DEPARTMENT OF ELECTRONICS AND COMMUNICATION

E X P L O R E , D R E A M , D I S C O V E R

ISSUE 58   MONTHLY NEWSLETTER   DECEMBER 2022

G E N E S I S

IGNITING THOUGHTS

Contents

Vision

- To be recognized at the national and international level for excellence in education and research in Electronics and Communication Engineering.

Mission

- Inculcating leadership qualities, adaptability, and ethical values
- Imparting quality education in the field of electronics, communication, and related areas to meet the challenges in the industry, academia, and research
- Nurture the growth of each individual by providing a dynamic and conducive learning environment.

DEPARTMENTAL ACTIVITIES

GNU RADIO WORKSHOP BY THE IEEE SIGNAL PROCESSING SOCIETY CHAPTER

The IEEE Signal Processing Society Chapter of IEEE SB ASIET conducted a technical event, a hands-on training session where students could learn about GNU Radio (GNU's Not Unix). The program was arranged for November 29, 2022, at the Scientific Computing Lab of the Adi Shankara Institute of Engineering and Technology. The session was handled by Mr. Sreerag M. and Mr. Albins Paul, assistant professors in the electronics and communications department, of ASIET.

The session commenced with an introduction to GNU Radio, a free software development toolkit that provides signal-processing blocks to implement software-defined radios and signal-processing systems. It can be used with external RF hardware to create software-defined radios or without hardware in a simulation-like environment. The speakers also informed the audience about GNU Radio Companion, a piece of software available under Linux. The event proceeded to delve into the basics of GNU Radio, and they discussed topics such as transmission and reception of signals, addition and multiplication of signals, and different sources of signals based on time and frequency. For the second part of the event, a session on FM reception was taken, which can be implemented using the GNU Companion software and a hardware component called the RTL Module.

This highly engaging and interactive session was beneficial to the students because they learned the fundamentals of GNU Radio using GNU Radio Companion and became aware of the numerous career opportunities and its utility in the electronic communication domain. The response received was positive and satisfactory. The event was a success because it provided participants with the opportunity to analyse some major aspects of upcoming technology and learn something new that they can apply to their future projects.

CODING CLUB INAUGURATION

The Electronics and Communication Engineering Department launched a new venture, a Coding Club exclusively meant to hold up the ones who are ready to thrive as programmers. The main aim of this club is to serve as a centre for enriching the coding skills of future engineers and exhibit their talents to the technical world. In connection with this, a grand inauguration of the club was held on 19th December 2022 in the Main Seminar Hall. The occasion was graced by the presence of Dr. Satheesh Chandran C, Lead, AI Solutions, TCS Kochi, who served as the chief guest for the ceremony. The logo of the coding club was launched and named the club as CodeX. Principal Prof. K T Subramanian gave the presidential address. Prof. Rajaram, Dr. Bipin P R, Dr. Santaram Rao, Prof. Arya Paul felicitated the gathering.

ESCALATE'22

ESCALATE'22

Date : 15thAugust 2022
Venue : Online(Google meet)
Duration: 1 hour
Audience: 50

A virtual orientation session ESCALATE was conducted by the GDSC for the students from the Second and Third years on the 15th of August 2022. The session was undertaken by the GDSC Lead-Jaison T Poulose who detailed the benefits and the requirements to join the club. A total of 50 students attended the event and the majority of them had joined the club.

The speaker presented, in-depth, about the GDSC clubs in and around India and their frequently occurring workshops which stimulated further interest among the students to become a member. The session also covered an insight into the workshops which were conducted by the other clubs.

The speaker assured his support to all the students who would be members of the club and announced the first session would be conducted as per the topic of interest of the students. The session was indeed after an hour with a positive note from the participants.

