Mar Baselios Institute of Technology and Science

SieTech Chronicles

2021 - 2022

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SIEHZ

VISION AND MISSION

Vision of the Institute

To nurture a positive campus culture and equip the younger generation to take our nation forward.

Mission of the Institute

- M1: To provide graduate level technical education in the existing or conventional branches, as well as in the newly emerging fields.
- M2: To build up a centre of technical excellence for post-graduate studies and research in all fields of human endeavour.
- M3: To help the youth of rural agricultural background to change with times, and join the mainstream of industrial growth and information technology
- M4: To impart ethical values of our Indian tradition to the future generation.

TECHNICAL MAGAZINE COMMITEE

- **CHIEF EDITOR** : Sandra Biju
- **EDITOR** : Abhirami Aji
- **STAFF-IN CHARGE** : Jeena Jacob, Asst Professor ECE
  Hyma Joy, Asst Professor, ECE

VISION AND MISSION OF DEPARTMENT

Vision of the Department

To be a center of excellence to produce globally competent technocrats.

Mission of the Department

- **M1: To provide quality education and training through effective teaching learning practices.**
- **M2: To solve the complex technological problems of modern society in the various fields related to Electronics & Communication Engineering.**
- **M3: To nurture students to improve their leadership and entrepreneurship skills with core values.**

Program Educational Objectives (PEOs)

Graduates will be able to:

PEO1: To acquire fundamental and advanced concepts of electronics and communication engineering to analyze, design, develop and implement electronic systems or equipment.

PEO2: To apply intelligence and skills in academic, industrial, or research career with creativity, commitment and social awareness.

PEO3 : To work in a team as a member or leader and adapt to the changes taking place in their field through deep-routed learning.

Graduates will be able to

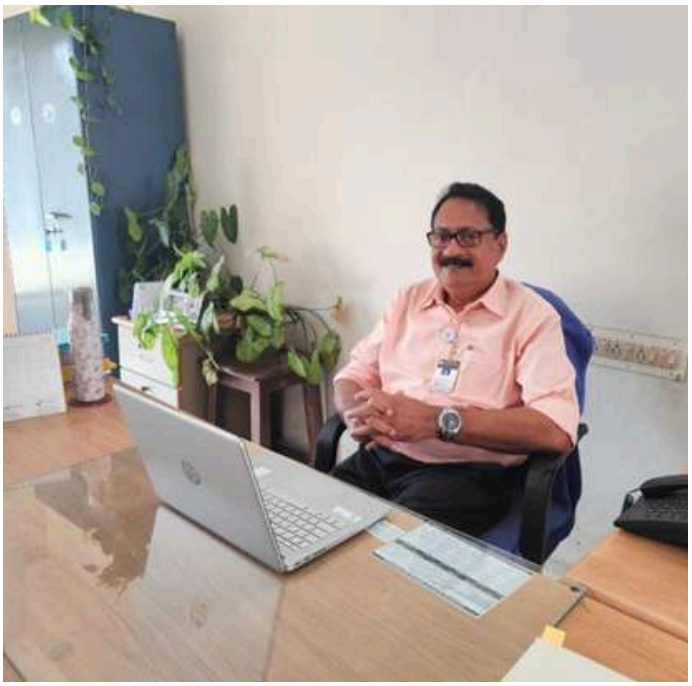
PSO1: Understand fundamental knowledge of various electronic subjects in the analysis, design and development of analog and digital systems to support the needs of industry and society.

PSO2: Demonstrate the knowledge of signal processing, communication and networking to solve the issues of modern communication systems.

PSO3: Procure proficiency in specialized hardware and software packages useful for the electronic engineering field.

HOD MESSAGE

"Hello Team,



As we step into a new year filled with fresh opportunities and challenges, it's time to reflect on our collective journey and celebrate our accomplishments.

Firstly, I want to extend my heartfelt appreciation to each and every one of you for your unwavering dedication and hard work. Your commitment to excellence is the driving force behind our department's success.

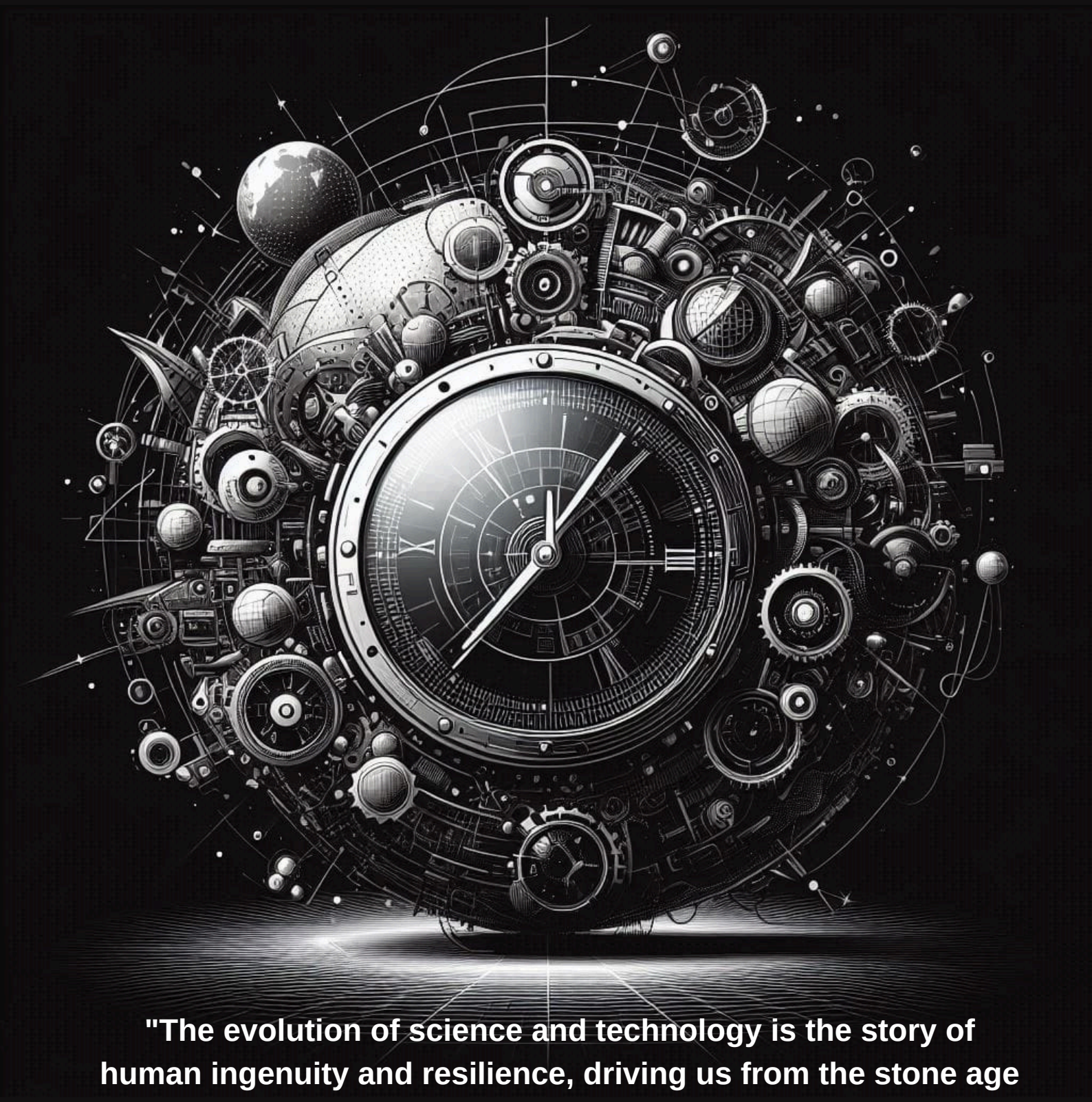
In the spirit of collaboration and innovation, let's continue to support each other and explore new ways to exceed expectations. Remember, our strength lies in our unity and diversity of thought.

As we move forward, let's keep communication channels open, share ideas freely, and embrace change with enthusiasm. Together, we can overcome any obstacle and achieve remarkable results.

Thank you for being an integral part of our team. Here's to a productive and fulfilling month ahead!

Best regards,

Prof Johny Joseph,
HOD ECE



"The evolution of science and technology is the story of human ingenuity and resilience, driving us from the stone age to the space age and beyond. It is a testament to our unyielding quest for knowledge and our ability to transform dreams into reality."

- Neil deGrasse Tyson

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COVID-19: AN INFLECTION POINT FOR INDUSTRY4.0

In 2020, industrial digitization was put to the ultimate test. Faced with the worst health and economic crisis, businesses of all kinds were forced to take extreme measures to protect their employees and keep their operations running. While some battled to keep operations running in the face of labor or raw material shortages, others fought to keep up with the unexpected surge in demand.

According to the findings of a new McKinsey poll, there are three possible outcomes: a win for organizations that have already scaled digital technologies, a reality check for those currently scaling, and a wake-up call for those who haven't begun their Industry 4.0 adventures.

Technology has played an important role for all the occupations due to the global pandemic. It has highlighted the technology's importance in our lives and how everything could continue despite the challenges. It was a key for the students' learning, kept businesses running and all of us connected.

Our annual Industry 4.0 survey of global manufacturing organizations has been tracking the growth of Industry 4.0 since 2017, and our most recent poll of more than 400 companies globally (Exhibit 1) provides a picture of leaders' thoughts six months into the coronavirus outbreak. Overall, 94% of respondents claimed Industry 4.0 assisted them in keeping their operations functioning during the crisis, and 56% said these technologies were crucial to their crisis responses.

As businesses across the world face a painful transition to the post-COVID-19 next normal, some companies may be tempted to slow, or even pause, their digital transformations. For most, that would be a mistake. Industry 4.0 leaders are already reaping the benefits of their pre-pandemic investments, creating the prospect of a widening gap between winners and losers. Instead, we believe the better option for most businesses is to focus their digital efforts, targeting the most strategically important opportunities and aiming to achieve real scale at an accelerated pace.

