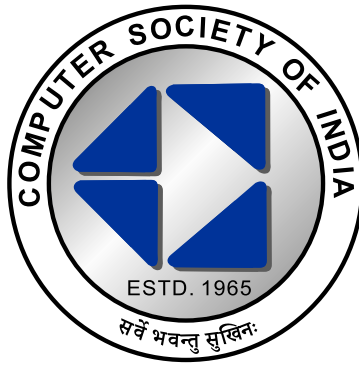




csipce
INVIGORATING TECHNOLOGY SINCE 2010

**bytestream
10001**





Formed in 1965, the Computer Society of India has been instrumental in guiding the Indian IT industry the right path since its formative years. Today, the CSI has 72 chapters all over India, 511 student branches and more than 100000 members including India's most famous IT industry leaders, brilliant scientists and dedicated academicians.

The mission of the CSI is to facilitate research, knowledge sharing, learning and career enhancement for all categories of IT professionals, while simultaneously inspiring and nurturing new entrants into the industry and helping them to integrate into the IT community. The CSI is also working closely with other industry associations, government bodies and academia to ensure that the benefits of IT advancement ultimately percolate down to every single citizen of India.

PCE

PILLAI COLLEGE OF ENGINEERING

Pillai College of Engineering (PCE) seeks to develop in its students a sound technical foundation and to enhance the natural curiosity of its engineers. We believe that a successful engineer is one who complements his deep theoretical knowledge with an intuitive practical approach. Pillai College of Engineering (PCE) was formerly known as Pillai Institute of Information Technology, Engineering, Media Studies and Research (PIIT) from 1999 to 25th April, 2016.

Our mission is to develop professional engineers with respect for the environment and make them responsible citizens in technological development both from an Indian and global perspective. This objective is fulfilled through quality education, practical training and interaction with industries and social organizations.



Hon. Dr. K. M. Vasudevan Pillai

Founder & CEO, Mahatma Education Society

Dr. K. M. Vasudevan Pillai is many things to many people, but at his best he is a pioneer, an entrepreneur and a social reformer who believes that education is the only means to large-scale transformation, the only language of change. A belief that saw him venture into areas of little or no development and start schools and colleges against all odds.

We would like to express our deep gratitude for your generous support.



7
years

**CSI
PIIT**

ASSOCIATION ESTD. SINCE 2010

csipce
INVIGORATING TECHNOLOGY SINCE 2010

CELEBRATING CHANGE, INNOVATION, PASSION AND TECHNOLOGY

2010 - 2017

 **AlumniMeet**

GREETINGS



Dear campus community,
Today we are delighted that our students have taken byteStream to a new level. The magazine 'bytestream' promises to be one of the leading college magazines in Navi Mumbai. It provides our students a new avenue to demonstrate their skills in scientific and technical writing, art as well as administering and publishing a state of the art magazine. Pillai College of Engineering (PCE) has become one of the leading colleges in Mumbai partly due to the talent, dedication and hard work of its students and we, the management wish the magazine and its creators the best of luck for the future.

Dr. Priam Pillai,
COO of Mahatma Education Society (MES)



Dear Students,

It gives me immense pleasure and a sense of pride, and to be part of this event of magazine launch of CSI PCE. I've seen it grow from the very beginning as small student body organization to what it is today and I am truly delighted to see where it stands today. CSI, being a premier and one of the oldest association for IT/Computer professionals, the CSI membership commands respect among fellow professionals as well as IT organizations. I am happy that we have such an active and vibrant student chapter of CSI-PCE.

The educational-professional bodies like CSI and others help the students with comprehensive perception of the professional life, the industry trend from time to time and the Industry expectation from young professionals. The PCE Chapter of CSI not only provides opportunity for the members to interact with senior professionals but also enlarges their technical canvas by creating avenues for acquiring additional knowledge and also share it among the peers and established professionals. Professional bodies play a vital role in the growth of the individual, giving them the opportunity to acquire additional skill complementing those acquired through their regular curriculum.

I congratulate the CSI team for ensuring a very active academic year. I am happy to know that the CSI-PCE is bringing out its own technical magazine over and above all the technical activities conducted by them. This creates one more platform for the students to hone their technical writing skills and also to share the latest developments with their peers. I urge them to set the benchmark for other professional societies at PCE to catch up. Wish the entire CSI team all the best!

Dr. R. I. K. Moorthy,
Principal, PCE.





It gives me great pride to see the CSI-PCE Team launching the 2017 edition of their magazine '**bytestream**'. It has been a long journey but the team has worked undying energy and enthusiasm for the success of the magazine.



'**bytestream**' has been a voice for all the tech-savvy fanatics, inspiring and encouraging them to cultivate and promote their technical knowledge and skills. I would love to congratulate the entire CSI-PCE team for the unfathomed success of byteStream and all their technical events. Keep up the good work and team-spirit and best of luck for your future endeavors.

Warm Regards,

Dr. Madhumita Chatterjee,
HOD, Computer Engineering



I feel the utmost pride in standing up here and to see CSI-PCE coming up with another edition of their magazine byteStream. The efforts that have been put in by everyone are both praise and applaud worthy. I am delighted to see how members and students have actively participated in extracurricular activities & performed remarkably well. Their interest in the technical field & their desire to push their knowledge barriers is just thrilling and joyful to see.



My heartiest congratulations to the entire CSI team for the honest efforts they put in and their hard work for commendably designing this magazine & I expectation CSI-PCE to keep up the good work & come up with similar startups. I wish the whole magazine team All the Best!!!!

Warm Regards,

Prof. Sharvari Govilkar
HOD, IT Engineering



I have been with CSI PCE for over five years now and they never fail to amaze me. Year after year, they make sure to come up with something out of the box and something that's without a doubt outstanding. Today, I can proudly say that I am associated with CSI-PCE Student Branch– the most active CSI branch in Mumbai. And this launching of the magazine makes me feel honored and satisfied to be a part of it. I am happy to see that each member of CSI-PCE Student Committee have actively participating and worked hard during the execution of various workshop, along with their academic schedule.

I congratulate the magazine team for launching this third annual magazine. They have been working hard to compile every bit of byteStream. I wish them All the Very Best for their adventures ahead and encourage them to keep the CSI flame burning red hot as always.

With Best Wishes,

Prof. Varunakshi S. Bhojane

Student Branch Co-ordinator



It takes a lot of passion, determination and patience to transform ideas into effective solutions and even more to turn those practical solutions into a success.



It gives me immense pleasure and pride to introduce you to the 2017 edition of CSI-PCE's annual magazine - **bytestream**. The magazine is a compilation of credible and illuminating articles organised into segregated sections including both technical and non-technical topics which will engross the readers and add to their knowledge.

I would like to thank our Principal, Dr R.I.K. Moorthy for encouraging us at every step of the way. I am highly obliged to our Student Branch Coordinator, Prof. Varunakshi Bhojane for her guidance and firm support in bringing out this magazine and putting CSI-PCE at a remarkable peak.

I heartily congratulate our Magazine Team Head Mr. Nimish Mhatre and his team who have worked hard with dedication to make byteStream an appealing publication for everyone. Last but certainly not the least, I wholeheartedly thank my entire team of CSI-PCE committee for their support and dedication.