Compose Camp:Android Development Using Jetpack Compose

Date:13th to 16th October 2022
Time: 6:30 PM to 8:30 PM
Speaker: Abimel S B and Kaivalya
Facilitator: Jaison T Poulose

A 3-day online workshop on Android Development using Jetpack Compose was conducted in collaboration with GDSC JCMCSIIT. The session had the participation of 50 students from both institutes. It started at 6:30 PM and concluded at 8:30 PM.

The session started with a basic introduction to Android Development and the benefits of using Jetpack. It also discussed installing the studio/IDE required for building the projects. Further, the session detailed the libraries, the trials, the services in Android, and demonstrations of the projects such as creating a GUI. The session also allowed the students to build projects and the best ones were explicitly rewarded.

The session ended after clarifying the doubts of the learners and on a word of positive note by them.
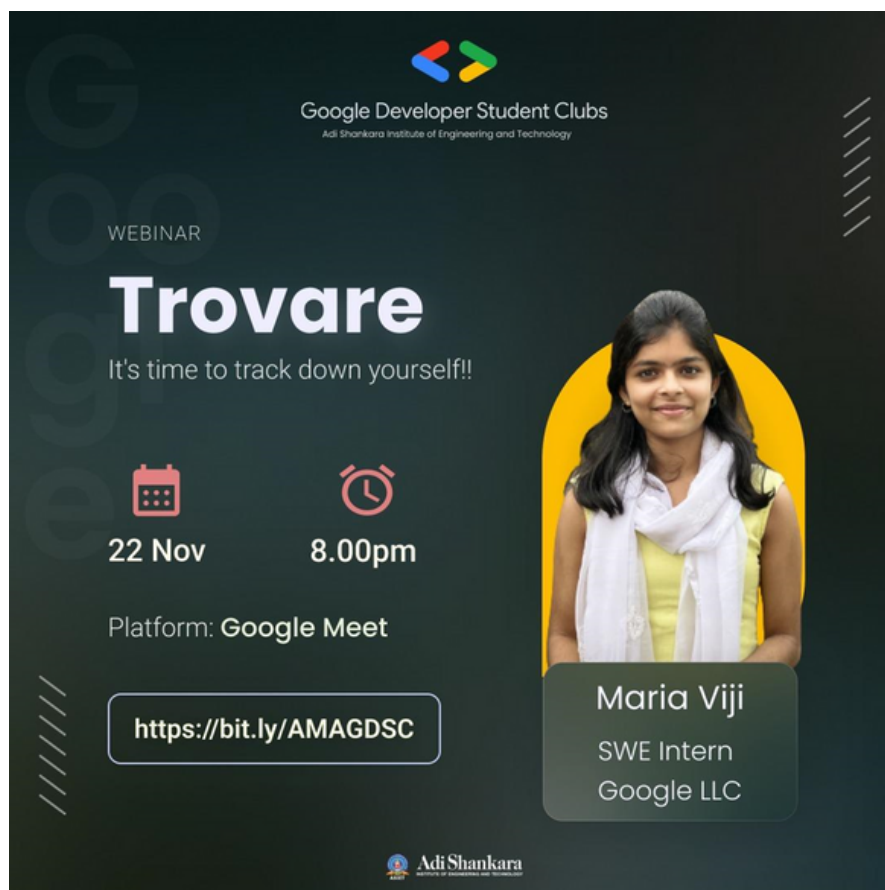
TROVARE

Date : 22nd November 2022
Venue : Online(Google meet)
Duration : 1 day
Audience : 88

The GDSC conducted its event -TROVARE on 22nd of November from 8:00 PM to 9:00 PM. The session was anchored by
Ms. Maria Viji , Intern at Google LLC .

The speaker emphasized on the roles and responsibilites undertaken by her as the intern.She also highlighted the importance of working as an intern at one of such MNC in the track of getting placed and mentioned the grave support which the club had on her to bag this opportunity.

The session ended with an urge by the mentors to actively participate in the events conducted by the club to get acquainted with the skill set.It ended with a positive note by the attendees.

