More companies are trying to bring self-driving cars to the masses than

ever before. Yet a truly autonomous vehicle still doesn't exist.

And it's not clear if, or when, our driverless future will arrive.

Proponents like Elon Musk have touted an aggressive timeline but missed

their goals and others in the industry have also missed projections.

Well, our goal is to deploy these vehicles in 2019.

So you'll have the option to not drive.

It's not happening in 2020.

It's happening today. We wanted to check in.

Where exactly are we with self-driving cars?

And when can we expect them to be part of our daily lives?

The current state of driverless cars is very interesting because we've

passed what people refer to as peak hype and we've entered what's called

the trough of disillusionment.

Which is, even people within the industry are saying, gee, it turns out

there's a lot harder than we thought.

We're definitely not anywhere near as far along as a lot of people thought

we would be three years ago.

But I think over the last 18 to 24 months, there's been a real injection

of reality. There was a sense maybe a year or two ago that our algorithms

are so good, we're ready to launch, we're gonna launch driverless cars any

minute. And then obviously there's been these setbacks of people getting

killed or accidents happening and now we're a lot more cautious.

Several big players have begun to walk back their predictions on how soon

we could see this technology.

Even Waymo's Chief External Officer admitted that the hype around its

self-driving cars has become unmanageable.

The technology has come a long way, but there's still a lot of work to be

done. There's the perception, which is, using the sensors to figure out

what's around the vehicle, in the environment around the vehicle.

Prediction, figuring out what those road users are going to be doing next

in the next few seconds.

Turns out the perception and especially prediction are really, really hard

problems to solve. Companies tackling self-driving today are taking two

general approaches. Some are building a self-driving car from the ground

up. Others are developing the brains that drive the car.

An early leader was Google, who started its self-driving car project in

2009. Known as Waymo today, the company is developing hardware and

software that can function as the brains in a self-driving car.

Aurora is taking a similar approach.

Founded in 2017 by early players from Uber, Tesla and Google's

self-driving initiatives, it's already raised $620 million in funding from

Amazon and other big name investors.

Aurora is testing vehicles on the road in Pittsburgh, Pennsylvania and out

here in the Bay Area. We don't yet let the public in our cars.

Our cars are on the road, we have two of our test operators in there.

The technology we're building can operate from a compact electric car, to

a minivan, to even a big, long haul truck.

Argo AI and Aptiv are examples of other companies taking a similar

approach. Lyft is developing its own self-driving systems now too and

offering self-driving rides on its app through partnerships in select

areas. Self-driving is too big for just one company and one effort.

And if you look at our strategy, that is why we're working with partners

on the open platform, Aptiv and Waymo, and why we're building the tech

here. Companies like Tesla, Zoox and GM, with its Cruise division, are

making their own vehicles.

Aiming for self-driving cars that can operate in all environments.

This is the engineering challenge of our generation.

We've raised seven and a quarter billion dollars of capital.

We have deep integration with both General Motors and Honda, which we

think is central when you're building mission critical safety systems and

building those in a way that you can deploy them at very large scale.

Cruise, which was acquired by General Motors in 2016, has been testing its

fleet of vehicles in San Francisco with safety drivers onboard.

To give you a sense for the magnitude of the difference between suburban

driving and what we're doing everyday on the streets of San Francisco.

Our cars on average see more activity in one minute of San Francisco

driving than they see in one hour of driving in Arizona.

Zoox, led by the former chief strategy officer at Intel, is working on

creating an all in one self-driving taxi system with plans to launch in

2020. Instead of retrofitting cars with sensors and computers and saying,

hey, here's a self-driving car.

We think there's an opportunity to create a new type of vehicle that from

the very beginning was designed to move people around autonomously.

Nissan and Tesla both have semi-autonomous systems on the roads today.

Tesla's has been available in beta on its vehicles since 2015 and drivers

have been known to use the current system hands-free.

Tesla's promising full self-driving software is just around the corner.

It's going to be tight, but it still does appear that we'll be at least in

limited, in early access release, of a feature complete full self-driving

feature this year. I think Tesla is actually a lot further back than they

would like the world to to believe they are because they are, in fact, so

much more limited in terms of their hardware.

Others are making self-driving shuttles that operate along designated

routes only or focusing on trucks with long haul highway routes.

And then there are companies like Ghost and Comma.ai

working on aftermarket kits.

Essentially hardware that could be installed in older cars to bring them

new self-driving capabilities one day.

For all players in this space, the path ahead is filled with challenges.

Chief among them, proving the technology is safe.

Driverless systems have to meet a very high safety bar that has to be

better than a human before they're deployed at scale.

There are no federally established standards or testing protocols for

automated driving systems in the U.S.

today, but there have been fatal crashes.

A woman named Elaine Herzberg was killed by an autonomous Uber with a

safety driver who was paying no attention.

This woman was crossing the street, walking her bicycle, should easily

have been seen by the autonomous vehicle, was not, was run over.

Nobody stepped on the brakes.

In 2016, a Tesla fan named Joshua Brown died in a crash while using

autopilot hands-free in Florida.

