MAHATMA GANDHI INSTITUTE OF TECHNOLOGY

SYNERGY

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NAMASTE CORONA

SENSEX

THE SPIDERMAN

EXCLUSIVELY MGIT!

FROM THE PRINCIPAL'S DESK

It is with profound sense of pride and pleasure that we present you this very special volume of SYNERGY. Every page unfolds a plethora of the abundant creative and literary talents of our ever enthusiastic students. You can feel the pulse of this great institution as the pages reveal our students' apabilities. SYNERGY is truly the systematic product of a team of people. I am delighted to present you through these pages our students' thoughts, attitudes and aspirations. These young shining stars with their well embedded roots and spreading wings are the promise of a great tomorrow. This institution serves as a springboard from where they can unleash their true potential.

"Yesterday - Hierarchy was the model. Today - Synergy is the mandate." - Dennis Waitle

I encourage everyone to go through this wonderful masterpiece of MGITians, whose quality ideas and contributions made the first edition of SYNERGY colourful and readable.

Prof. K. Jaya Sankar

Principal

Message from TEAM SYNERGY

We're thankful to our Principal-Prof. K. Jaya Sankar, faculty coordinator, MS C.N.A. Chandra for giving us this golden opportunity to be a part of "Synergy" newsletter and their constant support and guidance in the instrumental success of the launch of this newsletter.

As part of the IDEA INCUBATOR club of MGIT leading this newsletter, it was an amazing learning curve for us to work as a team and start the newsletter from scratch.We felt this was a necessary arrangement to give enough acknowledgement and feats of our fellow students, faculty and management.

We expect the newsletter to become a platform for students to showcase their talents and skills. We wish that the newsletter acts as a bridge between the faculty and students and make MGIT a more informed and student-centric community.

We welcome everyone to give us suggestions, articles, feedback and ideas to improve the newsletter with time.

Best,
Team SYNERGY
idea.mgit@gmail.com

iDEA INCUBATOR MGIT R & D

CELEBS AND DIGITAL DETOX

By Atharva Patil
Mechanical 1/4

Digital detoxification also known as digital detox is a trending movement where one quarantine's themselves from all forms of technology for a specific period of time which can last from an hour to days and weeks and in some cases go on indefinitely. Among those who support this movement are some of world's well known personalities. We will be looking at what they think and how it has affected them.

1. Ed Sheeran

Back in 2015, Ed Sheeran decided to detoxify himself from social media. He claimed that he was living his life through his devices. He told his fans "I find myself seeing the world through my screen and not my eyes" which promoted the break from all technology.

2. Kendall Jenner

The Kardashian/Jenner clans are no strangers to social Instagram posts it came as a shock to us when we found out Kendall Jenner appreciated logging off. Jenner recently told Allure magazine that so many of her family and friends are addicted to their phones. She hates itwhen people are glued to their phones during meal times, and the constant need to photograph a beautiful location rather than just take it in. After Sister Kylie spent a vacation hooked to her phone Jenner realized the dependence on these devices and prompted change “sometimes I delete Instagram or Twitter or Snapchat off my phone for a couple days.”

3. Steven Spielberg

One of the most famous directors of all time isn’t constantly glued to technology. Spielberg believes that our constant logged on lifestyle has a negative impact on creativity. Spielberg told Wired magazine that technology can be our best friend but it can also be the biggest party pooper of our lives. He said. “It interrupts our own story, interrupts our ability to have a thought or a daydream, to imagine something wonderful because we’re too busy bridging the walk from the cafeteria back to the office on the cell phone.”

4. Selena Gomez

Pop star Selena Gomez told Thrive that her 90-day digital detox gave her the “most refreshing, calming, rejuvenating feeling.” Since her detox, she says she rarely picks up her phone anymore, and only allows a few select people to have access to her.

5.Stephen Curry

Our very own Stephen Curry goes on a social media blackout every year during the NBA playoffs so he can focus on his game. “When you’re really trying to zone in and keep your focus, you don’t want to have any unnecessary distractions during this point of the season. We have goals to accomplish, and you want to make sure you’re giving your all… It’s just a way to help me keep my focus on what’s important.” Now that you've gone through all the awesome things these great people have said, hope we too can take inspiration from them and at least try a digital detox at least once and check how it's affects us.

A FAILED FRANCHISE

By Nikhil Gotla
Mechatronics 1/4

Spiderman, he's not just a fictional superhero who does whatever a spider can. He's a character a character with depth,struggle and problems which makes him relatable to us as a person He does what's right not for glory or fame but because he has to and does not take his powers for granted Spiderman is a super hero who is a complete different person when he takes off that mask peter parker a person who has problems with money relationship and friends. His unique style and costume were a huge asset to his character he is just so amazing and he taught us "with great power comes great responsibility.

People adored this character since he was first introduced in marvel's 1962 anthology "The amazing spider man" from then he's been swinging in fans hearts for almost 6 decades.

THE FIRST REBOOT

The Amazing Spider-Man was the first big screen reboot of the wall crawler. 2012 was the fiftieth anniversary of the Spider-Man and also a time where superhero films were hot cakes. The NYC web head was a established hero who was fan's fav and a perfect movie could have been made billion Dollars to the studio. They got every thing right. Casting was perfect. Andrew Garfield was the perfect Spiderman one can ever imagine. As Spiderman was a character with depth and emotion they got Marc Webb as the director the aspiring film maker who made the master piece 500 days of summer and the budget was never the problem. With this cast and crew a spider man film could easily make a fortune for the studio but NO .....

Here's why,

1.NOBODY WAS ASKING FOR IT

The early 2000's was the time where superhero films were not cared as much as the blockbuster films or even as much as gangster films. But on 24 may 2002 a film was released which not only changed the superhero genre but also the way people look at movies and that film was Spider-man directed by Sam Rami, the character was brilliantly portrayed by Tobey Maguire. The first spiderman film made over 700 million USD at the box office and which was not just the highest grossing superhero film of that timebut was also one of the highest grossing film's of main stream media. On may 23 july 2004 the sequel Spider-man 2 was released which was not only a box office but also a critical success.
Hopes for the third instalment were sky high and he film was made on a whopping budget of 258 million made it the most expensive movie in that era the harsh involvement of the studio not only made the movie heavy but also made the movie take a fair share on negative reviews honestly it could have been a lot better. Spider-Man 3 was a financial success as it made 896 million USD world wide but a critical failure. Though spider-man 3 was disappointing fans were waiting to watch spider-man 4 which was already on sets but Sony had weird problems with the director Sam Rami and chose to reboot the franchise. Fans were mad at Sony for the reboot, Sony received a huge backlash from the fans.

2.THE THEME OF TASM 1

Considering the Nolan's dark knight series as a game changer the dark theme was so perfect for Batman the first billon dollar superhero film made Sony wanting the theme for Spiderman. Spider-man was a light fun loving character the dark theme forced the movie to look dull, Infact a bit scary for children so Sony chose to abandon it in the second installment.

