Malnad College of Engineering
(An Autonomous Institution under VTU, Belagavi)
THE MALNAD TECHNICAL CLUB
TECHsandhya
8TH EDITION

The Rise of Artificial Intelligence: An Overview of Milestones from Past to Present

Imagine a mind, vast and intricate, capable of processing information and formulating solutions beyond anything we can fathom. This isn't science fiction; it's the very core of the Artificial Intelligence (AI) quest now in 2024. For centuries, the embers of this dream have flickered in myths and clockwork contraptions, fueled by humanity's insatiable desire to create something greater than ourselves.

Our journey towards AI hasn't been smooth. There have been detours, dead ends, and moments of genuine concern ("Did we just unleash Skynet?"). But despite the stumbles, the potential remains breathtaking. It whispers of solving problems once deemed insurmountable, unlocking the secrets of the universe, and pushing the boundaries of what it means to be intelligent.

Prepare to embark on an intellectual adventure. We'll delve into the fascinating world of AI, where machines learn, adapt, and perhaps even dream. This is not a linear journey, but a meandering path filled with twists, turns, and mind-bending possibilities. Are you ready to explore the unknown potential of the human mind, amplified by machines? Let's begin.

The Dawn of Dreams:

The 1950s saw the seeds sown at the Dartmouth Conference, where visionaries like John McCarthy declared the creation of "Artificial Intelligence" achievable. Early optimism fueled research into symbolic reasoning, like Newell and Simon's Logic Theorist, laying the groundwork for future problem-solving algorithms.

The 90s: Language and Vision Bloom:

The 1990s witnessed a renaissance. Natural Language Processing (NLP) made strides with machines translating languages and understanding basic commands. Computer vision blossomed, with systems recognizing faces and navigating environments. Deep Blue's defeat of Kasparov marked a watershed moment, showcasing AI's prowess in complex games.

The Rise and Fall of the Perceptron:

The Perceptron, a simple neural network capable of learning, emerged as a symbol of progress. However, its limitations were soon exposed, leading to the "AI winter" of the 1970s and 80s, a period of funding cuts and dwindling enthusiasm.

Big Data Fuels the Fire:

The dawn of the 21st century ushered in the era of Big Data. Mountains of information fueled advances in machine learning, particularly Support Vector Machines and early deep learning techniques. Applications soared, from spam filtering to image recognition.

Deep Learning Revolution:

The 2010s witnessed the explosion of deep learning, inspired by the structure and function of the brain. Convolution Neural Networks (CNNs) revolutionized image recognition, while Recurrent Neural Networks (RNNs) tackled language tasks with unprecedented accuracy. AlphaGo's triumph over Go champion Lee Sedol marked another milestone, demonstrating AI's mastery in complex strategic domains.

Enter the Age of Generative AI:

While conquering games and translating languages are impressive feats, the 2020s ushered in a new era - the blossoming of generative AI. Imagine the awe-inspiring deep fakes blurring the lines between reality and fantasy, or the captivating music composed by AI, transcending genres and pushing creative boundaries. These, once fictional dreams, are now tangible realities.

Self-Driving Cars: Taking the Wheel:

Self-driving cars powered by deep learning are advancing towards autonomous urban navigation. Companies like Waymo, Tesla, and Nuro are leading the way, promising seamless integration of transportation and technology that will reshape city experiences.

Unlocking Faces, Unveiling Potential:

Deep learning-powered facial recognition offers personalized shopping experiences at Amazon Go, helps locate missing kids like Timmothy Pitzen, but risks erroneous detentions, ubiquitous surveillance like in China, and bias. Responsible development balancing convenience and privacy is crucial.

Converse with Language Masters:

Unveiling the secrets of language, Large Language Models (LLMs) are captivating the world. These systems understand your nuances, conversing naturally, and even sparking creative dialogue. That's what LLMs offer, trained on vast amounts of text to perform magic with words. Their secret lies in complex neural networks, often leveraging the "transformer" architecture, analyzing language patterns and relationships.

Open-source LLMs like Mixtral, Mistral 7B, LLaMA 2, Falcon, and Qwen offer customizable natural language processing capabilities. Proprietary models from companies like OpenAI and Microsoft, such as GPT-4 and PaLM 2, provide as-a-service solutions with varying levels of transparency and customization.

The future of LLMs is electrifying. Models like GPT-4 possess reasoning and code generation skills that are game-changers. Specialized LLMs tailored to specific fields like healthcare or science are on the horizon. As we continue our exploration, let us embrace collaboration, both between humans and LLMs, and across disciplines and borders. We can write the next chapter of this voyage not just with wonder but also with purpose by encouraging responsible innovation and making effective use of language models. Let's work together to build a future in which artificial intelligence (AI) increases human creativity, comprehension, and potential.

Editorial Column

Techsandhya 8.0, the gateway to an enriched tech experience!

Back in 2016, during the state-level technical fest, ENIGMA, the visionaries of our club set the stage for a tech revolution 'TECHSANDHYA'. Techsandhya, our annual newsletter, emerged from the need to keep pace with the ever-evolving technology landscape. This year, Techsandhya is a grand unveiling to the deeper insights of groundbreaking technology. We've upgraded specific elements to make tech an engaging adventure into the past and the future. In this edition, we're not just unveiling articles, we're announcing a thrilling expansion into the transformative world of Artificial Intelligence. But that's not all – we're turning the pages of time with a retrospective glance at the technological marvels of the past years. It's a reflective journey, understanding the shifts and breakthroughs that have paved the way for the tech landscape we navigate today. To enhance reader experience, we've also given Techsandhya an upgrade. QR codes are woven throughout Techsandhya 8.0, these codes help readers unlock additional insights about topics that ignite their interests. With each page we hope you embrace the tactile thrill, become an active explorer, and let the tangible journey of discovery draw you in. We anticipate that each narrative becomes your companion to exploration and helps you surpass conventional limits.

Uncover the hidden gems of innovation as Techsandhya 8.0 unfolds!

Revolutionary 3D Printing Breakthrough at UC Berkeley

Rodin's "The Thinker" statue, as rendered in miniature by a light-based 3D resin printer.

In a groundbreaking development at the University of California, Berkeley, scientists have unveiled a new 3D printing technology that could transform the way we manufacture objects. This innovative method, called Computed Axial Lithography (CAL), brings us one step closer to the futuristic concept of the "replicator" from Star Trek, where any object can be materialized on demand. Traditional 3D printers, like the ones you might have heard of, work by building up objects layer by layer. While these printers have been useful, they often leave a rough finish, like stairs along the edges, and struggle with creating flexible or complex shapes without additional support structures.

The researchers formulated a thick, syrupy liquid that hardens into a solid when exposed to a certain threshold of light.

But the CAL technology changes the game entirely. So, how does it work? Imagine a special printer that can take gooey liquids and transform them into solid objects in just minutes using light. Yes, you read that right – light! Instead of stacking layers, CAL uses patterns of light to solidify the liquid into the desired shape all at once. This technique is like a high-tech version of how doctors use CT scans to see inside the human body. CT scans project X-rays from different angles to create detailed images of bones and organs. Similarly, CAL uses light patterns to create 3D shapes in a liquid material. What's even more amazing is that this new printer doesn't just create objects on their own. It can also add new materials to existing objects, like adding a handle to a screwdriver. This means it could revolutionize how we customize products, from prosthetics to running shoes.

One of the key advantages of CAL is its speed and efficiency. Unlike traditional 3D printers, which can take hours to print a single object, CAL can create complex shapes in a matter of minutes. Plus, it generates very little waste, making it an eco-friendly option. The team behind this incredible technology faced some tough challenges along the way. They had to figure out how to formulate a special liquid that stays liquid when exposed to a little bit of light but turns solid when exposed to a lot of light.