WORDPRESS DEVELOPMENT WORKSHOP

Date: 15th – 16th November 2022
Time: 7:30 pm – 9.00 pm
Speaker: Jaison T Poulose (GDSC ASIET Lead)
Attendance: 58

On November 15 and 16, 2022, Google Developer Student Clubs ASIET (GDSC ASIET) hosted a two-day hands-on workshop on WordPress Development for students in the first and second years of ASIET. They found the lesson to be very useful. They learn the fundamentals of web development and obtain the self-assurance they need to begin their career as WordPress developers.

Day 1: 15th November 2022
The session starts with an introduction to WordPress. What are the advantages as well as disadvantages over the others etc? Also what kind of websites can WordPress make? It also includes a detailed discussion on pages, and posts. What are a website and more about the front end and back end of the website? After that, the session continues and shows how to do hosting. Also taught them how to install WordPress on Infinity Free and how to work on that.

Day 2: 16th November 2022
The session begins with going over the previous day's material again to get a continuation. Then encourage everyone present to download Xampp and WordPress. The group then discussed using our system as a local host for WordPress. Then the session moves to creative. Developing a website. All are attentive and thrilled. It was a coding-related website. And it includes all the basics of WordPress.
The session ends with a discussion section. Several students share their experiences as well as their doubts. And the workshop ends with a Vote of Thanks.
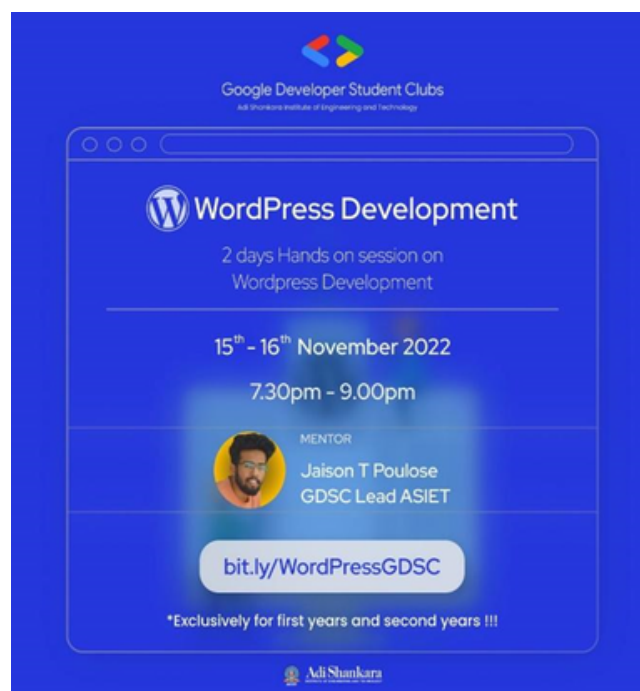
PyCon: THREE DAY PYTHON BOOTCAMP

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Date : 12th to 14th December 2022
Venue : Online(Google meet)
Duration : 3 days
Audience: 88

The GDSC conducted its 3-day workshop-PyCon on the fundamentals of Python to give the non-coders a gist of the coding. The camp fixed a time slot from 7:30 PM to 9:00 PM. The session was anchored by the industry experts- Shaheen Hyder (CEO, Pygrammers, Tech Reviewer, Brototype) and Adnan Kattekadan (Technology fellow, Pygrammers).

The main topics in the session were beginner friendly such as the installation of the interpreter, introduction to the language, relevance in the industry, and the kind of projects that can be built using it. The speaker tried their best to make the students contain their enthusiasm, as a result of which the learners were interacting and raising doubts in every manner.

The session ended with an urge by the mentors to carry out the first project in Python.PyCon was on the brighter side for the members and the lead assured us to bring out like these in the near future.