Sandra Biju
S6 ECE

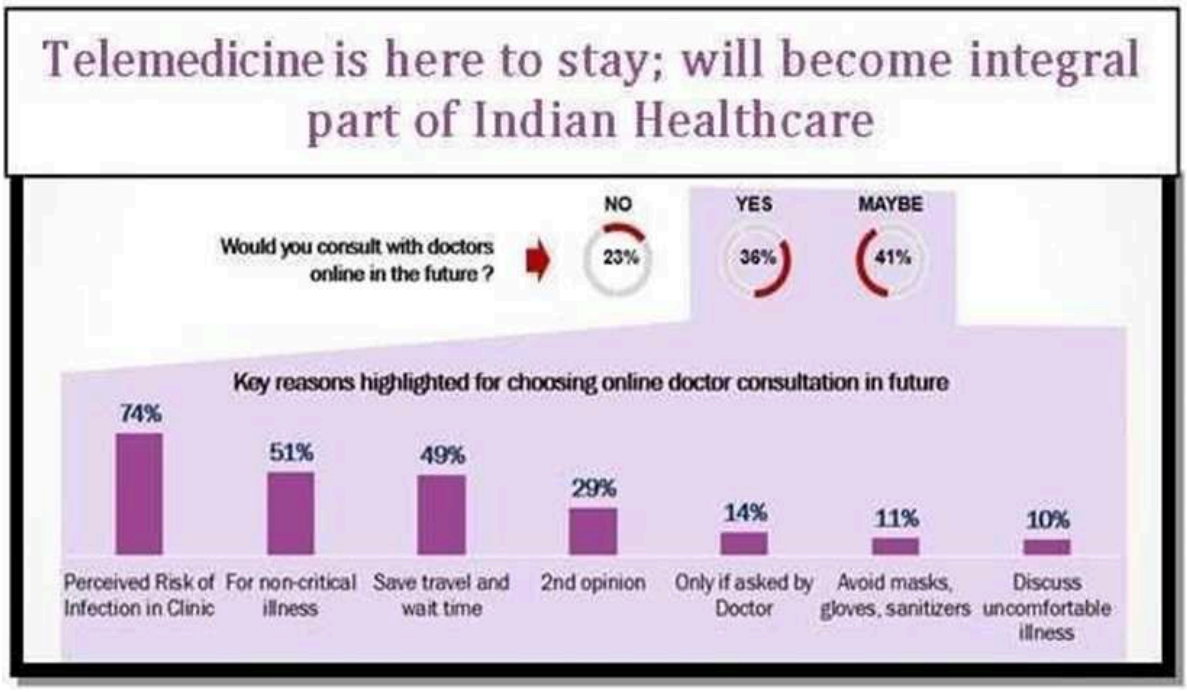
TELEMEDICINE: EMBRACING VIRTUAL CARE DURING COVID-19 PANDEMIC

The key issues faced by health care across countries include access, equity, quality, and cost- effectiveness. The problems are more aggravated and intense at the time of outbreaks, pandemics, and disasters when the already frail health system is over-burdened and nosocomial transmission of infections is a challenge. Technology of telemedicine has great potential to help address these concerns. Telemedicine is the delivery of health care services, by all healthcare professionals using ICTs for the exchange of information for diagnosis, research, evaluation, and for continuing education of health care providers. Telemedicine is a part of telehealth; telemedicine pertains to service delivery by physicians and telehealth signifies services provided by health professionals in general, including nurses, pharmacists, and others. This E-health concept has been extended to Telecare, Teleconsultation, Telehealth, and Telemedicine Cabin services.

Telemedicine and virtual care have become an important tool in caring for patients at COVID -19 pandemic time while keeping health care workers and patients safe. The explosive rise in number of cases in the community with many cases in home isolation, telemedicine is the only viable option available to monitor them and ensure timely referral. Platforms of teleconsultation are being utilized in surveillance and primary care delivery during home isolation of asymptomatic/mild COVID-19 cases. Triaging of patients by primary care practitioners will ensure that health facility and logistics are reserved for patients who need them most. With the fear of disease transmission, many primary care physicians are adopting technology for delivery of other routine health care services to patients reducing in-person clinic visits. Can be ensured wherein health care providers in high-risk category, with co-morbidities and on isolation post infection can also be utilized for telemedicine services.

The screening for suspected patients among vulnerable groups like frail old people in nursing homes, shelter homes, etc., can be done through telemedicine and if found to be in general good health, they can be kept under daily follow-up teleconsultation, thus preventing other healthcare workers from further exposure.

A mobile telemedicine device was used to effectively collect, transform, and assess patient health data such as oxygen level, respiratory rate, and blood pressure, which reports the data to the attending physician. This helps to prevent direct physical contact, thus decreasing the risk of exposure and prevents potential transmission of infection to nurses and physicians. The Australian government provided funding for Medicare telemedicine services (Medicare support at home) against COVID-19, to encourage physicians to help provide health services.



India has seen a surge in cases of COVID-19 despite its measures to contain the transmission of the virus by social distancing and stringent lockdown measures. Lack of access to health care is a major challenge in the period of lockdown. Such incidents have paved the way for recognition of telemedicine where health care delivery could be made ubiquitously available.

The Indian government has adopted telemedicine to reduce direct doctor-patient contact during the course of pandemic. In view of the increasing importance of telemedicine at the time of COVID-19 pandemic, the guidelines on practice of telemedicine published in 2005 got revised in 2020 to focus on medical ethics,

data privacy, confidentiality, documentation, digital records of consultation, and process setting of fees for telemedicine. It emphasizes on principles of medical ethics, including professional norms for protecting patient privacy and confidentiality as per the Indian Medical Council Act. Several measures thereafter were introduced by the central and state governments to boost telemedicine services in country.

All India Institute of Medical Sciences, a premier institute has started providing consultation to patients on non-COVID-19 ailments through telemedicine. “Calldoc” and “DR YSR Telemedicine” are initiatives by state governments during COVID-19 to deliver OPD services. In Delhi, the government has joined hands with “CallDoc” app to launch 24 × 7 free online medical consultation services to help the patients connect with doctors remotely through mobile application for nonemergency medicalneeds. The user is able to connectto doctor through video or audio or chat and get the consultation over phone by using this mobile app and the patients can upload their test reports for doctors to review. The doctors can upload prescriptions on the app after consultation. “DR YSR Telemedicine” helps the health department to locate people with symptoms of COVID-19 in Andhra Pradesh. On receiving a missed call, an executive collects the detail of the patient and a doctor will respond through audio or video conference and will prescribe the medicines and tests required through SMS. Telemedicine holds a promising future in India with unprecedented growth and development in information and communication technology (ICT) system. Satellite transmission, high-speed broadband connectivity, mobile and wireless telephones are making inroads into suburban and rural India. Other key growth drivers include the widespread use of wireless and web-based services, and improving technology which includes the adoption of 3G and upcoming availability of 4G spectrum and optic networks. The integration of telemedicine into national frameworks including public health preparedness is needed.

Abhijith Rajendran
S4 ECE

EMERGENCE OF DIGITAL LIFE

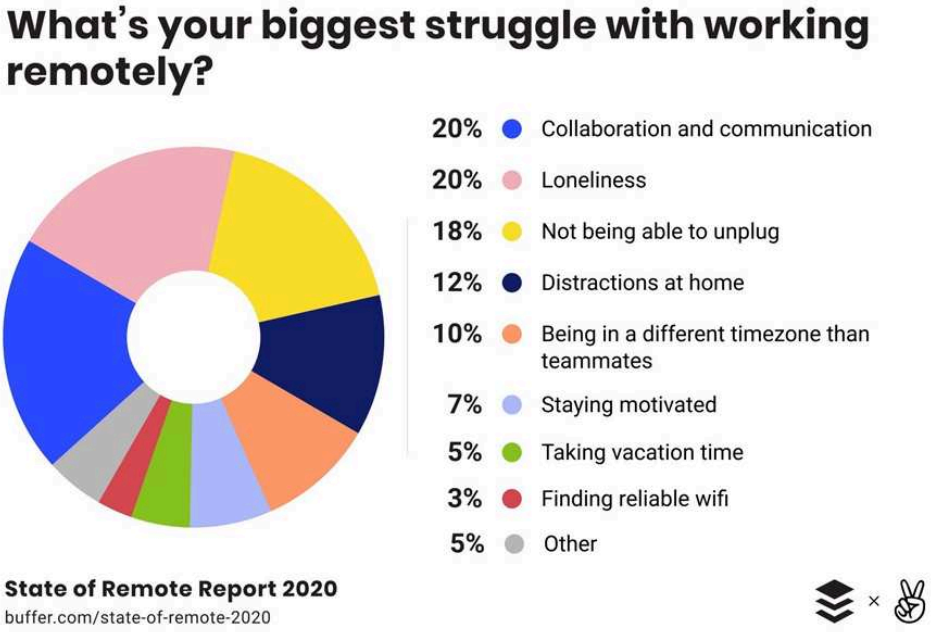
Coronavirus pandemic has posed a significant impact on an individual's life, both negative and positive. Due to the increase of the coronavirus pandemic at an alarming rate globally, every individual has to revisit the global norms. The global norms have usually been accepted to solve complex development challenges on the ground and are deemed crucial for societies to flourish. Therefore, to change the entire geopolitical systems, the government has endorsed new methods of applying technology to positively impact the community and encourage ongoing activities for every individual. Due to the coronavirus pandemic, there has been a significant effect on the running of the economy by the government by introducing new methods of technology to ensure activities are ongoing as well as they are done more effectively. Typically, government information has focused on addressing the public by giving out detailed information about the outbreak of the disease and imposing strategies and policies to be followed, such as restrictions on traveling and social distancing among individuals, hence assessing technology advancement.

Remote work

Many companies have asked employees to work from home. Remote work is enabled by technologies including virtual private networks (VPNs), voice over internet protocols (VoIP), virtual meetings, cloud technology, work collaboration tools and even facial recognition technologies that enable a person to appear before a virtual background to preserve the privacy of the home. In addition to preventing the spread of viruses, remote work also saves commute time and provides more flexibility.