After lots of trial and error, they succeeded in creating a resin that does just that. Not only that, but the objects produced by CAL don't have to be transparent. By adding a special dye to the resin, the researchers were able to create opaque objects that look solid. This breakthrough wouldn't have been possible without support from UC Berkeley and Lawrence Livermore National Laboratory. The team has already filed a patent application for their technique, which could have far-reaching implications for manufacturing.

In conclusion, the CAL technology developed at UC Berkeley is not just another 3D printing innovation – it's a game-changer. With its ability to create smooth, flexible, and complex objects in minutes, it brings us one step closer to the science fiction future we've only dreamed of. Who knows what incredible inventions lie ahead with this revolutionary new technology?

To Know More

The Rise of Deepfakes

In recent years, a new technology known as Deepfakes has emerged, capturing the attention and curiosity of people worldwide. Deepfakes refer to manipulated videos or images that use artificial intelligence algorithms to seamlessly replace the faces of individuals in existing content. While this technology has sparked excitement for its creative potential, it has also raised concerns about its potential misuse.

Deepfakes have gained popularity due to advancements in machine learning and computer vision. With access to vast amounts of data, algorithms can analyze and learn patterns, enabling the creation of highly realistic and convincing fake content. From swapping faces in videos to altering voices, Deepfakes have the potential to deceive and manipulate viewers. At the heart of the deepfake debate is their deceptive potential. These sophisticated creations can convincingly depict individuals saying or doing things they never did, posing a serious threat to our ability to discern fact from fiction. Imagine a world where a video of a beloved celebrity endorsing a controversial product turns out to be entirely fabricated. The ramifications for public trust and the spread of misinformation are significant.

Privacy is also a major concern. Deepfakes can easily be used to superimpose someone's likeness onto explicit or compromising material, putting individuals at risk of reputational harm or even extortion. This raises important questions about consent and the boundaries of digital manipulation.

Beyond these immediate challenges, deepfakes also raise broader ethical questions. The use of AI to create highly realistic but fake content challenges our notions of truth and authenticity. This has implications for our legal and ethical frameworks, as well as our understanding of what constitutes reliable information.

And to combat the negative effects of Deepfakes, researchers and tech companies are actively developing detection techniques. By analyzing subtle inconsistencies and artifacts in manipulated content, algorithms can identify potential Deepfakes. Additionally, educating the public about the existence and implications of Deepfakes is essential in fostering a critical and discerning audience.

Despite the concerns surrounding Deepfakes, there are also positive and creative applications. Artists and film-makers have embraced this technology to create stunning visual effects and bring fictional characters to life. Deepfakes offer a new level of immersion and realism in storytelling, pushing the boundaries of what is possible in the world of entertainment.

The image on the left is an unaltered original, while its counterpart on the right is a deepfake.

Moreover, education and media literacy play a vital role. By empowering individuals to recognize and critically evaluate digital content, we can mitigate the impact of deepfakes and strengthen our resilience against misinformation.

Deepfakes represent a double-edged sword in the realm of technology. While they offer exciting creative possibilities, they also pose significant risks to society. It is crucial to strike a balance between innovation and responsible use. By staying informed, promoting ethical practices, and supporting ongoing research, we can navigate the complex world of Deepfakes and harness their potential for positive impact.

To Know More

"Did you know? The Google Graveyard, is a repository where discontinued products are laid to rest. From Google Reader to experimental ventures, it's a fascinating glimpse into the company's ever evolving innovation journey!"

Embark on an Epic Web Quest, Guided by Veteran Explorers:

Navigate the internet with ease! Our savvy guides will steer you through the digital maze, making your journey through the web a breeze.

Handy Tools: A Compilation of Utility Websites for Everyday Needs

TinyWow

TinyWow is a free online toolkit offering tools for file conversion, video/image editing, PDF manipulation, QR code generation, URL conversion, essay writing, and content improvement.

CleanPNG

CleanPNG offers over 110,000 transparent PNG images and vector files for various purposes. You can find clean templates, clipart, icons, logos, backgrounds, overlays, and more. Explore their extensive collection!

Notion

Notion is a versatile tool that lets you write, plan, share, and manage your work with AI and customizable views. Whether you need notes, docs, wikis, projects, or calendars, Notion has a template for you.

Remove bg

Remove.bg is a tool that automatically removes backgrounds from images in 5 seconds. It's perfect for creating transparent PNGs, adding white backgrounds, or isolating subjects. Integrates with popular design software and workflows.

Tempmail

Temp Mail is a free and anonymous email service that provides temporary, self-destructing email addresses. It shields your real email from spam, advertising, and hacking. Use it for trials, downloads, or privacy.

Figma

Figma is a collaborative web application for interface design, offering real-time collaboration, vector graphics editing, and prototyping tools. It also includes FigJam, an online whiteboard, and Dev Mode for developers to translate designs into code.

AI Hub: Essential Websites for AI Enthusiasts

Feedeo

Feedeo simplifies video creation using AI templates, customizable avatars, image animation, interactivity, built-in scriptwriting, drag-and-drop editing, and easy sharing, bridging the gap for novice marketers and camera-shy individuals.

Perplexity

Perplexity AI is an AI-powered conversational search engine that provides precise answers using natural language processing. It combines OpenAI's GPT-3.5 capabilities with a large language model for information discovery and sharing.

Adobe Firefly

Adobe Firefly is a generative AI tool available in Adobe Creative Cloud. It lets you create images, text effects, and color palettes from simple text prompts in over 100 languages.

Voice AI

Voice.ai provides a free real-time voice changer. Modify your voice, select from the Voice Universe, or clone any voice you want. Compatible with various apps and platforms.

Codeium

Codeium is a free AI code completion and chat extension available for 40+ IDEs. It offers autocomplete, chat, and search capabilities in 70+ languages, enhancing coding productivity and accuracy.

Curious about the endless possibilities of AI? This website unveils fascinating things AI can achieve.

TechPlay: Immersive Gaming Adventures in the Digital Realm

GeoGuessr

GeoGuessr drops players into random Google Street View locations, challenging them to identify their whereabouts using only Street View navigation. Tactics include spotting city names, country indicators on cars, and driving sides. Enjoyable for all, with or without extensive geography knowledge.

Skribbl

Skribbl.io is an online drawing game where players take turns drawing words while others guess. Points are earned for correct guesses and drawing recognition. The game offers fun and skill expression opportunities.

Please be advised that the QR codes and websites referenced above were active at the time of composing this newsletter.

Tech Revolution: Reshaping Our World

In the past few decades, technology has undergone a revolution, transforming our lives in ways unimaginable just a generation ago. From wired telephones to smartphones, from emails to instant messaging, the evolution has been remarkable. New technologies like Wi-Fi, AI, blockchain, and streaming services have become seamlessly woven into the fabric of our daily existence. Society has adapted to innovations such as social networking, virtual reality, and DNA testing kits, reshaping how we interact, work, and entertain ourselves. This continuous technological revolution has ushered in a new era of connectivity and convenience, fundamentally altering the way we live compared to previous decades.

How Tech Touches Every Aspect of Our Lives

Technology permeates every facet of human life, facilitating new activities and streamlining daily routines. Its influence spans entertainment, agriculture, communication, housing, education, and employment.
Consider a Reddit user's perspective: "One of the biggest improvements for me is scheduling. Tech helps me manage my work shifts across different locations and ensures I arrive on time. Streaming services allow me to watch what I want, when I want, and food delivery apps make life easier. Technology has honestly made my daily routine less stressful."

Technological Advancements Across Fields

The impact of technology on communication and information systems has been profound. Through smartphones and computers, video calls, audio calls, and text messages have conquered geographical barriers. Social media platforms like Instagram, Facebook, and Twitter have transformed social interaction, effectively shrinking the world into a global village. Access to vast amounts of information on the internet has revolutionized how we gather knowledge and apply it to our daily tasks.