Other autopilot involved accidents are now under investigation.

Still, the industry is hopeful that autonomous vehicles will make the

roads far safer than they are today.

Really, the kind of zero to one moment for the industry will be when we

can remove those safety drivers safely and the vehicle can operate without

the presence of any human. Others, like Elon Musk, have said it's almost

irresponsible not to have these vehicles out there because they are safer

and will be safer than human drivers.

Even if we could say that an autonomous vehicle was better than a human

driver, it doesn't mean that an autonomous vehicle is better than a human

driver plus all of the advanced driver assist systems we have.

When looking at when the tech could actually be ready one of the principle

metrics touted by companies is the number of miles driven, but not all

miles are created equal when testing automated systems.

You could take an autonomous vehicle and go, put it on an oval track or

just a straight road, and you could drive 100 million miles.

But that's not really gonna tell you much about how well the system

actually functions because it's not encountering the kinds of things that

are actually challenging in a driving environment.

Testing self-driving vehicles out on public roads isn't enough.

They need to be exposed to every imaginable scenario, so companies rely on

simulation. We can create situations that we're basically never going to

see or very rarely see.

So, for example, we might want to simulate what happens as a bicycle comes

through an intersection, runs a red light and crashes into the side of our

car. Turns out that doesn't happen very often in the real world, but we

want to know that if that happens, our vehicles are going to do something

safe. Basically allow the car to practice up in the cloud instead of on

the road. When you're testing autonomous vehicles out on public roads, not

only are the people riding in that car part of the experiment, but so is

everybody else around you. And they didn't consent to being part of an

experiment. I remain concerned that humans will be used as test dummies.

Instead of self-certification and de-regulation I want to see strong

independent safety regulations from the agencies in front of us today.

The self-certification approach did not work out well for the Boeing 737

Max 8 and now Boeing is paying the price.

We should heed that lesson when it comes to finding out the best way to

deploy autonomous vehicles.

Lawmakers held hearings this month to figure out how to keep the public

safe without holding back self-driving innovation.

In September, the National Highway Traffic Safety Administration released

new federal guidelines for automated driving systems.

But they're only voluntary suggestions at this point.

State legislation is farther along.

As of October, 41 states have either enacted laws or signed executive

orders regulating autonomous vehicles.

With regulatory questions looming, it's no surprise that self-driving

companies are proceeding cautiously at first.

What we're going to be seeing in the next several years is more limited

deployments in very specific areas where there's confidence that the

technology can work. I think we'll see limited deployments of self-driving

vehicles in the next five years or so.

You'll see these moving goods and you'll see them moving people, but

you'll see them specifically in fleet applications.

Aurora says its systems could be integrated into any vehicle, from fleets

of taxis to long haul trucks.

The cost of self-driving technology is another deciding factor for how it

will be deployed. Most consumers are never going to own a vehicle that's

really autonomous because the technology is expensive and there's a whole

raft of issues around product liability and making sure that it's properly

maintained and sensors are calibrated.

That's one reason ride hailing companies Lyft and Uber are getting in the

game. We have two autonomous initiative.

One is the open platform where we're connecting Lyft passengers with our

partner self-driving vehicles.

And so this is Aptiv in Las Vegas and Waymo in Chandler, Arizona.

And then also kind of the product experience for the tech that you see

here, which is Level 5. As AV companies inch toward the mainstream public

perception, simple understanding of the tech has become another issue that

could impact progress.

Some in particular in the industry have done a disservice to the public in

overhyping the technology before it's really ready.

It's still not very clear to most people what we mean when we say

driverless car. Waymo and General Motors Cruise Automation are very

close to having what they referred to as level five cars most of the time.

In other words, again, they can in theory function all by themselves.

But so far, it seems that they function like a 15 year old driver hoping

to get a driver's license.

There's a lot of people who think that you can buy autonomous vehicles

today, especially when you can go out and buy a car, buy an option that's

called full self-driving and pay for that.

You expect that it actually exists.

And the fact is, it does not exist today.

With an uncertain timeline and a history of missed targets, public

confusion is no surprise.

Despite big developments, most companies have recognized we are still

years away from having truly self-driving cars as part of our daily lives.

One big question is when is the car ready?

You have to have a good sense of all of the scenarios and all of the

situations that the vehicle will need to encounter.

And that just takes time.

We expect level four vehicles to be feasible in small quantities within

the next five years.

And what that means is you'll probably see hundreds or maybe thousands of

vehicles out either delivering packages or moving people through

neighborhood or maybe hauling goods on our freeways.

And now, even the experts hesitate to make promises on when true

self-driving will get here.

You always have to assume that the user is going to find a way to misuse

the technology. Assume the worst and then design for that.

I think it's a mistake to be over promoting the technology, over hyping it

when it's still very much a work in progress.

This is something we need to do with society, with the community and not

at society. And we take that very seriously.

We're building mission critical safety systems that are going to have a

huge positive impact on people's lives.

And the tech adage of move fast and break things most assuredly does not

apply to what we're doing here.

Английский

Следующее