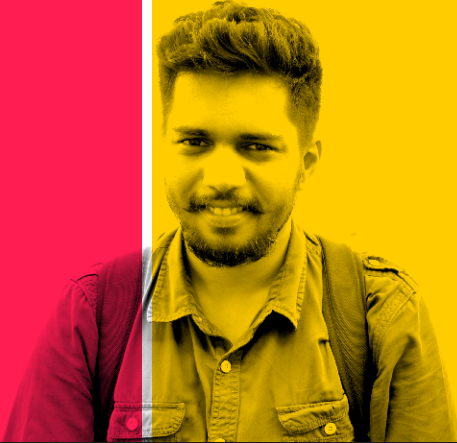
We aim and strive to take CSI-PCE to greater heights and we hope that this magazine stands true to the expectations of each of our valued members.

Regards,

Rahul Govindkumar,

Chairman

Editor's Note



**Design is not just what it looks like
and how it feels like.
Design is how it works.**

- Steve Jobs

It has been an honour to work as the Creative and Magazine Team Head from 2014-16. I humbly welcome all readers to **bytestream '10001'**. 10001 is the binary for 17. This 2017 edition of '**bytestream**' marks the 7th year celebration of the association between Computer Society of India and Pillai College of Engineering. Ever since its early formation in 2010, CSIPCE (formerly known as CSI-PIIT) has been making technology more accessible to the students and providing opportunities to work for the student community. It's an environment that let's you open doors to new horizons and do your part in return to the humanity. It has been quite a journey.

The cover represents all faces that have been a part of this journey, till date. The three 'bars' on the cover mark the continuous growth graph of CSIPCE and also '111' which is the binary for 7. (Yes! Binary again, because computers speak 1s and 0s) I thank every person associated with CSIPCE all this while. Your efforts have made it possible for us to touch the student lives in a way that ensures growth for all.

This edition is a perfect amalgamation of my love for ever changing **Design** and **Technology**. The purpose is to enlighten you with a dose of insights from the technical world today and tomorrow.

I thank my Creative Editor - Chetan Kalra and the entire Magazine teams 2015-17 for playing their part in the process. I also thank Prof. Varunakshi Bhojane for her ever firm support and guidance. I lastly thank Team CSIPCE for the love, and belief in me and my work. This wouldn't be possible without you.

#KeepCreatingAndExploring

Warm Regards,

Nimish Mhatre.

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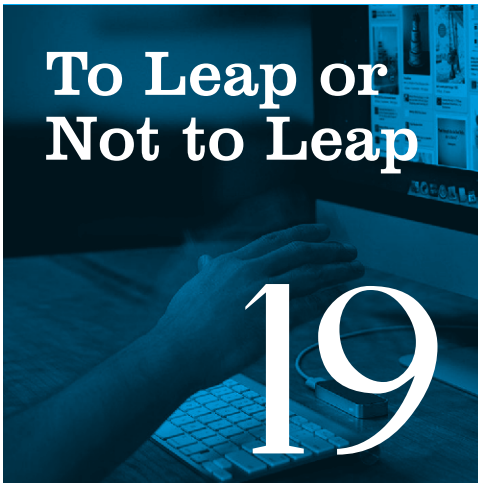
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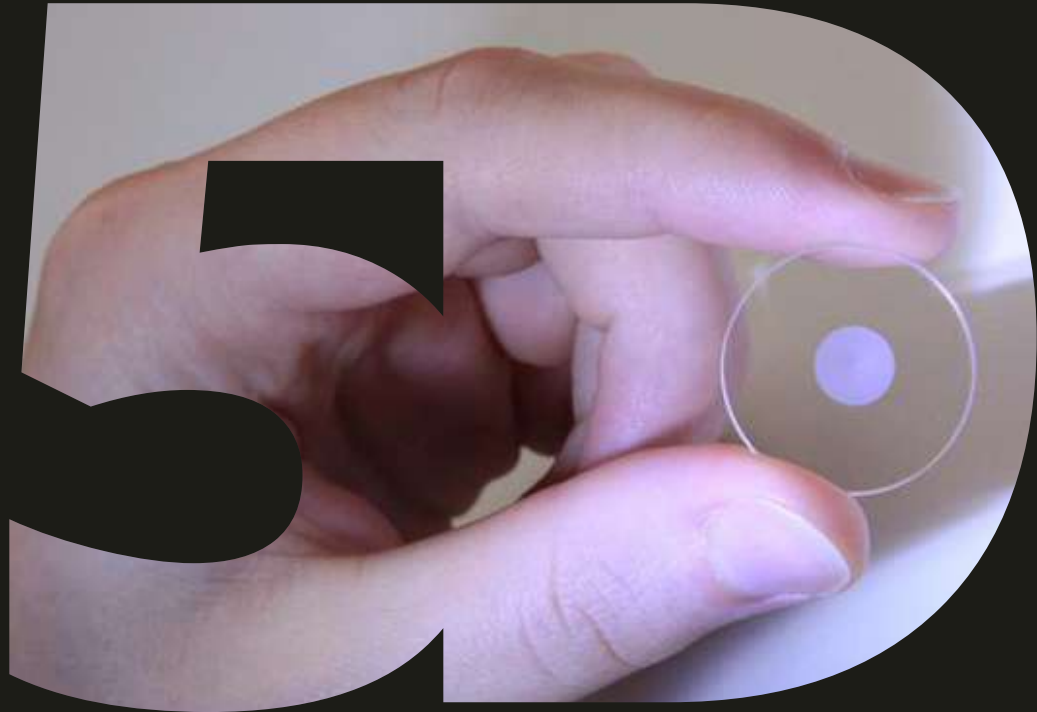
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SUPERMAN STORAGE REBORN:

- Chetan Kalra



Many forms of data storage have come and gone over the years, as computer technology continues to evolve. Each has been discarded after a time, replaced by something bigger, better, and more durable.

Compact Disc (CD) is a digital optical disc in which data is read by shining a laser at a tiny line with bumps in it. Whenever the laser hits a bump, it's reflected back and recorded as a 1; whenever there's no bump, it's recorded as a 0. These are just two dimensions of information on or off but from them, CDs can store anything: music, books, images, videos, or software. But because this bumpy line is stored on the surface of the CD, it's vulnerable.

With the introduction of these 'five-dimensional' glass discs, there may not be a need to look much further when it comes to advances in data storage. Developed by researchers of Southampton University in Optoelectronics, the memory crystal has a massive 360 terabyte storage. The method is called five-dimensional data storage.

The 5-D measurements incorporate height, length, width, the way the subject is orientated, and location. In addition, the gem is rather challenging to damage. It can remain stable under temperatures as high as a thousand degrees Celsius. It virtually has an infinite lifespan when preserved at room-temperature. In essence, the micro-developed crystal can keep information for more than thirteen billion years.

5D discs, by comparison, store information within their interior using tiny physical structures known as nanogratings. Much like those bumpy lines in the CDs, these change how light is reflected, but instead of doing so in just two dimensions, the reflected light encodes five hence the name. The changes to the light can be read to obtain pieces of information about the nanograting's orientation, the strength of the light it refracts, and its location in space on the x, y, and z

axes. These extra dimensions are why 5D discs can store data so densely compared to regular optical discs. “Our following objective is to improve the rate of crafting and come up with a magnifier-free read-out drive. We are now developing the science equivalent to what is utilised for scanning traditional disk’s,” stated Rokas Drevinskas from the University of Southampton.