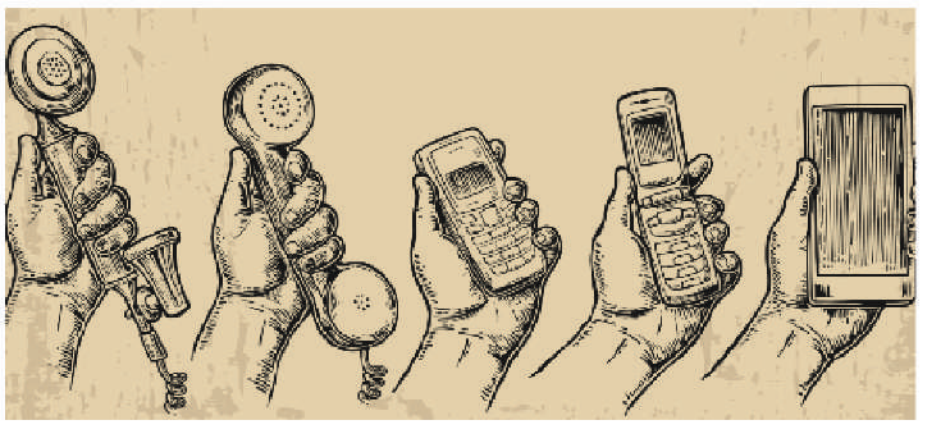


Illustration of evolution of communication-tech

The Internet of Things (IoT) has further revolutionized our way of living by allowing us to automate many daily tasks using smart devices. From household chores to transportation and healthcare, technology has permeated every aspect of our lives, making them more convenient and efficient.
In the realm of education, technology has brought about significant changes. E-learning systems democratize access to education, providing interactive and resource-rich learning experiences. The COVID-19 pandemic accelerated the adoption of distance learning, showcasing the integration of technology into educational systems. Artificial intelligence and the internet play crucial roles in facilitating research, deep learning, and educational activities, enhancing the learning experience for students worldwide.

Entertainment consumption has also been revolutionized by technology. Streaming services like Netflix, Hulu, and Amazon Prime offer a plethora of entertainment options, accessible at the touch of a button. The internet has made entertainment content readily available, allowing users to enjoy their favorite shows and movies from various platforms.
In the healthcare sector, technology has led to remarkable advancements. Procedures like organ transplants and robotic surgeries have become commonplace, extending human lifespan and improving quality of life. Personalized medicine, telehealth, and innovative treatments like cancer immunotherapy have further revolutionized healthcare delivery, making it more efficient and effective.

Embracing Change in a Tech-Driven World

The recent surge in Artificial Intelligence (AI) integration across various sectors exemplifies the ongoing technological revolution. This rapid advancement has sparked concerns about AI replacing human workers. However, the answer likely lies in a collaborative future. One thing remains certain: technology shows no signs of slowing down. Whether the pace accelerates or decelerates, our ability to adapt and embrace new technologies remains crucial. Regardless of profession, staying current with technological advancements is key to remaining relevant in this ever-evolving landscape. Ultimately, the key lies in embracing change and leveraging technology to enhance our capabilities rather than fearing its potential to replace us. Hope this article brought a new perspective towards tech and its growth.

Consumer Electronics Show

CES (Consumer Electronics Show) is the most influential tech event globally, where breakthrough technologies and innovators converge. It serves as a proving ground for cutting-edge releases, business networking, and industry insights. With over 4,400 exhibitors and 180,000 attendees, CES serves as a platform for companies to launch products, establish partnerships, and address industry challenges through exhibits, keynotes, and conferences.

Standout releases of CES'24:

- Rabbit R1 AI.
- LG Signature OLED T Transparent TV.
- EcoFlow Delta Pro Ultra.

For CES 2025, mark your calendar! It will be held in Las Vegas once again, from January 7th to January 10th, 2025. Scan Qr Code for Best of CES'24.

"When they said AI would integrate seamlessly into the workplace, I didn't think I'd be the one struggling to keep up!"

Retro Tech : The Walkman

Take the phone out of your pocket, open any music app or YouTube, and you instantly have access to millions of different songs at your fingertips.We often overlook the convenience of portable music today. It's become a ubiquitous sight: commuters in bustling cities worldwide, donning earbuds or headphones as they navigate their way to work, school, or leisure activities. Yet, for the majority of human history, personal portable music was a distant dream, absent from mainstream culture. That is, until the Sony Walkman revolutionized the way we experience music.

Evolution of portable music

Early days of portable music : Back in the day, enjoying music at home was a rare treat. Then in 1877, Thomas Edison's phonograph changed the game, letting people record and play back music in their own homes. It was a hit, catching the eye of global markets and setting the stage for vinyl's big debut in 1948, courtesy of Columbia Records. Fast forward to 1958, when magnetic tape showed up, not blowing minds at first but sparking some cool ideas for music recording and car rides. Still, you needed specific gadgets like 8-track players or phonographs to enjoy your music.

Enter walkman : Sony's introduction of the Walkman in 1979 completely revolutionized how we listened to music on the go. This lightweight device, accompanied by its own set of headphones, quickly became a must-have item, thanks to Sony's massive marketing campaign. The Walkman, utilizing cassettes, not only allowed people to enjoy their favorite tunes wherever they went but also enabled instant music sharing. Its wide appeal made it incredibly popular. A few years later, in 1984, Sony launched the D-50, the first in the Discman line, which played CDs.

The Digital Era: CDs, Piracy and Streaming Services : In 1982, the commercialization of digital music began with the introduction of compact discs, offering both portability and durability compared to traditional vinyl and tape formats. However, despite their advantages, CDs didn't gain widespread popularity until 1988, when production surged to approximately 400 million units per year.

The landscape dramatically changed with the emergence of Napster in 1999, a peer-to-peer file-sharing platform that allowed users to freely exchange digital audio files. This disruptive innovation deeply unsettled the music industry, leading to widespread legal battles and a sharp decline in CD sales.

The early 2000s witnessed a resurgence in digital music consumption with the introduction of the iPod in 2001 and the subsequent rise of MP3 players and digital downloads. However, this digital shift failed to offset the decline in physical format sales, forcing artists to rely increasingly on live performances for revenue.

A pivotal moment arrived in 2011 with the launch of Spotify, a Swedish company that revolutionized the music industry with its extensive licensed music library and subscription-based model. This sparked a wave of similar streaming services, providing users access to vast music catalogs for a monthly fee.

Cassette

SONY TPS-L2 (The First Walkman)

Sony CD Walkman D-E330

What was the significance of the Walkman?

The Walkman wasn't a groundbreaking engineering feat; magnetic cassette technology had existed since 1963, initially for secretarial and journalistic purposes. On July 1, 1979, Sony unveiled the Walkman TPS-L2, a 14-ounce portable cassette player with headphones and a leathercase.

The Sony Walkman cassette player revolutionised the way that we listen to music. It enabled people to create soundtracks to their lives in ways that hadn't been possible before. The fact that you could use your Walkman anywhere changed that; music had never been so personal.

It was the first in a long line of portable audio players, and without it, we might not have the same objects such as iPods and MP3 players that came along.

Aftermath of Walkman

The late 1990s and early 2000s witnessed a significant transformation in portable media players with the emergence of MP3 players like the iconic Apple iPod. These devices revolutionized music consumption with their user-friendly interfaces and ample storage capacities, marking the dawn of the digital music era.

However, the rise of smartphones in the late 2000s presented a new challenge to standalone media players. With smartphones incorporating music playback capabilities and offering access to streaming services, users could consolidate their entertainment needs into a single device.