3.THE WRONG TIME TO RELASE TASM1

In 2012 something special happened some thing which no studio did till then The avengers happened watching 6 superheros on a big screen was an eye feast for movie lovers joss whedon's way of blending the characters was absolute magic I as a fan watched the avengers 4 times in the theatres the film was a blockbuster Amazing spiderman which already had enough negative criticism stored was scheduled to release 2 months after avengers honestly the timing made the huge impact on the movie

WHY IT DESERVED SUCCESS

1. MARC WEBB

Marc webb was a director with a vision everything that marc did for the movie was pure love to the character the scenes were master shots the cinematography was stunning the way marc showed the character was really amazing. Marc webbexplored the emotion of peter parker in the most humane way possible compelling plot about fatherhood touched hearts the emotion between peter and gwenis one of the best love stories in superhero movies the identity crisis issue was hugely addressed and made spiderman a complete character the approach marc webb tried to give was the best one can do in those conditions from the suit texture to every angle and movement of camera was motivated

2.ACTION AND CGI

No one can deny that amazing spiderman franchise had the best action in the history of spiderman. In the swinging scenes you feel like you're swinging with him. The visuals gave the comic book feels especially in the second part. In TASM and TASM2, I love how well the action is choreographed. Spider-Man looks and moves like Spider-Man. What more could you want?

But SM trilogy has superior action scenes. The final showdown in SM, the entire train sequence in SM2, and SM3's brutal beatdown between "dark" Spidey and Sandman. These are all incredibly visceral and emotional confrontations that I don't think TASM and TASM2 matched nearly as well.

3. BETTER FEMALE LEAD

Kirsten Dunst was a pain in Raimi's Spider-Man trilogy. All she ever did is get captured, need saving and be on-and-off with Peter more than Rachel and Ross. In The Amazing Spider-Man, Emma Stone's Gwen Stacy was a refreshing delight. She was a funny, charming and smart blonde who actually helped Spider-Man save the day.

Thanks to the chemistry of Andrew Garfield and Emma Stone, the interactions between the pair were awkward and broken, realistic and endearing. As opposed to wanting the latest thanks-to-science criminal to shove a knife through her screaming mouth, Gwen was a girl you legitimately wanted to see Peter hook up with. While she isn't a headache-inducing scream-queen, Laura Harrier's Liz is just a girl. There's no chemistry between her and Peter, and she's only included for there to be an object of desire for Spider-Man to save and romantically pursuit in high-school. Nothing she does is memorable, She has no personality, and the movie's attempt at recreating the charm of the hallway scene in The Amazing Spider-Man is a flattering fail.

Gwen was a captivating love interest with an ugly fate that comic book fans both rued and anticipated, meanwhile Liz is reminscent of that one you girl you once had a crush on but now can't even remember the name of.

4. ANDREW GARFIELD

Re-enacting the origin story rather than telling the "untold" tale that Sony promised its audiences, Garfield's Peter Parker had a sympathetic motivation for becoming Spider-Man: to capture/potentially kill Uncle Ben's grunge-looking killer. It's only after Peter encountered the Lizard and rescued the passengers from the bridge that he truly understood Uncle Ben's lecture about responsibility as he begrudgingly abandoned his personal quest for revenge to protect New York from the giant reptilian.

Andrew Garfield really pulled out some crazy acting skills in these movies any scene with spider mask on Andrew really tries to emote through the mask he uses his voice and body language and we buy it as it is real and compelling in an interview Andrew said "I really love Spiderman he is the character I loved and looked up to as a hero I'm really glad I got to play him

FINALLY

The Amazing Spiderman franchise was all set up to be an amazing tale of Spiderman without these studio influences it would've really changed spiderman and cinema.

PHILAUTIA ~ SELF-LOVE

Caution: use without moderation.

By Keerthana Bommireddy | ECE 3/4

I know you feel the pressure to fit in right now; that the world wants you to look a certain way and be a certain size but I promise that true happiness isn't found here. I know you are trying so hard to fit in. I wish I could hug you and tell you how important are to love your body and care for it and respect it.

We live in a world where everything can be seen, shared and reviewed in a few seconds which makes it so easy to compare. We compare everything-our body, our relationships, everything!! When you overcome your insecurities only then you can truly love you yourself. It's always easy to see the difference-your curves, desires, and talents but there is something common in all, i.e., "YOU ARE RARE". Choose to put your goals at top of your priorities. Start trusting yourself,

YOU SHOULD BE ON TOP OF "YOUR WORLD" and not someone else's.

PS : You're Beautiful ❤

STRANGER DANGER AI

By Atharva Patil
Mechanical 1/4

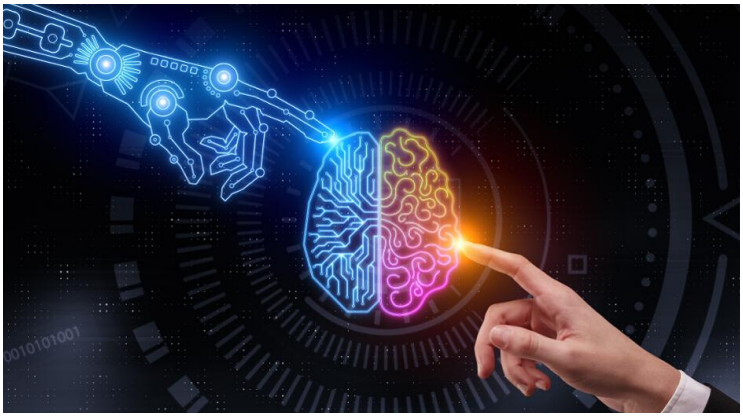
When speaking of artificial intelligence, we hear a lot about adversarial attacks, especially ones that attempt to “deceive” AI into thinking or categorizing something incorrectly such as self- driving being fooled into thinking stop signs are speed limit , beautiful white-black animals being identified s gibbons. These were examples which are voice of AI deception. Major AI conferences speak about AI deception as well. Here we’ll be looking at how AI lies on its own without any human intent. These may look like some futuristic concern as AI is still is in its infant stage. However, in order to progress we need to have a robust understanding of all possible forms of deception. These has to be done in order to propose technological defenses against it.
The first step towards preparing for our coming AI future is to recognize that such systems already do deceive, and are likely to continue to deceive. How that deception occurs, whether it is a desirable trait (such as with our adaptive swarms), and whether we can actually detect when it is occurring are going to be ongoing challenges.

Once we acknowledge this simple but true fact, we can begin to undergo the requisite analysis of what exactly constitutes deception, whether and to whom it is beneficial, and how it may pose risks.
This is no small task, and it will require not only interdisciplinary work from AI experts, but also input from sociologists, psychologists, political scientists, lawyers, ethicists, and policy wonks. For military AI systems, it will also require domain and mission knowledge. In short, developing a comprehensive framework for AI deception is a crucial step if we are not to find ourselves on the back foot.