As stated by the experts who developed the design of the crystal, the memory crystal would be ideal for corporations with gigantic records to take care of using the crystal, museums, galleries, libraries will be able to save their important information and documents, as stated by the institution. Recently, the Universal Declaration of Human Rights, Magna Carta, Newton’s Opticks, and a copy of the early Christianity Bible, were each scanned for this unique innovation. Now, this becomes much more interesting that we will soon be having a device in the future years to store a mass of information.



“

It is thrilling to think that we have created the technology to preserve documents and information and store it in space for future generations. This technology can secure the last evidence of our civilisation; all we’ve learnt will not be forgotten.

- Professor Peter Kazansky

CLICKJACKING

YOU ARE JUST
ONE CLICK AWAY
FROM BEING **CLICKJACKED.**



Ever since the advent of Internet there have been various security issues. Many security mechanisms have been deployed in the past which have turned obsolete with time. The need has always been to provide users around the globe a secure web experience. However Internet being an open medium this has so far been an unfulfilled dream. CSS and JavaScript being vital for web pages, has turned out to be a source of a new type of attacks commonly called Clickjacking.

WHAT IS CLICKJACKING?

Clickjacking is a malicious practice of manipulating a website user's activity by concealing hyperlinks beneath legitimate clickable content, thereby causing the user to perform actions of which they are unaware. Clickjacking is peculiar in itself as in this the user reveals the confidential data by falling prey to a trap set based on human cognitive abilities, hence emancipating the possibility of such an attack is all but impossible. Clickjacking attack was introduced by Robert Hansen and Jeremiah Grossman in 2008, to perform actions that the user is not interested in. The attacker achieves the goal by choosing a clickable region on a web page e.g. the region where the login button on the web page is located and user is asked to enter his or her username and password.

On clicking, malicious web page loads from the website inside an iframe, which makes use of Cascading Style Sheets (CSS) to hide all the content on the website except the targeted region. It may be transparent or overlapped by another element on the website. Technically, both the JavaScript and CSS are used to place the iframe under the mouse cursor to make user click in the targeted region resulting a malicious action the attacker is intended to do. Clickjacking attack can cause several threats like stealing personal data such as bank account information, credit card information and social security numbers or installing software applications on a computer.

Clickjacking, also known as a "UI redress attack", is when an attacker uses multiple transparent or opaque layers to trick a user into clicking on a button or link on another page when they were intending to click on the top level page. Thus, the attacker is "hijacking" clicks meant for their page and routing them to another page, most likely owned by another application, domain, or both.

One of the most notorious examples of Clickjacking was an attack against the Adobe flash plugin settings page. By loading this page into an invisible iframe, an attacker could trick a user into altering the security settings of flash, giving permissions for any Flash animation to utilize the computer's microphone and camera.

~~PRIVACY~~

~~SECURITY~~

~~SAFETY~~



! EXISTING ATTACKS !

1. Compromising Pointer Integrity

Attacker may violate pointer integrity by deploying a fake cursor and place the real pointer at a location of his benefit. This is termed as cursor jacking. It leads victims into misinterpreting a click's target, since they will be having wrong perception about the cursor's location. Using various CSS property, an attacker can easily hide the default cursor and programmatically draw a fake cursor.

A common scenario is one in which a user gets a popup like an advertisement, and he wants to skip it and therefore proceeds to click on skip this ad believing its purpose is to skip the Ad. But the cursor visible to the user is fake, the actual cursor is on something like permission granting button which might be an accept button of webcam access. Being completely unaware of the existence of fake cursor he will actually click on skip this ad and therefore grant webcam access to the attacker. Fig 1 demonstrates this scenario.



2. Compromising Target Display Integrity

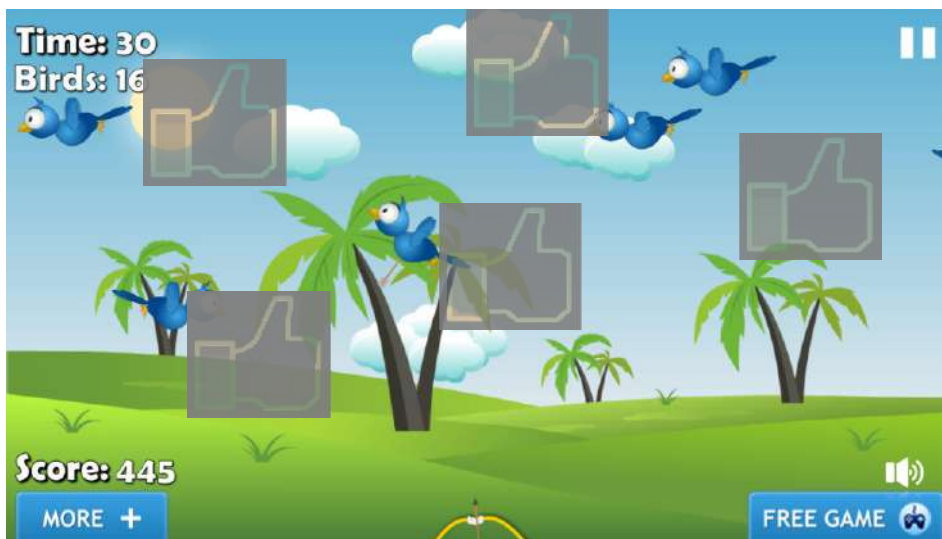
It is done by layering transparent malicious iframes over another legitimate website. CSS opacity property and z-index property are utilised to hide target element over the legitimate one. One sees the genuine page but the response is directed to the transparent traps that sit on top of it.

Frequently while surfing through internet users are prompted with alerts like “You Have Been Logged Out Please Sign In Again” or “Please Like To Support Our Cause” and we proceed to sign in again or cast our like. But while doing so we are actually giving response to the malicious form that sits on top of what appears to be a valid login page hence providing our personal information to the attacker. In the latter case users tend to like the attacker's social page on Facebook and thereby compromise their identities which can then be masqueraded by attacker for evil purposes like cyber blackmailing. Demonstration based on such attacks can be viewed in figures.



3. Whack-a-mole attack to compromise web surfing anonymity

Clickjacking attacks usually require tedious work of studying victim site's layout and accordingly setting the clickable traps. But in whack-a-mole type of Clickjacking this work is tremendously reduced. The attacker simply deploys attractive games intended for users to play. The attacker sets traps randomly beneath the game visuals. Such games require clicks. Shooting the birds as shown in the figure, for instance. People fall prey to such content and start playing the game not realising that they are providing multiple clicks to the attacker.



Clickjacking is one of the attacks which don't get a lot of importance normally but it is dangerous, however the extent upto which it can exploit private and important content is unclear. Thus, it's on us to be aware of such attacks. We need to be careful towards the preventive measures of Clickjacking.

Clickjacking entails targeting an innocent user onto a malicious website. Because of this, the user's browser could totally come under the control of the hacker who can perform dangerous tasks on the behalf of the user or may steal his confidential information.

