World Health Organization.

In US there is 6 Million accident per year and

5.6 Million is due to human error.



INTELLIGENCE AUTOMATED VEHICLE

We want to copy the intelligence of human in vehicles, also thinking and behavior.

Make able to take Decisions and having the intelligence compare to a human experienced driver.

Human can make mistake but Machine is not, if it is fully intelligent and a

ELEMENTS OF AUTOMATION:

This project involves the use of elementary robotics, digital imaging and image processing and artificial intelligence. It's main parts are

Steering control circuits

Speed control circuits (Break and Accelerator included)

Collision detection systems

This system is superior in the sense that ALL the tasks related to driving are automated. Even break and accelerator is responsibility of automated vehicle.

The driver just has to sit back and enjoy the ride and Vehicle take you at desire or Selected place which you want.

AUTOMATED AND AUTOMATED GUIDED VEHICLE

Automated vehicle and automate guided have many similarity

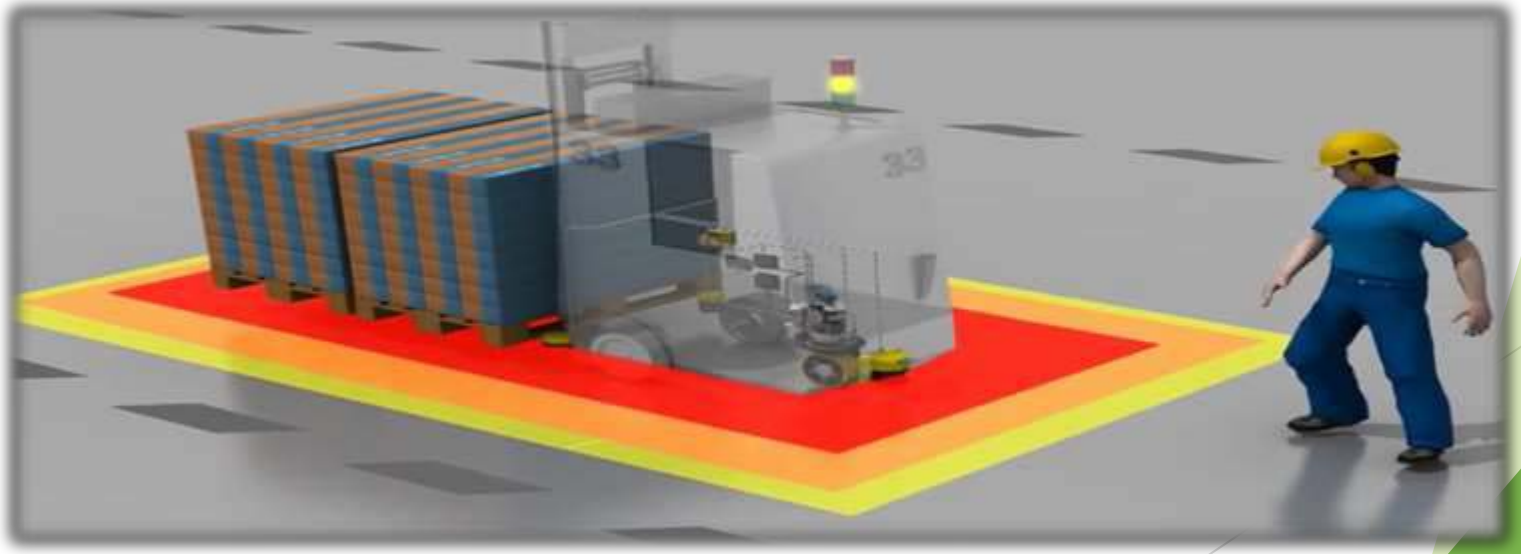
But both have different working and architecture

Automated guided Vehicle adopt the path or only travel on a line whereas automated vehicle can make decisions.

AUTOMATED AND AUTOMATED GUIDED VEHICLE

If any hurdle come in their path automated guided vehicle is stuck until the hurdle is not remove from their path

If automated vehicle have any hurdle in their path the find the other solution to reach their destination.



AUTOMATION MODES :

Some Car have a Steering and steering control automatically. These car have two mode manually or automatic. In automatic mode vehicle drieve the vehicle on self governing and in manual mode driver drive the car

Now some of the car having no steering the are just automatic having no steering to display. Internal steering control the movement and drives the car

THE FIRST AUTOMATED CAR :

Us organize a Compactions about robotic cars

DARPA grand challenge 2003-2007.