DID YOU KNOW?

The government of Telangana has announced 2020 as the Year of AI and plans to make the next decade as Telangana's decade of AI with an aim to establish Hyderabad as amongst the top 25 Global Artificial Intelligence (AI) Innovation Hubs

Furthermore, once this framework is in place, we need to begin thinking about how to engineer novel solutions to identify and mitigate unwanted deception by AI agents. This goes beyond current detection research, and moving forward requires thinking about environments, optimization problems, and how AI agents model other AI agents and their interactive or emergent effects could yield risky or undesirable deceptive behaviors.



We presently face a myriad of challenges related to AI deception, and these challenges are only going to increase as the cognitive capacities of AI increase. The desire of some to create AI systems with a rudimentary theory of mind and social intelligence is a case in point to be socially intelligent one must be able to understand and to “manage” the actions of others 5 ,and if this ability to understand another’s feelings, beliefs, emotions, and intentions exists, along with the ability to act to influence those feelings, beliefs, or actions, then deception is much more likely to occur. However, we do not need to wait for artificial agents to possess a theory of mind or social intelligence for deception with and from AI systems. We should instead begin thinking about potential technological, policy, legal, and ethical solutions to these coming problems before AI gets more advanced than it already is. With a clearer understanding of the landscape, we can analyze potential responses to AI deception, and begin designing AI systems for truth.

BEHIND THE SCENES - PUBG

BY ATHARVA PATIL
MECHANICAL 1/4

Player's Unknown BattleGrounds a.k.a **PUBG** is an online multiplayer battle royale game developed and published by PUBG Corporation, a subsidiary of South Korean video game company Bluehole.
The main reason behind the game becoming such a big hit is the idea behind it and that it appeals to people of all ages. Now let's look behind the scenes to see what makes a game such as PUBG successful.

Gaming Strategy

Gaming strategy is lifeline for any game to gain its success . It must be planned with utmost care as it clearly defines the scope of its success or its failure . You need to have a clear thought of what you are going to offer in your games , how it is going to impact users and most importantly how users are going to engaged with your app.

Game Graphics

Game graphics is another important factor that can define your path to success . Making it doable for user to play game in every device be it smartphone , desktop or tablet is what a web or mobile software development company can suggest you with some unique design which will be in accordance with the theme you have planned for .

Awesome Gaming Concept

Whether you are an online game explorer or a gaming developer , you must have gone through 1000's of games with good design and graphics , however they can't gain the user attention .Why ? It is because they don't have a good gaming concept . Although design is important factors for any gaming app to gain its success but you can't hold user entirely on the basis of beautiful design. The best solution to this problem is to develop an app that user love to use and keep on playing the app until their gaming fantasy does not take them to the next level in gaming . And for this to make this happen gaming conceptualization is must . Adding different stages in games , time limit to clear that stage , and connecting different players online from the world can create fun and engaging online games fascinating the way to its success .

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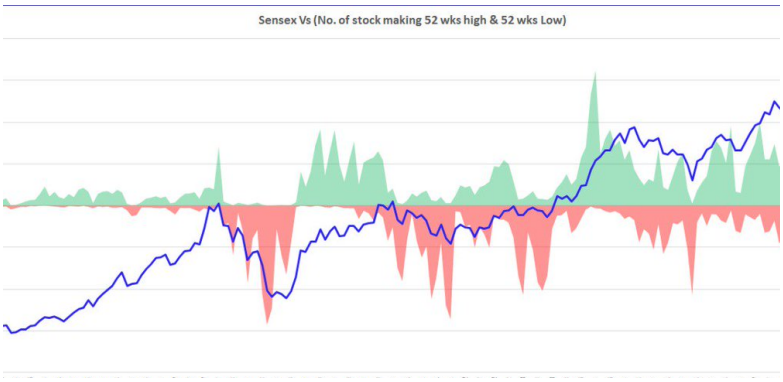
SENSEX

BY K.C.SABITHA
Sr.Asst.professor



The term Sensex was named by a stock market analyst Mr. Deepak Mohoni, the word is a portmanteau of Sensitive and Index. The Sensex is primarily an index which reflects the Bombay Stock Exchange (BSE) which got established in 1875. Till Jan1, 1986 the stock exchange did not have any official index. This was the time when Sensex was opted for gauging the performance of the Indian market. The Sensex comprises of 30 prominent stocks which are derived from sectors and are traded actively in the exchange market. Sensex truly reflects the Indian stock market movement. If the Sensex value increases it means that there is a general increase in the prices of shares whereas, if the Sensex decreases it means there is a general decrease in the price of shares.You can identify the booms and busts going in the stock market through S&P BSE Sensex. From Feb 19, 2013, BSE and S&P Dow Jones Indices entered into an alliance to calculate Sensex. Nifty is the other index calculated in India for the National Stock Exchange.Sensex comprises of the 30 largest and most actively traded stocks on BSE, providing a gauge of India's economy. The Sensex is one of the oldest stock indexes in India. Sensex is used to observe the overall growth, development of particular industries, ups and downs of the Indian economy by the investors.Calculation Methodology for SensexHistorically Sensex used the weighted market capitalization methodology, but from September 1, 2003, it shifted to Free Float Market Capitalization methodology. All the major indices in the world use the same methodology. The performance of the 30 selected key stocks directly reflects the level of the index.Free-Float Market Capitalization = Market Capitalization * Free Float FactorFree Float is referred to as that % of the total shares issued by the company that is readily available for trading in the market. It excludes the shares that are held by the promoters, government, etc.To understand better let's look at an example: If the company has 100 shares, in which 30 are held by the government or the promoters and the remaining 70 are available for trading to general public then, those 70 shares are the free-floating shares and thus the free float factor will be 70%. Whereas the word market capitalization represents the valuation of the company. Market capitalization is determined by multiplying the price of a stock with the number of shares issued by that company.

How Sensex is calculated?

The Sensex comprises of the 30 stocks which are selected according to the criteria set.
The Market Capitalizations of all the 30 companies are determined. The Free Float Market Capitalization of all the 30 companies is determined. Of all the 30 companies the Free Float Market Capitalization is summed up to get a total of all the Free Float Market Capitalization.
As the formula of Sensex= (total free float market capitalization/ Base market capitalization) * Base index value. The base year to calculate Sensex is 1978-79, the base value is static but it has to be changed. According to BSE Rs. 2501.24 crore is to be used as the base market capitalization.
The base index value is 100.
Therefore,Sensex= free float market capitalization of 30 selected companies /25041.24 crores* 100(The free float market capitalization of 30 selected companies are added and which get divided by 2501.24 crores and multiplied by 100.)