Yet remote work also imposes challenges to employers and employees. Information security, privacy and timely tech support can be big issues, as revealed by recent class actions filed against Zoom. Remote work can also complicate labor law issues, such as those associated with providing a safe work environment and income tax issues. Employees may experience loneliness and lack of work-life balance. If remote work becomes more common after the COVID-19 pandemic, employers may decide to reduce lease costs and hire people from regions with cheaper labor costs.

Laws and regulations must be updated to accommodate remote work – and further psychological studies need to be conducted to understand the effect of remote work on people.



Further, not all jobs can be done from home, which creates disparity. According to the US Bureau of Labor Statistics, about 25% of wage and salary workers worked from home at least occasionally from 2017 to 2018. Workers with college educations are at least five times more likely to have jobs that allow them to work from home compared with people with high school diplomas. Some professions, such as medical services and manufacturing, may not have the option at all. Policies with respect to data flows and taxation would need to be adjusted should the volume of cross-border digital services rise significantly.

Distance Learning

Technology has improved distance learning among the students and their teachers. Due to the increasing number of patients infected with the coronavirus, many countries issued the cessation of all in-person learning classes in institutes to help thwart the coronavirus spread. Many institutions started offering online classes through online platforms such as Google or Zoom to ensure that the quarantine measures didn't disrupt education. Technology implemented in distance learning is the same used to enhance effective remote working.

Online Entertainment

Online entertainment has been enhanced by technology tremendously during this time. Although personal interactions have been reduced by the quarantine measures placed to prevent the spread of coronavirus, different ways have been innovated to bring parties online. All over the world, different platforms have been created to bring the music and entertainment industries together. Cloud raves and online streaming are significant ways where many people tend to get unmaintained through listening to musicians or actors of their choice all over the world. The outbreak of COVID 19 resulted in the cancelation of many movements and any forms of gatherings that enabled the museums and international heritages site to offer virtual tours the entire world. Many people have started embracing online games since the outbreak to keep them engaged and entertained.

The rise of the Coronavirus disease has gradually led to changes in individuals' lives in both positive and negative ways. Equitable access to the application of various digital infrastructures has been considered to be essential right now. The demand for advancement in technology is to respond to the current implications of COVID-19 disease.

It is clear that as far as concerned, the rapid application of the new technological methods to curb the current emergency has posed a broad and wide digital division. Even if the digital divide's existence is not new, the present disaster has added a new dimension of addressing urgent issues. Through the application of policies imposed by the government and the world health organization toward social distancing, maintenance of basic hygiene and traveling restrictions has taught individuals to be responsible for their own health and how to respond to urgent issues when they arise. Besides, the advancement of technology has played its best role in ensuring and maintaining ongoing activities without interruption. Therefore, it is crystal clear through the past discussion above that technological advancement during this era of COVID-19 has significantly impacted individuals' activities and states in a few countries.

Sreelakshmi Chandran
S8 ECE

CONTACTLESS PAYMENTTECHNOLOGY DURING COVID-19

Contactless payments have been gaining momentum for some years now, with payment via the tap of a bank card, smartphone, or wearable device becoming commonplace. Consumers in many countries have been attracted by the speed and convenience of contactless payments compared to chip-and-pin (PIN) cards or traditional cash. Still, there is a huge amount of variation between countries in terms of how quickly this technology has been adopted. For example, in 2018 only 3% of payment cards in the US were contactless compared with up to 96% in South Korea. This imbalance may be set to change, as concerns about hygiene and social distancing during the pandemic have made contactless payments very appealing. According to MasterCard, in 2020 contactless payments as a proportion of face-to-face payments have grown 25% compared to the previous year.

In this brave new world of social distancing, making the switch to contactless payments has seemed like a natural way for people to protect themselves and others while out shopping. Not only do they not have to handle cash that has been touched by many other people, but they also avoid contact with card readers that could hold traces of the virus on their surfaces. Contactless payments made via a smartphone or wearable device mean even less touching is required. And QR code apps take this still further. The technology behind QR codes allows a customer to scan a merchant's code with their smartphone camera from a distance of several meters away, making social distancing easier.

Although QR codes have lagged behind other contactless payments outside of Asia, the pandemic may accelerate their use in more countries. Aside from the issue of touching surfaces, the speed of contactless payments has also demonstrated further advantages during the pandemic. They reduce the time customers need to spend in-store and help to prevent long queues forming, lessening the risk of standing too close to other shoppers for a significant period, where they could become exposed to infection.

Contactless payments are the feature of money transfers. The outbreak and its worldwide spread significantly increase the popularity of contactless payments because cash is transmitting covid-19. Contactless payments are the best way to prevent the spreading of covid19.

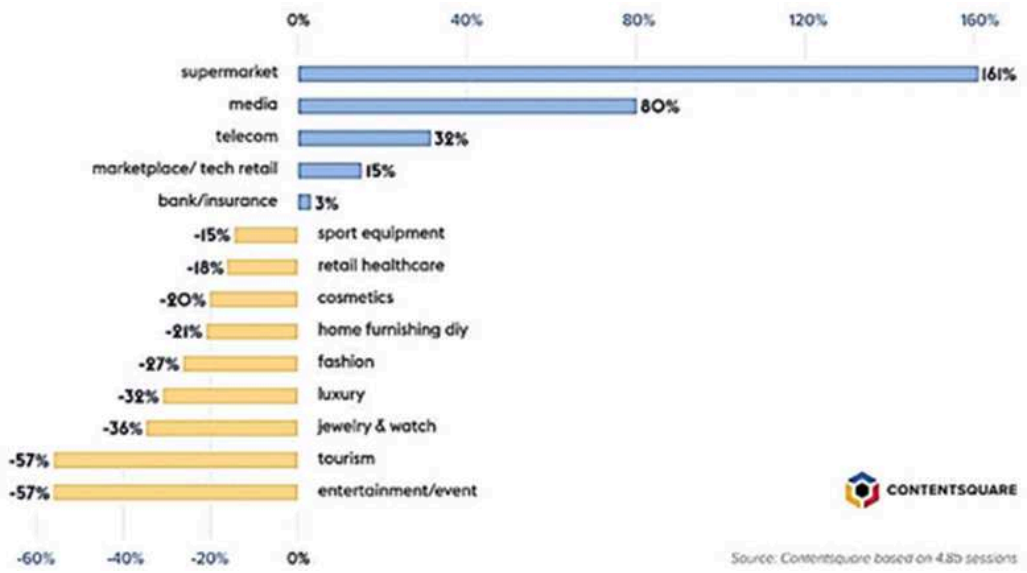
Contactless payment and ID are more necessary than ever and governments should adopt contactless ID for the public's safety by rolling out mobile ID technology. With government-issued mDLs, the possibilities of improving the safety, health, security, and privacy of our ID-proofing transactions are numerous. The COVID-19 pandemic has clearly shown all of us how necessary and important this is.

Vyshnavu Santhosh
S6 ECE

SHOPPING, ROBOTS AND COVID-19

The retail industry, from the start of the pandemic, has been negatively affected. Brick and mortar stores with no online presence, particularly smaller shops and boutiques are among the most affected. Social distance guidelines and the implementation of quarantine measures have made it difficult for many shops to open, or to operate at maximum capacity like they used to.

It is important to note as well that COVID-19 has not only forced businesses to adapt to new trends, but also it has also forced companies to have cash flow forecasts to at least 6 months, minimize all operations, cut all unimportant investments, and adopt new business models in order to properly adapt to the upcoming trends and be more prepared for the unpredictable times ahead. This cements the importance of automation and technological innovation in the business world. Responding to new demands from industries during the crisis, robotics companies across the globe are taking actions in different sectors, contributing to people’s safety and well-being during this challenging period of time.



Due to the pandemic, people today have turned to one-stop shopping options for doing all their shopping. This includes online shopping, hypermarkets, large stores, etc. This makes it hard for smaller businesses to attract people since it's harder to compete with the level of the variety found in larger shopping stores or the versatility and convenience of online shopping. It's not only the small and medium businesses that need this, in a department store, but shoppers also have so many similar choices of different brands, those brands need to differentiate themselves from others as well. Not only that, but people are no longer spending as much, so business owners must focus on making their whole brand equal to quality and good customer experience. Shop owners must find answers to the questions of, how can I attract customers to my store, how can I change a window shopper to a real customer, and what can I do to add some visually appealing things to attract customers' attention that doubles as part of the customers' experience. One particular example is how in Tokyo, Pepper has been deployed in giant shops like Big Camera, Yodobashi, and SoftBank mobile stores.

Here Pepper robot welcomes shoppers and helps them find their way around the store.

For Sonae Sierra, Humanizing Technologies has enabled 'welcome' and 'Inform & Recommend' features in Pepper. This enables Pepper to give an extremely warm welcome to all its visitors at the mall and inform them about the current offer of tenants and services, thus seeking more support for the stores and services of the Center. The pre-covid era has significantly decreased the footfall in the mall and Sonae Sierra's initiative of deploying a humanoid robot to combat the decreasing sales has been highly beneficial. Pepper's proactive engagement with the visitors has been prolific and Sonae Sierra is looking forward to deploying Pepper in several other locations!

Robotics plays a huge role in the post-COVID-19 era, as much as it does in the height of the pandemic. Robots like Pepper can allow people to stay safe, inform and educate, allow people to have contactless experience, draw attention, among many other incredible solutions. Like we saw in the previous use cases, Pepper played a pivotal role in the businesses' strategies and how they chose to adapt to the COVID-19challenge, and how they will move forward into the post- COVID-19 era. Pandemic or not, retail always has to innovate and evolve the way people show and experience their shopping.

Haleena Jaimon
S4 ECE

IMPACT OF COVID-19 ON DIGITAL WORKING AND CYBERSECURITY

The coronavirus pandemic has created new challenges for businesses as they adapt to an operating model in which working from home has become the ‘new normal’. Companies are accelerating their digital transformation, and cybersecurity is now a major concern. The reputational, operational, legal and compliance implications could be considerable if cybersecurity risks are neglected. This article examines the impact of COVID-19 on cyber risk and mitigation measures those businesses can take.