Clickjacking attacks are mostly website and browser dependent. There's no easy fix for this design bug. It's very likely that we'll continue to experience variations of Clickjacking attacks in the near future. The best way to protect ourselves is to follow rational security practices and use only the latest, most up-to-date, and fully patched versions of software products.

- Rahul Govindkumar

Jio

A BUSINESS MASTERSTROKE

- Tilby Thomas

Telecommunication sector is the latest business sector to rake in the big bucks across the globe. People around the world have realised the potential of new technology and have started to acknowledge that the world has transformed into a 'Global Village'. You can access all and any data within seconds and reach across to anyone in any part of the world with just a few clicks. You can carry the world in your hands and it is easily available at your fingertips! From analog voice calls and text messages to video calls and fourth generation internet options, the world has seen a huge transformation and the telecommunications sector is responsible for this giant leap in connecting people across the globe.

Smartphones have made it extremely easy for people all over the world to access the internet. India is the second largest market in the world for a telecommunications network. It has the second highest number of the phone (fixed and mobile) and internet users in the world. This means that the telecommunications sector in India is a gold mine for business ventures and investors. The increase in the number of mobile and internet users has also helped to reduce the gap between rural and urban India. It is this potential that Mukesh Ambani recognised and decided to tap into when he said during the initial announcement of Reliance Jio "Today I see a billion people as a billion potential consumers, an opportunity to generate value for them and to make a return for myself".

India's richest man made a second foray into the telecoms industry after losing his brain-child Reliance Infocomm Limited (now Reliance Communications or RCom) started in 2002, to younger brother Anil Ambani in the family feud in 2005. The split also included a non-compete pact which meant that Mukesh could not start a rival telecoms venture. This pact was later scrapped in 2010 by mutual agreement. No sooner was it scrapped that Mukesh's RIL bought Infotel Broadband Services Limited (IBSL) for a whopping 4,800 crores on the same day that Infotel achieved broadband spectrum in all 22 zones in India in the 4G auction. IBSL was renamed as Reliance Jio Infocomm Limited (RJIL) in January 2013.

“

Today I see a billion people as a billion potential consumers, an opportunity to generate value for them and to make a return for myself.

- Mukesh Ambani

Although the groundwork for Jio has been underway since 2010, it can be safely said that Mukesh had this dream of a digital revolution right from 2002 when he first ventured into the telecommunications business. There are six major aspects that have to be considered while talking about Reliance Jio.

1. THE GRAND SCALE OF INVESTMENT

Investing in a new business is not a big deal for the richest man in the nation, but still, the money that he has put into Jio will surely boggle your minds. Mukesh Ambani has invested a staggering 2,50,000 crore rupees i.e. 46.3 million dollars in Reliance Jio. Well, let's put it this way to understand the magnitude of this amount- it is more than double the combined investment of Idea, Airtel and Vodafone in the 4G sector. When asked about how he expects to get the returns for such a huge amount, Ambani says that it is not just a random gamble but rather a well thought-out, well-engineered and well-executed investment. He also stated,

“ Reliance at this scale and size will not do anything that does not create huge societal value. At the end of the day, I strongly believe that the society gives the licence to operate and making only money is not the licence. ”

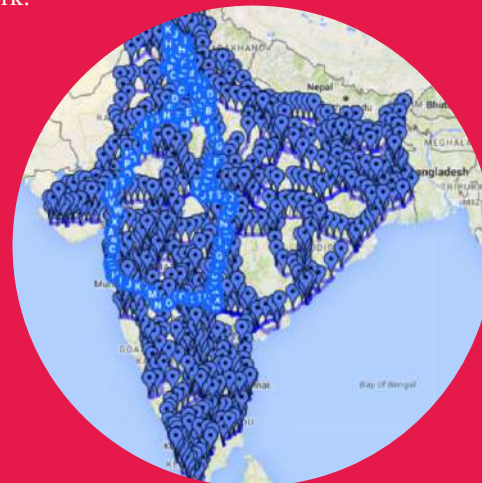
The map gives an estimated idea of the optic fibre network across the country.

3. FREE VOICE CALLS & ATTRACTIVE DATA PLAN

With the advent of new technology, it has become very clear that voice has no future. So if a company wants to win the market then they have to make headway in data. This is something that Ambani realised way back in 2010 and has been working on developing fourth generation (4G) network when other companies were still trying to set the base for 3G network. Jio has made voice calling absolutely free for all networks across the country. Only data usage is being charged and that too at very low prices as compared to other service providers. This has forced all the other companies to cut down their rates. It is quite natural at this point to wonder how Jio can afford such low charges for data and free voice calls. Well, this was possible because the network was being laid since 2010 and is not a sudden change being brought into place.

2. THE OPTICAL FIBRE NETWORK

Reliance has been laying an underground network of optical fibres since many years. This has been one of the biggest advantages for Jio. Optical fibres can transmit data at the speed of light. Jio has the largest network of optical fibre network of almost 2.5 lakh kilometres across the country. Other telecom contenders cannot even think of overtaking this network for at least the next five years. The groundwork and money required for this large a network will take years and by then Jio will have already made the top mark in the game. Reliance Jio and Reliance Communications have an agreement to share the fibre network.



4. JIO APPS

Jio has not just created a network for voice calling and cheap data usage; they also have a range of apps that will ensure that consumers do not have to go outside for major requirements. It has JioTV, JioCinema, JioChat Messenger, JioMusic, JioMags, JioXpressNews, JioSecurity, JioDrive, JioMoney Wallet, Jiofi, etc. this means that all the major requirements ranging from security, entertainment, banking and online payment have been met. Users require a Jio sim to avail these services. The latest tie-up with Uber means that you can book and pay for Uber cabs using Jio's online wallet. This means that Jio has an entire ecosystem that caters to the needs of all its users.



5. STRONG LONG-TERM VISION

Ambani had long foreseen the scope for making money in the telecommunications sector. Also, India being such a huge market, it is not difficult to obtain returns. His aim is to monopolise the market and become the largest Telecoms service provider of the country. And with the success that Jio has seen in just a few months since it was launched, we can easily say that Ambani was right on target. His masterplan has forced other contenders to shut shop and look for new shores. Many of the smaller companies are opting out of India and even the bigger names are considering mergers. The first was Norwegian multinational company Telenor that pulled out of India following the launch of Jio and merged with India's largest telecom provider Bharti Airtel. The latest to join this merger race is Reliance Communications! Yes, Anil Ambani's RCom has merged with Aircel and the news does not come as a surprise. Although Reliance Communications will continue to own their spectrum and network, the company will no longer exist as a consumer brand. This means that in just a few months, Jio has become the second largest service provider in the country.

Even Vodafone and Idea are in talks for a merger. This clearly shows the impact that Jio has had on the market. On the day of its announcement, all the major companies like RCom, Airtel, Vodafone, Idea, etc. saw a drop of up to 10% in shares.