The proliferation of high-speed internet and streaming platforms like Spotify and Apple Music further reshaped the landscape. Now, users can access vast libraries of music and video content directly on their smartphones, diminishing the need for dedicated media players and enabling on-demand access to a plethora of entertainment options.

Conclusion

The evolution of portable media players, from the Walkman to smartphones, reflects the dynamic intersection of technology and consumer preferences. While standalone devices may have declined, their influence endures through integrated features on smartphones and the convenience of streaming services. This journey underscores the ongoing evolution of technology and its profound influence on our entertainment habits and daily routines.

TECHsandhya

ADITYA - L1

Sunrise at Lagrange and Aditya L1's Potential

To Learn More

Intro

After the huge success of Chandrayaan-3, ISRO our proud National Space Research Centre has launched it's one of the most awaited missions to study the closest star Sun, in the month of September.
This is the first Indian space mission dedicated to research on the sun, it is revolutionizing our understanding of solar dynamics and space weather.
Imagine a spacecraft stationed about 1.5 million kilometers away from Earth, nestled in a special orbit around the Sun-Earth system known as Lagrange point 1 (L1). From this unique vantage point, Aditya L1 has an uninterrupted view of the Sun, free from any eclipses or obstructions.

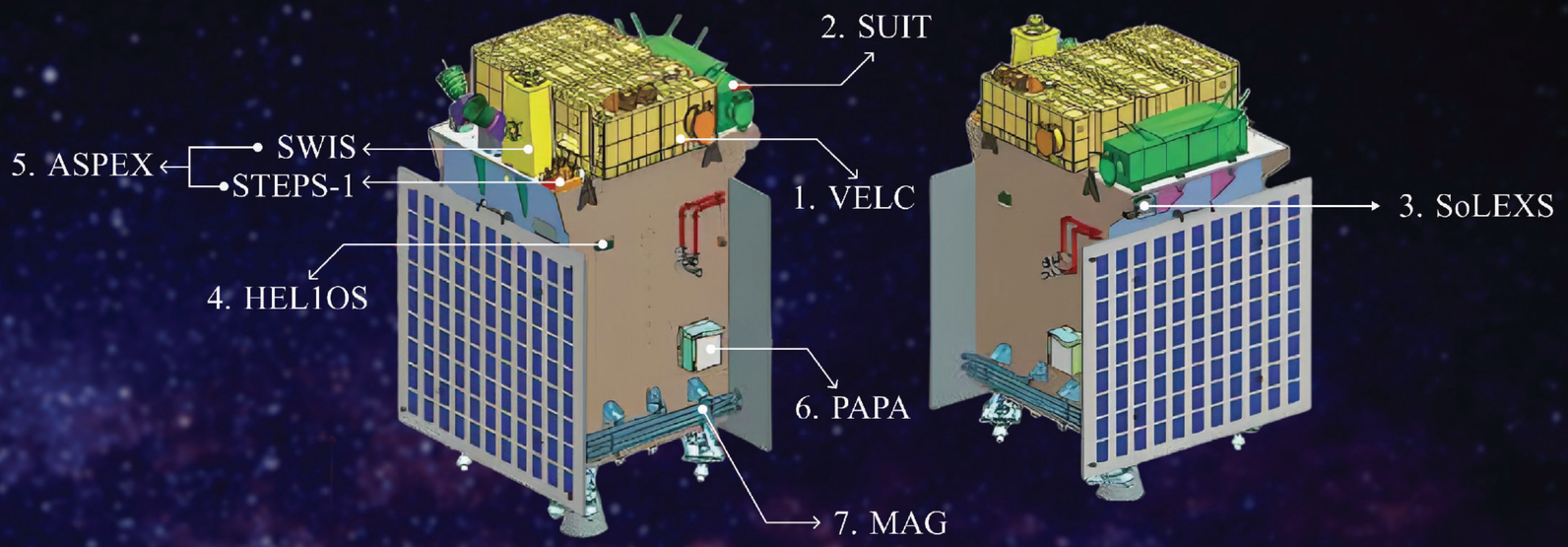
What is L1 and why is L1 specifically chosen ?
Lagrange points, named after the Italian-French mathematician Joseph-Louis Lagrange, are fascinating positions in space where the gravitational forces of a two-body system, such as the Sun and the Earth, create special regions of attraction and repulsion. At these points, the gravitational pull of the two large masses precisely balances the centripetal force required for a smaller object to move with them. As a result, objects placed at Lagrange points tend to remain relatively stable in their positions.

Positioning Aditya L1 at Lagrange point 1 (L1) offers numerous benefits for space exploration. By taking advantage of this strategically positioned orbit, Aditya L1 can conserve fuel and extend its mission duration significantly. The balanced gravitational forces at L1 enable the spacecraft to maintain its position with minimal fuel consumption, allowing it to focus its resources and energy on conducting groundbreaking research on the Sun. This fuel efficiency not only prolongs the mission but also enhances its effectiveness by providing continuous and uninterrupted observations of solar activities.

This means Scientists have the unprecedented opportunity to observe solar activities in real-time, providing invaluable insights into phenomena like coronal heating, coronal mass ejections, flares, and more.
Equipped with seven cutting-edge payloads, Aditya L1 will delve into the heart of the Sun, studying its photosphere, chromosphere, and corona using a combination of electromagnetic, particle, and magnetic field detectors. Four of these payloads will directly observe the Sun, while the remaining three will conduct on site studies of particles and fields at Lagrange point L1, shedding light on the propagation of solar dynamics in the interplanetary medium.

Payloads

Payloads Onboard Aditya-L1
Aditya-L1 carries seven 'payloads'– to study the Sun's layers, Payloads are the scientific or technological instruments carried on board a satellite for a specific purpose. In these 7 payloads, four remote sensing payloads directly observe the Sun: capturing data on its atmosphere and corona. The remaining three in-situ Payloads measure particles and magnetic fields at their location, offering a different perspective. In-situ payloads are those which are situated in the original, natural, or same space. This unique combination promises new insights into our star.
Remote Sensing Payloads
The four remote-sensing payloads include VELC (Visible Emission Line Coronagraph), SUIT (Solar Ultra-violet Imaging Telescope), SoLEXS (Solar Low Energy X-ray Spectrometer) and HEL1OS (High Energy L1 Orbiting X-ray Spectrometer). Let us briefly know about these payloads one by one,



1. VELC

VELC payload is designed to study solar corona and dynamics of coronal mass ejections. This payload is developed by the Indian Institute of Astrophysics, Bengaluru in close collaboration with ISRO.
What VELC does is it blocks the Sun's bright light and takes pictures in different ways to study the corona in detail, by doing all of these things, the VELC helps scientists learn more about the corona's temperature, how it moves, and how it interacts with other parts of the Sun. This information is important for understanding space weather and how it affects Earth. This payload will send 1,440 images of the Sun every day to the ground station on Earth for analysis and research of the intended orbit.

2. SUIT

SUIT is to image the Solar Photosphere and Chromosphere in near Ultraviolet (UV) and, to measure the solar irradiance variations in near UV, it uses different filters that allow it to focus on specific ranges of ultraviolet light. It also creates full-disk images of the entire sun, giving Scientists a complete view of its activity at any given time.
By studying the ultraviolet light captured by SUIT, scientists can learn more about:

- Solar flares and eruptions: These events can disrupt communication systems and damage satellites, so understanding them is crucial.
- Solar wind: This stream of charged particles from the Sun can impact Earth's atmosphere and cause auroras.
- The Sun's temperature and composition: By analysing different wavelengths of ultraviolet light, Scientists can understand the temperature and composition of different layers in the Sun's atmosphere.

