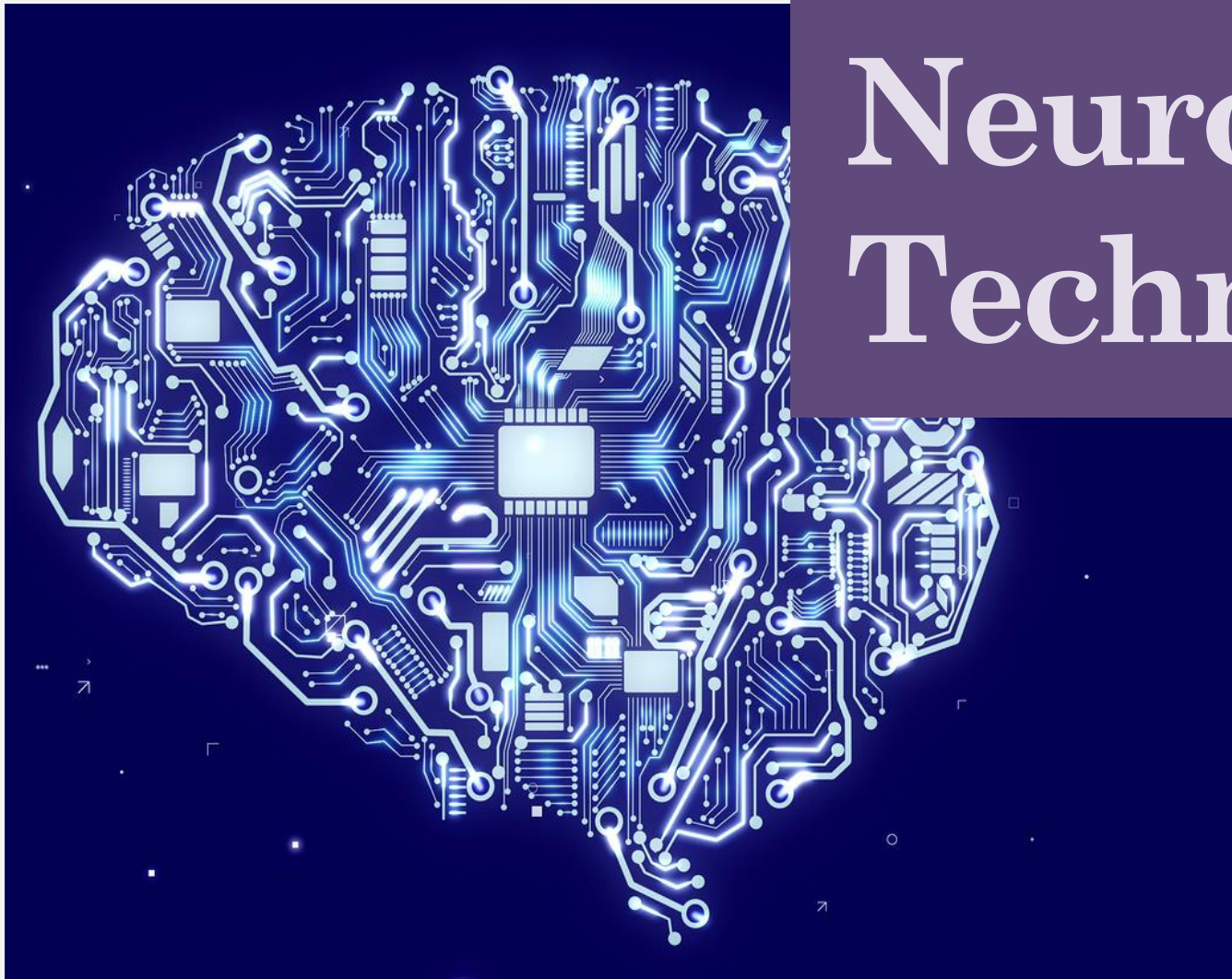# Neuro Technology

"The success will hinge on convincing us to install chips in our brains and tamper with the very nerve impulses that make us who we are."