K SHOWS MORE POTENTIAL THAN LI

BY ATHARVA PATIL
MECHANICAL 1/4

Renewables are poised to expand by 50 percent in the next five years, according to the International Energy Agency. Much of that wind and solar power will need to be stored. But a growing electric-vehicle market might not leave enough lithium and cobalt for lithium-ion grid batteries. Some battery researchers are taking a fresh look at lithium's long-ignored cousin, potassium, for grid storage.

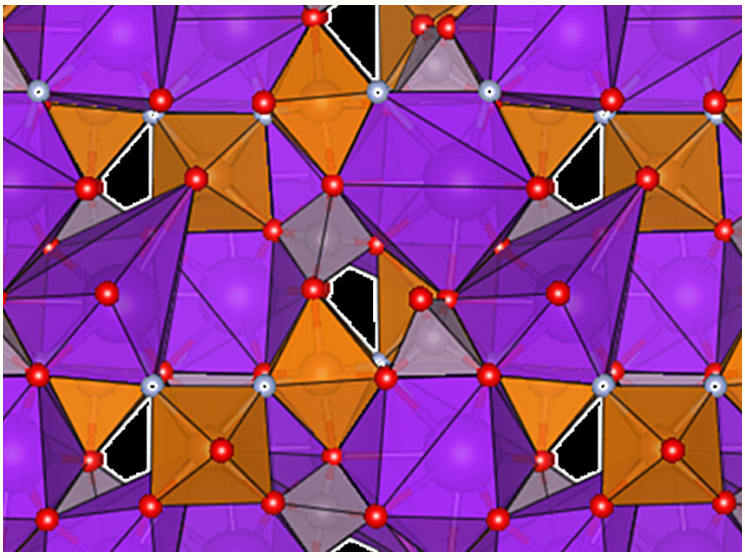
Potassium is abundant, inexpensive, and could in theory enable a higher-power battery. However, efforts have lagged behind research on lithium and sodium batteries. But potassium could catch up quickly, says **Shinichi Komaba**, who leads potassium-ion battery research at the Tokyo University of Science: "Although potassium-battery development has just been going on for five years, I believe that it is already competitive with sodium-ion batteries and expect it to be comparable and superior to lithium-ion." People have historically shied away from potassium because the metal is highly reactive and dangerous to handle. What's more, finding electrode materials to hold the much heftier potassium ions is difficult.

Yet a flurry of reports in the past five years detail promising candidates for the cathode. Among the leaders are iron-based compounds with a crystalline structure similar to Prussian blue particles, which have wide open spaces for potassium ions to fill.A group from the University of Texas at Austin led by John Goodenough, co-inventor of the lithium-ion battery and a winner of the 2019 Nobel Prize in Chemistry, has reported Prussian blue cathodes with an exceptionally high energy density of 510 watt-hours per kilogram, comparable to that of today's lithium batteries.

But Prussian blue isn't perfect. "The problem is, we don't know how water content in the material affects energy density," says **Haegyeom Kim**, a materials scientist at Lawrence Berkeley National Laboratory. "Another issue is that it's difficult to control its chemical composition." Kim is placing bets on poly anionic compounds, which are made by combining potassium with any number of elements plucked from the periodic table. Potassium vanadium fluorophosphate seems to hold special promise. Kim and his colleagues have developed a cathode with the compounds that has an energy density of 450 Wh/kg.

These cost less than inorganic 1, and their chemical bonds can stretch to take up potassium ions more easily.

While Goodenough is giving potassium a chance, his fellow lithium-battery inventor and Nobel Prize winner **M. Stanley Whittingham**, professor of chemistry at Binghamton University, in New York, isn't sold. "It's a scientific curiosity," he says. "There's no startup looking at potassium batteries."



R&D @ MGIT

The ongoing and completed R&D Projects funded by various agencies are listed below.

1. JNTU Hyderabad awarded the following R&D Projects under TEQIP III on 25-09-2019.

a. Development of Green protocols for the synthesis of Benzidazole and Pyrazole derivatives and evaluation of their biological activity, of Rs 2,50,000.

b. Direct Amide synthesis from alcohols and amines via vinyl functionalized N-heterocyclic carbene based ruthenium catalysts, of Rs 2,50,000.

c. Nano structured materials: morphology controlled synthesis, properties and their advanced applications in drug delivery, of Rs 2,50,000.

2. JNTU Hyderabad awarded the following R&D Projects under TEQIP III on 22-07-2019.

a. Assessment of Warm Mix Asphalt with partial replacement of recycled aggregate and inclusion of nanomaterial", of Rs 2,99,100.

b. Influence of weld profile shape in the forming of Tailor Welded Blanks, of Rs 2,99,000.

c. Process Simulation Studies of flow and fill characteristics of light alloy castings, of Rs 2,90,000.

d. Improving object visibility under atmospheric degradation of haze and fog by adopting deep neural network model, of Rs 2,55,000.

3. AICTE awarded Rs 8,40,000 under PRERANA scheme to the CSE Department for the year 2019-20.

4. DRDO Recognized Dr VVN Satya Suresh under dare to Dream DRDO Innovation Contest for the Miniaturization of unfolding mechanism for rocket lifting surfaces proposal through a ceremony in New Delhi with all expenses paid invitation.

MGIT is working on few industrial consultancy projects as follows:

1. Lightspeed AI Labs Private Limited, Bangalore:

a. LightSpeed AI Labs are working on building opto-electronic processors to accelerate machine learning applications and Digital logic + photonics integration in a single package for high throughput data transfer.

b. The consultancy is effective 01 Nov 2019 and the payment is based on the project progress based on number of hours of working.

c. We expect two joint invention disclosures as a result of the consultancy

d. Faculty from ECE and Mechatronics are co-opted into the consultancy

2. Oremi Systems, Singapore:

a. MGIT is working with Oremi Systems for data generation, segregation, signal processing and classification of brain-computer interface signals

b. Oremi recommended a wearable sensor to be procured at a cost of USD 2600

c. Oremi will reimburse the cost of wearable sensor to MGIT

d. A detailed test plan is developed by Oremi and shared with MGIT.

e. The project is monitored remotely through video conferencing on weekly basis

f. Six faculty members and Nine FYP batches from CSE, IT and ECE are involved in the research activity

3. Vigo Medical Systems, (connected care india Ltd), Hyderabad

a. MGIT is working with Vigo Medical in digital signal processing of Wearable ECG patch electrode data

b. Four faculty members from IT and ECE and three FYP students from IT are working on the Projects.

c. The following are the Project objectives:

i. Objective 1: Plot the data t in proper amplitude and amplify the data (with factors)

ii. Objective 2: apply Low Pass Filter IIR and High Pass Filter FIR according to IEC60601 standards (.67-40Hz range or anything less than .67)

iii. Objective 3: Apply filters to compensate the Baseline Wander, EMG, Electrode Motion and powerline

iv. Objective 4: Apply different thresholds of filter values against the Raw data and identify potential differences/losses with respect to processing the data in AI with different filters. Configurable selection of filter values for user to process the data and display the data.

v. Objective 5: Process the data with different threshold values and apply AI engine for various arrhythmia conditions.

vi. Objective 6: Discussion about the IoT gateway that could be used to connect either single medical device or multiple medical devices

4. Oremi Systems, Singapore, for Factory Floor autonomous monitoring using vision cameras with following activities

a. Identify the Machine type in the factory floor from images

b. Identify number of operators working

c. Monitor the process time for each machine

d. Monitor how much time each operator is spending at the machine

HOW BS6 ENGINES WORK?

