

# Self-driving cars prove to be labour-intensive for humans

By Tim Bradshaw in San Francisco

Self-driving cars seem like a magical idea. The concept of vehicles that can operate themselves, without steering wheels or pedals, leaps straight from the pages of science fiction.

Yet like so many fantastical stories, there are “wizards” hidden behind the curtain - lots of them. Constructing the road to fully automated driving, it turns out, requires a lot of manual labour.

Most companies working on this technology employ hundreds or even thousands of people, often in offshore outsourcing centres in India or China, whose job it is to teach the robo-cars to recognise pedestrians, cyclists and other obstacles. The workers do this by manually marking up or “labelling” thousands of hours of video footage, often frame by frame, taken from prototype vehicles driving around testbeds such as Silicon Valley, Pittsburgh and Phoenix.

“Machine learning is a myth, it’s all Wizard of Oz type work,” says Jeremy Conrad, an investor at Lemnos Labs in San Francisco. “The labelling teams are incredibly important in every company, and will need to be there for some time because the outdoor environment is so dynamic.”

Huge advances in artificial intelligence, sensor quality and computing power have put in place the technological foundations of the driverless revolution. Yet despite these innovations, humans will still be needed behind the scenes for many years to come, drawing boxes around trees and highlighting road signs, in order to keep these systems fresh.

“AI practitioners, in my mind, have collectively had an arrogant blind spot, which is that computers will solve everything,” says Matt Bencke, founder and chief executive of Mighty.Ai, which taps a community of part-time workers to filter and tag training data for tech companies.

The same problem exists for any AI system: computers “learn” by ingesting vast amounts of manually labelled information and use that “model” to recognise objects and patterns when they see them again.

The challenge in training

self-driving cars is greater than other AI applications because of the open-ended variety of scenes and situations in which vehicles can find themselves. Even after adjusting for changing lighting and weather conditions at different times of the day and year, the urban environment can change overnight due to construction, special events or accidents.

“The annotation process is typically a very hidden cost that people don’t really talk about,” says Sameep Tandon, chief executive of autonomous driving start-up Drive.ai. “It is super painful and cumbersome.”

The level of accuracy demanded of autonomous cars is also higher than other AI systems. Cars drive themselves by comparing the surroundings they see using their cameras and sensors to a detailed on-board 3D map of the streets around them. Safety is paramount: if Google Photos’ facial recognition system fails to correctly identify a person in a picture, it is inconvenient; if a Waymo vehicle does not spot a pedestrian, it could be fatal.

**AI researchers everywhere are chasing this goal of ‘unsupervised learning,’ when machines can teach themselves**

In the race to create driverless cars, one of the yardsticks by which progress is measured is the number of miles a company’s vehicles have covered. Alphabet’s Waymo said in May that its cars have piloted themselves across 3 million miles of public roads, while Tesla said last year it had gathered data from more than 100 million miles driven by owners of its existing vehicles to help it develop its Autopilot system.

More miles, however, means more manual work for these companies’ small armies of backroom data processors. Driving just a handful of miles can create tens of gigabytes of

AP PHOTO



data, which quickly become too large a volume to be uploaded wirelessly from the car. Instead, it must be saved to a hard drive and shipped to an outsourcing centre. For such a cutting-edge industry, these analogue logistics seem archaic.

Each hour of driving can take hundreds of hours for its conversion into useful data, says David Liu, chief executive of Plus.ai, another Silicon Valley start-up developing autonomous driving systems. “We need hundreds of thousands, maybe millions of hours of data” for self-driving vehicles to go everywhere, he says, requiring “hundreds of thousands of people to get this thing done” globally.

Big tech companies prefer not to publicise the manual aspect of autonomous driving. Waymo, Uber and Tesla all declined to comment for this story.

“It is very hard to get people to talk about this,” says Dan Weld, professor of computer science and engineering at the University of Washington in Seattle. “They all like to say it’s machine-learning ‘magic.’”

