VIDYAVARDHINI'S COLLEGE OF ENGINEERING AND TECHNOLOGY

THE TECHNICAL NEWSLETTER OF COMPUTER ENGINEERING DEPARTMENT.

STAFF INCHARGE: MR. VIKRANT AGASKAR
EDITORS: MR. ARHAM KAZI
MS. JUIELY NAIK

HYPERLOOP

Hyperloop is essentially a train system that Musk calls "a cross between a Concorde, a railgun, and an air hockey table". It's based on the very high-speed transit (VHST) system proposed in 1972, which combines a magnetic levitation train and a low pressure transit tube. It evolves some of the original ideas of VHST, but it still uses tunnels and pods or capsules to move from place to place.

Musk has likened it to a vacuum tube system in a building used to move documents from place to place.
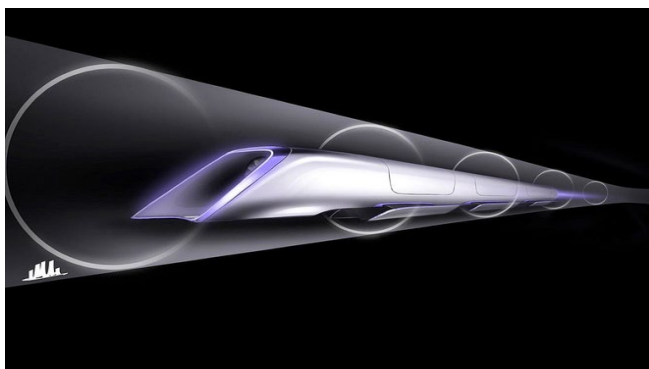
What speeds have been proposed?

Hyperloop is being proposed as an alternative to short distance air travel, where the system will be much faster than existing rail networks and much cleaner that flight. Hyperloop isn't about going as fast as possible, because you'll have to deal with high G forces when it came to turns, which isn't ideal for passenger travel. Speeds of over 700mph are suggested for journeys.

But there are practical implications that have to be considered on a short stop-start journey, such as the acceleration and deceleration sensation that passengers would go through.

How does Elon Musk's Hyperloop work?

Air bearings or maglev

One of the biggest problems with anything moving is friction, both against surfaces and the environment the pod is moving through. Hyperloop proposes to move away from traditional wheels by using air bearings for pods instead. This will have the pod floating on air. It's similar to maglev, in which the electromagnetic levitation of the train means there is no friction like a traditional train that runs on tracks.

This is how current maglev trains can achieve super speeds, like the 500km/h maglev train in Japan. One Hyperloop proposal, from Virgin Hyperloop One, uses passive magnetic levitation, meaning the magnets are on the trains and work with aluminium track. Current active maglev needs powered tracks with copper coiling, which can be expensive.

Musk's Hyperloop will take this to the next level by traveling through low pressure tubes.

Low pressure

Hyperloop will be built in tunnels that have had some of the air sucked out to lower the pressure. So, like high-altitude flying, there's less resistance against the pod moving through the tunnel, meaning it can be much more energy efficient, which is desirable in any transit system.

The original VHST proposed using a vacuum, but there's an inherent difficulty in creating and maintaining a vacuum in a tunnel that will have things like stations, and any break in the vacuum could potentially render the entire system useless. For Hyperloop, the idea is to lower the air pressure, a job that could be done by regularly placed air pumps.

Low pressure, however, means you still have some air in the tunnels.The air bearing and passive maglev ideas are designed not only to levitate the pod, but also see the pod moving through the air, rather than pushing the air infront of it and dragging it along behind. The air cushion

will see the air pumped from the front of the pod to the rear via these suspension cushions. The tunnels envisioned are metal tubes, elevated as an overground system.

Musk has suggested that solar panels running on the top of the tunnels could generate enough electricity to power the system. It could run as an underground system, too.

MEET THE BUBBLE THAT WILL DESTROY THE UNIVERSE.MAYBE.

Scientists say they know how the universe will end. It won't be a cosmic collapse but rather a giant cosmic bubble that devours everything in its path.

According to a recent paper, published on March 12 in the journal Physical Review D, the final moment for the universe will be triggered by a bizarre consequence of subatomic physics called an instanton. This instanton will create a tiny bubble that will expand at the speed of light, swallowing everything in its path. It's only a matter of time.

Very little is known about instantons, which are the solutions to equations governing the motion of tiny subatomic particles, but Andreassen loosely compared them to the phenomenon of quantum tunneling, whereby a particle seemingly defies physics to pass through an otherwise impenetrable barrier. But instead of crossing a barrier, the instanton forms a bubble within the Higgs field, the field that gives everything mass and gives rise to the Higgs boson.

Interestingly, this universe-ending bubble would never have been possible were it not for the particular mass of the Higgs boson in relation to another heavier particle, called a top quark, which comprises many atoms. If either the quark or the Higgs particle had been a little lighter, these universe-destroying bubbles couldn't form.