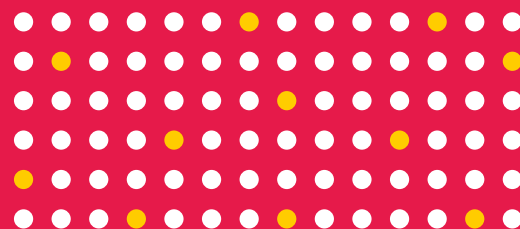
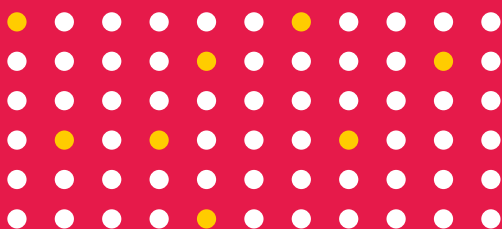
Mukesh Ambani has played his best cards and is waiting to see how his business masterplan finally unfolds. His technique was extremely simple and had just a few steps:

- Undercut the current market price by offering various irresistible discounts.
- Get people to switch to Jio due to very low data rates.
- Make optimum use of optical fibre to provide super-fast internet.
- Increase the number of subscribers.
- Recover the initial investment simply by the help of a very large user base.

6. COURAGE TO TAKE RISK

It is not difficult to see that Mukesh Ambani has taken a huge risk with his business strategy of Jio. But that also goes to show how strong his instincts as a businessman are. There is a possibility that Jio may not earn profits for a few initial years. But this has not stopped the business tycoon from refraining charging voice calls or provide cheapest data rates. This means that he knows what he is doing and his goal is not simply to earn initial profits, but rather to gain a monopoly in the market.

This basically shows what a shrewd and ruthless businessman Mukesh Ambani is. He has managed to not just bring his company right to the top but also kill all competition. If we calculate the returns based on the post-paid plans offered by Jio, we realise that if 30% of the Indian population use about 2 GB internet per month, then Jio can very easily recover the initial investment in about 5 years. Jio got 100 million users in six months since its launch. Ambani has a goal of capturing at least 80% of the market by 2021. We can only wait and watch how this business masterstroke turns out at the end. It is quite possible that by 2025 Mukesh Ambani might own more than 90% of the telecommunications market and with it also entire data about how India shops, eats, travels and has fun.





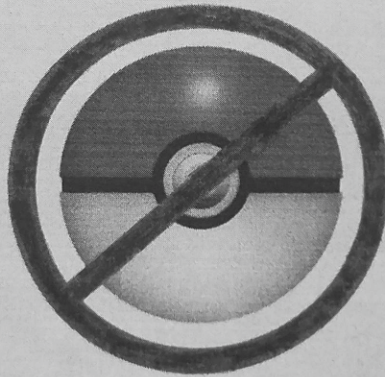
GOTTA START SOMEWHERE

Two years - that's how long it took for Niantic to create what took over the world overnight and made us all holed up socially networking youngsters as well as adults actually get out of our houses (Yes, even introverts!). Pokémon Go created a sensation which made us 90's kids feel nostalgic. Within a few nights, our streets were crawling with wannabe Pokémon trainers. If you had a creepy neighbour who never got out of his house and at one point even made you feel that the house beside yours is empty, I won't be surprised if this game actually made him step out of his house. And how can we forget the pokéstops which made all youngsters go to temples for probably the first time! But what is it that made us all go gaga over

Well, let's just break it all down. It all started in 1997, when Pokémon was first aired. The 10-year-old Ash Ketchum being electrocuted by Pikachu, their unbreakable friendship, the cute and dangerous power bearing pokèmons and the strategy that a trainer has to develop during a battle is what piqued our interests to such level that today, even after more than a decade, Pokémon Go managed to be a global sensation. After all, what original pokèmon fan wouldn't want his own little clan of Pokèmons? So may it be the lazy Psyduck or the cute little Bulbasaur or the boss of them all, Pikachu. Needless to say, Pokémon Go really made our childhood dream come true, since this virtual game is the closest we got to be to being a pokèmon trainer



**We are paying you to work,
not chase fictional video
game characters with your
cell phone all day.**



**Save it for your break time or
lunch. Otherwise you'll have
plenty of time unemployed to
"Catch them all".**

Made for Android and iOS users, our phones were a medium for connecting us to the virtual pokémon world. The fact that we actually have to move out and around to find a pokémon is what makes it even more fun! The gym battles are a cherry on the top, since we can battle your heart out to be the leader there. And if you think you can drive around on a car or bike to play, think again because you have to maintain a walkable speed to actually make the miles count for hatching an egg. This game is the best workout tactic! People actually started socializing because anyone else around them playing the game had an instant topic to talk about. And what's wrong with some healthy competition between the Mystiques, Valours and Instincts, right? Pokémon Go is the closest we have been to our childhood dream. However, nothing lasts forever.

No sooner did the game release than the news of accidents and homicides started rolling out on news. People running into a bad neighbourhood for catching a pokémon and getting stabbed or a teenager being hit by car for being too engrossed his phone for playing. Very few know that these were all false rumours spread by the rival companies of Niantic Inc. Though these rumours managed to make a few percentage of people go against the game, fans remain undeterred. Dedicated pages on Facebook, Twitter, Tumblr, Instagram and vines on YouTube popped up within no time at all.

One of the most bizarre news was that of New York Central Park where hundreds of trainers actually halted the traffic at midnight, literally creating a human stampede, to catch a Vaporeon. However, now that a few months have passed since the actual release of the game, we can see a downfall in the poke-trend. Millions of people have uninstalled the game for downloading the cracked version. The streets see lesser trainers now, since one can easily use fake GPS to go anywhere in the world without stepping down from the couch or being banned by Niantic if they are cautious enough. Also, the constant lagging and hanging of phone fast battery draining issues, etc. due to the game were a small momentum in this downfall.

Regardless of these issues, I think it's safe to say that Pokémon Go was one of the most extravagant topic of 2016. Whether the game survives in the market or not remains to be seen, it did manage to give us all an amazing time of our lives. It is interesting to see what Niantic and Nintendo would come up with for putting the game on top of the charts again. Will it be new updates or a completely new game, time will tell. Till then, for those who are new to this game, don't let the reviews scare you. The game is an amazing experience altogether. So grab your phone and power-banks, for you could be the next one to catch 'em all!

- Bhargavi Acharya

Gotta catch 'em all!™



AMAZON ECHO

With the world inching towards Artificial Intelligence (AI) with every tick of the clock, nearly, every aspect of our daily routine, now depends on the availability of technology at our nearest disposal. And Amazon, with its Echo and Dot, just made that much more appealing and fascinating. The launch of the Amazon Echo stirred the interests of hundreds of thousands of people worldwide.

Amazon Echo is where technology receives a personal touch. The Echo is a table-device that incorporates all the aspects of a virtual assistant, which you might find in your phone and supplements it with the state-of-the-art AI technical aspects.

- Anurag Nair



AMAZON ECHO DOT



Alexa uses the ‘Amazon Alexa’ application, available on Android and iOS platforms, to connect to the real world. Once online, Alexa is quite frankly, the most reliable AI available. It can connect to any smart device present in the vicinity. For instance, if you have a smart light installed, Alexa can easily gain access and control its functioning through voice inputs. A simple, **“Alexa, switch of the lights!”** will, in fact, switch them off. Not just that, she can control, othersmart devices like your smart phones, smart TV etc. The wake up phrase “Alexa-” is the key to voice conversation with Alexa. Alexa is a self-sustaining technology that adapts to each user requirement and understands their needs. The most fascinating fact about Alexa is its cloud based working. You would think, akin to the other AIs, Alexa would also be deployed onto the device, but as it so happens, it is deployed on a common cloud server where every update on Alexa and skills that each Alexa learns pertaining to the user is shared. So, not only is Alexa globally accessible, but it is also the same variety on each Echo device.