There is 100 Teams in the challenge.

First robotic racing car name Stanley Robot

This Automated car complete the challenge and win the prize of 2 million dollar by US Government.

TOP THREE AUTOMATION VEHICLE COMPANIES :
1) GOOGLE

Yes, the superstar of search engines is also a pioneer in the autonomous vehicle space. In fact, it’s closer to delivering a working AV than any other developer.

SebastianThrun is main person who give and idea of google car and the reason behind this idea is an accident in with he loss his best friend.


Google™
self-driving car

2) QNX

QNX is basically a commercial Unix-like real-time operating system

The product was originally developedin the early 1980s by Canadian company Quantum Software Systems, later renamedQNX Software Systems and ultimately acquired by BlackBerry in 2010.


QNX

3) DELPHI

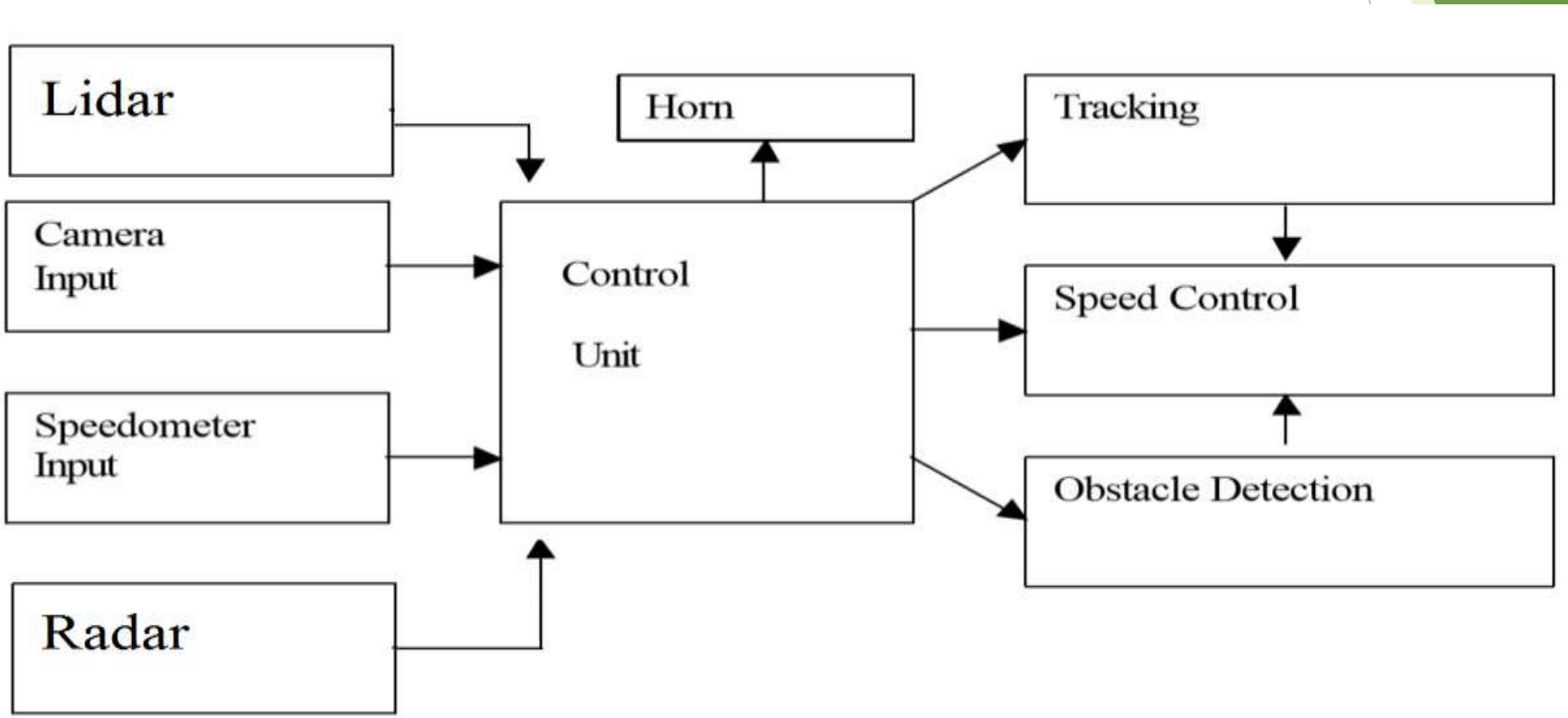
Delphi is a leading global supplier of technologies for the automotive and commercial vehicle market, making vehicles smarter, safer, and efficient.