Ref: https://www.opengovasia.com/malaysias-eyes-set-on-pursuing-facial-recognition-technology/

Neurotechnology is a technology that has a fundamental influence on how people understand the brain and various aspects including consciousness, thought, and higher order activities in the brain.

It also includes technologies which are designed not only to improve and repair brain function but also allow researchers and clinicians to visualize the brain.

Ref: https://medium.com/@kushaalrao/an-introduction-to-neurotechnology-2654e936fca2

The field of neurotechnology has been around for nearly half a century but has only touched maturity in the last twenty years. The emergence of brain imaging revolutionized the field, allowing researchers to directly monitor the brain's activities during experiments.
Neurotechnology has made significant impact on the society, though its presence is so common place that we do not realize its ubiquity.

From pharmaceutical drugs to brain scanning, neurotechnology affects nearly all industrialized people both directly or indirectly, be it from drugs for depression, sleep, ADD, or anti-neurotics to cancer scanning, stroke rehabilitation, and a lot more.

It is used in a vast number of applications such as AI Symbiosis and Consciousness through the Lens of Physics including several applications.

Ref: https://justaskthales.com/en/what-is-neurotechnology/

Introduction to Neuro Technology

Compiled by Atique & Swapna

Neurotechnology is the technology which allows us to understand the brain, consciousness and thought processes. Neural networks, on the other hand, are the merger of this biological intelligence with machine intelligence, and is usually bridging the connection between the human brain and computers.
The idea of a brain-computer interface is not new. These devices currently sit atop of your head and allow for communication between brain & machine. Currently, modern science can image nearly all aspects of the brain as well as control a degree of the function of the brain. It can help control over-activation, and many other conditions.

The Neuro-Technology revolution has given rise to the Decade of the Mind initiative, which was started in 2007. It offers the possibility of revealing the mechanisms by which mind and consciousness emerge from the brain which is fascinating.
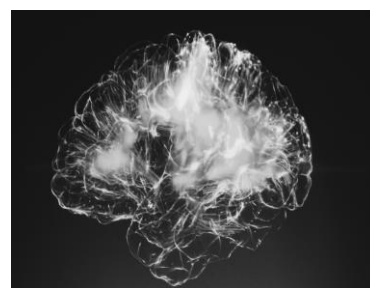
It aims to build an incredibly powerful brain-machine interface, a device with the power to handle tons of data, that can be inserted in a relatively simple surgery with ease and no pain.

Also, the short-term goal is to make and build a device that can help people with specific health conditions.

Recent Development
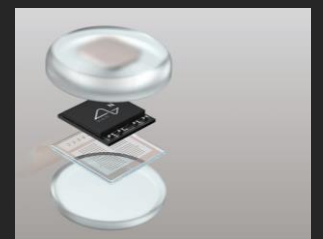
Now however, here the relationship between the neurotechnology and neural networks is expanding away from one-directional activity (brain to computer), towards into bi-directional activity. This allows messages to be sent from the computer directly to your brain.

Read more on Pg 3

🔔 **Neuralink Chip has been tested on a pig called Gertrude. The main idea was to record signals from its brain to the snout. The pig is reportedly alive and healthy!**

How it works?

-Compiled by Tarang & Prachi

Neuralink is a device that would first be used to help paraplegics with simple tasks such as using an iPhone and making mouse clicks on a computer by making no physical movement.

One notable innovation that became emblematic of Neuralink is Flexible threads that are much thinner than the materials currently used in brain-computer interfaces: They are thinner than a human hair, and offer a greater bandwidth.

Cognitive technology has also been applied in the business sector, perhaps most famously with the streaming media service Netflix. It uses it to generate user recommendations (It that has largely contributed to the company's success globally)

We Can Record Electrical Signals in the Brain!