The Amazon Echo, itself, is a 9 inch cylindrical-matt-finish device that runs the cutting-edge Fire OS developed by Amazon and doubles up as a wireless Bluetooth speaker. The top has LED white rim that makes the Echo look stupendous. It has seven microphones built-in for high quality voice and sound recognition. For practical reference, the Echo will be able to hear and capture voice even if the source is 12 meters away. This not just makes it highly efficient as a home device but also allows the user to move around and still be able to communicate with Alexa. The Echo also comes equipped with a hefty 360 degree speaker body that produces powerful and crystal-clear sounds. This is truly appreciated when the Echo is assigned to reading an audio book or the news. It certainly performs all the functions of an ideal virtual assistant which include, playing music, checking the weather, creating reminders, surfing the web and other several tasks that one might need from their assistant. Apart from these typical features, the Echo harbors the ability to access your phone applications and sync your accounts. Consider the Pandora music application on your phone. A simple command: **“Alexa, play Pandora playlist.”** Will open up your Pandora playlist and start up your music. In addition to this, Amazon Echo, also allows direct access to its ancestor - Amazon.com. You can ask Alexa to look up the price of an object on Amazon and she will get you the details from the website. Once you have your card details pushed into your phone, Alexa will also be able to make purchases directly on voice command. Another interesting connection to the outside world that Echo has is the access to your Fitbit application. Alexa can bring up your record, or give you the details of your current count as per your phone response.

But, these are that you would expect your assistant to perform right? So to top that, the Echo also features interactive and exciting responses to general questions. A few of the frequently asked questions include: **“Alexa, what movies are playing in the neighborhood?”**, **“Alexa, when is the next flight out to Boston?”**, **“Alexa, what is the average rent in New York City?”**. Even uncommon requests like, **“Alexa, sing me a song.”**, **“Alexa, tell me a joke”** or even definitions of words. All of these are accounted for by the Amazon Echo -making it one of the most advanced and progressive AI assistant available.

But, having said so, Amazon went on to introduce, the ‘Amazon Echo Dot’. The Echo Dot is a much smaller version of its predecessor. But only in size as the Echo Dot still has the ability to perform every task that the Echo can. The Echo Dot is only 1.5 inches high and doesn’t include the much acclaimed 360 degree speaker that the Echo carries. But it is well compensated for by the price reduction. Nearly 75% cheaper than its sibling, the Echo Dot is much economical with exactly the same features. The Echo Dot also comes equipped with a 3.5mm AUX port which allows the user to connect a speaker in case they want to listen to music. The Echo Dot has a slightly improved voice recognition and has different variants when it comes to appearance –available in black and white.

Oh, and of course, if the name **Alexa doesn’t seem flattering to you, you can always change the name to whatever suits you the best!**



Li-Fi Internet

A new innovation in Wireless Communication

Most of us are familiar with Wi-Fi (Wireless Fidelity), which uses 2.4-5GHz RF to deliver wireless Internet access around our homes, schools, offices and in public places. We have become quite dependent upon this nearly ubiquitous service. But like most technologies, it has its limitations. While Wi-Fi can cover an entire house, its bandwidth is typically limited to 50-100 megabits per second (Mbps) today using the IEEE802.11x standard. This is a good match to the speed of most current Internet services, but insufficient for moving large data files like HDTV movies, music libraries and video games.

The more we become dependent upon the cloud or our own media servers to store all of our files, including movies, music, pictures and games, the more we will want bandwidth and speed. Therefore RF-based technologies such as today's Wi-Fi are not the optimal way. In addition, Wi-Fi may not be the most efficient way to provide new desired capabilities such as precision indoor positioning and gesture recognition. Optical wireless technologies, sometimes called Visible Light Communication (VLC), and more recently referred to as Li-Fi (Light Fidelity), on the other hand, offer an entirely new paradigm in wireless technologies in terms of communication speed, flexibility and usability.

Li-Fi—the superset of VLC & Co.

Many people's first exposure to optical wireless technology was VLC. This emerging technology offers optical wireless communications by using visible light. Visible light communications (VLC) works by switching the current to the LEDs off and on at a very high rate, too quick to be noticed by the human eye. Today, it is seen as an alternative to different RF-based communication services in wireless personal-area networks. VLC represents only a fraction of what appears to be a much larger movement towards optical wireless technologies in general. This larger world has been dubbed 'Li-Fi' (Light Fidelity) by people such as Dr Harald Haas of Edinburgh University and organisations such as the Li-Fi Consortium. "We have the infrastructure there," Haas said in a TED Talk demonstrating Li-Fi. "We can use them for communications. "All we need to do is fit a small microchip to every potential illumination device and this would then combine two basic functionalities: illumination and wireless data transmission. In the future we will not only have 14 billion light bulbs, we may have 14 billion Li-Fi's deployed worldwide for a cleaner, greener and even a brighter future." Li-Fi provides a completely new set of optical technologies and techniques to offer users add-on as well as complementary functionalities compared to well-known and established RF services as it comprises several optical wireless technologies such as optical wireless communication, navigation and gesture recognition applied for natural user interfaces.



What Li-Fi stands for :

Li-Fi comprises a wide range of frequencies and wavelengths, from the infrared through visible and down to the ultraviolet spectrum. It includes sub-gigabit and gigabit-class communication speeds for short, medium and long ranges, and unidirectional and bidirectional data transfer using line-of-sight or diffuse links, reflections and much more. It is not limited to LED or laser technologies or to a particular receiving technique. Li-Fi is a framework for all of these providing new capabilities to current and future services, applications and end users offering speeds of up to 100 times the speed of Wifi.

How Li-Fi works :

Imagine yourself walking into a mall where GPS signals are unavailable but the mall is equipped with ceiling bulbs that create their own 'constellation' of navigation beacons. As the camera of your cellphone automatically receives these signals, it switches your navigation software to use this information to guide you to the ATM machine you're looking for. You conclude your ATM transaction and notice the GigaSpot sign for instant digital movie downloads. You pick out that new Tom Cruise movie using your phone's payment facility, and then download within a few seconds the high-definition movie into the GigaLink flash drive plugged into the USB port of your smartphone.

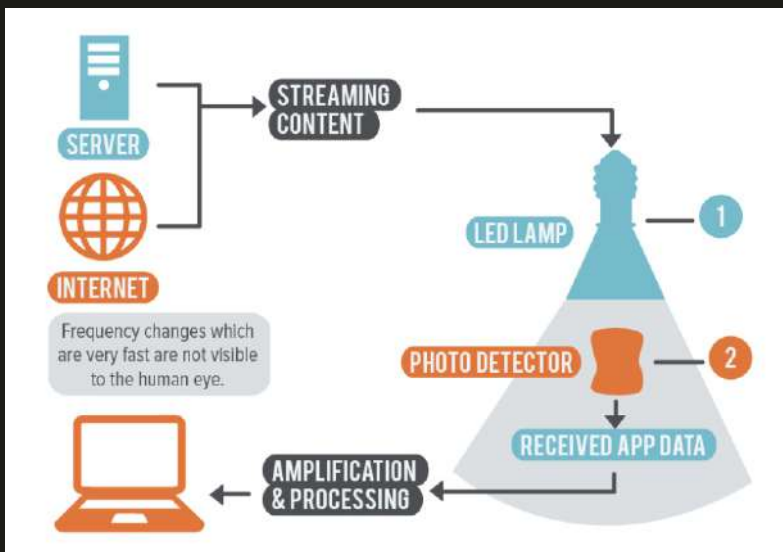
As you walk away, your phone notifies you that the leather jacket Tom featured in the movie is on sale nearby. You walk over towards the show window and your image comes up on the screen, wearing that coveted jacket. You turn and pose while the image matches your orientation and body gestures for a 'digital fitting.' When you walk into the store, the clerk hands you the actual jacket in exactly your size.