By Rithvik Reddy
Mechatronics 3/4

Jumping from BS4 to BS6 involves a drastic reduction in emissions. But let's understand what makes the emissions so toxic in the first place. The noxious gases being spewed out of the exhaust is the unholy trinity of carbon monoxide (CO), unburnt hydrocarbons (HC) and oxides of nitrogen (NOx). In addition, there is particulate matter (PM) – a microscopic mix of nasty elements that the engine can't burn. PM hangs in the air and is known to be carcinogenic, if you inhale too much of it. Any engine burning fossil fuel unchecked, emits this deadly cocktail, and the only way to reduce these emissions is to make the combustion process as complete as possible. In theory, the emissions from complete combustion are water (H2O), carbon dioxide (CO2) and nitrogen (N2) – all of which are natural, non-toxic elements. CO2 is the biggest culprit for global warming, though. Combustion, however, is never 100 percent complete and it's those engines that come closest that are the cleanest. BS6 standards demand a drastic reduction in emissions (see below) and the technology needed to achieve this varies between petrol and diesel engines as their emissions profiles are different.

How petrol engines are upgraded to BS6 norms

Petrol engines have it a lot easier than diesel, which is why the cost and effort to upgrade them to BS6 isn't that high. Hence, the cost difference between a BS4 and a BS6 petrol car is quite reasonable and the reason why they will increase in popularity in the BS6 era.

Taking Maruti Suzuki as an example, the price hike across its BS6 range is between Rs 8,000 to Rs 40,000. The thing about petrol engines is that they emit far lower PM and NOx than diesels, and hence don't need the same expensive hardware. To meet the tougher norms, petrol engines essentially need a larger catalytic converter and this isn't hugely costly or difficult to engineer, even on engines that are decades old. Case in point is Maruti's venerable 796cc F8D powering the Alto and the 1.2-litre G12 in the Eeco, which are already BS6-compliant

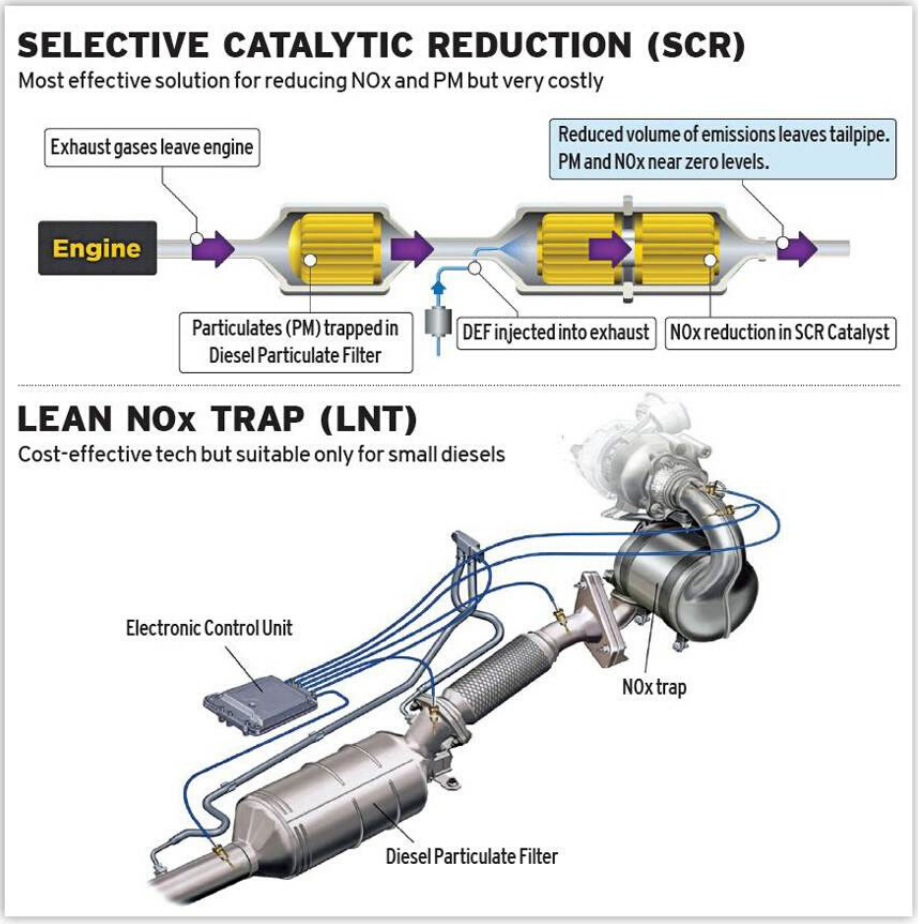
However, the problem with a bigger catalytic converter is increased exhaust back pressure, which has a direct impact on fuel efficiency and drivability. This is why the official fuel consumption figures on some BS6 cars are lower. Also, the throttle response in many BS6 cars has been dulled, and the power delivery feels flat and less perky.

This challenge has made engine-calibration engineers a much-sought-after bunch, because they are the ones in the field, finely balancing the conflicting demands of performance, fuel efficiency and emissions. The tragedy is that the oil companies didn't increase the octane rating to 95 as originally planned, due to cost reasons, and have stuck to 91 octane – the same as BS4. The low octane penalises fuel economy and performance by as much as 3-4 percent.

How diesel engines are upgraded to BS6 norms

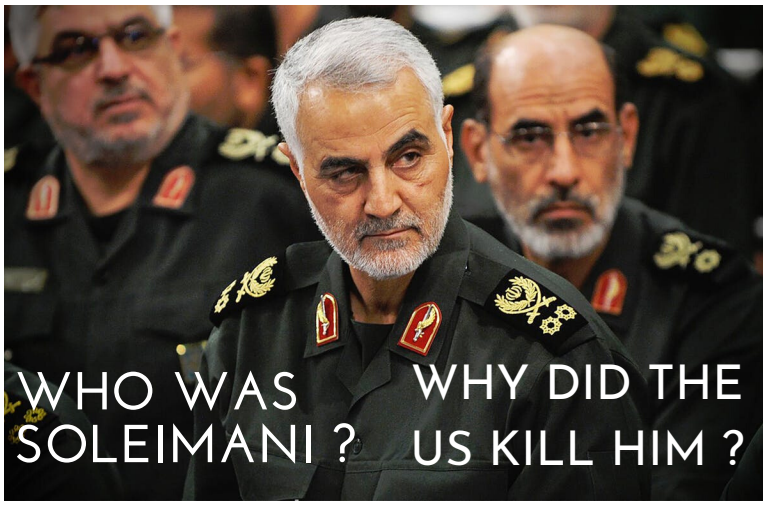
For diesel engines to jump from BS4 to BS6 is a herculean task. BS4 regulations were easy on diesels and didn't call for any after-treatment system, but to meet BS6 standards, the engines will need both, a DPF (Diesel Particulate Filter) and NOx treatment.It's because diesels, unlike petrols, produce high levels of PM and NOx, and to achieve the 82 percent and 68 percent reduction, respectively, of both thesepollutants, sophisticated hardware is needed. It's this hardware that has seriously shot up costs, especially for bigger diesels.