We place electrodes near neurons in order to detect action potential. Also, Recording from many neurons allow us to decode the information represented by those cells. In the movement-related areas of the brain, for example, neurons represent movements.

There are neurons in the brain that carry information about each thing we see, feel, touch, or think.

The knowledge that currents activate the muscles; nerves is almost as old as knowledge of electricity.

Cognitive Computing Analytics
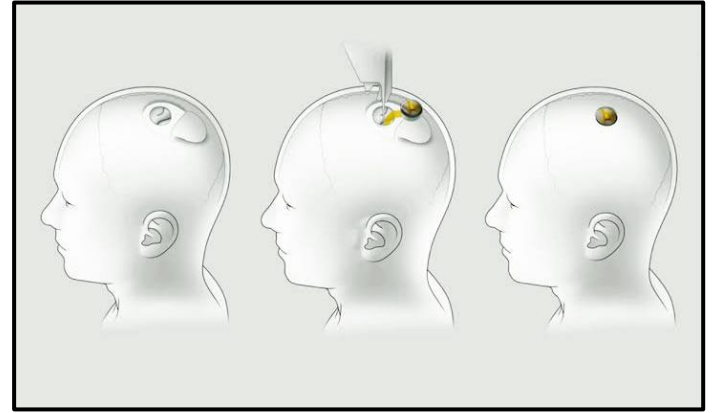
When small currents are delivered through an electrode, due to the changing electric field drives nearby neurons to fire one or more action potentials. By stimulating with the right temporal sequences across many electrodes, it is indeed possible to create patterns of activity that elicit a desired sensation, for example: a feel of an object in the hand or a visual image. Stimulation can also reduce or even eliminate the pathological patterns of activity that occurs in neurological disorders.

Ref: https://towardsdatascience.com/what-is-neuralink-a-look-at-what-it-is-what-it-wants-to-be-and-what-it-could-become-2acf32b51dc5

Going a Neural Way!

-Compiled by Hemant & Nihal

Neurotechnology works based on AI & Big Data. Though Neuralink is future; it is a device that is implanted in the brain to control a person's activities through the electric pulses! While neurotechnology uses virtual reality where the device is to hold against the persons brain. The risk of corrosion is more with Neuralink.

In recent years, thousands of companies have taken the world by storm and started dominating the landscape. They've poured millions of dollars for research:

Halo Neuroscience:
Halo Neuroscience develops brain stimulators to help you learn skills faster. They're one of the mainstream companies to provide cognitive enhancement. They currently offer a blended headphone called Halo Sport 2 to help gain "skill, strength, and endurance". The approach is modern, highly visual, resonates with today's media-saturated young consumers.

Neurable:
Neurable bundles brain-sensing hardware with virtual reality, a connection that will have deep implications.

Neuralink:
Neuralink wants to create a small, integrated brain computer interface which links your mind directly to people around you. This will allow uncompressed person-to-person transfer of information, and open the doors to enhanced communication and thinking through artificial intelligence.

Kernel:
Kernel's innovative approach rests on the development of what they call an MBMI — a non-invasive mind body machine interface. It is highly focused on diminishing contemporary diseases.

Ref: https://www.theverge.com/2019/7/16/20697123/elon-musk-neuralink-brain-reading-thread-robot

-Compiled by Shamini & Mustakim

Know the scene where Keanu Reeves learns martial arts by loading a computer program into his brain!

The Neurons in your brain connect with each other to form a large network and communicate through chemical signals called neurotransmitters. This reaction generates an electric field and we can record these reactions by placing electrodes nearby.
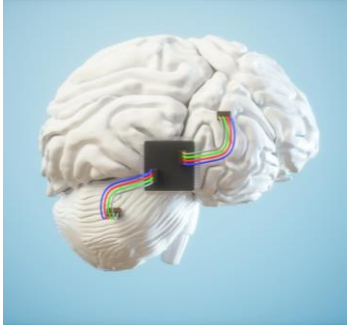
The chip will contain several tiny electrodes, thinner than a strand of hair at 100 micrometers. They understand the electrical signal in your brain, translate them into an algorithm that a machine can read. Isn't it fascinating?