It is one of the world'slargest automotive parts manufacturers and has approximately

146,600 employees


DELPHI

WORKING BLOCK DIAGRAM:



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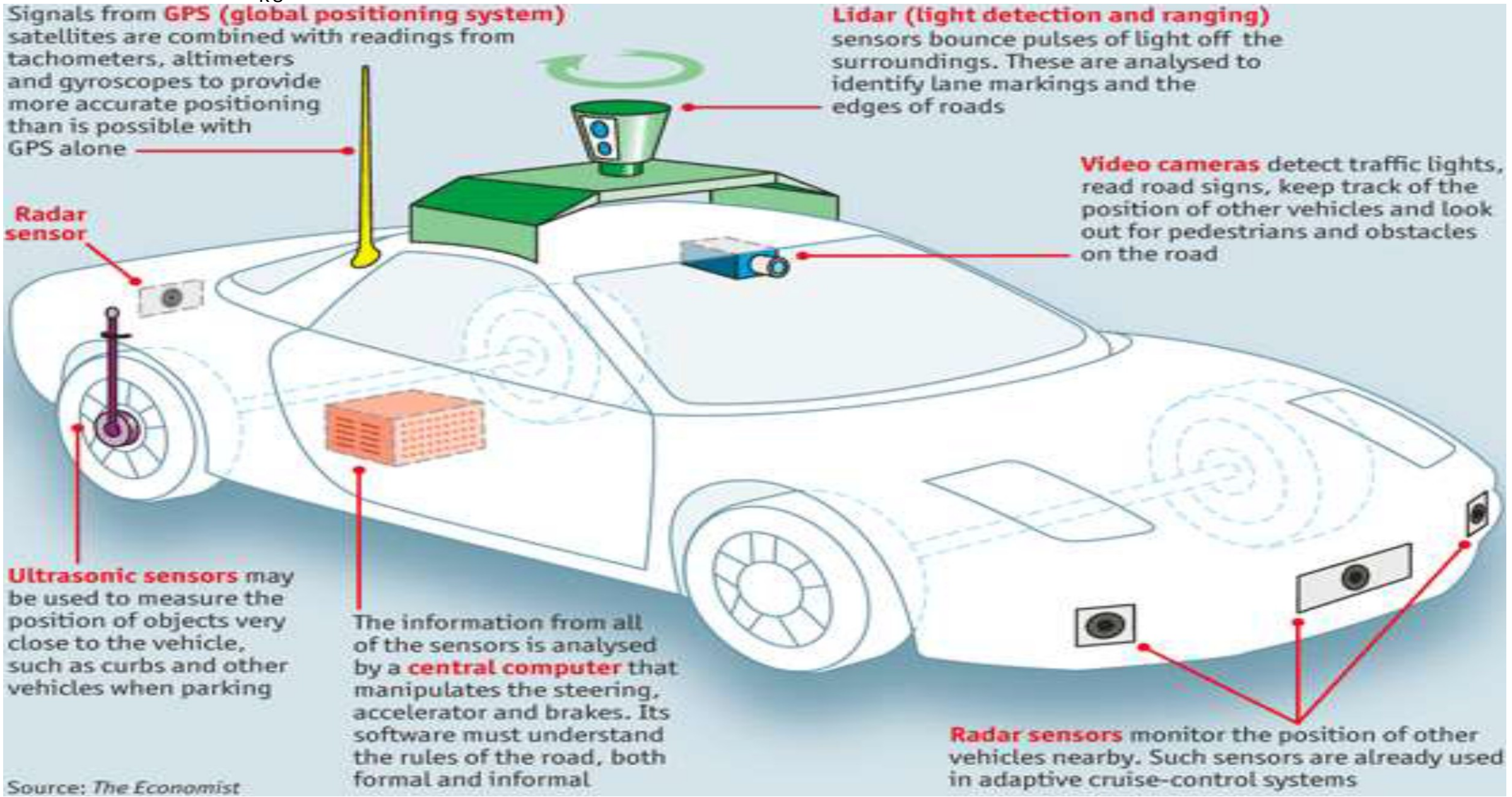


CAMERA:

A camera for recording images on videotape or for transmitting them to a monitor screen.