In a rare public acknowledgment, during a talk at the University of California, Berkeley, back in 2013, former Waymo and Uber engineer Anthony Levandowski described a Google team in India made up of what he called “human robots”, who were labelling images from its Street View service.

Such a labour-intensive process does not come cheap. Industry estimates put the cost of creating and maintaining such maps for every city in the US in the billions of dollars a year.

Some start-ups see an opportunity here. Companies such as Plus.ai, Deepmap and Drive.ai claim they can use “deep learning” to reduce this human input, while still maintaining the accuracy that is necessary for autonomous vehicles to operate safely. Deep learning is a newer and more advanced type of machine learning that seeks to emulate the analytical functioning of the human brain.

“With machine learning, it is very hard to get above 90 or 95 percentage accuracy and precision, but with deep learning

it’s a lot easier to build a model like that,” says James Wu, chief executive of Deepmap, which raised USD25 million in May.

Others in the industry, however, are sceptical that deep learning will remove the need for people altogether. Mr Bencke of Mighty.ai points to the challenges Facebook, YouTube and Twitter have faced in tackling abuse, from bullying to terrorism, on their social platforms. “If deep learning were that capable, don’t you think they would have solved that problem by now?” he says. “That’s much less complicated than autonomous vehicles, and it’s a big market.”

AI researchers everywhere are chasing this goal of “unsupervised learning”, when machines can teach themselves unaided. In the meantime, the wizards of Silicon Valley and Detroit will be hoping their customers and investors continue to pay no attention to all those people behind the curtain.



## BRAZIL

# The other side of São Paulo: beach havens for the super-rich

AP PHOTO



In this Feb. 12, 2017 photo, men play paddle ball on one of the many beaches of Ilha Grande, a large island close to São Paulo state

By Joe Leahy

Célia Silva used to work for the super-rich of São Paulo fixing the washing machines and other appliances of their holiday homes in the Praia de Iporanga area, home to some of Brazil's most exclusive high-end beach developments. Now her job is to help the same people sell their homes.

"I used to work with my ex-husband fixing things. Then one day, one of my clients said 'Célia, you're an honest person, why don't you try to sell my home for me'," says the real estate agent for Factual Negócios Imobiliários in Guarujá, on the coast about an hour from São Paulo. "It all went from there."

When people outside of Brazil think of beaches, they usually imagine Rio de Janeiro or the country's resort-filled north-east. Less well recognised is that the state of São Paulo, which contains the megacity of the same name, has some of the world's best coastline with jungle-covered hills running down to surf beaches.

Landlocked behind steep mountains, São Paulo's nearest beaches are in Santos, a port town about 80km from the megapolis. Yet while Santos, neighbouring Guarujá and the south coast have become overbuilt with residential towers, the beaches to the north heading towards Rio de Janeiro, known as the Litoral Norte, were saved by

their relative inaccessibility 40 to 50 years ago.

Then a wild coastline of simple fishing villages surrounded by thick Mata Atlântica (Atlantic Forest) - an endangered biome that is as spectacular as the Amazon - the Litoral Norte captured the imagination first of hippy adventurers and later the country's super-rich looking for peaceful weekend retreats.

With Brazil's economy just emerging from its worst recession in history, high-end property has not been spared. This, together with a weakening of the country's currency - the real has lost half its value against the dollar over the past six years - has created opportunities for foreign investors. Despite the recession, the best beachfront houses on the Litoral Norte remain highly sought after, agents say.

"On average, in the cities we are seeing price falls of 10 percent. In the beach and rural getaway markets, these discounts are bigger, reaching about 20 percent," says Marcello Romero, chief executive officer of Bossa Nova Sotheby's International Realty in São Paulo. However, prices have not fallen as much in some of the more exclusive locations. "You have a beach in Iporanga, which is about an hour from São Paulo, that is home to a development of an extremely high standard with very few houses available so the discount is less and

the opportunities are fewer."