Recent Development

No more saying "Ok Google" or "Alexa"

Fitted along with the electrode array is to be a trans receiver. It would help to transmit the readings from the brain to other electronic devices or maybe even users of the same technology. There's a hypothesis that this could result in a new form of communication. Communicating mind to mind, without speaking or typing. A hermetic package protects the control electronics from body fluids and attacks in the course of the foreign body reaction in case if any.

It also protects the body from seam able toxic agents of electronic components. Connectors allow assembling during the surgical procedure of implantation and exchange of components if failures occur.

CHALLENGES FOR NEUROTECHNOLOGY

Whilst this might sound exciting for some and shocking for others, It is worth remembering that the technology to deliver these ambitions is still in the planning stages. It is facing significant challenges from industry and public.

There are various challenges faced by Neurotechnology. The former challenge is the way it is being done. Surely, it is going to be the next big thing. But it needs to be controlled.

Ref:https://link.springer.com/article/10.1007/s12152-019-09406-7

The next main challenge is Data Ladders. This is nothing but different several levels of organization. Once we overcome this, the next big task is to Simulate the brain. It is not an easy task if you consider the complexity of our brain. These are the main parts to be done. After this, comes the part of convincing.

The most vital challenge ahead for neuroscience is to recognize all of these fears, lay them to rest, and actively build public support for neuro science research together.

🔔 **A neurosurgical robot is capable of safely inserting threads into the brain extremely quick. i.e., about six threads per minute, avoiding blood vessels.**

"Fascinating aspect of Neurotechnology is that, in a certain sense, human beings and machines are "fused" together to a degree unheard of before."

Compiled by Sneha & Sanskruti

Neuralink's success will hinge on convincing us to install chips in our brains and tamper with the very nerve impulses that makes us who we are. That's a hard sell. There are a lot of people who are enthusiastic about invasive Brain Machine Interface. This system needs to be safe; it must have a fully wireless communication through the skin, and it has to be ready for patients to take home and use on their own without any problems.

It can also be used in Cyber Physical Systems. Now, in the future, besides helping people with psychiatric and neurological disorders, Neuro technology will drive each and every aspect of society. The possibilities are endless and beyond imagination! The roadmap for guiding the responsible research and innovation could make a huge visible difference towards a better future for all!

Ref: https://iopscience.iop.org
https://cristinagillopez.com/2020/05/01/neurotechnology-where-we-are-and-where-we-go/

MEET OUR ETA TEAM!

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	Shamini Iyer
SPONSORSHIP TEAM	Mustakim Ansari
	Sanskruti Talgaonkar
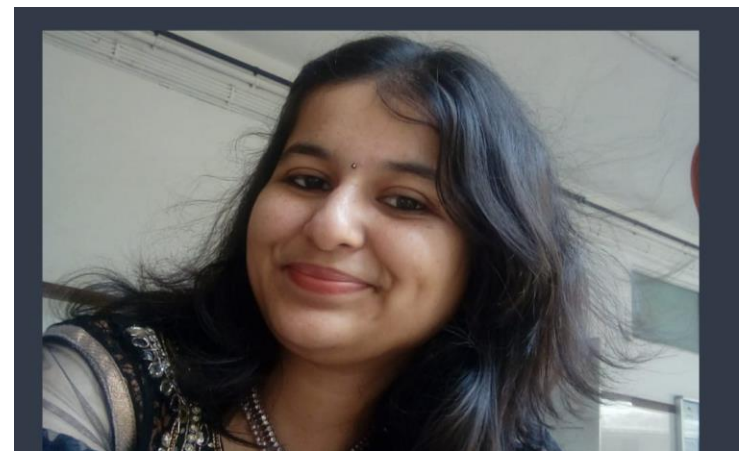
" Heartiest Congratulations to VCET Best Outgoing Student of 2019-20:

Ms. Ketakee Modak

ETA PULSE 2021

Coming Soon

ALUMNI TALK

Mr. Subodh Govind Desai

We are extremely pleased to interview Mr. Subodh Govind Desai who is a 2016 batch pass out student of VCET.