3. SoLEXS

The Solar Low-Energy X-ray Spectrometer (SoLEXS) is a proposed instrument meant to work alongside the visible emission line space solar coronagraph on the Aditya-L1 mission for understanding the heating mechanisms of the solar corona.
Being on the same satellite, SoLEXS and the coronagraph can provide highly accurate timing data for studying the relationship between coronal mass ejections and solar flares. SoLEXS can also help by providing accurate temperature estimates of flares due to its high spectral resolution, aiding in the study of flare dynami cs. The instrument will operate in the low-energy X-ray range, where the solar flux is high and variable, especially during flares.

4. HEL1OS

The High Energy L1 Orbiting X-ray Spectrometer (HEL1OS) is a tool used to study solar flares, which are sudden bursts of energy from the Sun. These flares release a huge amount of energy in a short time and emit various types of radiation, including X-rays.
It has detectors sensitive to different energy ranges of X-rays, allowing it to capture a wide spectrum of flare emissions. By analysing the data from HEL1OS, scientists can study how energy is released and how particles are accelerated during flares which can give clues about the processes behind flare eruptions.
HEL1OS was launched as part of the Aditya-L1 Solar Mission by ISRO and started observing the Sun's X-ray activity. It has already provided valuable data on solar flares, showing differences from observations made by other instruments. This data helps scientists better understand the complex phenomena happening on the Sun.

5. ASPEX

The Aditya Solar wind Particle Experiment (ASPEX) onboard the Aditya-L1 satellite aims to study the solar wind, the stream of charged particles flowing from the Sun. ASPEX consists of two instruments: the Solar Wind Ion Spectrometer (SWIS) and SupraThermal and Energetic Particle Spectrometer (STEPS).
SWIS utilizes two sensor units with a 360-degree field of view each to measure solar wind ions like protons and alpha particles. It helps scientists understand the composition, speed, and other properties of the solar wind. On the other hand, STEPS focuses on studying higher-energy particles in the solar wind, crucial for understanding phenomena like solar flares and coronal mass ejections.
Together, these instruments provide comprehensive data on the solar wind, aiding in the understanding of various solar phenomena and their effects on space weather. This research contributes to a better understanding of the Sun's influence on our solar system.

7. MAG

The Magnetometer payload, developed at the Laboratory for Electro Optics Systems in Bengaluru, is capable of measuring interplanetary magnetic fields at the L1 point.

6. PAPA

The Plasma Analyser Package (PAPA) for payload onboard the Aditya-L1 satellite has been operational and is performing well. It has successfully detected the impact of coronal mass ejections (CMEs), including those occurring in February 10-11, 2024.
PAPA analyses solar wind particles using two main components: the Solar Wind Electron Energy Probe (SWEEP) and the Solar Wind Ion Composition Analyser (SWICAR). SWEEP measures electrons from 10 eV to 3 keV, while SWICAR measures ions from 10 eV to 25 keV and masses from 1 to 60 amu. These sensors also determine the direction of solar wind particle arrival.
The payload has been operational since December 12, 2023. Observations during the Halo Orbit Insertion (HOI) phase, depict the time series of SWEEP electron energy spectra and total count. During the HOI phase, there is a drastic reduction in electron energy spectra and total count due to the payload's orientation away from the Sun, which occurs during this orbit manoeuvring period. This reduction is also evident in the ion energy spectra observed using SWICAR.

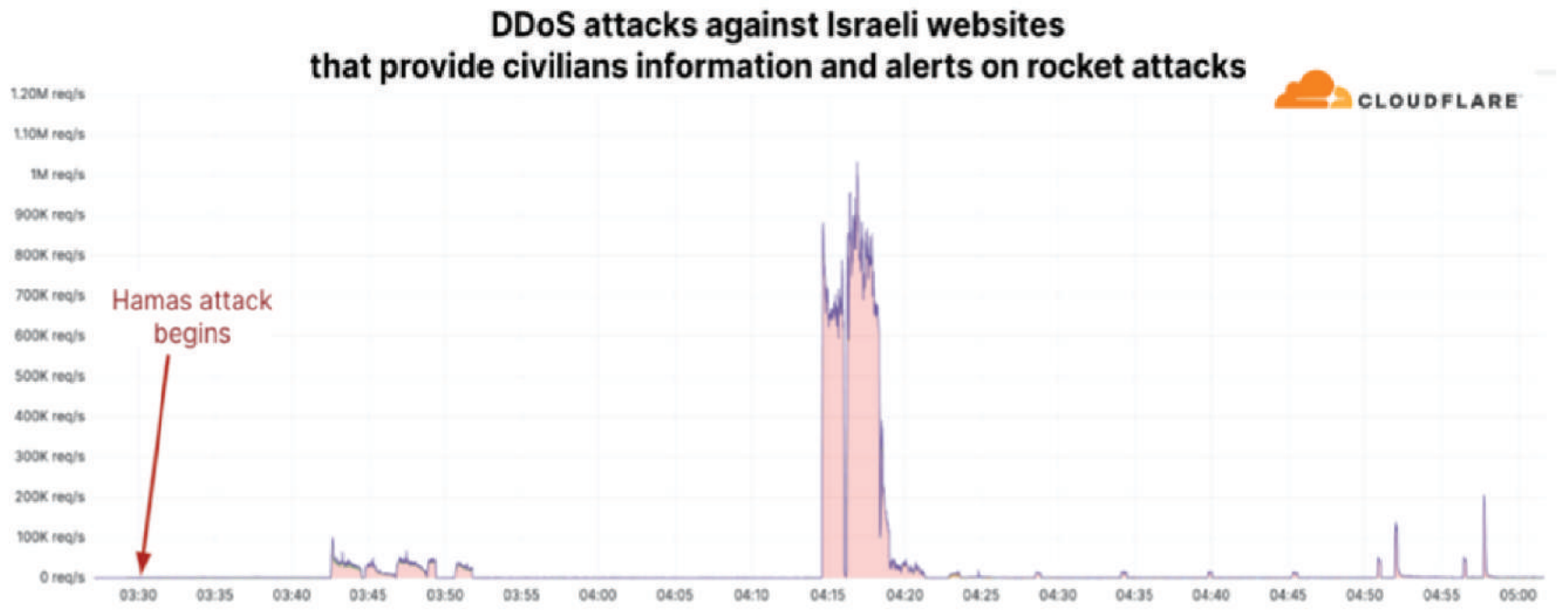
Conclusion

India, like many other nations, invests in space missions for various reasons. Firstly, space exploration serves as a catalyst for technological advancement, driving innovation in various sectors such as communication, navigation, and remote sensing. Additionally, space missions enhance national prestige and contribute to scientific research, which can lead to economic benefits in the long run.
Even though space missions themselves may not generate direct profits, the technologies developed during these missions often have commercial applications that can stimulate economic growth. Furthermore, space exploration fosters international collaboration and partnerships, which can lead to shared resources and knowledge exchange.
Every nation seeks to dominate space because of its strategic importance. Control over space assets enables countries to enhance national security, gather intelligence, and establish dominance in emerging space-based industries such as satellite communication and Earth observation.
Aditya-L1 will have a mission life of at least five years, and findings collated in this period will be significant.
In conclusion, investing in space missions is not just about profit-making but also about advancing science, technology, and national interests. By exploring and harnessing the resources of space, nations can secure their future and contribute to the greater understanding of the universe.

Inside the Cyber Attacks of the Israel-Hamas War

As we witnessed a huge number of wars, border conflicts and sanctions in the year 2023, every country is trying its best to maximize its defence forces by introducing many new technologies, weapons and abilities. After the breakout of the Russia -Ukraine and Israel-Hamas wars every other country realized the importance of cyber attacks in armed wars. Let us revisit 7th October 2023, a dark day for Israel due to the attack of Hamas force on populated cities including Jerusalem and Tel Aviv.