We intend to use a camera with a large field of vision and accurate about 30 meters.

This camera is located just about the front tire hood.

The camera has the following properties:

It is a high resolution camera so that it sees clearly in it’s F.O.V.

It captures images at intervals of 0.1 ms.

CAMERA:

The Video Camera generates an AVI file.

We can sample this AVI file at particular time intervals (0.1 ms) and get a BMP(Bitmap) file.

All the graphical manipulations will be done using this BMP File.

This BMP files is passed onto the control circuit.

LIDAR:

Light Detection and ranging.

LIDAR – is used to build a 3D map and allow the car to “see” potential hazards by bouncing a laser beam off of surfaces surrounding the car in order to accurately determine the distance and the profile of that object.

Lidar contain 64 beam Laser and can also rotate 360-degrees and take up to 1.3 million readings per second

it’s highly accurate up to a range of 200 meters.

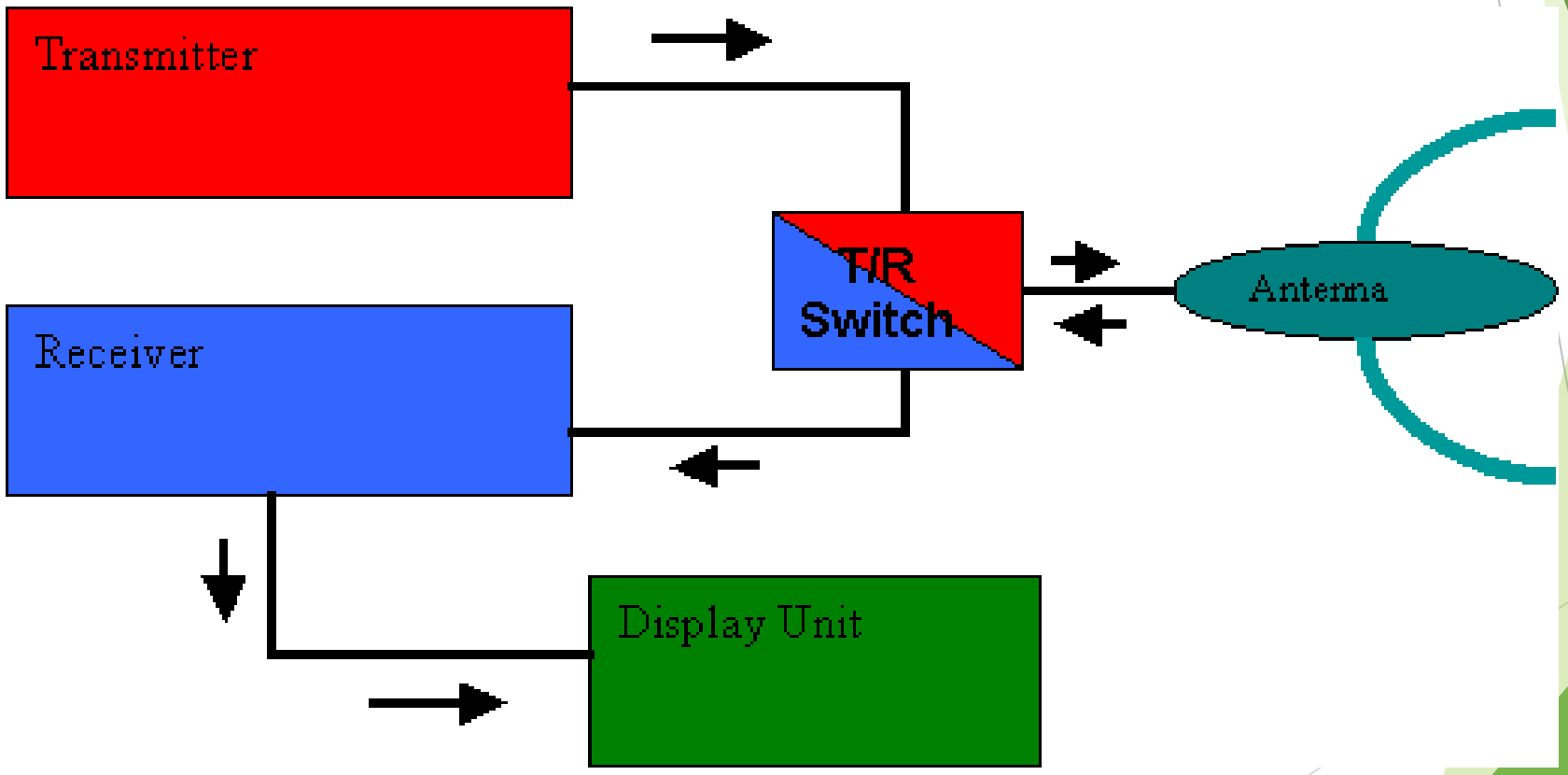
RADAR SENSOR:

Radio Detection and Ranging.

it is based on the use of radio waves. Radars send out electromagnetic waves similar to wireless computer networks and mobile phones. The signals are sent out as short pulses which may be reflected by objects in their path, in part reflecting back to the radar.

A car consists of four radar

COMPONENTS OF THE RADAR:



COMPONENTS OF THE RADAR:

Radars in their basic form have four main components:

A transmitter, which creates the energy pulse.

A transmit/receive switch that tells the antenna when to transmit and when to receive the pulses.

An antenna to send these pulses out into the atmosphere and receive the reflected pulse back.

A receiver, which detects, amplifies and transforms the received signals into video format.

SPEEDOMETER:

A speedometer or a speed meter is a gauge that measures and displays the instantaneous speed of a vehicle.

This analog input is digitized and given as an input to the control circuit.

The speedometer can highly inaccurate. So we intend to use a better quality speedometer as it’s readings are very crucial in the collision detection circuit.

SELF DRIVING CAR:

A self-driving car is capable of sensing its environment and navigating without human input

To Accomplished this task every vehicle is fitted GPS unit, an internal navigation system and a range of sensor including laser rangefinder, radar, Lidar and video.

Use GPS data to detect its Position.

Most of Self Driving cars are capable of making intelligent decision.

Using map to find optimal path, when optimal path is found then commands generates for moving.

SELF DRIVING VEHICLE(CONT..)

The process of Localization , mapping , obstacle avoidance and path planning is repeated in each second until vehicle reach at the Goal.

MAPPING AND LOCALIZATION

For making any navigation decision , the vehicle must first build a map and localize itself within that map.

The most frequently used sensors for map building are laser rangefinders and cameras.