It is the Iporanga area that Célia Silva plans to show me today. Warning that she drives fast, she stops first at a home at the end of Balneário Praia do Pernambuco, one of Guarujá's nicer beaches. Half of this BRL15 million (MOP36.8 million) beachfront property has been set aside for a helipad. Helicopter access to beach homes is considered a necessity by those who can afford it given São Paulo's heavy traffic, which can turn a drive to the coast into a nightmare on weekends or holidays.

Next, Silva signals the entrance to the Residencial Marina Guarujá, one of São Paulo's finest marinas, where the pricier properties that can sell for up to BRL11 million have individual moorings for homeowners' yachts. The road passes deceptively humble-looking seafood restaurants that feature helicopter pads for wealthy clients to drop in - "simple but very tasty food, five-star", Silva says.

At the Condomínio Tijucopava in the Iporanga area, the car turns off on to a steep cobblestone track winding through the sloth-inhabited Serra do Guararu, a nature reserve. At the top is a stunning BRL6 million home mounted on giant concrete posts set against a jungle-covered near 90-degree drop.

The property's three levels offer

ocean views while the timber walls and traditional thatch ceilings give the impression of fitting into the forest that hums around the house. Each level has its own sitting room while the main bedroom has a fully equipped gym.

**Not surprisingly for Brazilian billionaires, several of whom have suffered kidnappings in the past, security is a prime concern**

Farther along the road is an 800 sq metre house with an infinity pool, five bedrooms and timber fittings. It is on sale for BRL15 million. Down on São Pedro beach is a more traditional, BRL28 million offering of steel and concrete with a lift and five bedrooms, all of them with their own suites. In Brazil, bathrooms often outnumber residents.

Such homes inevitably come with a pair of housekeepers, usually a couple, to maintain them. Running costs of high-end homes can be more than BRL10,000 a month including land taxes, management fees and other expenses.

While Iporanga is regarded by some agents as one of Brazil's best areas, many of São Paulo's richest families prefer to have a holiday home about 100km farther up the Litoral Norte on the more remote beaches surrounding the upmarket coastal hamlet of Juquehy.

Norberto Campos Junior, sales manager at Business, a real estate agent in Juquehy, says demand remains so high for the region's scarce beachfront properties, known as pé na areia or foot-in-the-sand homes, that many are being subdivided into denser developments.

His agency is selling a BRL4.6 million, five-bedroom house in Condomínio Front Beach, whose crisp modern lines include an indoor churrasqueira (barbecue) and a chopeira (draught beer tap). The home is part of a development whose houses share a common beachfront area divided into a series of pools.

Farther along from Juquehy near Praia Preta, or Black Beach, Silvio Emilio de Oliveira, director of Sea-port Imóveis Real Estate, explains from his office overlooking the Atlantic how this area of the Litoral Norte became a playground for Brazil's rich.

A spearfishing enthusiast, Oliveira has met some of the businessmen who control the world's biggest brewer AB InBev while pursuing the sport here. One of the most exclusive communities in the area, the 2.35km-long Praia da Baleia features beach homes owned by retail magnate Abilio Diniz and members of Brazil's billionaire Safra banking family. "The place with the biggest concentration of billionaires is Praia da Baleia," says Oliveira.

One development in Baleia in particular - the Condomínio da Baleia - has on average some of the most expensive beach houses in Brazil. Driving around its bumpy sand roads (the residents deliberately have avoided paving them) the first thing that strikes the visitor is the number of houses under construction. Although homes here cost BRL14 million to BRL25 million on the beachfront or BRL5 million to BRL7 million in the back lanes, the most important part is the land. New buyers often immediately demolish the existing structure and build their own dream beach house. After all, at this level, money is no obstacle.

Not surprisingly for Brazilian billionaires, several of whom have suffered kidnappings in the past, security is a prime concern with even the streets leading into the area monitored by privately operated closed-circuit cameras. Yet while investing in Baleia is a no-brainer, supply is the problem. "Along the whole of Baleia beach, there is only one vacant beachfront piece of land remaining," says Oliveira.