For NOx reduction, all diesel engines above 2.0 litres need Selective Catalytic Reduction (SCR), which is a clever emissions control system that injects ammonia-based urea, or what is called Diesel Exhaust Fluid (DEF), into the exhaust. The ammonia in the fluid triggers a chemical reaction that essentially converts NOx into harmless nitrogen and water. SCR technology alone can achieve NOx reductions of up to 90 percent and allows diesel engines to comfortably meet the norms. However, the DEF needs regular replenishment, and hence all SCR-equipped cars have an onboard DEF tank that'll need to be topped up every 10,000km or so, depending on the usage. This can be done when the car goes for a routine service, or at a fuel station. Trouble is that SCR systems are hugely expensive and add over Rs 1 lakh to the cost of the car, threatening to price them out of the market. Hence, it's only on big, expensive cars and SUVs that SCR is viable. The technology that mainstream Indian car companies are banking on is a Lean NOx Trap (LNT) because it's a cost-effective solution that's much cheaper than SCR. A cannister placed downstream of the engine's exhaust manifold traps NOx as the name suggests.



When the cannister or trap fills up, a richer fuel mixture is injected into the engine, and that reacts with the NOx, converts it to harmless nitrogen, and is then expelled from the LNT into the exhaust system.

This technology, however, is a suitable solution only for small cars with small engines. A general rule is that the limit for LNT is in cars with engines up to 1.5 litres and a body weight of under 1,500kg. Since LNTs use very expensive precious metals, and the size of the LNT catalyst is proportional to the size of the engine, this tech becomes too costly for big engines. Also, the technology is not as effective as SCR, and the emission levels can be close to the limits, leaving very little margin. This is one reason why Renault didn't take the LNT route for its K9K engine, as, in certain conditions, the emissions levels could cross the limit. An SCR would have given Renault enough tolerance but the costs would have priced the Duster and Captur out of whack.Interestingly, the Kia Seltos and the upcoming, new Hyundai Creta are betting on LNT, but rivals feel using this tech on midsize SUVs is risky. Not just because LNT is on the edge of the emission limits, but because LNTs are susceptible to sulphur poisoning. So when the Seltos was launched last year – when only BS4 diesel (which has five times more sulphur than BS6 fuel) was available – it did raise eyebrows in the engineering fraternity. Kia, however, says it's done enough testing and is confident the LNT is hardy enough to run on BS4 fuel for a limited period – that is until April, after which low-sulphur BS6 should be available pan-India.The DPF, the other main piece of hardware in a modern diesel, also located in the exhaust system, and usually before the SCR or after the LNT, doesn't like sulphur either. Excessive sulphur can clog the filter, but it can be burned off by running the engine at high speeds or by active regeneration – a method that involves spraying neat, unburnt diesel through the cylinders into the exhaust manifold to light off the DPF. The higher sulphur content in BS4 fuel means the DPF has to be regenerated or cleaned more frequently.



By Ritvik Reddy
Mechatronics 3/4

On Jan 3, the US launched a drone strike near the Baghdad International Airport in Iraq. It killed several Irani and Iraqi military officials including Iran's top commander named Qassem Soleimani. Moments later, Iran's supreme leader Ayatollah Khamenei declared Soleimani a martyr and vowed severe revenge against the US. Over the next few days, hundreds of thousands of Iranians came out to mourn Soleimani's death. But Iran wasn't the only place the people took to streets. There were demonstrations in Iraq, Syria, Lebanon & Yemen. These are some of the countries where Soleimani commanded a network of powerful Shia Militias which gave him and Iran extraordinary influence across the region. This network made him one of the most important people in Iran and the middle east and that's what also got him killed.

So How did Solemani expand Iran's influence? And what happens to this Militias after his death? - It all began with Iran's Islamic revolution in 1979. A cleric named Ayatollah Khamenei led a popular movement that toppled Iran's monarch and established the Islamic Republic of Iran. This new regime wanted to export its revolution.This threatened the entire Sunni dominated the Middle East. The first one to act was Iraq. In 1980, Saddam Hussein sent his army to invade Iran (Iran-Iraq War 1980-88). Other countries that felt threatened by Iran supported him. The US sent some weapons to Iran but mainly supported Iraq throughout the war, hoping to keep Iran’s ambitions in check. The war carried on for 8 years and nearly a million died.

During that time, Iran was devastated and surrounded by enemies. So, it devised a strategy to spread its ideology and fight its enemies covertly at the same time.But first, it needed a security force to find groups to partner with outside of Iran’s borders. So, in the '80s, it put together an elite soldiers and spies unit called the Quds Force. They became a part of the Islamic Revolutionary Guard Corps, a branch of the military that answered directly to Iran's supreme leader, Khamenei. Next, it needed an opportunity to unleash this force and it found one in Lebanon (Lebanese Civil War 1975-90).

In the 1970s civil war was raging in Lebanon. The US had sent troops as peacekeepers but violence was spilling over into Israel so in 1982 Israel invaded Lebanon. Several Lebanese militias fought back. Some of these militias were led by Shia clerics who had ideological ties to Iran. So Iran sent forces, millions of dollars and tons of weapons to back their fight. They eventually merged into one powerful Shia military called the Hezbollah. They attacked Israeli soldiers in Lebanon and launched rockets over the border in Israel.they even bombed the US Embassy and Barracks killing 304 people. Eventually, Hezbollah succeeded. US troops left Lebanon in 1984 and Israel pulled in 2000. Iran’s dual strategy worked. It turned Hezbollah into a powerful proxy that could fight Israel and even the US on its behalf, without inciting conflict around is own borders. Iran had also found an effective way to export its ideology in Lebanon.So Iran's Quds Force started supporting proxy militias in Palestine and Iraq as it built the foundation for a network, a charismatic soldier worked his way up the ranks. Ion 1998, Soleimani took command of the Quds Force and within a few years, he had an opportunity to firmly establish Iran's influence in Iraq.

In 2003, US invaded Iraq and toppled Saddam and his Sunni dominated regime. This created a power vacuum in Iraq that was quickly filled by Shias. Soleimani used this opportunity to continue to back Shia militias here; growing his network into a powerful force that fought against the US and other Iraqis (Iraq Insurgency 2003-13). One of the most violent period in Iraq’s troubled history.