The restrictions imposed by governments in response to the coronavirus pandemic have encouraged employees to work from home, and even ‘stay at home’. As a consequence, technology has become even more important in both our working and personal lives. Despite this rise of technology need, it is noticeable that many organizations still do not provide a ’cyber-safe’ remote- working environment. Where business meetings have traditionally been held in- person, most now take place virtually.

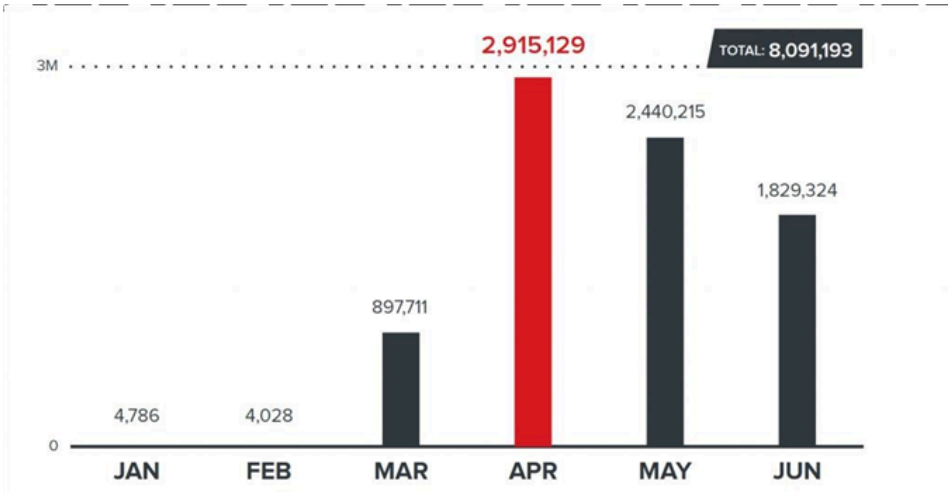


Figure 2. The monthly count for Covid-19-related email threats in the first half of 2020

In June 2020 Swissinfo.ch reported figures from the NCSC (National Cyber Security Centre) showing that there were 350 reported cases of cyberattacks (phishing, fraudulent web sites, direct attacks on companies etc.) in Switzerland in April, compared to the norm of 100-150. The coronavirus pandemic and increase in working from home were seen as a major cause of this increase, since individuals working at home do not enjoy the same level of inherent protection/deterrent measures from a working environment (e.g., internet security).

47% of individuals fall for phishing scams while working at home Cyberattacks on video conferencing services between February and May 2020 more than half a million people globally were affected by breaches in which the personal data of video conferencing users was stolen and sold on the dark web.

An example of criminals exploiting the cybersecurity weaknesses in remote working has been the series of cyberattacks on video conferencing services. Between February 2020 and May 2020 more than half a million people were affected by breaches in which the personal data of video conferencing services users (e.g., name, passwords, email addresses) was stolen and sold on the dark web. To execute this attack, some hackers used a tool called 'Open Bullet'.
Hackers also use credential stuffing techniques to gain access to employees' credentials and the stolen data is then sold to other cybersecurity criminals. One of the consequences is a serious disruption to businesses that rely heavily on videoconferencing platforms. Credential stuffing is a form of cyberattack whereby hackers use previously-stolen combinations of username and password to gain access to other accounts. This is possible because it is very common for individuals to use the same username/password combination across multiple accounts.
We noted instances where unwanted and uninvited members gain access to virtual meetings and obtain confidential or sensitive information, which is then sold to another party or made available to the public to damage the company's reputation.

The cyber threat landscapes

The cyber threat landscape is diverse:
• Malicious employees working from home with less supervision and fewer technical controls may be tempted to carry out a fraud or other criminal activity
• Cybercriminals recognize that the data security measures currently in place are 'not fit for purpose' or sufficiently robust to prevent them from making successful cyberattacks
• The activities of hacktivists (hackers fighting for social and political issues) are adding to the cybersecurity threats

• Script kiddies ('junior' hackers with less technical skills) are testing out cyberattack packages on a variety of organizations and improving their skills.

Most of these threats have intensified because of the opportunities that have arisen during the COVID-19 outbreak.

One of the reasons for the spike in cyberattacks may be due to the fact that some small and medium-sized businesses take a ‘Bring Your Own Device’ (BYOD) approach (in contrast to a ‘Corporate Owned Personally Enabled’ (COPE) approach), which means that employees can use their personal devices (phones, tablets, or laptops) to access corporate information. Working from home does not guarantee the same level of cybersecurity as an office environment. When using a personal computer or laptop to access corporate files and data (even with the security of an MDM solution) users are more exposed to cyberattacks. For example, employees may not run an antivirus or anti-malware scan regularly, if at all. A home working environment does not have sophisticated enterprise prevention and detection measures. Additionally, home Wi-Fi networks are much easier to attack.

Human error is another issue of concern. Prior to the pandemic, human error was already a major cause of ‘cyber insecurity’: employees would unknowingly or recklessly give access to the wrong people. With home working, however, the problem is even greater. When they work from home, employees may be interrupted in the work they are doing by family members or social visitors. These distractions can make individuals more careless. IT systems need to adapt to these changes in working practices and the increase in human error. This can be accomplished in many ways such as incorporating time-outs in key information systems, enhancing controls to apply the ‘four-eyes principle’, enforcing segregation of duties(SOD) or automated controls. After all, this is what ’digital empathy’ is about.

The changing nature of cyberattacks

It appears that many hackers are upping their game, and to capitalize on the new shift by companies to remote working, they have developed new malware to attack and infiltrate systems.

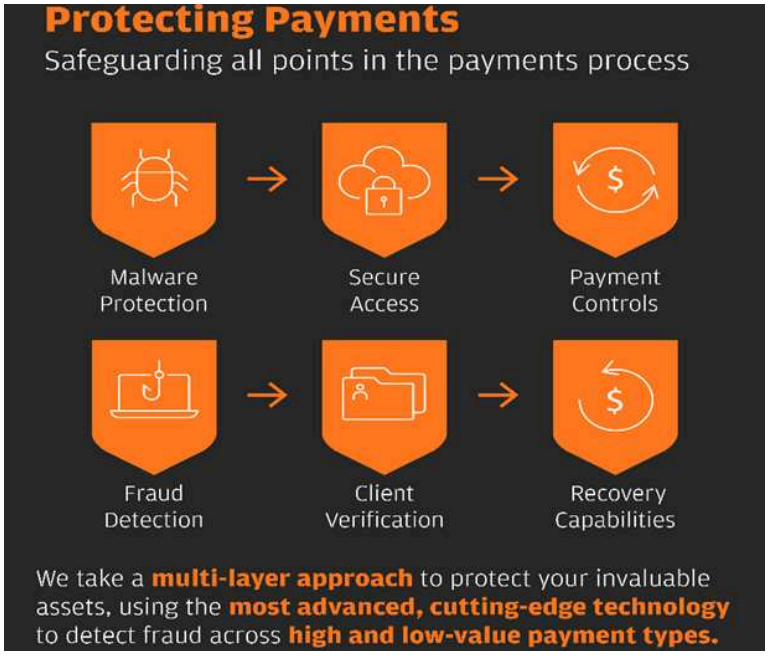
Prior to the pandemic, about 20% of cyberattacks used previously unseen malware or methods. During the pandemic, the proportion has risen to 35%. Some of the new attacks use a form of machine learning that adapts to its environment and remains undetected. As an example, phishing attacks are becoming more sophisticated and using different channels such as SMS and voice (vishing). Moreover, news about vaccine developments is used for phishing campaigns. Ransomware attacks are also becoming more sophisticated. For example, hackers are combining data leakage attacks with ransomware to persuade victims to pay the ransom.

This upsurge in sophisticated cyberattacks calls for new ‘cutting edge’ detection mechanisms to meet the threat, such as ‘user and entity behavior analysis’ or UEBA. This analyses the normal conduct of users, and applies this knowledge to detect instances where anomalous deviations from normal patterns occur.

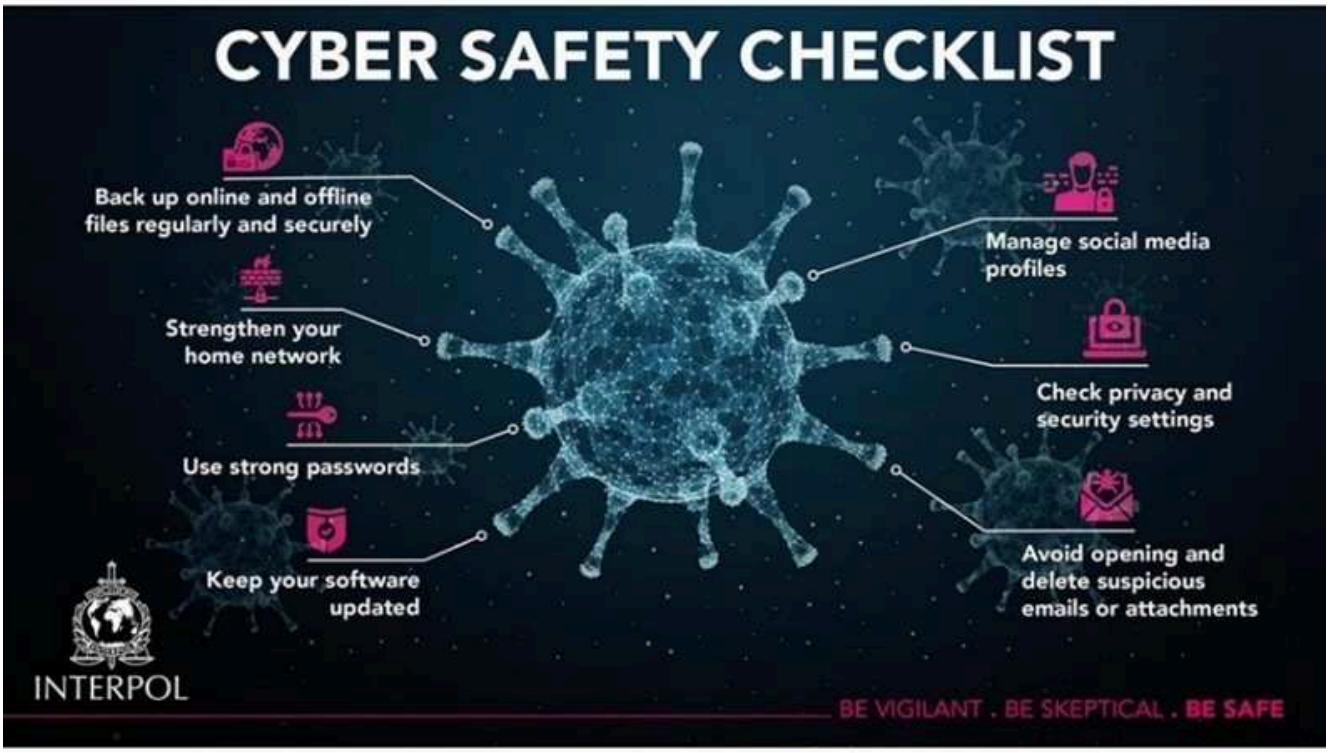
Examples of how companies and employees can increase cybersecurity