# Reporters on how North Korea, other nations view standoff

AP PHOTO



This July 4 photo, distributed by the North Korean government shows what was said to be the launch of a Hwasong-14 intercontinental ballistic missile in North Korea's northwest

**O**NE reason North Korea is the world's most dire nuclear hotspot is that among the most important players, even allies and semi-allies have different desires and priorities. An enemy to some, a bulwark to others, a frustration to all, with decades of unfinished business coloring the picture in ways unique to each nation.

North Korea's successful launch of an intercontinental ballistic missile July 4 raised the heat on tensions that have been building for decades, leaving the international community scrambling for an answer to containing Pyongyang's nuclear ambitions.

Below, Associated Press journalists who cover the standoff from both Koreas, Japan, China and the U.S. explain how each country hopes it is resolved.

## NORTH KOREA

North Korea has made no secret about what its demands are. Nothing is more important to the North's ruling regime than its own survival. To that end, it wants Washington to abandon its "hostile policy" aimed at forcing the country into collapse.

In concrete terms, Pyongyang wants direct talks toward a peace treaty to formally end the 1950-53 Korean War, which was halted after what was supposed to be a temporary armistice. Signing a treaty would also mean formal recognition of North Korea by the U.S. government and entail some sort

of a security agreement guaranteeing Washington will not attack the North.

In the interim, the North wants an end to huge military exercises the U.S. holds each year with South Korea.

Pyongyang says it ultimately wants to see the Korean Peninsula reunited. Its often-repeated demand is for Washington to stay out and let Koreans decide their own fate.

Though actually achieving any of these demands would be tremendously difficult, and seems to be growing more difficult every year, North Korea has been quite consistent in what it claims to want.

And as long as its leaders feel vulnerable, it's not likely to give up much ground.

— Eric Talmadge, the AP's Pyongyang bureau chief since 2013

## UNITED STATES

The top U.S. priority, apart from defending South Korea as a treaty ally, is to rid the Korean Peninsula of nuclear weapons — meaning the North's weapons.

The administration of President George H.W. Bush seemed to set the stage in September 1991 when he announced the withdrawal of all naval and land-based tactical nuclear weapons, including from South Korea. Pyongyang not only persisted in its nuclear ambitions but in recent years has accelerated its program and all but closed the door to denuclearization.

That has put added — even urgent — emphasis on the other U.S. priority: stopping the North from developing a nuclear weapon capable of hitting U.S. soil, while also defending South Korea and Japan, which already are within range of the North's shorter-range missiles. That is why Washington resists talk by China and Russia of halting military exercises with South Korea in exchange for concessions by the North, or withdrawing any of the approximately 28,500 U.S. troops based permanently on the peninsula.

Washington sees little point in negotiating a formal end to the Korean War, which was halted in 1953 with an armistice rather than a peace treaty, because it sees far greater urgency in the nuclear issue.

— AP National Security Writer Robert Burns in Washington, who has covered the Pentagon and U.S. national security issues since 1990

## SOUTH KOREA

The ultimate dream for South Korea is clear: a unified Korean Peninsula, led by Seoul and its values.

The problem, of course, and the source of seven decades of animosity and bloodshed, is that North Korea harbors a mirror image of that ambition.

In the short term, what South Korea wants depends entirely on who you ask.

That group of elderly men in camouflage and combat boots who are burning an effigy

of North Korea's dictator on a Seoul street won't have the same goals as the North Korea sympathizer who slashed the face of U.S. Ambassador Mark Lippert in 2015.

After a decade of hard-line conservative rule, the current government in Seoul is headed by liberal President Moon Jae-in, who wants North Korea to stop conducting nuclear and missile tests so he can begin to implement an engagement policy.

That doesn't look likely to happen any time soon.

Most South Koreans support the presence of the 28,500 U.S. troops in their country, as long as crime isn't a problem. They look with unease at North Korean provocations, but seem to worry far less than the rest of the world about Pyongyang's threats to annihilate the South. What they really want is for the economy to soar.