But eventually, Shia-dominated govt took control of Iraq. Soleimani had managed to solidify Iran's influence in Iraq when another opportunity arose, this time, in Syria(Syrian civil war 2011) In Syria, protests in Syria turned into a civil war that threatened to overthrow dictator Bashar-Al-Assad. Soleimani orchestrated a network of proxies to work together to defend Bashar. He called in fighters from lebanon, Shia-militias from Iraq, and even soldiers from Iraq. He also created two new militias with Afghan and Pakistani fighters. All these groups fought alongside the Syrian army to keep Assad in power. This intensified a war that killed eventually killed more than 500K and displacing more than 11M, mostly civilians. But Assad survived. Soleimani was successfully exploiting conflicts to advance Iran’s interests across the region and it was making him a very popular figure in Iran. He became arguably the second most important person in the country. More conflicts gave Iran more oppurtunities. When ISIS sparked another war in Iraq, Soleimani again called on his network to defend Iraq and keep ISIS away from Iran. By now, he had unprecedented influence and continued to command Shia militias in Iraq directly even if they were officially folded into Iraq’s military. When civil war erupted in Yemen, Iran threw its support behind a rebel group, now instead of being surrounded by enemies, Iran had them surrounded. Soleimani empowered a fast array of militias across the middle east. Many of them are excessively violent and have killed thousands. Lebanese Hezbollah and the Iraqi Shia Militias, for instance, are the targets of mass protests in those countries and they are putting down the protests with more violence. But to Iran and its supporters, Soleimani is a hero. He helped build a web of Militias that not only keeps Iran’s enemies in check but also provides a pipeline for the Islamic ideology that Iran wanted to see in the far corners of the Middle east. Its why Iran’s supreme leader immediately called a martyr and also declared that his efforts and path won't be stopped after his killing. Even though its commander is gone, the network remains intact.

TRUMP IN INDIA

BY **RAHUL EBENEZER CHAND, IT 3/4**

The president of the United States of America and the First Lady Melania Trump paid a visit to India on the 24th and 25th of February. Accompanying them, was their daughter, Ivanka Trump.

So what exactly did their visit accomplish?

Strengthening ties is one aspect of it, but this bromance between India and America has sparked up the individual interests of both countries. With their Make in India and MAGA slogans and China being their common competitor Trump had to shake hands with the man who once sold chai for a living, but is now the prime minister of our beloved nation, Narendra Damodardas Modi.

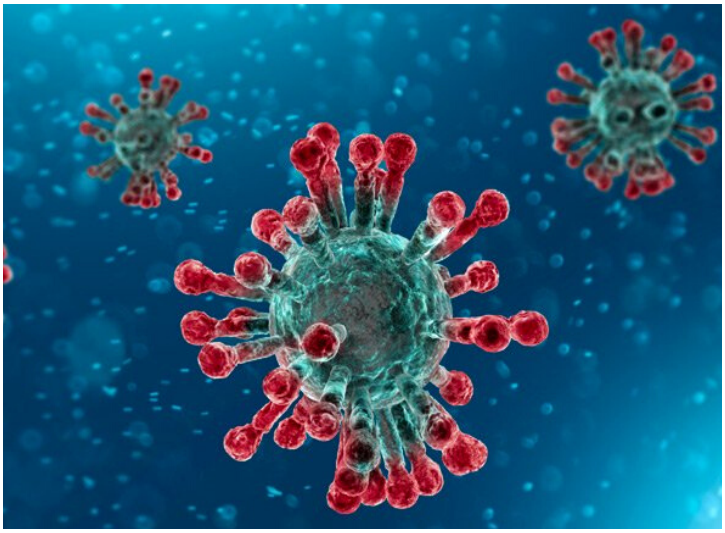
Ironic, the wall was never built between the Mexico and America border, but was build around the slums in Ahmedabad to hide the slums. But in the end, they both wanted to build a wall.

So much in common right? No, both Trump and Modi have been extremists, supporting a monotonous ideology. One country one religion. Trump with his anti-Muslim speeches and the CAA in India, only seem to be narrowing the differences.

But as long as the ball remains in our court, we have nothing to worry about. With support like this growing, India is sure to see a surge in power and can help put us in an economical advantage.

NAMASTE, CORONA

By Prakhya
ECE



India's way of life is among the world's most seasoned; development in India started around 4,500 years prior. Numerous sources portray it as "Sa Prathama Sanskrati Vishvavara" — the first and the preeminent culture on the planet, as indicated by the All World Gayatri Pariwar (AWGP) association. Western social orders didn't generally observe the way of life of India well, as per Christina De Rossi, an anthropologist at Barnet and Southgate College in London. Early anthropologists once thought about culture as a transformative procedure, and "each part of human advancement was viewed as driven by development," she revealed to Live Science. "Right now, outside of Europe or North America, or social orders that didn't follow the European or Western lifestyle, were viewed as crude and socially sub-par. Basically this incorporated all the colonized nations and individuals, for example, African nations, India, and the Far East."

Be that as it may, Indian culture has made huge advances. In the grave circumstances that are pervasive all through the world on the episode of the novel Corona infection, Indian method for welcome, Namaste has come into spotlight. As indicated by examines, a handshake transfers 124 million bacterial colonies, a high-five exchanges 55 million bacterial colonies and a fist bump transfers 7 million bacterial colonies where as Namaste, has zero likelihood of any bacterial exchange.

Following the circumstances, at a press conference after the survey meeting on the pandemic, the Israeli Prime Minister Benjamin Netanyahu said a few estimates will be declared to forestall the spread of the infection, a PTI report from Jerusalem said. Be that as it may, some basic advances, for example, keeping away from handshakes while welcoming individuals might be supplanted with different types of welcome like the Indian Namaste. Responding to Netanyahu's post, Congress MP Shashi Tharoor, in a tweet in Hindi, stated: 'हमारी हर परंपरा में विज्ञान है, तभी तो भारत महान है', which deciphers as, 'There is science in each custom that is the reason India is extraordinary" which holds true in current circumstances.

Unexpectedly, Sanjay Bhattacharyya, secretary incharge overseas Indian and consular, passport and visa undertakings in the Indian foreign ministry, had proposed something like beat Covid-19 in a Twitter post, “Time to make #namaskar go global! It has deeper significance and in times of #COVID19 its best to switch from physical contact to spiritual bonding."

So, let us all say NAMASTE to Corona.

POWER OF WORDS

BY TANEEKSHITH SHREETH, MMT(3/4)

To outshine a gem is stereotype and old to have this world listening. It takes a gift which isn't gifted to normal humans,it is the play of words. To work words like nerds and connect lines like crosswords is a diabolical ability. To rhyme every syllable like you're in your prime and ahead of time is mind-boggling. To exploit words with wit and puns that hit fun filled with ambiguity is sporadic.