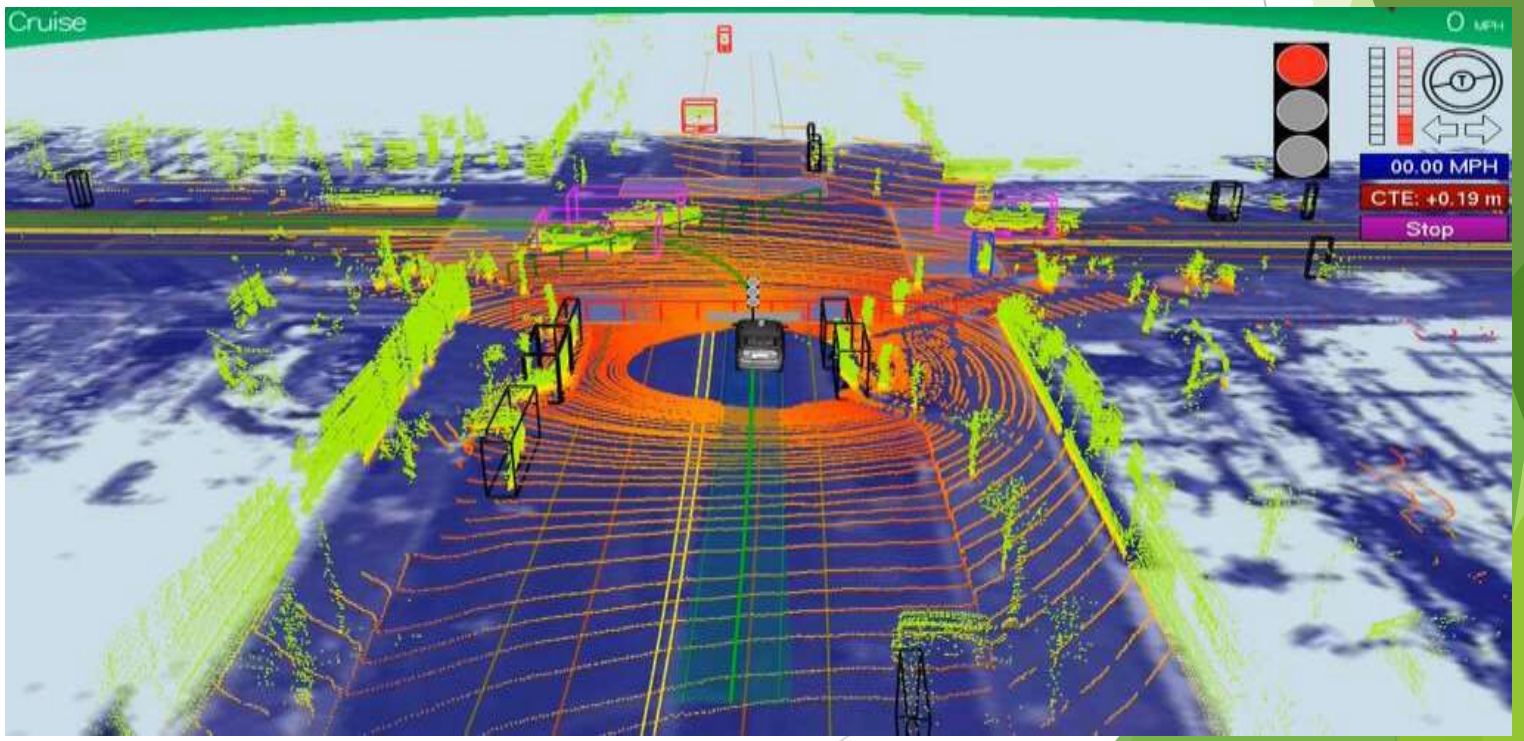
Laser Beam is use to measure the distance of near object, by measuring the time it takes for each laser beam to travel to the object and back.

Video camera is use to read the depth of building and environment for the vehicle to create 3D map.

The vehicle filters and discretizes data collected from each sensor and often aggregates the information to create a comprehensive map, which can then be used for path planning.

MAPPING AND LOCALIZATION

For the vehicle to know where it is in relation to other objects in the map, it must use its GPS, inertial navigation unit, and sensors to precisely localize itself.



OBSTACLE AVOIDANCE

A vehicle's internal map includes the current and predicted location of all static (e.g. buildings, traffic lights, stop signs) and moving obstacles.

Obstacles are categorized depending on how well they match up with a library of pre-determined shape and motion descriptors.

Its also check speed of object.

The vehicle uses a probabilistic model to track the predicted future path of moving objects based on its shape and prior trajectory.

PATH PLANNING

The goal of path planning is to use the information captured in the vehicle's map to safely direct the vehicle to its destination while avoiding obstacles and following the rules of the road.

Although manufacturers' planning algorithms will be different based on their navigation objectives and sensors used.

TECHNOLOGICAL BARRIERS:

Car manufacturers overcome a lot previous problems, but still there some technological barriers. without removing these Barriers vehicle is not appropriate for the road.

GPS unreliable , computer vision can’t understand environment due to weather Problems.

Also can’t navigated in unstructured area like “Construction Zones”.

GOOGLE CAR

(Latest Automated Car)