He is currently pursuing MBA from IIT-Nagpur. He was working as an Assistant Consultant at Capgemini and Infosys.

He was also awarded as Best Outgoing Student 2015-16, VCET.

1) When you first stepped into this field (Workex), how was the vibe around? Were the people around you supportive?

I always wanted to have work experience before pursuing MBA, but was never interested to get into IT company. So, after getting the campus placements in Capgemini, my initial aim was to survive in the industry but landed up developing immense interest.

After the training period, I was assigned to a development project. There it was a gradual learning process of adapting to the work culture and learning the corporate ethics apart from the technical skills.

Learning in the corporates was, one should always look out for mentors. If you are a student then reach out to professors or try to build a relationship with managers. Once you find a mentor, your process of development gets eased up as you will always have someone to guide and take an advice from.

2) Did you face problems learning the hacks of this field or was it a breeze (Workex)?

It's about the pace you adjust to the corporate life. Personally, I did not face much issue and it wasn't a breeze either as well. One has to stay focused on their goals but also try to have a contingency plan.

I could not clear CAT during initial 2 years but always had a contingency plan of exceling in this technology field, which helped me switch my job to INFOSYS.
At Infosys was interesting as you move up the ladder, people expect you to deliver quantifiable results. Here I got an experience of owning the projects and managing a team.

3) Why do you want to receive an MBA? Why now?

MBA is not something which came all of a sudden, I was trying to clear CAT since 3rd year of Engineering. I was always bad at these aptitude tests and its ok to accept that.

Reason to pursue MBA was to have a holistic development and it helps to setup platform to get into Leadership roles.
Even after having low percentile in CAT it was more about the profile and interview that helped to crack IIM-Nagpur.

4) What has been your most challenging or rewarding academic experience so far?

Most rewarding academic experience was being awarded the

'Best Outgoing Student 2015-16 at VCET'.
At VCET, I urge everyone to work towards it from the first year itself as it's a process of building your profile during 4 years of graduation.

5) How Did the College Prepare You for Your Career?

I was never inclined towards doing engineering, it just happened with the flow. Even the professors at VCET know the answer I gave when asked about why Engineering, it was always for the Fun.

Engineering in EXTC at VCET was the most beautiful experience I ever had. Each of the teaching, Non-teaching staff and HOD sir guided me through the process.

During first year itself I developed interests towards Student's Council at VCET and eventually ended up being a DGS. There it gave me first-hand experience to deal with the internal as well as external stakeholders.

Being in VCET cricket team it gave me an experience about how the channelized efforts can be converted to positive results. Graduation Experience played a crucial part in shaping my career.

6) How was your experience during the initial years?

Initial days were tough, as I was not so good with the coding but one has to adapt and evolve as per the situations.
In corporate nobody will teach you, it's a self-learning process wherein individual has to put extra efforts for things to fall in place.
Also, for most of you it will also be a period when you will be in a new city all alone. There are so many positives to take from each city and one should explore that as well.

7) What is your valuable suggestion for the young engineers?

Upcoming engineers should know the value of NETWORKING, it's a best opportunity to develop contacts with 7 graduation batches in case of an ideal engineering term.

Engineering Degree is just a piece of paper which everyone will have it some or the other day, what is more important is to learn the life skills from the colleagues during this graduation days.

Not everyone will again experience the days of being a student, so just enjoy this moment and explore the opportunities.

Results are not important, the most important part is participating or giving an attempt. If your attempt is pure, then results will follow you.
Always remember that "Hard Work beats Talent when Talent doesn't work Hard"

-As interviewed by Sneha Jaiswal and Omkar Chaudhari

Designed By: Kushal Raut