There are very few personalities such as speakers, songwriters, teachers, politicians and others who can use this supernatural ability. In a clear perception, Literature is not enough to have this world listening. Wordplay emphasizes one's literature. It's sophisticated what wordplay can do to one's mental state. To use enemy's words as strength, to draw inspiration off them is the most influential thing wordplay can do to an individual. The importance of wordplay is understood when it is dealt with. It is not easy to deal with things that make you stand out in every deal.

This is about something simple yet so complicated. This is about something in near reach yet out of reach. To master wordplay, one has to master their own mind. And when one masters their own mind, there's nothing they cannot do. Literature is the bridge in mastering the play of words. Wordplay doesn't have language barriers nor does literature. All it takes is studying, deciphering, learning and constructing efficient sentences which is not an easy job. There's nothing in this world that comes easy. Even simple poems are constructed with sophisticated rhymes.Try to keep up with the wordplay in lyrics mentioned below:

I never had a place to call my own
I never had a home, ain't no body calling my phone
Where you been?
Where you at? What's on your mind?
They say every life's precious but nobody care about mine Wordplay is most influential when reached through music. This is why most music artists with great ability to jot lyrics stand out different. This can be used to create change. To start revolution. If only the power of words is acknowledged, this world would have a better ending.

Wordplay is Dictatorship.

Woman: Bulbul of Bharat Mata

By Simrah Munaza Ikram, CSE 1/4

"Women I am,
Bleed I do,
Scars I have,
Tolerance I need,
Voice I have,
Brave I feel,
Strong I Stand,
Love I Share,
Life I create,
Woman I am!"

India has been at the perk of its irony, by worshiping female deities , and treating women as second-class citizens of India. Do we still hold ourselves eligible enough to celebrate "International Women's Day"? Should we be proud to live in a country where;
a girl's cry is suppressed,
her plea is unheard,
her education is at stake,
where her ambition is a joke?
And yet we dream of becoming a developed country, laudable, isn't it?
According to UNGC (United Nations Global Compact) India study, India is the only country among 153 surveyed countries where the economic gender gap is larger than the political gap. The study found that raising women's participation in the labour force, to the same level as men, can boost India's GDP by 27 percent.
Equal participation of women along with men in the affairs of the world, in religious and in political matters is the need of the hour. Why do SC need to grant women the right to permanent commission and command in India Army, when women like Rani of Jhansi have proved how capable we are of it!
To conclude, you can break down a woman temporarily, but a real woman will always pick up the pieces, rebuild herself, and come back stronger than ever!

DEPRESSION

BY RITHVIK REDDY
MECHATRONICS 3/4

Today's youth is driving into a world that is racing against time, a world that is enslaved by technology and advancement. In this endless pool of hustle, grinding work schedules, crushing social norms, mental health is a luxury.

Being born in an internet ridden society with access to details about the personal and professional lives of others one can't help but compare one's achievements to everyone else's which pushes him into a pool of insecurity, low self-esteem, disappointment, anxiety, the fear of missing out and depression.

We constantly work to become this "perfect person" defined within our societies without realizing that we are losing our individuality in the process and setting ourselves up for failure.

We navigate through a minefield of emotional turmoil daily hoping that nothing would explode. In this modern world depression amongst millennials is common and inevitable.

Inculcating the practice of mindfulness among people at a young age can help them cope with the symptoms of depression and help in decreasing the public stigma surrounding mental health. It is high time that mental health is given equal importance as physical health and raise awareness in people that there is nothing wrong in seeking help, after-all everyone deserves a happy and peaceful life.

NIRVANA

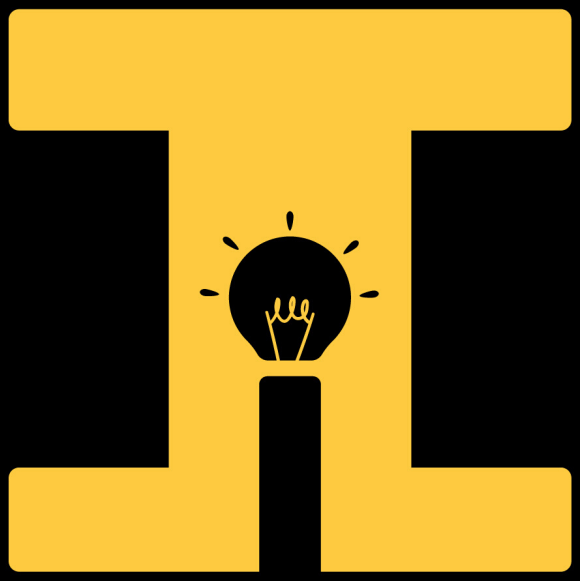
BY RHEA V NAIR
MECHATRONICS 3/4

Nirvana , my favourite time at MGIT.
Classic and contemporary music, exciting competitions, colourful lights, mouth-watering food , the festive vibe , brilliant candids. To be fair , there's not enough words to describe how MGIT transforms itself for Nirvana. Nirvana is when MGIT is at it's full and splendor. Nirvana is the annual fest of Mahatma Gandhi Institute of Technology. On this day, students and faculty celebrate all the hard work for the academic year and are appreciated for their achievements. I believe that Nirvana is more than just about the memories, it's more of an experience. During Nirvana, students from all the branches work together to work-interact with people from different colleges and enhance their social and communication skills. Usually Nirvana preparations starts a month before the fest. The noise commences two weeks before Nirvana, with the intra-college sports competitions where all the branches play against each other in different sports to win the overall championship cup for their branch.

This is followed by the flash mobs, performed by all the 8 branches to promote their technical events. The flash mobs are a celebration and a means of expression to channel their creativity and energy. One day before Nirvana, the dance club, music club and drama club entertain the crowd with their electric performance and setup the stage and mood for NIRVANA to start. The first day of Nirvana is the technical fest hosted by different branches. Technovation , Yukti, Qubit, Cinfra, Microcosm, Ignito, Potenzia and Metallon are the names of the technical fest of various branches. Students come up with creative events, both technical and non-technical, making the first day fun and knowledgable.

The second day is the traditional day, all the students dress up in fancy and glittering ethnic clothes , click photos and the beautiful decorations are put up by the art club to further boost the spirit of NIRVANA. In the evening, all the deserving are rewarded for outstanding academic and sports performances. This day's celebration is wrapped with student and faculty dancing the night away to dandia beat

The final day is the institute day starts which begins with motivational speeches and invaluable pieces of advice from the intellectual and wise minds The clubs get yet another chance to showcase their newly acquired skills and talents in the cultural night. Nirvana ends with the most anticipated event, DJ night, where the students dance to upbeat and peppy music. Nirvana to me is my favourite time at college. It has taught me a lot about how much work goes into putting up a successful event and how many people we need to do so and what all needs to be done.



iDEA INCUBATOR

M G I T

R & D