Employees working from home and using their personal computer (and even those using a corporate-owned device) should implement essential cyber hygiene practices. These include:

1. Antivirus protection. Employees should be provided with a license to antivirus and malware software for use on their personal computers. Although this does not provide failsafe protection, it eliminates many low-level attacks.
2. Cybersecurity awareness. Staff should be briefed on best practices and procedures to regulate the sending of emails or other content to private email addresses and/or cloud storage.
3. Phishing awareness. Employees should be vigilant when receiving emails and should check the authenticity of the sender's address.
4. Home network security. Employees should ensure that their home Wi-Fi is protected by a strong password.
5. ·Use a VPN. Virtual private networks add a further layer of protection to internet use from home. They cannot on their own be relied upon to prevent cyberattacks, but they can be a useful barrier against cyberattack. There are some basic cybersecurity strategies that businesses can adopt.
6. ·Identify weak spots. All IT systems have weaknesses. Companies should run tests to identify them and patch the most critical vulnerabilities as soon as possible. This can take the form of vulnerability scanning, or various type of penetration testing exercises. Additionally hardening of components of the technical infrastructure should be performed.
7. ·Frequent reviews. Companies should regularly evaluate cybersecurity risk exposure and determine whether existing controls are robust enough. Any new forms of cyberattack that have appeared recently should be considered during these reviews.
8. Renew business continuity and crisis plans. Business lines Managers need to keep their business continuity plans updated and consider cyberattack scenarios.



Cybersecurity is on the agenda of most executive committee meetings, but should perhaps be given extra attention in view of the growing threats during the pandemic. In the midst of the second wave of the coronavirus and concerns about a potential third wave, companies should be proactive in addressing the threats, and plan ways of preventing successful cyberattacks rather than responding when they occur. However, although prevention measures are important, there is also a ned for cyberattack detection, response and recovery capabilities.



There are ways to reduce the likelihood and impact of a cyberattack, but it requires focused action and planning. Companies need to make their remote working practices resilient to cyberattacks and enhance their development and application of security measures.

Sonu Sani
S8 ECE

COVID AND CRYPTOCURRENCIES

Coronavirus or COVID-19 has created havoc in the history of humankind. It's no less than a disaster we are going through. Sustaining in this time seems the only way to survive.

While the pandemic caused several commodities and assets to lose their value, the cryptocurrency market, on the other hand, was found immune to coronavirus. From approximately $7000 in March 2020 to more than USD 54,000 to date, Bitcoin has boomed and astonished the whole world.

Investors have doubled or tripled their fortune. Some made millions in a year, and some became Billionaires.

It's absolutely inappropriate considering this global epidemic as the reason for the growth of the crypto market. It's important to look at the facts and figures and analyze every corner.

So, let's see how COVID-19 has impacted the overall Crypto Market.

Positive Impacts of COVID-19 on Cryptocurrency

The volatility of the market is inevitable. Still, people were buying cryptocurrency that has made the crypto market appealing among the crowd.

- The prices had gone down to half in March 2020, alleviating as low as $ 3,780. Since then, Bitcoin has gained so much wealth and popularity in the pandemic.
- Sentiments have been way too bullish that pumped the Bitcoins and Altcoins, surpassing several existing records. As of now, the market cap of Bitcoin has a staggering of $1.1 TN, comprising half of the cryptocurrency market, which is over $2 TN.

● While other commodities were losing worth, cryptocurrencies, on the other hand, were proving themselves as a reliable asset in these tough times.
● Despite this deadly outbreak, Cryptocurrency exchanges in India kept on expanding their business and their figures. Also, this led to the opening of new Bitcoin Exchanges in India as well.
Months back, RBI had banned cryptocurrency since the illegality was the reason. But soon, the Supreme court of India quashed the ban stating that these aren't regulated yet but aren't illegal too.
Despite the threat revolving over cryptocurrency, the volume in India itself is 8 million holdings up to 100 billion rupees corresponding to tokens held by Indian investors.
In the beginning, speculation analysis helped investors to book profits. But as time passed by, people realized that it's more secure and a safer means of exchange and can be a reliable asset in worst cases.
Cryptocurrency Exchange in India like **WazirX, CoinSwitchKuber** started expanding their business and doubled their fortune.
Several Bitcoin Exchanges in India opened up that allowed newbies to invest and trade Bitcoins.

Negative Impacts of COVID-19on Cryptocurrency

Well, no coins single-faced. If the value and market had swelled up, there must be other things that have shrunk because of coronavirus.
● Indeed, the equities have increased since the outbreak. However, some analysts believe that this sudden spike won't last forever. Bitcoins are way far from a safe haven like Gold and Silver.
● The crypto is uncertain and unregulated in India yet. That is leading the sentiments to go on a negative note since the crypto market is experiencing this threat revolving over its head.
● Bitcoins are still yet to be accepted as a norm in many countries. Yes, it's still mainstream, but this unexpected outbreak has turned some moods against the Crypto investment.
The positive side of cryptocurrency is that the market is acting as a safe haven and a reliable investment.
The market is quite nascent as of now. It's because the value and consideration had swelled amid the pandemic.

Anna Shiju
S6 ECE

WEARABLEDEVICES TO PREDICTILLNESS, INCLUDING COVID-19

Stanford Medicine researchers and their collaborators, Fitbit and Scripps Research, are launching a new effort that aims to detect early signs of viral infection through data from smartwatches and other wearable devices.

By using wearable devices to measure things such as heart rate and skin temperature, which are known to elevate when the body is fighting off an infection, the team seeks to train a series of algorithms that indicates when your immune system is acting up.

If the algorithms succeed, the team hopes they could help curb the spread of viral infections, such as COVID-19.

“Smartwatches and other wearables make many, many measurements per day — at least 250,000, which is what makes them such powerful monitoring devices,” said Michael Snyder, PhD, professor and chair of genetics at the Stanford School of Medicine. “My lab wants to harness that data and see if we can identify who’s becoming ill as early as possible — potentially before they even know they’re sick.”

Snyder, who holds the Stanford W. Ascherman, MD, FACS, Professorship in Genetics, and his team are recruiting participants for the study through his lab’s Personal Health Dashboard. Fitbit, a company that makes wearable devices, will assist in that effort by raising awareness of the study with its users and offering them the option to participate. In addition, Fitbit plans to donate 1,000 smartwatches to Snyder’s research. As part of this collaboration, scientists at

Scripps Research will also work with Fitbit to try to track how infection spreads in a community.

Once the algorithms are developed and verified, Snyder said, they could help people keep tabs on their health. Devices with an algorithm could alert users when their heart rate, skin temperature or some other part of their physiology signals that their body is fighting an infection. When people come down with a cold or flu, there's usually a period just before symptoms set in when they wonder if they're actually getting sick. Even during that time, without heavy symptoms, a sick individual often can still spread the virus. "You might wonder, 'Are these sniffles allergies, or am I getting sick?' These algorithms could help people determine if they should stay home in case their body is fighting off an infection," Snyder said.

Watching for signs

Snyder's research will be based on an algorithm that he and former postdoctoral scholar Xiao Li, PhD, now an assistant professor in the Center for RNA Science and Therapeutics at Case Western Reserve University, created in 2017. The algorithm showed that it was possible to detect infection using data — specifically, data from a change in heart rate — from a smartwatch. Snyder's study showed that specific patterns of heart rate variation can indicate illness, sometimes even while the individual is asymptomatic. Li is also a collaborating principal investigator in the current study.

For this study, Snyder is collecting data from five different brands of wearable device, including a smart ring and a variety of smartwatches. Each participant will also fill out surveys that keep track of their health status. Snyder and his team will create five new algorithms — one for each of the different wearables — to potentially detect when someone is getting sick. How quickly they can develop and verify the algorithms will depend on the number of participants who sign up for the study, Snyder said.

Although he's hopeful that these algorithms will be able to successfully flag a specific change in heart rate linked to viral infection, Snyder also foresees some kinks to work out. "It's possible that the algorithms could detect an elevated heart rate, but the user could be watching a scary movie or participating in some other activity that naturally elevates heart rate," he said. "An alert isn't a direct diagnosis, and it will be important for folks to be able to contextualize their situation and use some common sense." Snyder also adds that even as his team works to develop algorithms that can flag illness, the next step is to investigate whether those signals can be sorted to be able to differentiate between viruses.

The study is an example of Stanford Medicine's focus on precision health, the goal of which is to anticipate and prevent disease in the healthy and precisely diagnose and treat disease in the ill.