On the verge of a breakthrough:

First applications of Li-Fi have been put to use already, for example, in hospitals where RF signals are a threat due to interference problems with medical equipment such as blood pumps and other life supporting instruments. In the coming years, we will see more Li-Fi products entering the market, both in the industrial as well as consumer markets.

Limitations :

The light waves cannot penetrate walls which makes a much shorter range, though more secure from hacking, relative to Wi-Fi. Interference from external light sources like sun light, normal bulbs; and opaque materials in the path of transmission will cause interruption in the communication. High installation cost of the VLC systems.



TO LEAP OR NOT TO LEAP

- Gaurav Biswas & Pratik Deo

It is 2017 and someone says using a mouse is overrated. How'd you react to that? Obviously with a tad disagreement. Mouse is the integral part of a computer after all. But let's just consider this, you have experienced playing Kinect equipped xbox and you get a similar virtual control but not on xbox rather on your laptop/desktop. Amazed? Shouldn't be. These days people have to play catch up with technology rather it being other way round. The beauty of manipulating stuff without touching anything but just the air is exquisite needless to say. So is it safe to say computer mouse, your days are numbered?

Apparently mouseless computing is the hot new tech frontier: laptops and tablets controlled by touch, voice, eye-tracking and hand movements. Gesture control being the new cool, with smart TVs and lots of experimental startups emerging on the scene. One of those startups, Leap Motion, has brought this technology to the mass market. The Leap Motion Controller is a big step towards bridging this gap and allowing humans to manipulate computer programs in a similar manner that they manipulate real world objects. The controller itself is an unassuming 3-inch-by-1-inch-by-0.5-inch black box. Leap Motion can track the movements of all 10 fingers on your hand down to 1/100th of a millimeter, which is smaller than the tip of a pin. After having a hand on it tracks movements at breathtaking 290 frames per second.

"Precision is important, but it's also the lack of latency. Your brain gets confused if what's on the screen isn't moving at essentially the same exact time as your hand," Buckwald says.

“

If you want to use this on something like robotic surgery, you need zero latency. Robotic surgery could well be in Leap Motion's future.

- Andy Miller, President and COO

How does the mouse-killer work?

From the earliest hardware prototypes to the latest tracking software, the Leap Motion platform has come a long way. We've got lots of questions about how our technology works, so we're gonna take a look at how raw sensor data is translated into useful information that developers can use in their applications.

Hardware :

From a hardware perspective, the Leap Motion Controller is actually quite simple. The heart of the device consists of two cameras and three infrared LEDs. These track infrared light with a wavelength of 850 nanometers, which is outside the visible light spectrum.

Thanks to its wide angle lenses, the device has a large interaction space of eight cubic feet, which takes the shape of an inverted pyramid – the intersection of the binocular cameras' fields of view. Previously, the Leap Motion Controller's viewing range was limited to roughly 2 feet (60cm) above the device.

With the Orion beta software, this has been expanded to 2.6 feet (80 cm). This range is limited by LED light propagation through space, since it becomes much harder to infer your hand's position in 3D beyond a certain distance. LED light intensity is ultimately limited by the maximum current that can be drawn over the USB connection. At this point, the device's USB controller reads the sensor data into its own local memory and performs any necessary resolution adjustments. This data is then streamed via USB to the LeapMotion tracking software. The data takes the form of a grayscale stereo image of the near-infrared light spectrum, separated into the left and right cameras. Typically, the only objects you'll see are those directly illuminated by the Leap Motion Controller's LEDs. However, incandescent light bulbs, halogens, and daylight will also light up the scene in infrared. You might also notice that certain things, like cotton shirts, can appear white even though they are dark in the visible spectrum.

Software :

Once the image data is streamed to your computer, it's time for some heavy mathematical lifting. Despite popular misconceptions, the Leap Motion Controller doesn't generate a depth map – instead it applies advanced algorithms to the raw sensor data. The Leap Motion Service is the software on your computer that processes the images. After compensating for background objects (such as heads) and ambient environmental lighting, the images are analyzed to reconstruct a 3D representation of what the device sees. Next, the tracking layer matches the data to extract tracking information such as fingers and tools. Our tracking algorithms interpret the 3D data and infer the positions of occluded objects. Filtering techniques are applied to ensure smooth temporal coherence of the data. The Leap Motion Service then feeds the results – expressed as a series of frames, or snapshots, containing all of the tracking data – into a transport protocol. Through this protocol, the service communicates with the Leap Motion Control Panel, as well as native and web client libraries, through a local socket connection (TCP for native, WebSocket for web). The client library organizes the data into an object-oriented API structure, manages frame history, and provides helper functions and classes. From there, the application logic ties into the Leap Motion input, allowing a motion-controlled interactive experience.

How far can it leap after all ?

With the ability for developers to design their own software for the Leap Motion Controller it creative potential is incredible. The creators of Leap Motion have put the tools into the hands of others to experiment with and modify. This is already leading to the development of new, unique, software and uses for this technology. Furthermore Leap motion has made specific VR headset mounts compatible with Oculus Rift and HTC vive. Say whaaat? Exactly. Venturing into Virtual Reality wasn't that far for Leap Motion after all. Just mount it and bam you enter the alternate world of virtual reality. Let your imagination run wild and reach new heights, okay not too wild though because you gotta

What happens after you take the leap?

The Leap Motion Controller only works with programs that are specifically written for it. This means that what it can do is strictly limited to the programs that were built with the Controller in mind. Also, while much of the software works very well it has a tendency to be inconsistent. A lot of times the gestures are misinterpreted and it goes berserk. But which software is inch perfect, right? Hopefully these bugs would bug off in the future.



- Shailey Kadam

HUMAN CYBORGS

The fantasy of humans and machines seems so divine. All the limitations of humans could be eradicated. Feels like fun, doesn't it? One can be Arnold Schwarzenegger as The Terminator, the Borg from Star Trek: The Next Generation, or perhaps The Six Million Dollar Man if he's a little older. Every weakness of humans would come to an end and as dreamy this idea seems, it has already taken an edge to the end. All these ideas lead to one word - CYBORG.