Ardunox: TWO DAY ARDUINO WORKSHOP

Date : 16th to 17th December 2022
Venue : Online(Google meet)
Duration: 2 days
Audience: 70

The GDSC conducted its 2-day workshop-Arduinox
 on the fundamentals of Arduino to familiarize the students with the core hardware and software principles. The camp fixed a time slot from 7:30 PM to 8:30 PM. The session was anchored by the home club leads-Jaison T Poulose (GDSC Lead, ASIET) and
Avin Sony (Technical Lead, GDSC ASIET).

The main topics in the session were beginner friendly such as the hardware overview, downloading and installing the Arduino IDE, and understanding Arduino syntax. The speaker also showed demonstrations of the working such as the traffic light using an Arduino Uno Microcontroller. The speaker tried their best to make the students contain their enthusiasm, as a result of which the learners were interacting and raising doubts in every manner.

The session ended with an urge by the mentors to carry out four projects in Arduino. It was on the brighter side for the members and the lead assured us to bring out like these in the near future.

PROJECT BUILDING USING PYTHON

Date: 20th december 2022
Time:9 am to 12 pm
Venue: Simulation Lab (ECE Dept.)
Speaker: Aaron P Laju

Google Developer Student Club of ASIET conducted its first offline session on Project building using Python. Machine Learning Concepts were taught by our speaker Aaron P Laju, (GDSC ASIET Technical Team).
The Session started with basics of Machine Learning Concepts such as BFS, DFS, etc.The mentor demonstrated his personal projects to students to show them how it works.
The session was done under the supervision of the GDSC Execom Team and ensured everyone was present. The attendees were shortlisted on the basis of their performance in the tasks that were assigned to them on the three day python boot camp session.

CONGRATULATIONS

Amal K Roy of S7 EC-A won the silver medal for the 67 kg category in the Inter-zone Karate Tournament held at MA College, Kothamangalam.

Hearty congratulations to Manikandan of S7 EC for getting placed in EY.

**Manikandan A R
S7-ECE B**

Patent Publication

Happy to share that one of our patents filed earlier based on the last year's (Ac. Year- 2021-22) project work has got published.

"VEG DOC"
(Patent file number- 202241060615)
Published on 18/11/2022.

The published work is authored by the following :

Staff:

1.Dr.Bobby Mathews
2.Dr.Arya Devi
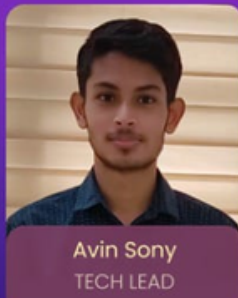3.Divya V chandran
4.Remya Ramesh

Students (2018-22 batch Alumni) :

1.Narayan Seshan
2,Nikhil Krishnan
3,Preethesh K

Congratulations to the authors for this remarkable achievement.

TECH TALKS

STAFF ZONE

How quick is QUIC?

ARYA PAUL
ASSISTANT PROFESSOR
ECE DEPT.

QUIC (Quick UDP Internet Connection) is a new encrypted transport layer network protocol. QUIC was designed to make HTTP traffic more secure, efficient, and faster. Theoretically, QUIC has taken all the best qualities of TCP connections and TLS encryption and implemented it on UDP.

What is QUIC protocol used for?

QUIC is a low-latency transportation protocol often used for apps and services that require speedy online service. This kind of protocol is a necessity for gamers, streamers, or anyone who relies on VoIP in their day-to-day life. Here are the changes QUIC brings to an online session:

- Reduced connection times: To establish TLS encryption, the client and the server need to perform a TLS handshake and exchange encryption keys. It's a "lengthy" process in IT terms, as there are 4 round-trip requests involved. When the data is transferred over TCP, even more steps are added to this process, slowing down the connection even more. QUIC replaces all of this with a single handshake.
- Better performance when data packets are lost: HTTP/2 on TCP can suffer from head-of-line blocking, a phenomenon where a line of data packets can be held up by the first packet. If one data packet is lost, the recipient must wait for it to be retrieved, which has a huge impact on connection performance. The QUIC protocol solves this problem by allowing streams of data to reach their destination independently. They no longer need to wait for the missing data packet to be repaired.