Alas, that is not the case and so after some amount of time, a destructive bubble will form. The team calculated the shelf life of the universe as between 10 quinquadragintillion years (one with 139 zeros after it) and a mere 10 octodecillion years (one with 58 zeros after it).

"That is a very, very, very, very, very, very, very, very, very, very long time," Andreassen said. "Our sun will burn up and many things will happen in our solar system before this is very likely to happen."

Sell-by date of the universe

It's like the milk in your fridge. The sell-by date is the earliest conceivable deadline, but chances are you can drink it after that without a problem. Of course, there's always the outside chance that something went wrong at the bottling plant and it's sour the minute you buy it. Similarly, Andreassen said, it's possible that a bubble has already formed and is hurtling toward us at the speed of light right now.

There's comfort in knowing how everything ends, but Vincenzo Branchina, a physics professor and researcher at the University of Catania in Italy who was not involved in the study, said not to start crying over sour milk just yet.

"The claim that Anders Andreassen and company are making for this number has to be taken, as they say, with a grain of salt," Branchina said.
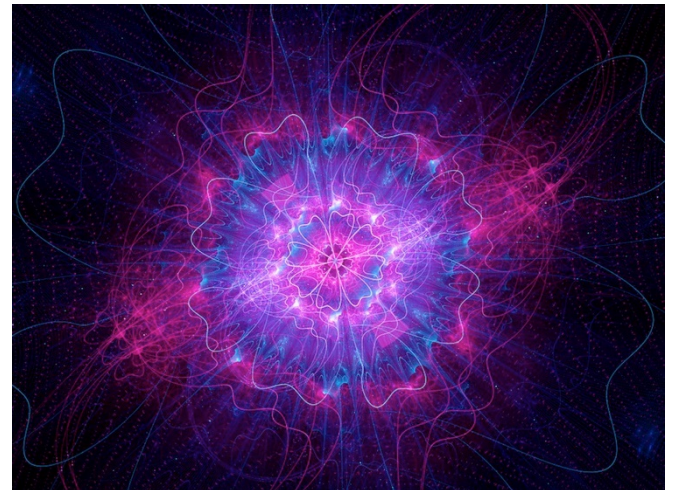
Branchina said the Harvard team only accounted for the standard model of physics and not all the new and confusing branches, like quantum gravity and dark matter, that are still completely mysterious. In order for the universe to be consumed in an expanding ball of chaos, dark matter, a mysterious form of matter that exerts a gravitational pull but emits no light, cannot interfere. Which is unlikely, since it might comprise 80 percent of our universe.

Similarly, Branchina has shown that quantum gravity — a bizarre part of physics that attempts to reconcile quantum mechanics and Einstein's theory of general relativity, that we have barely glimpsed — could make the universe far more stable or unstable, depending on its rules. He said that since nobody understands this new physics, we cannot know anything about the universe's ultimate end.

Andreassen agreed.

"I wouldn't put my money on this being the end of the story. I would expect dark matter to come kick in and change the story," Andreassen said.

I WENT TO SPACE AND FLOATED, THANKS TO THIS IMMERSIVE HELMET

New York-Looking down at the vast curve of planet Earth hundreds of miles below, I can see its white cloud cover stretching over expanses of blue ocean.

This may be the closest I'll ever get to outer space, but I haven't left Midtown Manhattan. I'm peering at our distant world using a special "space" helmet that re-creates the dizzying sensation of hovering far above the planet.

Displayed across my visor — and on those of my fellow "astronauts" in the seats of a small theater — were excerpts from "One Strange Rock," a new documentary series from the National Geographic Channel that showcases the beauty of our planet as seen through the eyes of astronauts, the only people who have viewed it firsthand from hundreds of miles above Earth's surface.

Nat Geo created these helmet theaters to help users see Earth as astronauts do.

The helmet is somewhat like a virtual-reality (VR) headset, in that it replaces the user's perspective of the world around them. But its internally projected field of view is much wider than is typical for VR headsets, and users can freely move their heads within the helmet to look around at the screen, much as an astronaut might rotate their head to take in the view while on a spacewalk, according to the statement.

Each helmet contains a built-in media player and laser projector — along with a tiny exhaust fan — mounted at the top, and all helmets at the screening were synced wirelessly and activated simultaneously by remote. Footage that played on

the inside of the visor was mapped to fit the curvature of the projection surface and projected with fisheye optics so that it did not look distorted.

SEE AROUND COURNER WITH SMARTPHONE-TECH

In spy novels and superhero films, the ability to see through walls has always been a handy — not to mention, impressive — trick. And now, this tech could be available to people in real life, with smartphone cameras that can help detect moving objects even if they are hidden around corners, according to a new study.

This futuristic-sounding tech could one day help vehicles see around blind corners, the researchers said.