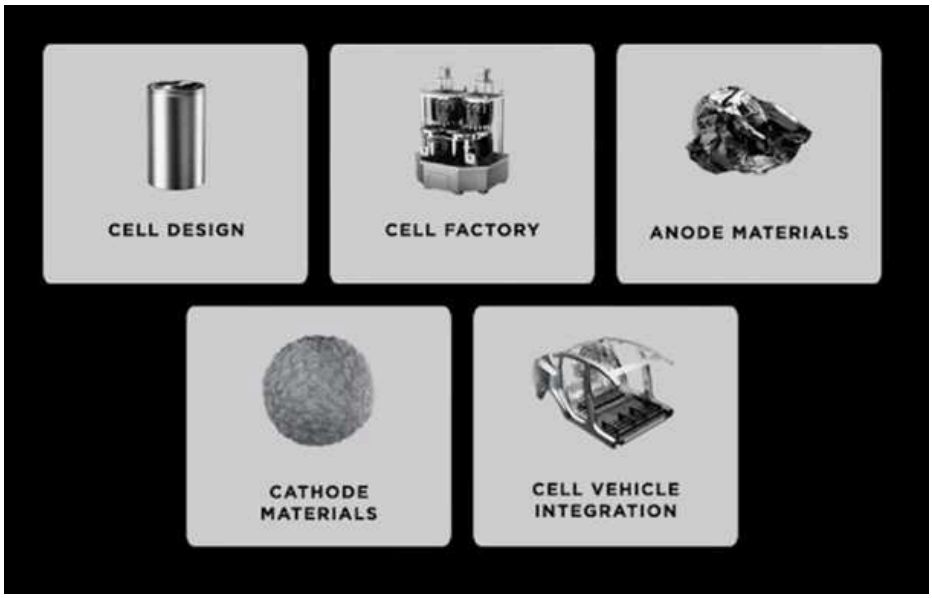
"I feel confident based on our former study that we'll be able to detect some signal of infection based off of the wearables' data," Snyder said. "And I'm hopeful that as our study picks up, we may even have the granularity to anticipate the severity of viral infection based on smart device data. This tool may end up being a plus for both diagnosis and for prognosis."

Alvin Joseph
S4 ECE

TESLA "BATTERY DAY"

On September 22nd, 2020, in an event called "Battery Day", CEO Elon Musk and Senior Vice-President & Engineer Drew Baglino, described a plan for a new generation of Electric Vehicle Batteries.
Not a plan that rests on a single innovation. It is the entire process from the raw material to the making of the batteries.

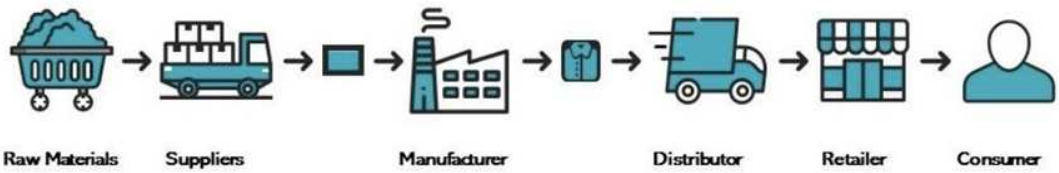
A Plan to Half the Cost per KWh



Musk stated that the cost reduction in the Tesla Electric Vehicles will get the price in-line with gasoline powered vehicles.
Tesla's new cylindrical cell named "48-60" will give 5x more energy, 6x more power and 14% reduction in price per KWh.
Full production is about 3 years away.

Vertical Integration

- Process of acquiring and controlling different parts of the same production chain.
- It can happen forward or backward
- FORWARD – buying companies closer to the consumer side of the spectrum.
- BACKWARD - buying companies closer to the raw materials side of the spectrum



All about Batteries

Tesla still isn't getting enough batteries from Panasonic

Panasonic's pace has been an issue since the Gigafactory opened, and Tesla says demand continues to outstrip supply

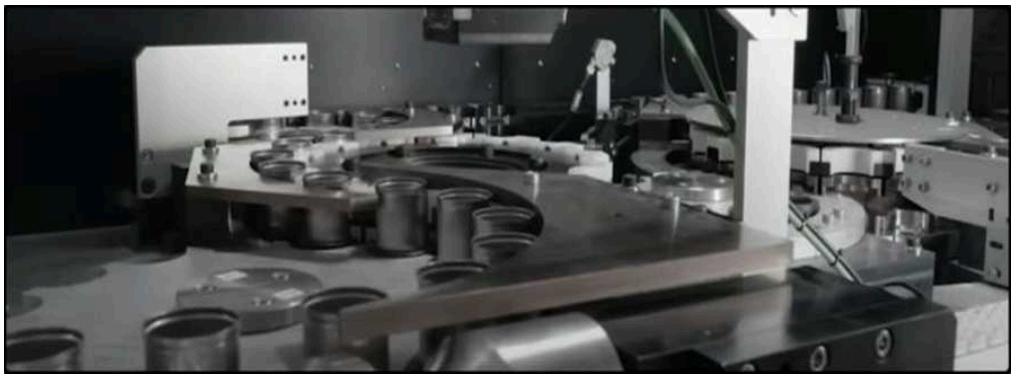
In 2018, battery shortage by Panasonic caused some delay in production. At this stage Tesla realized they can rely on external partners and they have to start working on their own.

Tesla is building a new plant in North America to reduce supply chain cost and simplifying cathode production.

Tesla is trying to produce everything in-house, from raw materials to the final product.

Battery production is estimated to use 10x less energy from the production techniques by Maxwell Technologies.

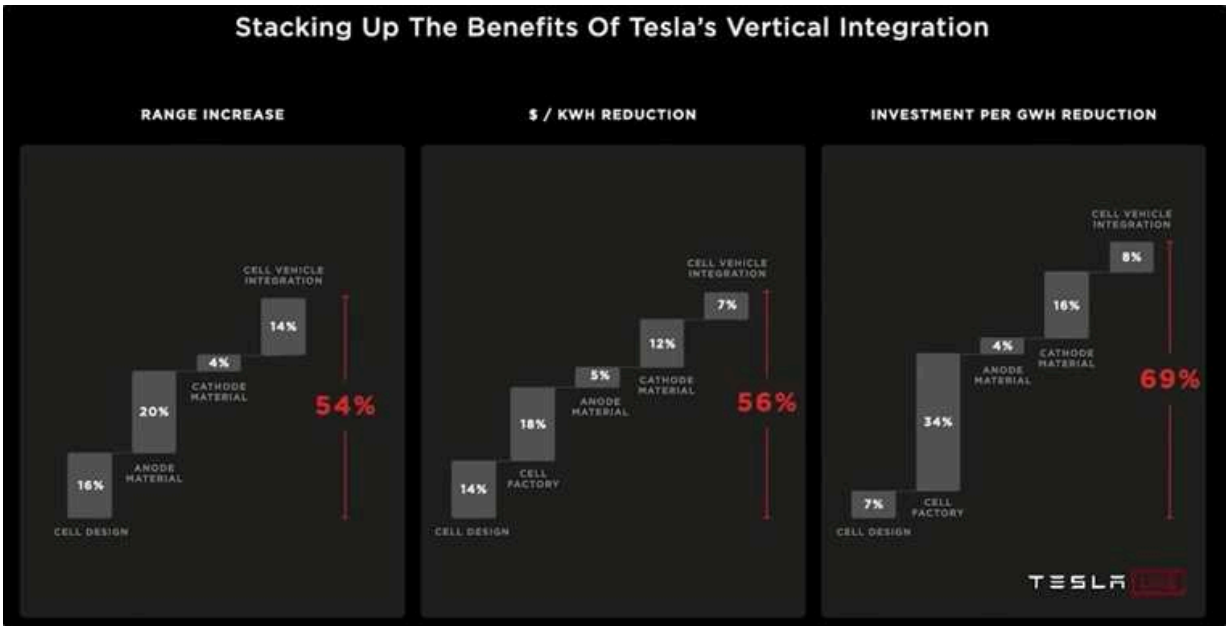
It will make cathode 76% cheaper and will produce no waste water.



Combined effort in streamlining the production line could see a plant to output 1TWh of energy produces fewer footprints than that of a plant that produces only outputs 150GWh of energy.

Localizing the production of materials of cathode saves 80% of cost and travelling emissions.

Combining all of this, Tesla expects:



Vertical Integration is making this all possible, allowing more control and customization to make the whole system as efficient as possible.
It's an advantage that most electric vehicles companies don't have.
Tesla is also building a cell manufacturing facility in Berlin, Germany, in addition to the plant in California.

These new Batteries will be seen in:

• Cyber Truck

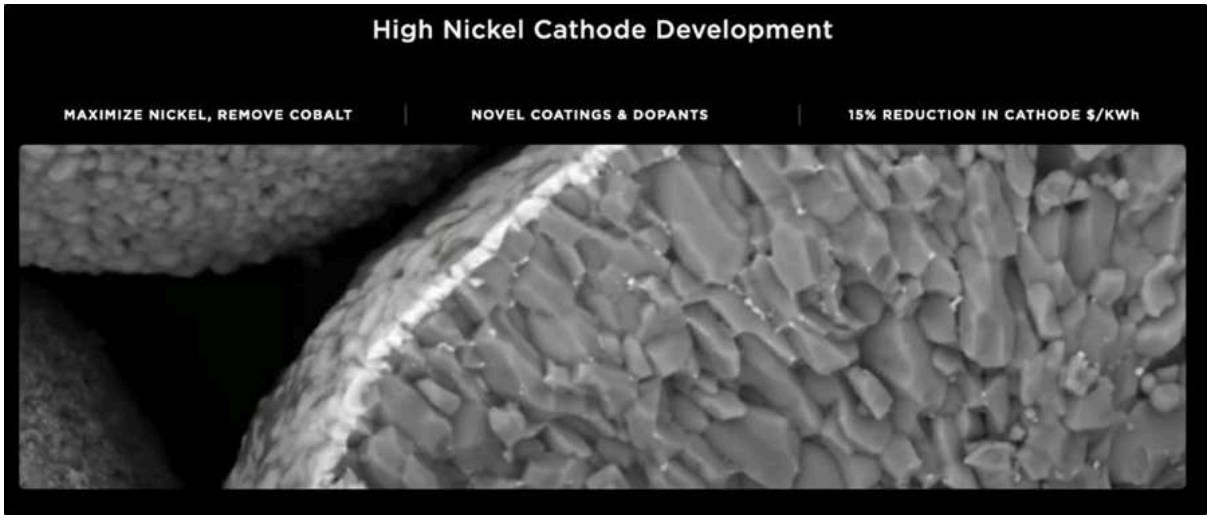
• Roadster 2.0

• Semi-Truck

Reducing Cobalt

Tesla is also trying to eliminate the use of cobalt, even though Tesla's existing batteries use very little.