- Stable connections when networks are changed: If you are connected to a web server via TCP and your network suddenly changes (from Wi-Fi to 4G, for example), each connection times out and needs to be reestablished. QUIC allows for a smoother transition by giving each connection to a web server a unique identifier. These can be reestablished by simply sending a packet rather than establishing a new connection, even if your IP changes.
- Easier to improve and develop: TCP is implemented in operating system kernels, which means changing it is close to impossible. QUIC can be implemented on the application level, making it a more flexible protocol.

What apps use QUIC?

Google has been pushing for widespread QUIC integration since its genesis in the early 2010s. While the protocol is technically still experimental and in its draft phase, Google already uses it in its Chrome browser. Any connection to a Google server is established via QUIC. As to be expected, everything under Google's umbrella uses QUIC. YouTube, Blogger, Hangouts – they're all QUIC-based.

QUIC has also been adopted by businesses that rely on a stable, fast connection for their service to be viable. Uber, for example, uses QUIC for their mobile apps. They rely on short bursts of latency-reliant data transfers – something that QUIC can help with. Less packet loss means a more efficient app.

Is QUIC really worth choosing over the standard TCP/IP connection we've relied on for so long? In a world where speed dictates success, QUIC is soon to have a much larger presence online. With Google announcing that, on average, QUIC searches are one second faster than TCP searches, the age of QUIC may come quicker than we think.

QUIC relies on multiplexing — this is what gives it an edge over TCP. Where TCP uses a single end-to-end connection point, QUIC establishes multiple connections between 2 endpoints. If one of the streams of information is interrupted, either by shoddy connection or other outside interference, the multiple connection points will allow the streams of information to continue. If a website uses TCP and the connection is disrupted, the data in the packet midway between endpoints will now hold up the rest of the information. This head-of-line blocking has been an issue for decades, and QUIC solves it.

If you want to get into the nitty-gritty of which protocol performs more efficiently — TCP or QUIC — have a look at a test run here. The results show that, in the right situation and under the right circumstances, QUIC performs marginally better. However, we need to remember that TCP has been in use and has worked for decades. QUIC has been used for not even half the amount of time that TCP has been prevalent. Knowing Google's resources and the fact that QUIC can be implemented on an application level instead of an operating system level like TCP, QUIC may just start to outstrip its competition very soon.

Is QUIC as flawless as it seems?

There are few downsides to the QUIC protocol. It improves web communications and reduces latency, but it's still in its experimental stages. It's not widely adopted by other websites or web servers, nor is it supported by cybersecurity tools such as firewalls. Because of this, experimental QUIC protocol can currently open a security loophole.

Firewalls pass HTTP and HTTPS traffic through a web protection module, which performs malware scanning. But what happens if the connection is made via QUIC? Well, the browser and supporting web servers do recognize it as a QUIC connection, but the device you are browsing on may not. It treats it like simple UDP traffic, which doesn't get sent to your firewall's web protection module.

The Road to QUIC

QUIC (Quick UDP Internet Connections) is a new encrypted-by-default Internet transport protocol, that provides a number of improvements designed to accelerate HTTP traffic as well as make it more secure, with the intended goal of eventually replacing TCP and TLS on the web. In this blog post we are going to outline some of the key features of QUIC and how they benefit the web, and also some of the challenges of supporting this radical new protocol.