CYBORG is basically a short form for " cybernetic organism ". A humantechnology mixture, that could make one have all the super power of machines, technologies and physical and mental abilities exceeding the pure power of humans but mind the fact that the term cyborg is not same as bionic, biorobot or android; it applies to an organism that have restored functions or enhanced abilities due to the integration of some artificial component. There's a lot more to cyborgs. In medicine field, there are two important and different types of cyborgs: the restorative and the enhanced. Restorative technologies restore lost function, organs, and limbs. The key aspect of restorative cyborgization is repairing of broken or missing processes to revert to a healthy or average level of function. There is no enhancement to the original faculties and processes that were lost. Whereas, the enhanced cyborg follow a principle and it is the principle of optimal performance: maximising output (the information or modifications obtained) and minimising input (the energy expended in the process). Thus, the enhanced cyborg intends to exceed normal processes or even gain new functions that were not originally present.

Some of the progress made are:



The Brain Computer Interface (BCI) provides a direct path of communication from the brain to an external device, effectively creating a cyborg.

Deep Brain Stimulation is a neurological surgical procedure used for therapeutic purposes. It has aided in treating patients diagnosed with Parkinson's disease, Alzheimer's disease, Tourette syndrome, epilepsy, chronic headaches, and mental disorders.



Retinal Implants helps to restore vision for people suffering from retinitis pigmentosa and vision loss due to aging.



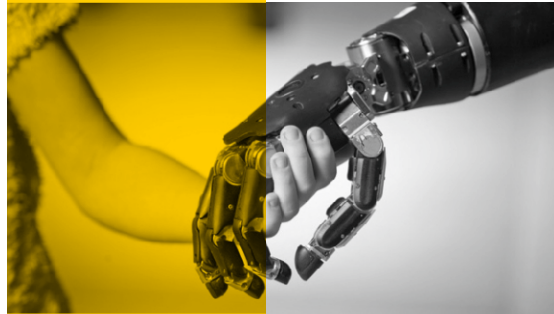
Although, if you thought enhancement could be the only use of such cyborgs, in 2014, researchers from the University of Illinois at Urbana-Champaign and Washington University in St. Louis developed a device that could keep a heart beating endlessly that utilizes a spider-web like network of sensors and electrodes to monitor and maintain a normal heart-rate with electrical stimuli. Yes, they literally found a path to immortalization!



There have been many human cyborg experiments till date. Neil Harbisson was born with extreme colour blindness but after getting equipped with a specialized electronic eye or eyeborg, he could see the colors which made him superior to other humans - for whom black, faded black, dark black appears to be same.



Kevin Warwick installed a microchip in his arm so that he can operate the doors, lights and heaters, also all other computer related devices, sitting in one room.



There are so many other living Cyborg humans such as Claudia Mitchell(bionic limb), Jens Naumann(Artificial Visions Interesting boon, fun fiction turned into reality, yet would you like to live for eternity with the body made of metal, connected with your nerves or other organs? Seems weird, doesn't it? Many other possible reasons would be the pain you have to go through while installing these tools into your body. Yet the progress of Cyborgs lies within humans to carry forward. With the increasing technology and its usage would someday change the world into robots and semi-robots. Ever imagined what would be the remaining difference between the nature and technology when everything would just be in place, perfect and worked in sequence. Progress would stop. Technology wouldn't move on if everyone's brain would be replaced with technical brains. Ever feared that love wouldn't exist if all the hearts would be replaced with those spider-web hearts? But surely it would make the life of disabled and other special people to acknowledge the world, giving them a new life. Cyborgs may be a boon or a curse. It totally depends on humans creating them to limit or exceed their thoughts keeping in mind the natural processing of human beings. We would surely love to see the people's happiness but not at the cost of crossing the limit lines of the nature.

Are you listening intelligently ?

- Gaurav Biswas & Pratik Deo

Imagine if you could make a garage band sound as if it were playing in a concert hall, or if could turn down the volume of a screaming baby on an airplane. The earbuds from the **Here Active Listening** can now instantly transform sounds from your surroundings. These wearable devices seek to "augment reality" i.e. in this case, your soundscape. In the future, these devices could enable translation of live speech, much like the "universal translators" in "Star Trek". One can only hope right?

"We believe in a future where supercomputers can fit in the ears," Noah Kraft, co-founder and CEO of Doppler Labs, told Live Science. Noah Kraft the CEO and cofounder of Doppler Labs apparently believes in a future where he can visions ears fitted with supercomputers. The future that was imagined in Terminator isn't far away then. Well the Here system differs from both virtual reality and augmented reality headsets. Virtual reality headsets, such as the Oculus Rift and Samsung Gear VR, block the user's view of the real world, while augmented reality headsets such as Google Glass and the Microsoft HoloLens superimpose images onto the real world to create a mixed reality. In contrast, Here seeks to modify what people hear instead of what they see. "We think the future is in wearable technologies, in our case, hearables. We want people to be more engaged in their environments, to personalize their sonic experiences" said Kraft.

here
ACTIVE LISTENING



The Here system consists of a pair of earbuds that use Bluetooth to wirelessly connect to a smartphone app. A microphone on each Here earbud captures incoming sound waves. Electronics in each bud can modify these sounds, and then miniature speakers play the result, all in less than 30 millionths of a second, leading to no perceivable delay, according to Doppler Labs. Users can use the smartphone app to adjust Here's settings. The earbuds can boost or reduce the volume, bass, treble, reverb and other aspects of live sounds in a person's environment. For example, you could dampen noise from chatter in a crowded room or crank up the bass of music playing at a club.

Hans Zimmer the legendary film composer says " You can turn off your nagging mother or the dog barking. It's about having control of your life beyond the ear that you were born with." Gotta admit Zimmer has a good sense of humor for an old man. To nullify sound, the earbuds possess not only complex internal air spaces, but also active noise-cancelling technology, which generates sounds to counteract incoming noises. Here can operate for 4 to 6 hours with the help of a rechargeable lithium-ion battery and low-power electronics that optimize battery power. Moreover, the case that holds the earbuds houses two extra charges as well, Doppler Labs said.



Through Kickstarter, Here raised more than \$635,000 from more than 2,800 backers. Doppler Labs then raised \$17 million from venture capitalists to help bring Here to market. And that's how this company started. They just made 10,000 Here units in the start. And since then they got so popular that they have come up with an improved version of Here Active and are soon launching Here One earbuds with extra controls compared to the earlier earbuds. When Doppler Labs first launched Here Active they emphasized that it is not meant for phone calls, nor does it play music that's been wirelessly transmitted by smartphones. Here is not a hearing aid, either, nor is it meant to replace the kind of hearing-protection systems used at firing ranges.

But with Here one they just changed their stance became what they denied earlier. Here one has all the above features in its device as a result becoming the complete experience. However the true power of Here is yet to be unearthed. The future where you walk into a country whose language you don't speak and yet be able to converse with the locals without embarrassing yourself.

Useful Websites

1. Beautiful free stock images :

wallpaperscraft.com
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2. Best Fonts

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5. Web Video Tutorials

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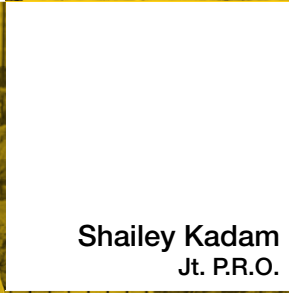
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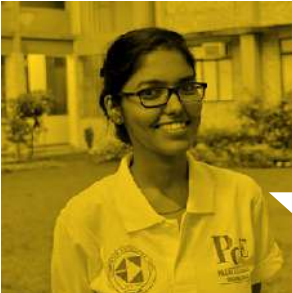
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