On 7th October 2023, at 3:30 GMT Hamas groups fired thousands of rockets towards central and southern parts of Israel causing death and injuries to lakhs of people. Approximately 12 minutes later, Cloudflare systems which is responsible for application securities detected DDoS attacks that targeted websites which are responsible for providing critical information and alerts on rocket attacks to civilians. DDoS is a method of overflooding the applications or websites with internet traffic. This results in exponential increase in requests to the servers for which servers are not ready. Since servers will be busy in handling fake traffic, legitimate users face serious issues while using that software. This distributed denial of service (DDoS) can be used by hacktivists to smokescreen the user interfaces and to breach the target's security perimeter. The initial attack peaked at 100k requests per second and lasted for ten minutes. 45 minutes later, a second much larger attack struck and peaked at 1M rps. It lasted for 6 minutes. Cloudflare of Israel became successful by protecting these attacks, but the story doesn't end here.



A graphical representation with time on x axis and unauthorised request frequency on y axis.

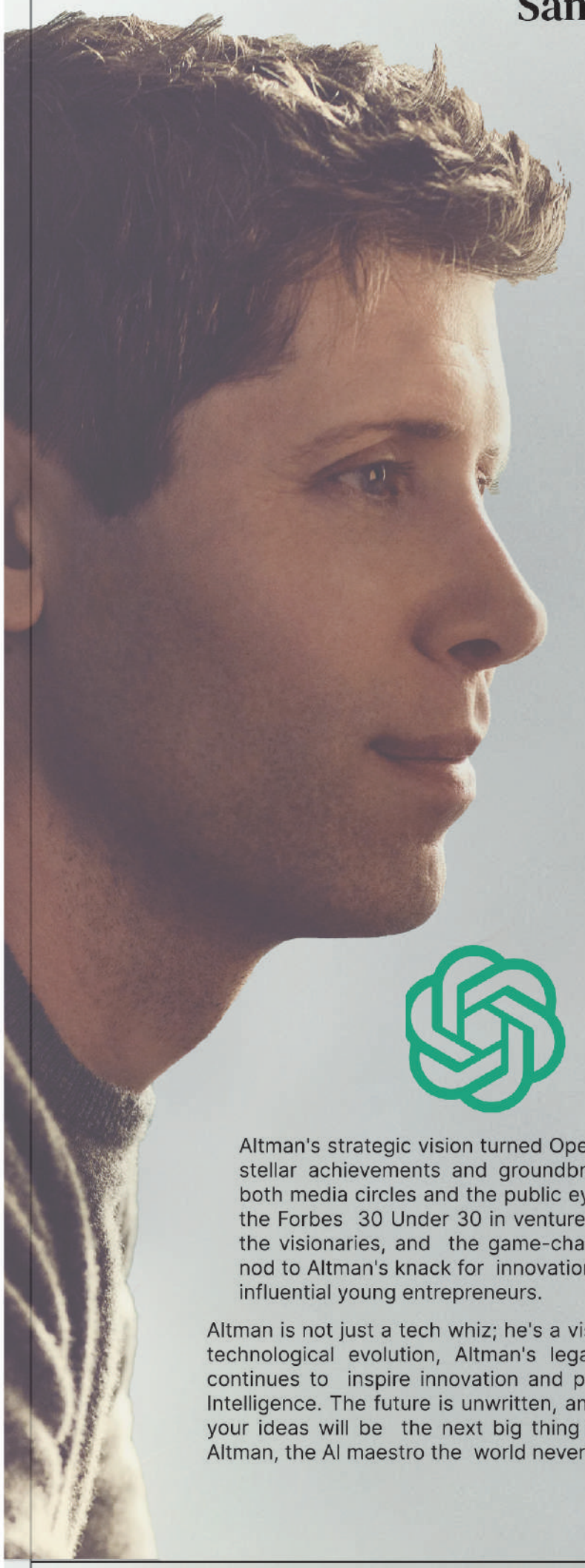
AnonGhost, an anonymous Pro-Palestinian hacktivist group exploited a vulnerability in a mobile app called Red Alert, which is available on Playstore that alerts about incoming threats like these terror attacks. This exploit has become successful in intercepting requests, exposing servers and APIs. The group also sent fake and sensitive alerts like "Nuclear Bomb is coming" AnonGhost also claimed to have attacked various other rocket alert applications. According to the cyber investigation conducted by "Cloudforce One", malicious apps have obtained sensitive information including SIM and mobile specification, SMS messages, phone call logs and about installed applications and accounts.

Many attacks of these kind are also recorded in Ukrainian websites and defence systems. More than 70 government websites including Ministry of Foreign Affairs and the National and Defence Council were taken down by Russian hackers on 14th January 2022. Suspected Russian hackers left a message on the foreign ministry website, according to reports. It said: "Ukrainians! ... All information about you has become public. Be afraid and expect worse. It's your past, present and future." In response to this Ukrainian security officials quoted "All subjects of cyber security were aware of such possible provocations by the Russian Federation. Therefore, the response to these incidents is carried out as usual." The government later said that it has restored most of affected sites and that no personal data had been stolen. Later many government websites were suspended to prevent similar attacks from spreading due to conflict tensions.

We can conclude that the cybersecurity to the county's population and defence system can play a major role in tight times like this. It is important to keep people aware of these attacks to increase the precaution about anonymous websites and softwares. The data breach of single individual consisting of his/her credentials may lead to problems like identity theft, cybercrimes etc.

A fake notification falsely suggesting warning of nuclear attacks is being circulated to users through the Red Alert mobile app, which provides real-time emergency alerts for Israeli citizens.

Sam Altman: The AI Whisperer



Meet Sam Altman, a tech luminary whose journey from a tech-savvy kid to a pivotal figure in Artificial Intelligence and Entrepreneurship is nothing short of a gripping tale. 2023 was a year that gave the world an entirely new perspective with the multi-faceted appearances of AI. OpenAI was one such milestone in the field of AI, with its CEO being SAMUEL HARRIS ALTMAN.

Altman's love for technology blossomed early, leading him to co-found Loopt, a location based social networking app, in 2009. The success of Loopt, eventually acquired for a noteworthy $44 million, marked the beginning of his entrepreneurial spirit. He later went on to become president of Y Combinator, a renowned startup accelerator that helped launch companies like Airbnb, Dropbox, and Stripe into the stratosphere.
Ever wondered what it's like to be at the forefront of AI? Buckle up, because we're diving into the story of Sam Altman, a tech prodigy who's leading the charge in this rapidly evolving field.

In 2015, Altman co-founded OpenAI with a bold mission: using AI for good, from healthcare to climate change. Picture a world where AI tackles complex challenges. Under Altman's leadership, OpenAI became a powerhouse in AI innovation, chasing after machines with human-like abilities—that is, artificial general intelligence (AGI).

OpenAI

Altman's strategic vision turned OpenAI into a front-runner in the AI race. Altman's stellar achievements and groundbreaking contributions have sparked a buzz in both media circles and the public eye. In 2015, he also snagged a coveted spot on the Forbes 30 Under 30 in venture capital – a league reserved for the disruptors, the visionaries, and the game-changers. This wasn't just a recognition, it was a nod to Altman's knack for innovation and his trailblazing impact as one of the most influential young entrepreneurs.

Altman is not just a tech whiz; he's a visionary leader. As we navigate this era of rapid technological evolution, Altman's legacy as a tech prodigy and visionary leader continues to inspire innovation and progress in the dynamic landscape of Artificial Intelligence. The future is unwritten, and it's up to us to shape it. Who knows, maybe your ideas will be the next big thing in AI. Thanks to the groundwork laid by Sam Altman, the AI maestro the world never knew it needed.