Built-in security (and performance)

One of QUIC's more radical deviations from the now venerable TCP, is the stated design goal of providing a secure-by-default transport protocol. QUIC accomplishes this by providing security features, like authentication and encryption, that are typically handled by a higher layer protocol (like TLS), from the transport protocol itself.
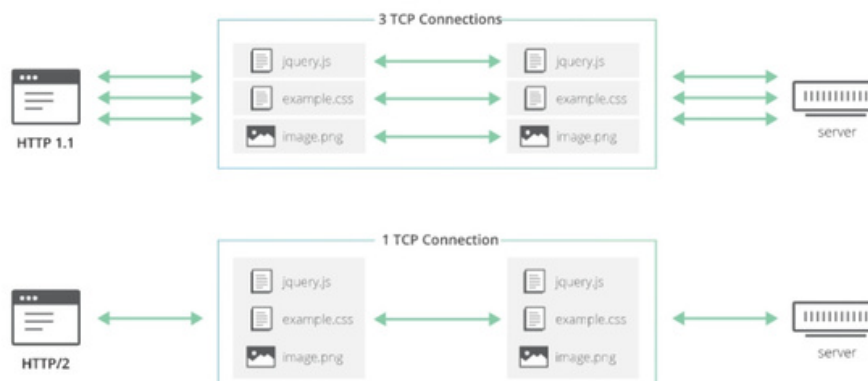
The initial QUIC handshake combines the typical three-way handshake that you get with TCP, with the TLS 1.3 handshake, which provides authentication of the end-points as well as negotiation of cryptographic parameters. For those familiar with the TLS protocol, QUIC replaces the TLS record layer with its own framing format, while keeping the same TLS handshake messages.

HTTP Request Over QUIC
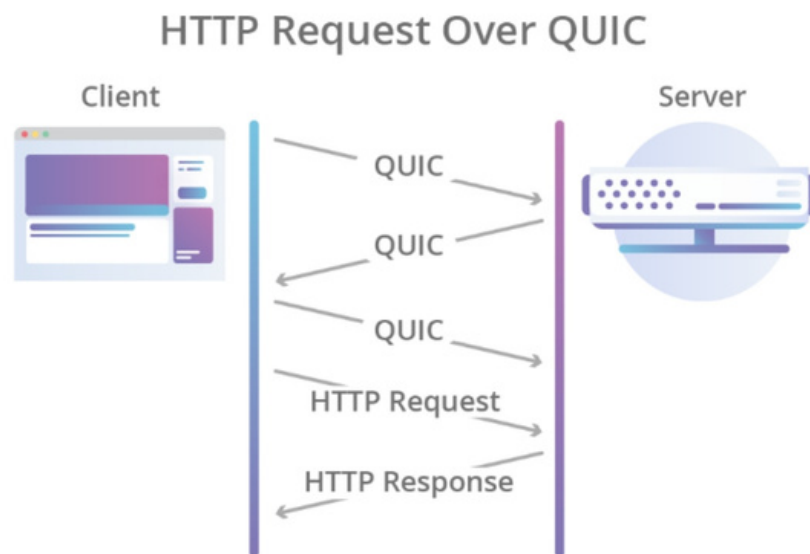
Not only does this ensure that the connection is always authenticated and encrypted, but it also makes the initial connection establishment faster as a result: the typical QUIC handshake only takes a single round-trip between client and server to complete, compared to the two round-trips required for the TCP and TLS 1.3 handshakes combined.

STUDENT ZONE

E-Textile

Sidharth P Pai
S5 ECB

As Technology is getting more and more integrated to the lives of the masses It always manages to integrate with people's lives one way or another , We all know that Dress is one of the most imporntant if else the essential factor in human lives.Now Technology is also an essentrtial aspect of humans and its importance will grow more and more in comming years , What if Technology is integrated into our wardrobes , crazy is'nt it . The level of technology influencing the dress culture is on another level . Now E-textile is a reality.