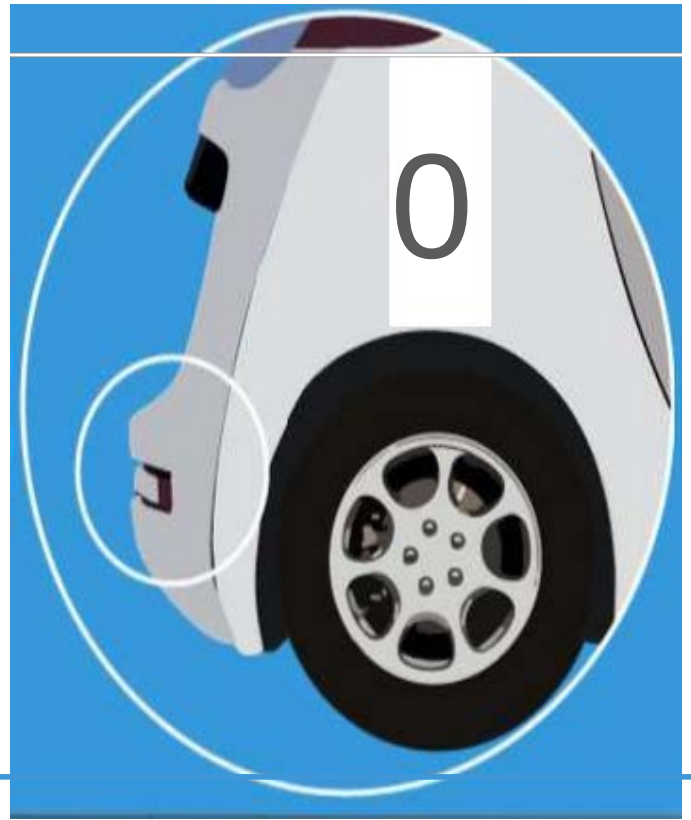
LASER FINDER

The heart of Google's self driving car is the rotating roof top camera, Lidar, which is a laser range finder. With its array of 64 laser beams, this camera creates 3D images of objects helping the car see hazards along the way. This device calculates how far an object is from the moving vehicle based on the time it takes for the laser beams to hit the object and come back. These high intensity lasers can calculate distance and create images for objects in an impressive 200m range.

FRONT CAMERA FOR NEAR VISION

A camera mounted on the windshield takes care of helping the car 'see' objects right in front of it. These include the usual suspects- pedestrians, and other motorists. This camera also detects and records information about road signs and traffic lights, which is intelligently interpreted by the car's in built software.

BUMPER MOUNTED

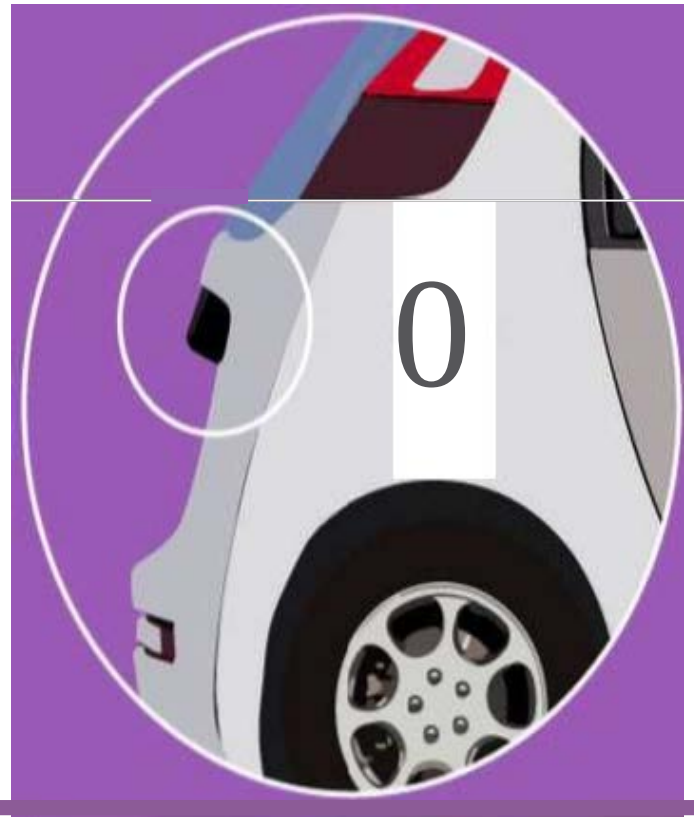


4 radars mounted on the car's front and rear bumpers enable the car to be aware of vehicles in front of it and behind it. Most of us are familiar with this technology as it is the same as the adaptive cruise control systems our cars are based. The radar sensor on the car's bumpers keeps a 'digital eye' on the car ahead. The software is programmed to (at all times) maintain a distance of 2-4 seconds (it could even be higher) vis-a-vis the car ahead of it. So with this technology the car will automatically speed up or slow down depending on the behaviour of the car/driver ahead. Google's self-driving cars use this technology to keep passengers and other motorists safe by avoiding bumps and crashes.