Yet, as ChatGPT took center stage, it wasn't all applause, it sparked a digital debate among political leaders.The U.S. President Joe Biden, who, in the wake of ChatGPT's dazzling debut, issued an executive order shaping the U.S. government's strategy on AI usage. British Prime Minister Rishi Sunak seized the moment, hosting an AI safety summit that drew Altman, the visionary Musk, and several other dynamic leaders such as U.S. Vice President Kamala Harris into it. Altman's insights served as a beacon in navigating the uncharted masterpiece of this technological marvel. As ChatGPT continues to captivate audiences, Altman's contributions unfold not only in lines of code but in ethical considerations, ensuring the technology enchants responsibly.

In 2018, Musk suggested Altman lead OpenAI, but Altman's refusal triggered Musk's exit, tossing the organization into a funding labyrinth. Cue a for-profit twist, creating a delicate dance between cash flow and control. Then, in 2019, OpenAI and Microsoft teamed up. GPT, the linguistic maestro, took center stage, dazzling with large language models (LLMs) and natural language processing (NLP). Then enters DALL-E, the Picasso of AI, turning art and algorithms into a pixelated spectacle.
Stepping into the thrilling world of ChatGPT, where the AI symphony conducted by Sam Altman is anything but ordinary. In the enchanting realm of 2023, ChatGPT isn't just a conversational wizard, it's a manifestation of Altman's commitment to pushing the boundaries of AI. His technical vision encompasses the architectural foundations of ChatGPT, where advanced neural networks and sophisticated algorithms converge to breathe intelligence into its responses.

Altman's journey was not without challenges. Altman's sudden departure stirred up a tech tempest. A digital rebellion erupted at OpenAI, demanding Altman's return. Microsoft's Sathya Nadella announced Altman's comeback. Negotiations and a new board brought suspense, cheers, and a dash of skepticism. Altman and Brockman's triumphant return unfolded like a plot twist.
Fast forward to 2024, and AI is no longer a science fiction. We're seeing incredible advancements, from self-driving cars, AI-powered art. OpenAI, under Altman's leadership, has been at the forefront of these breakthroughs.

The World's First AI Software Engineer:

Devin is a tireless, skilled teammate, equally ready to build alongside you or independently complete tasks for you to review. With Devin, engineers can focus on more interesting problems and engineering teams can strive for more ambitious goals.

Devin's capabilities:.

Advanced Reasoning: With long-term reasoning and planning, Devin can execute complex engineering tasks, recalling relevant context and learning over time.

Developer Tools Proficiency: Equipped with common developer tools within a sandboxed environment, Devin can use the shell, code editor, and browser just like a human engineer.

Collaborative Interaction: Devin actively collaborates with users, reporting progress in real-time, accepting feedback, and discussing design choices.

Learning and Adaptation: Devin can learn new technologies, build and deploy apps, autonomously find and fix code bugs, and even train and fine-tune AI models.

Open Source Contribution: Devin can address bugs and feature requests in open source repositories and contribute to mature production codebases.

Real-World Performance: Evaluated on SWE-bench, Devin resolved 13.86% of real-world GitHub issues in open source projects, surpassing previous models significantly.

Continuous Improvement: The team behind Devin is focused on advancing AI reasoning capabilities and plans to publish a detailed technical report soon.

To learn more about Devin, scan the QR code for additional insights

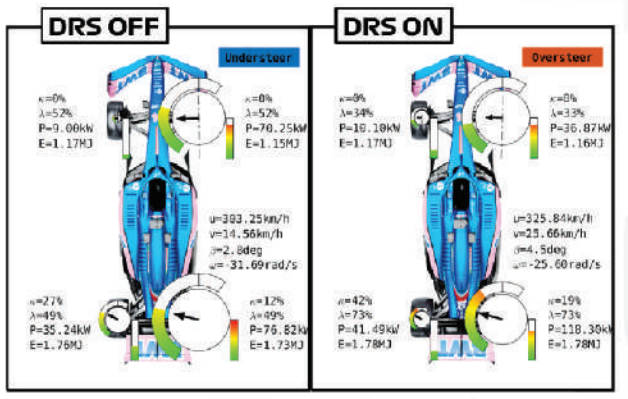
F1 WHERE SPEED MEETS SCIENCE

Introduction:

Formula 1, often referred to as the pinnacle of motorsports, is a thrilling symphony of speed, innovation, and human ingenuity that captivates millions around the globe. With its origins dating back to the early 20th century, F1 has evolved into a high-stakes battleground where cutting-edge technology meets the limits of human performance. Beyond the spectacle of roaring engines and lightning-fast pit stops, Formula 1 serves as a breeding ground for automotive innovation, pioneering technologies that find their way into everyday vehicles, shaping the future of transportation. From hybrid powertrains to aerodynamic advancements, many of the technologies driving today's cars were first tested and refined on the demanding circuits of Formula 1. As we delve into the heart of this electrifying sport, we uncover not just the pursuit of victory on the racetrack, but the relentless quest for progress that echoes far beyond the confines of the circuit.

DRS (Drag Reduction System)

In a bid to spice up races and increase overtaking maneuvers, Formula 1 introduced the Drag Reduction System (DRS) in 2011. This driver-controlled trickery sits on the rear wing of the car. Normally, this wing is crucial for generating downforce, which pushes the car into the track for sharper cornering. But DRS adds a twist. With a push of a button on the steering wheel within designated zones on the race track, the driver can activate a flap on the rear wing. This isn't your average flap; opening it dramatically reduces drag, the force acting like an invisible hand pushing back on the car. Less drag translates into a significant top speed boost on straights. This advantage allows the DRS-equipped car to close the gap on the leader and potentially make a daring overtake. The DRS flap itself is a clever piece of engineering, hinging on the rear wing assembly. While the exact details are closely guarded secrets by the teams, imagine a small, aerodynamically shaped plate that folds flat against the wing when inactive. When activated, the flap opens up like a miniature airplane wing, disrupting the airflow and reducing drag. DRS isn't foolproof – it requires strategic positioning and can be disabled under safety car conditions – but it's become an integral part of modern F1 racing, adding a layer of tactical battles and heart-stopping overtaking attempts.



Steering Wheel

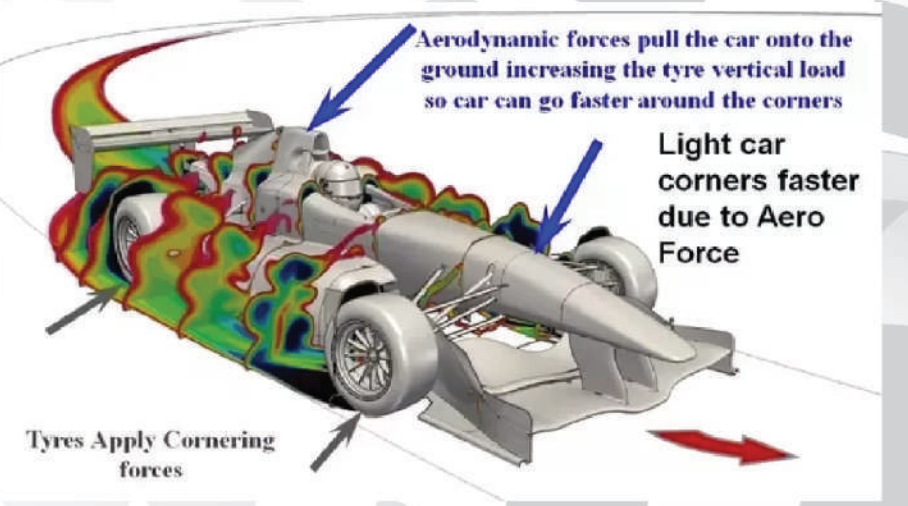
While driving an F1 car at breakneck speeds, drivers have to make adjustments and manage all these complex systems through the steering wheel. It's like piloting a high-tech machine, not just steering a car! These amazing F1 steering wheels give drivers the ultimate control they need to dominate the race. Unlike a regular car steering wheel, which is pretty basic, Formula 1 steering wheels are incredibly complex. Imagine a spaceship control panel instead!