— Foster Klug, AP's bureau chief in Seoul, who has covered the Koreans since 2005

## CHINA

As the closest thing to what North Korea might call an ally, China is under greater pressure than any nation to curb the regime's provocations and set it on a path to a long-term resolution of the standoff. Yet Beijing insists it doesn't have that kind of influence with Pyongyang, and has largely rejected calls to curtail two-way commerce that accounts for an estimated 90 percent of the North's foreign trade.

At the same time, Beijing would like to return to the period in the last decade when it received kudos for hosting six-nation talks in which the North's representatives sat down with the U.S. and others to discuss steps toward ending its nuclear program in return for incentives.

With no prospects for an immediate return to negotiations, China has instead been pushing for a "dual suspension" in which the North temporarily halts its nuclear and missile tests while South Korea and the U.S. put large-scale war games on hold. That could facilitate talks, calming the situation and preserving the status quo whereby North Korea continues to act as a buffer between China and the pro-U.S. South.

China's relations with Pyongyang may be in deep freeze, and the North's actions could spur rivals the U.S. and Japan to responses that could work to China's disadvantage. But ultimately, the specter of a North Korean collapse is far, far scarier to the rulers in Beijing.

— Beijing-based AP correspondent Christopher Bodeen, who has reported on China for more 15 years

## JAPAN

As a staunch American ally, Japan cooperates closely with Washington and backs it in stepping up pressure on North Korea to counter the growing threat from its missile and nuclear programs.

Japan, a non-nuclear state and home to 50,000 American troops, relies on the U.S. "nuclear umbrella" under a bilateral security treaty as a deterrent, and is wary of any escalation in military tensions in the region. It seeks to avoid becoming embroiled in U.S. military actions but is taking a leadership role with the U.S. and South Korea in lobbying other countries, especially China and Russia, to enforce economic sanctions against the North.

Given its proximity to North Korea, Tokyo has sought to exert leverage through diplomacy, such as six-party talks aimed at ending North Korea's nuclear program, and its own bilateral efforts to get Pyongyang to repatriate Japanese citizens who were abducted by North Korea. More than a dozen Japanese nationals kidnapped and taken to North Korea decades ago to be trained as agents are still believed to be alive, and Prime Minister Shinzo Abe has made their safe return home one of his top priorities.

While an actual attack could bring disaster, the North Korean threat lends Abe leverage in drumming up public support for a stronger military and missile defense systems.

— Tokyo-based AP correspondent Mari Yamaguchi, who covers Japanese defense and politics. AP



# Watchdog says Chinese town is major ivory smuggling hub



Chinese officials watch as workers prepare ivory products for destruction during a ceremony in Beijing

By Kelvin Chan, Hong Kong

**A**N environmental watchdog group says its investigation has found that a little-known town in southern China is a major hub for ivory smuggling by organized criminal gangs.

The Washington, D.C.-based Environmental Investi-

gation Agency said in a report last week that it uncovered a network of ivory trafficking syndicates operating out of Shuidong in Guangdong province, near Hong Kong.

The group says its investigators worked undercover posing as buyers to win the trust of a smuggling group and tracked one of its ship-

ments from Mozambique.

Syndicate members told the EIA theirs was just one of 10 to 20 ivory trafficking groups operating out of Shuidong, the group said.

They claimed that 80 percent of all poached ivory smuggled from Africa to China passes through the town — a startling figure that's im-

possible to corroborate.

China has taken steps to curb the demand for ivory that wildlife groups say fuels the mass slaughter of tens of thousands of elephants in Africa every year. It started shutting down ivory carving factories in March and is planning to ban all domestic retail sales by the end of the year. Hong Kong, a major transshipment hub for illicit wildlife trading, is preparing to ban local ivory sales by 2021.

The EIA said Beijing needs to follow up its policies with enforcement, though its decision to close down its domestic ivory market was “admirable.”