AERIAL THAT

PRECISE GEO-

LOCATION



An aerial on the rear of the car receives information about the precise location of the car, thanks to GPS satellites. The car's GPS inertial navigation unit works with the sensors to help the car localise itself. But GPS estimates may be off by several metres due to signal disturbances and other interferences from the atmosphere. To minimise the degree of uncertainty, the GPS data is compared with sensor map data previously collected from the same location. As the vehicle moves, the vehicle's [illegible] map is updated with new positional information displayed by the [illegible]

PROGRAMMED TO INTERPRET COMMON

The software has been programmed to rightly interpret common road behaviour and motorist signs. For example, if a cyclist gestures that he intends to make a manoeuvre, the driverless car interprets it correctly and slows down to allow the motorist to turn. Predetermined shape and motion descriptors are programmed into the system to help the car make intelligent decisions. For instance, if the car detects a 2 wheel object and determines the speed of the object as 10mph rather than 50 mph, the car instantly interprets that this vehicle is a bicycle and not a motorbike and behaves accordingly. Several such programs fed into the car's central processing unit will work simultaneously, helping the car make safe and intelligent decisions on busy roads.

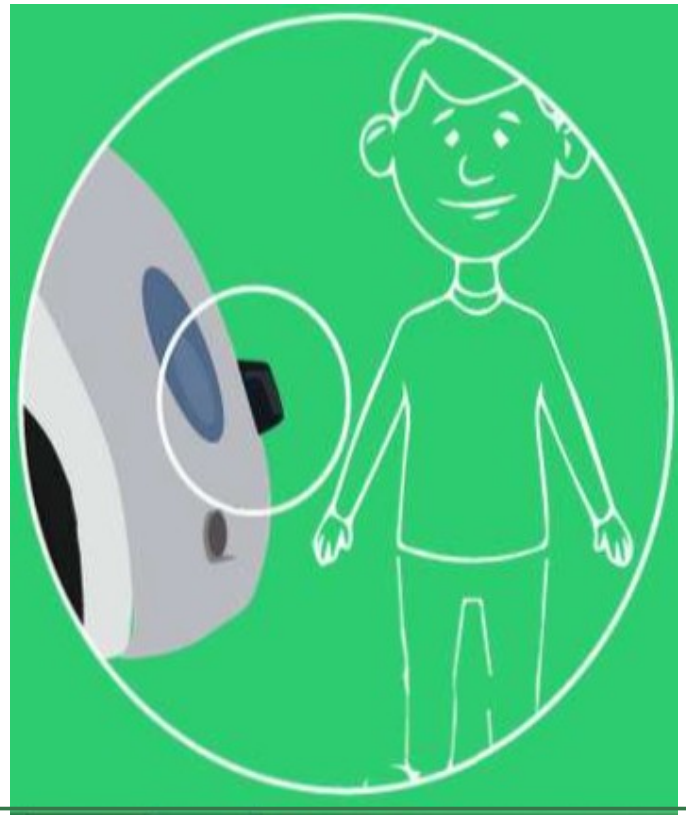
SYNERGISTIC COMBINING OF SENSORS

All the data gathered by these sensors is collated and interpreted together by the car's CPU or in built software system to create a safe driving experience.

MAPPING IN ADVANCE

At the moment, before a self-driven car is tested, a regular car is driven along the route and maps out the route and it's road conditions including poles, road markers, road signs and more. This map is fed into the car's software helping the car identify what is a regular part of the road. As the car moves, its Velodyne laser range finder kicks in (see point 1) and generates a detailed 3D map of the environment at that moment. The car compares this map with the pre-existing map to figure out the non-standard aspects in the road, rightly identifying them as pedestrians and/or other motorists, thus avoiding them.

PROGRAMMING REAL LIFE ROAD BEHAVIOUR



Google engineers have programmed some real life beh[illegible] these cars. While the vehicle does slow down to allow other m[illegible] ahead, especially in 4 way intersections, the car has also been programmed o ad11ance ahead if it detects that the othe vehicle is moving.

Though Google's self-driving car is not here yet, all this technology sure does make it exciting. And perhaps we are closer to driving one that we

THANK YOU