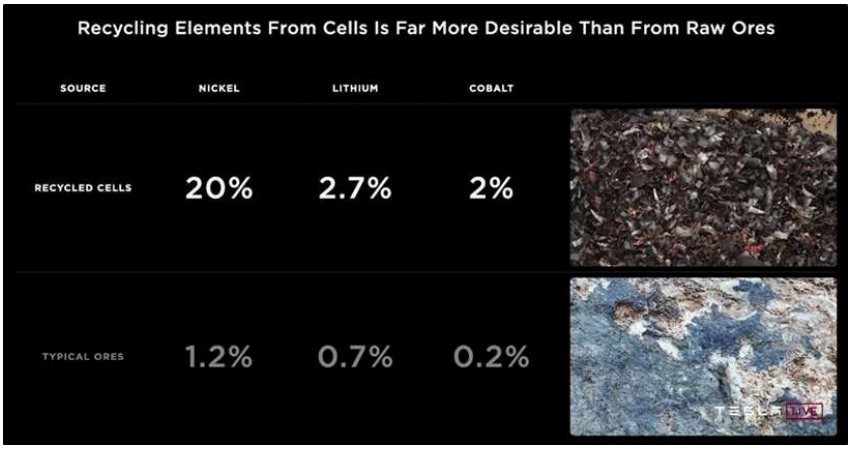
Cobalt is often mined under terrible conditions which violate the Human Rights. Their aim is to replace cobalt with higher quality of nickel.



Cobalt is one of the most expensive components in manufacturing batteries, so eliminating it will also help in reducing the cost.

Recycling

Tesla also stated that eventually there is not going to be a need to mine raw materials as recycling the older batteries will yield in more resources than mining.



Tesla recycles 100% of their vehicles. To date it is been done by third parties but Tesla thinks they can do it more efficiently because third parties have to recycle all types of batteries but Tesla has to make the same batteries.
Elon stated that it is necessary to reduce the price of the car because "Affordability is the Key to Scaling".

$25,000 Tesla

While the prices of average electric vehicles have been decreasing in previous years thanks to changes in battery composition, but still more expensive than regular cars.
It is estimated that a battery makes 1/3 of the cost of the electric vehicle.
Some researchers estimate that the price of regular vehicles and electric vehicles to be viable is:
Tesla: $156 per KWh (as per 2019)

Tesla says that they are going to make such a car by 3 years.
As per Musk and Drew, the plan is working in principle and on a small scale and most of the remaining work is in scaling.
There is also a change in structure of the car and the battery will be a part of the car which will take less space and allow adding more cells.

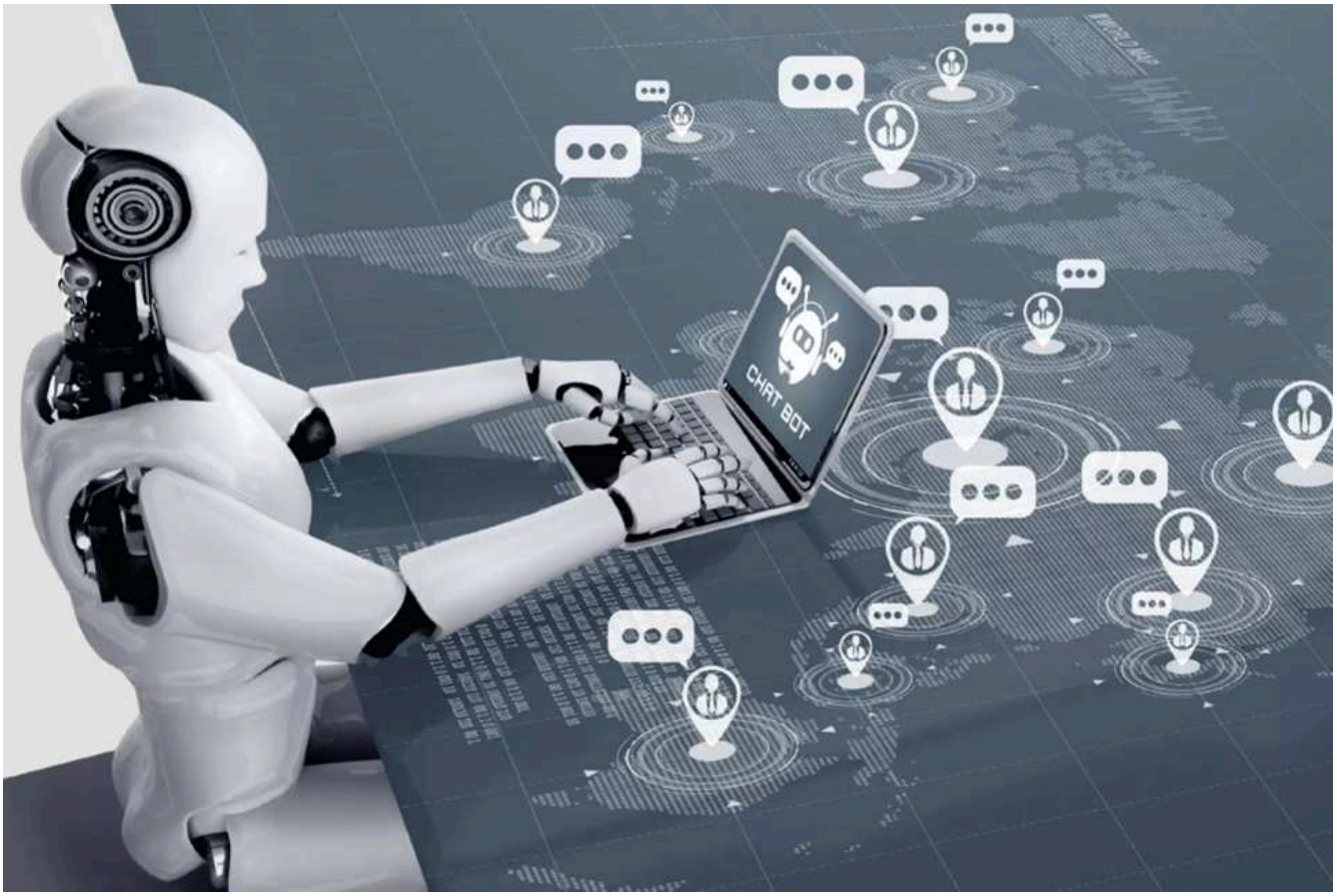
Finally

Range increase:54%
Price reduction: 56%
The plan is optimistic but Tesla is proving people wrong for over a decade.
•The competition is heating up with Lucid Air, Porsche and Rivian.
•So, if Tesla can do what they say, it’s an evolution for the automobile industry.

Haritha P Nair
S6 ECE

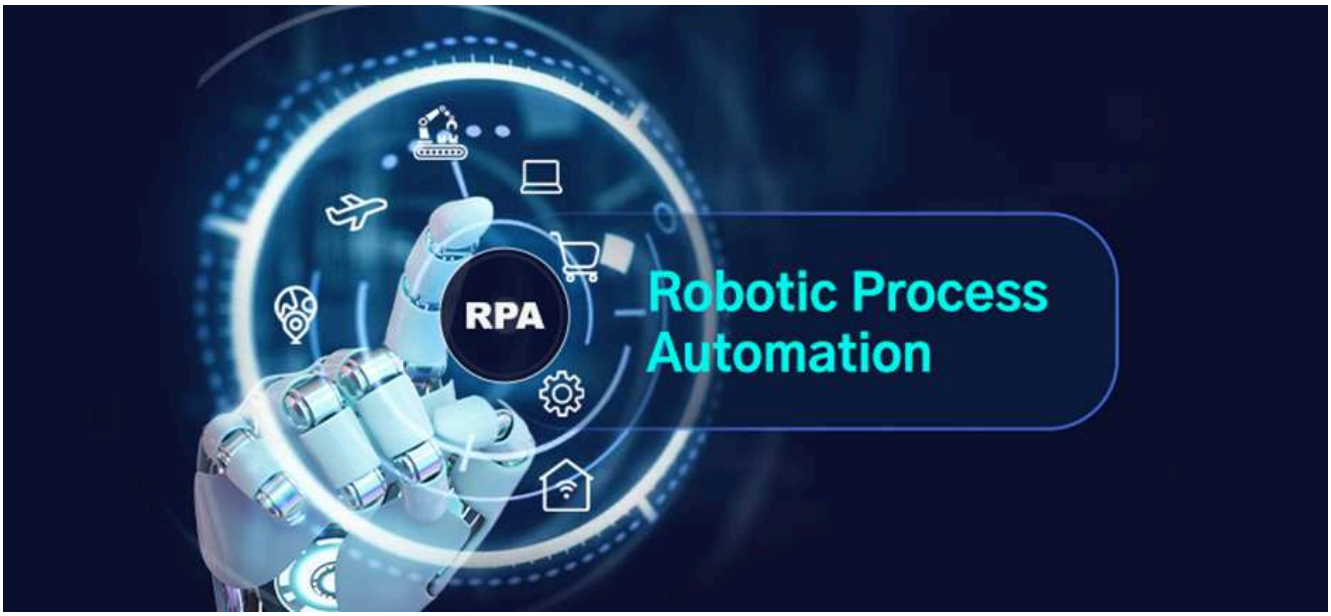
ROBOTICS PROCESS AUTOMATION

Robotic process automation (RPA) is a technology that automates a business process using software to carry out the tasks involved. RPA can improve efficiency and accuracy in business processes, reduce costs, and increase productivity. It can also help businesses scale their operations by automating smaller tasks that humans traditionally handle.