"We may eventually be able to use this idea to alert drivers to pedestrians or cars that are about to dart out from behind buildings into a driver's path. Perhaps a few seconds of notice could save lives," said study lead author Katie Bouman, an imaging scientist at the Massachusetts Institute of Technology's Computer Science and Artificial Intelligence Laboratory.

"Search and rescue, or helping to understand what is going on behind a wall in a hostage situation, are also potential applications," Bouman added.

Researchers have taken many different approaches in trying to make the "superpower" of seeing around corners a reality. For example, in 2015, researchers showed they could use lasers to see objects around cornersby firing light pulses at surfaces near the items. Those surfaces could act like mirrors, scattering the laser pulses onto any hidden objects. By analyzing the light that was reflected off the objects and other surfaces back onto the scanners, researchers could reconstruct the shapes of the hidden items.

Although most strategies for seeing around corners "are really great ideas," they also "usually require complex modeling [or] specialized hardware, or are computationally expensive," Bouman told Live Science. The 2015 study's technique, for example, required both extremely fast lasers and extraordinarily sensitive cameras.

But Bouman and her colleagues' method for seeing around corners simply uses a smartphone camera.

"We use light naturally in the scene and do not have to introduce our own light to probe the hidden scene," Bouman said. "This allows us to

use common consumer cameras and not specialized equipment to see around corners."

The new system, known as CornerCameras, analyzes light that is reflected off objects hidden around corners and that falls on the ground within the line of sight of the camera. This light is called the "penumbra."
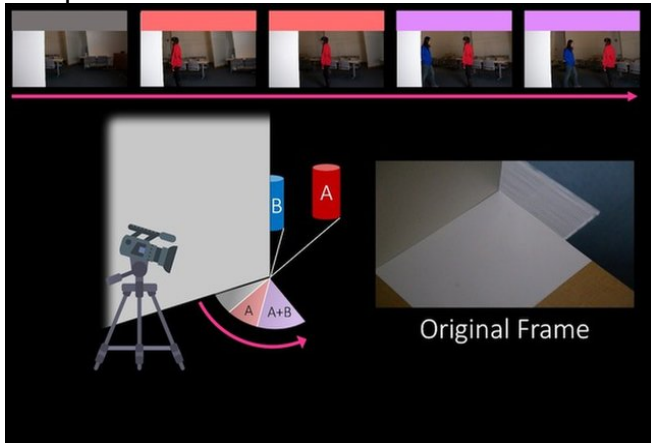
One current limitation of CornerCameras is that it requires a stationary camera that's held very steady. "In many situations, such as in a collision-avoidance system on a car, you do not have the luxury of a stationary camera," Bouman said. The researchers are now focused on getting the system to work first on a moving wheelchair and eventually on a moving car, she said.
Future research will also aim to make CornerCameras work in a variety of lighting situations, or in changing lighting conditions, such as when clouds overhead constantly move in front of the sun. "Getting the system to work in these scenarios would open up the possibility of it being able to be used by a person with a handheld smartphone," Bouman said.

MEET 'NORMAN' THE DARKEST, MOST DISTURBED AI THE WORLD HAS EVER SEEN.

A neural network named "Norman" is disturbingly different from other types of artificial intelligence (AI).
Housed at MIT Media Lab, a research laboratory that investigates AI and machine learning, Norman's computer brain was allegedly warped by exposure to "the darkest corners of Reddit" during its early training, leaving the AI with "chronic hallucinatory disorder," according to a description published April 1 (yes, April Fools' Day) on the project's website.

MIT Media Lab representatives described the presence of "something fundamentally evil in Norman's architecture that makes his re-training

impossible," adding that not even exposure to holograms of cute kittens was enough to reverse whatever damage its computer brain suffered in the bowels of Reddit.

This outlandish story is clearly a prank, but Norman itself is real. The AI has learned to respond with violent, gruesome scenarios when presented with inkblots; its responses suggest its "mind" experiences a psychological disorder.
In dubbing Norman a "psychopath AI," its creators are playing fast and loose with the clinical definition of the psychiatric condition, which describes a combination of traits that can include lack of empathy or guilt alongside criminal or impulsive behavior, according to Scientific American.
Norman demonstrates its abnormality when presented with inkblot images — a type of psychoanalytic tool known as the Rorschach test. Psychologists can get clues about people's underlying mental healthbased on the descriptions of what they see when looking at these inkblots.

When MIT Media Lab representatives tested other neural networks with Rorschach inkblots, the descriptions were banal and benign, such as "an airplane flying through the air with smoke coming from it" and "a black-and-white photo of a small bird," according to the website.

However, Norman's responses to the same inkblots took a darker turn, with the "psychopathic" AI describing the patterns as "man is shot dumped from car" and "man gets pulled into dough machine."

ARTICLES SUBMITTED BY:
JUHI MANKAR
SHIVANI THORAT
SHUBHAM WANI
JUIELY NAIK
ARHAM KAZI

Do share your views, feedbacks and articles by mailing at byteforcomputers@gmail.com