- Material: F1 steering wheels are built with super lightweight and ultra-strong materials like carbon fiber. This keeps the weight down, which is crucial for speed.
- Packed with Buttons: Unlike a few buttons for turn signals and wipers in your car, F1 wheels are loaded with buttons and switches.
- Fine-Tuning the Race: Drivers use these buttons to do all sorts of things while hurtling around the track at mind-blowing speeds. They can change gears with paddles, adjust the brakes for different corners, and even control the car's balance for optimal handling.
- Information Central: A tiny screen on the wheel displays vital information the driver needs to know, like speed, engine performance, and lap times.

To Know More

Aerodynamics

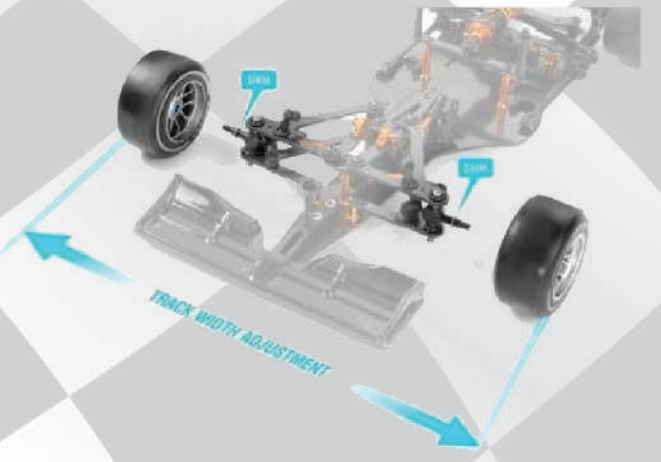
Formula 1 cars are the ultimate speed machines, but what keeps them glued to the ground when they're cornering at mind-bending speeds? The answer: cutting-edge aerodynamics!
Imagine air pushing the car down, not up. That's what F1 cars aim for. Here's how they achieve it:
Wings: Giant front and rear wings act like airplane wings, but in reverse. They push air down, creating downforce that pushes the car into the ground for better grip.
Diffuser: This hidden hero under the car channels air, creating a low-pressure zone that sucks the car down like a giant vacuum cleaner.
Bodywork: Every curve and slope on the car is designed to smoothly guide air, reducing drag (air resistance) and maximizing downforce.
F1 teams use fancy wind tunnels and computers to create these aerodynamic wonders. It's a constant battle between downforce for grip and drag for top speed. But the perfect balance gives F1 cars their legendary cornering ability.
So, the next time you see an F1 car carving up the track, remember - it's not just an engine with wheels. It's a marvel of science, slicing through air like a hot knife through butter.



Tyres

Formula 1 tyres are unlike any found on a road car. Forget chunky treads – these are all about maximizing grip for scorching speeds and aggressive cornering which are exclusively supplied by Pirelli since 2011. Unlike the single tyre type most cars use, F1 features a selection of Pirelli slick tyres with varying degrees of softness, designated by numbers (C0 being the hardest, C5 the softest). These compounds offer a trade-off between grip and durability. Softer tyres (C4, C5) provide incredible stickiness for optimal grip on smooth tracks, but wear out much faster, typically lasting only around 60km. Conversely, harder tyres (C0, C1) are more durable for longer stints but offer less grip. This adds a strategic layer to races, as teams grapple with choosing the right tyre for the conditions and their race strategy.

To further optimize performance, teams use tyre blankets before fitting them to the car. These blankets keep the tyres within a precise temperature range (around 80°C) for maximum grip when they hit the track. Wet weather throws another wrench into the mix. When rain hits, slick tyres are swapped for treaded intermediates for light rain or full wet weather Pirelli tyres for heavy downpours. These tyres prioritize channeling water away from the contact patch to maintain grip on a slippery track.



Conclusion:

From the rubber that grips the track to the wings that slice through the air, Formula 1 is a technological marvel. These innovations not only push the boundaries of racing, but also influence future car designs and even benefit other industries. It's a perfect blend of cutting-edge science and exhilarating speed.

BEST PROJECTS OF MALNAD COLLEGE OF ENGINEERING

A DEEP LEARNING APPROACH FOR AFFECTIVE STATES RECOGNITION USING ECG SIGNAL

Human Emotions play an important role in their personal professional and social life. Emotions are imperceptible but they can be assessed through facial expression human beings behave according to context and social circumstances, hence there is a chance of masking the actual emotion, hence it is difficult to identify genuine emotion based on the facial expression of a person. Emotions carry direct relationship with the physiological variables of the human system out of which Electrocardiogram (ECG) has been proved to be one of dominant variable of emotions evaluation. Here, Electrocardiogram (ECG) data from 20 subjects have been taken through an IOT module ADS1292R, primary emotions are evaluated based on Heart Rate variability acquired Electrocardiogram data, an Artificial neural network-based classification is used.

Team Members

NIKHITH M
SUSHITHA C S
SOWMYA J
VENKATESH H G

Guided by:

Mrs.Vanitha A
B.E., M.Tech.,
Assistant Professor
Dept. Of Electronics and Instrumentation Engineering

IOT BASED SOLID WASTE MANAGEMENT AND ANALYSIS USING MACHINE LEARNING TECHNIQUES

The Solid Waste Management project aims to address the challenges associated with efficient waste management using IoT and ML technologies. The project involves the implementation of smart bins equipped with ultrasonic sensors and NodeMCU microcontrollers for real-time waste level detection. The collected data is processed and analyzed using the Random Forest algorithm to predict future waste patterns. The system also incorporates GPS technology to track the location of the bins. Through this project, waste management processes can be optimized, leading to effective resource allocation and a cleaner environment.

Team Members

AKSHAY M A
ANIRUDDHA G A
VISHWAS S
PRAMODA M G

Guided by:

Dr. Chandrika J
B.E., M.Tech.,Ph.D
Professor and HOD
Dept. Of Information Science and Engineering

DEVELOPMENT OF A MULTIPURPOSE AGRICULTURAL PRODUCE DRYER

India is one of the countries based majorly on agriculture. Most of the agricultural products need drying after their harvest. Nevertheless, it takes a longer duration and lot of floor space for natural drying. On the other hand, number of industries provides equipment that is capable of drying the agricultural produce in relatively shorter duration. However, the cost of such dryers is high and is not affordable by common farmers. Hence, with the same insight, the present proposal focuses on development of a prototype dryer that works by using coil as a source of heating the agricultural produce. The proposed equipment is capable of drying the produce in a few minutes (depending on the type of produce) compared to conventionally available dryers that consumes hours together.

Team Members

GOWRAV S
BRUNDA K
KIRAN GOWDA H S
KUSHAL H P

Guided by:

Dr. Shashank Lingappa M
B.E., M.Tech.,Ph.D
Assistant Professor
Dept. Of Mechanical Engineering

THANKING OUR SPONSORS

TITLE SPONSOR

Tozy Innovations

MAIN SPONSOR

ESSCEE PRINT PACK PVT. LTD.

PRINTING PARTNER

Teachnook
STARTING POINT FOR YOUR CAREER PATH

EDUCATION PARTNER

Paradise Inn

FOOD PARTNER

VVC TV
ಸತ್ಯದ ಕಡೆ • ನಮ್ಮ ನಡೆ

MEDIA PARTNER

Chetak

CO-SPONSOR

HASSAN NEWS

SOCIAL MEDIA PARTNER

HEXA FABTECH

TICKETING PARTNER

POORVIKA

CERTIFICATE SPONSOR