Benefits of using RPA include improved accuracy, speed, and quality of work; reduced costs; and increased efficiency. RPA can free up human resources for more important work by automating simple tasks. RPA can also help businesses scale their operations by automating smaller tasks that humans would traditionally handle.

There are several different RPA tools available, each with advantages and disadvantages. Some of the most popular types of RPA tools include web scraping, chatbots, rule-based systems, and image recognition software. Each tool has its strengths and limitations, so it’s important to choose the right one for the task at hand.



How Should RPA Change Your Business?

Robotic process automation (RPA) is a technology that automates manual tasks using software programs to complete tasks more quickly and with less effort on the part of the human. It has been around for a few years now but is only just starting to gain mainstream traction in Business. There are a few reasons why this might be the case.

First, RPA can save businesses time and money. For example, say you have a team of employees responsible for creating sales proposals. With RPA, you could outsource the proposal creation process to a program that does it automatically for you. This would free up your employees to focus on more important tasks, like selling the product or services your company provides. In fact, according to research from Gartner, RPA will account for nearly $24 billion in savings by 2017.

Second, RPA can help businesses scale their operations. Suppose you have an administrative task that can be automated, such as data entry or customer service work. You can assign that task to a robot instead of hiring an additional employee to do it. This not only saves you money on salary costs, but it also frees up your employees to do more meaningful work.

What are the benefits of implementing RPA in your Business?

Robotic process automation (RPA) is a software engineering technique that uses automation to automate the performance of tasks within a business process. RPA can save significant time and resources by automating the work that humans perform manually.

Some of the key benefits of using RPA include:

- Reduced expenses: By automating tasks, companies can reduce the costs associated with human labor. This can lead to savings in wages, benefits, and overhead costs.

- Increased efficiency: By automating workflows, RPA can help businesses improve their processing speeds and agility. This can lead to improved customer service and increased profits.

- Increased employee productivity: By streamlining processes, RPA can help employees become more productive and focused on their tasks. This can lead to increased job satisfaction and decreased turnover rates.

Kavya Jayan
S8 ECE

GSOC 2021: MY SELECTION JOURNEY

Most of the people are curious to know how I got into the GSoC. Lots of them have an opinion of me that I am good at coding, a misconception that “He knows everything” but the truth is that I am just like everyone else. Sometimes I too get confused about what code I am writing, keep wondering for hours and hours. Sometimes I get the solution to my problem, other times don’t. So, when the pandemic started, I decided that rather than sitting idle, let’s do open source, at least I will be able to understand how software is constructed. Simultaneously I have started learning the flutter. Additionally, my secondary aim was to increase my network in the community. To get better knowledge and understanding of open-source, one must know how to use Git.

Git is the most essential part of open source since its version control system help you share, save, and arrange your code. Once I learned Git, I started the search for organizations on the google summer of code organizations page. To get the specification of the exact time, it was June of 2020. I came across the CircuitVerse

organization with the tag of flutter(mobile-app). The next thing I did was visit the GitHub page of CircuitVerse. I cloned its repository and set up everything on my local PC. Afterward, I began searching for the bugs on the GitHub page posted by anyone so that I can fix them. The bugs were fewer since other developers were working on this project every day. But I kept trying, hoping to find some bugs but I didn’t find any. Once I found a bug but I wasn’t able to fix it. One month passed by without solving any bugs. Every day I read about 1–2 lines of code from random files from the project. One day, I just started a project on a local machine using a flutter run and was testing an app.

Here comes the interesting part of our website, which is about online circuit simulation. I was looking for a simulator everywhere but was not able to find one, then I realized that there was no simulator design for mobile apps. I started researching and found that flutter was not well developed then to create a simulator. To tackle this problem, I have come up with a solution according to which we will integrate an internal browser to the app and link it to our web simulator. Here I came to know that our web simulator does not support touch devices. I thought I will wait for some time until someone makes it for touch devices. Again, a month just flew away, I was wondering maybe I can make this simulator work for touch devices.

So now I have decided I will accomplish it. Before getting into this I cloned the website repository and set up the server in docker-compose. At first, I started solving bugs so that I can understand the codebase, after some time I started working on the feature GIF-VIDEO recording for the simulator. Successfully implemented it but haven't yet merged it, there are some minor bugs. But fortunately, I got used to the repository and, finally, now I have started working on touch compatibility. Before starting it, I just posted on our community slack channel that I want to work on this project and one of the mentors replied this

project is for this year's GSoC idealist. When I heard about it, I immediately started researching, it was the month of December, three months before the official idealist announcement. I have started making this proposal, alongside research on how to touch-start on an HTML page. I will share my research in another blog. For now, let's focus on the selection. So, at the start of January, my organization had also applied for GSoC 2021. We all were waiting for the result to be declared. Few months passed by, and as March arrived, so did the result. Our organization was selected! Also, the idealist was officially declared, everyone had started making proposals. I was at that time, preparing my demo video to show it to the mentors. Before the student application process started, I had sent my proposal to many mentors for review. Most of them have given a good review and also helped me to correct the mistakes in my proposal. March has started student proposal period had also started I have submitted my proposal, the very last day. After submitting I was just waiting for the result, suddenly I received a message on the Slack channel by one of the mentors that there is a small interview and a live demo of the project. I was okay with it as I was prepared for this day. I gave the interview everything went well. I was waiting for the result. May just started, I was busy preparing for the university exam. Finally, the D-day or result day arrived and it was at 11:30 pm, yes you read it right, the time was set globally for everyone.

So, it was 11:29 pm, I was still confused as to where to find the result. Suddenly an email came and it said that you have been selected in GSoC 2021 for touch compatibility. I was at the top of the world, exhilarated for an hour after some time, I became normal. This was my journey of getting selected in GSoC 2021.

Jomy Joy
S6 ECE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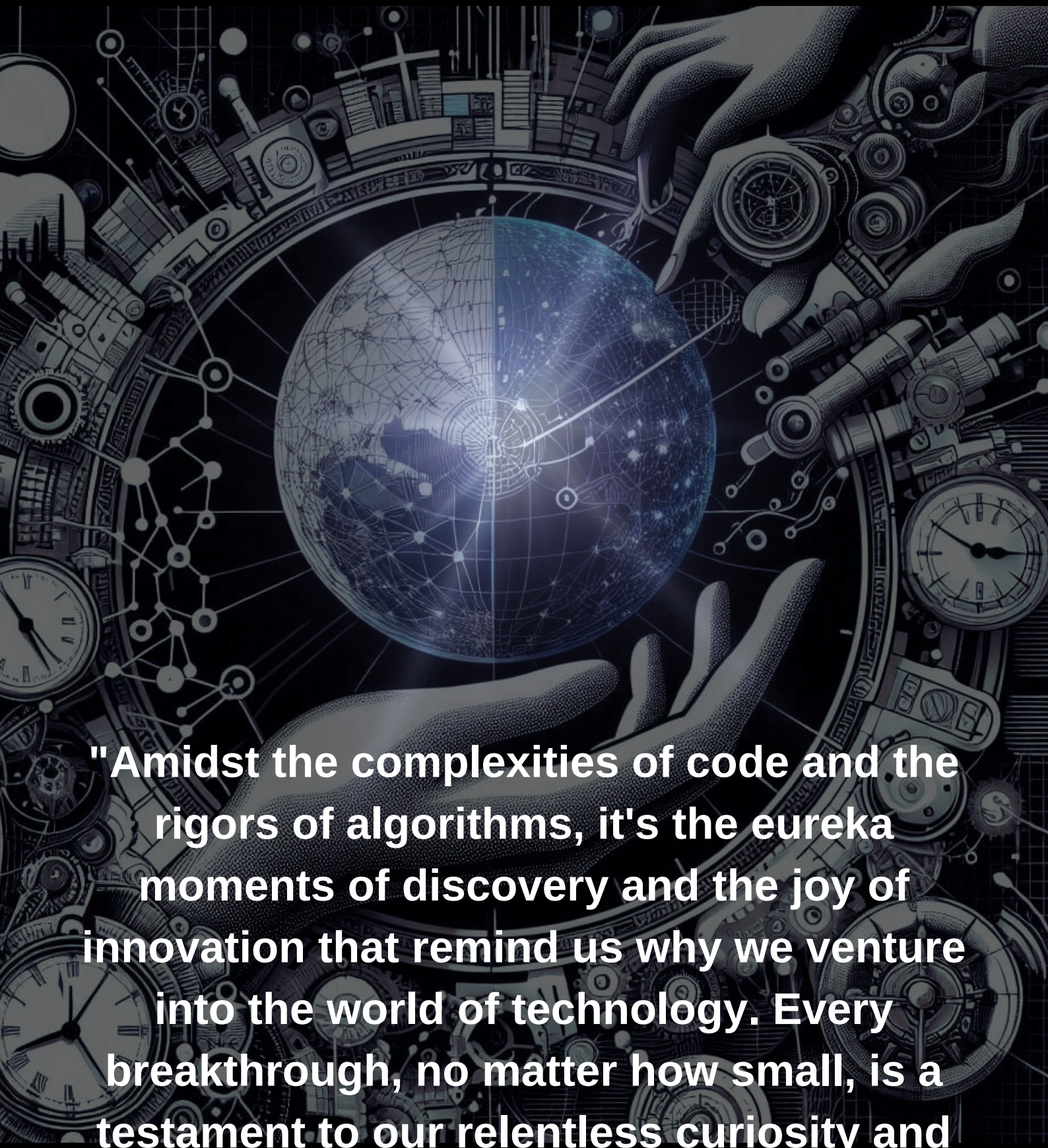

"Amidst the complexities of code and the rigors of algorithms, it's the eureka moments of discovery and the joy of innovation that remind us why we venture into the world of technology. Every breakthrough, no matter how small, is a testament to our relentless curiosity and boundless creativity."