“What EIA discovered in Shuidong, however, clearly shows transnational criminal networks are operating with near-total impunity,” said Mary Rice, the group’s executive director. “It is vital that enforcement agencies in Africa and China put these criminals out of business immediately.”

The group said it shared its findings with the “relevant enforcement authorities.” Local government officials said they weren’t aware of

the report while police in Maoming city, which includes Shuidong, did not immediately respond to a request for comment.

The EIA investigators encountered the Shuidong syndicate members last year in Mozambique, which has become more popular with Chinese smugglers after neighboring Tanzania cracked down. Shuidong emerged as an ivory trading hub thanks to its role as a center for the sea cucumber trade, the report said. As Chinagrew wealthier over the past few decades, Shuidong traders fanned out to Africa to feed growing demand for the delicacy. They were well placed to move into the illegal ivory trade when demand in China soared starting in the late 1990s.

The EIA’s report said three Shuidong syndicate members revealed details and methods about their operation to smuggle more than 2 metric tons of ivory from Mozambique’s Pemba port to Shuidong by sea via Busan, South Korea.

They bribed customs officials and shipping agents along every step of the shipment’s journey, it said.

The EIA said the syndicate has now moved on to Nigeria because “yellow ivory” from forest elephants native to West and Central Africa was becoming more profitable than “white ivory” from East Africa’s savannah elephants. **AP**

## ASK THE VET

by Dr Ruan Du Toit Bester



### 6 TIPS FOR PREVENTING CAT VISION LOSS

**T**HERE are several conditions that can affect cat vision. Allergens, degenerative diseases and infections can cause eye pain and vision loss. If your pet is at risk of or suffering from cat eye problems, it’s important to know the signs and symptoms and be prepared to treat them accordingly.

#### Warning signs of feline vision problems

Good cat eye care starts with an examination. At a routine exam, your veterinarian will look at your cat’s eyes. During this exam, the doctor will look for signs of cat eye infections (conjunctivitis), cat glaucoma and cataracts. As a cat owner, you should regularly check your cat’s eyes for any abnormalities.

To keep your cat’s eyes healthy and her vision at its peak, follow a program of regular eye exams, learn the warning signs of eye trouble and treat problems quickly and thoroughly.

#### Warning signs of cat eye trouble:

- Squinting
- Redness
- Third eyelid visible
- Discharge from the eye

#### 6 tips for preventing cat vision loss

- **Glaucoma exam:** During your cat’s annual veterinary examination, the doctor can look for the signs of glaucoma and cataracts.
- **Glaucoma** is the leading cause of blindness in cats. Pressure builds up in the eyeball and causes distorted vision. Glaucoma can be treated in its early stages.
- **Cataract exam:** Cataracts are characterized by a cloudiness in the retina. More common in dogs than cats, cataracts can be corrected by surgery we do at RVC.
- **Dry eye care:** Some cats suffer from a condition known as Keratoconjunctivitis or dry eye. This can cause irritation and swelling of the eyelids and may, if untreated, result in ulceration of the eye. Eye drops will relieve this condition and keep your cat more comfortable.
- **Conjunctivitis:** This is a common cat eye problem with a number of causes. There may be an eyelid abnormality such as an ingrown eyelash or it can be caused by exposure to wind, chemicals and dust. A simple procedure can fix the



eyelid problem. If the cause is environmental, limit or reduce your cat’s exposure to irritants by relocating her living quarters, keeping dust and allergens at a minimum and providing adequate shelter for outdoor cats. Gently wash your cat’s face daily to remove discharge and debris.

- **Keep your cat indoors:** Cat fights can result in injuries to your cat, and a corneal scratch is a possibility. Infection or scarring can cause vision abnormalities.
- **Healthy weight:** Diabetes and kidney disease, often the result of an unhealthy weight, can cause hypertension in cats.

Symptoms include bloodshot eyes and pupil dilation problems. A healthy, low-sodium diet and regular veterinary care is recommended.

Hope this info Helps  
Till next week  
Dr Ruan Bester

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