History of E-textiles:

The basic materials needed to construct e-textiles, conductive threads, and fabrics have been around for over 1000 years. In particular, artisans have been wrapping fine metal foils, most often gold and silver, around fabric threads for centuries.Many of Queen Elizabeth's gowns, for example, were embroidered with gold wrapped-threads.At the end of the 19th century, as people developed and grew accustomed to electric appliances, designers and engineers began to combine electricity with clothing and jewelry—developing a series of illuminated and motorized necklaces, hats, brooches and costumes.For example, in the late 1800s, a person could hire young women adorned in light-studded evening gowns from the Electric Girl Lighting Company to provide cocktail party entertainment.

In 1985, inventor Harry Wainwright created the first fully animated sweatshirt. The shirt consisted of fiber optics, leads, and a microprocessor to control individual frames of animation. The result was a full-color cartoon displayed on the surface of the shirt. in 1995, Wainwright went on to invent the first machine enabling fiber
optics to be machined into fabrics, the process needed formanufacturing enough for mass markets and, in 1997, hired a German machine designer, Herbert Selbach, from Selbach machinery to produce the world's first CNC machine able toa utomatically implant fiber optics into any flexible material.Receiving the first of a dozen patents based on LED/Optic displays and machinery in 1989, the first CNC machines went into production in 1998 beginning with the production of animated coats for Disney Parks in 1998. Further Down the Time sphere Electronic entities were bound to be integrated to higher level not only in production
but also embedded in the textile dresses

OverView:

The field of e-textiles can be divided into two main categories:*E-textiles with classical electronic devices such as conductors,Integrated Circuits,LEDs, OLEDs and conventional batteries embedded into garments.*E-textiles with electronics integrated directly into the textile substrates.This can include either passive electronics such as conductors and resistors or active components like transistors,

diodes, and solar cells.E-textiles are mainly conductive yarn, textile and fabric while the other half of the suppliers and manufacturers use conductive polymers such as polyacetylene and poly-phenylene vinylene).Most research and commercial e-textile projects are hybrids where electronic components embedded in the textile are connected to classical electronic devices or components. Some examples are

touch buttons that are constructed completely in textile forms by using conducting textile weaves, which are then connected to devices such as music players or LEDs that are mounted on woven conducting fiber networks to form displays.

Sensors in textile:

Smart textile fabric can be made from materials ranging from traditional cotton, polyester, and nylon, to advanced Kevlar with integrated functionalities. At present, however, fabrics with electrical conductivity are of interest.Electrically conductive fabrics have been produced by deposition of metal nanoparticles around the woven fibers and fabrics. The resulting metallic fabrics are conductive,hydrophilic and have high electroactive surface areas. These properties render them ideal substrates for electrochemical biosensing, which has been demonstrated with the detection of DNA and proteins.There are two kinds of smart textile (fabric) products that have been developed and studied for health monitoring: Fabric with textile- based sensor electronics and fabric that envelopes traditional sensor electronics. It has shown that can be used to incorporate electrically conductive yarn into a fabric to obtain a textile that can be used as a "Wearable Motherboard". It can connect multiple sensors on the body, such as wet gel ECG electrodes, to the signal acquisition electronics. Later research has shown that conductive yarns can be instrumental in the fabrication of textile-based sensors made of fabric or metallic meshes coated with silver or conductive metal cores woven into the fabric.There are two broad approaches to the fabrication of garments with ECG sensor electrodes in research:

·Finished garments through functionalization or integration of finished garments with sensor elements. This approach involves the integration of finished electrodes into finished garments by simply stitching the electrodes at the appropriate locations on the garment or using deposition techniques to transfer the functional materials at the appropriate locations.

·Unfinished garments. The introduction of smart materials during the garment fabrication process. This in Finished approach entails the use of textile fabrication techniques to form woven or nonwoven fabrics with the inclusion of functional materials.

Fiberelectronics:

Just as in classical electronics, the construction of electronic

capabilities on textile fibers requires the use of conducting and semi-conducting materials such as a There are a number of commercial fibers today that include mixed with textile fibers to form

conducting fibers that can be woven or sewn.However, because both metals and classical are stiff material, they are not very suitable for textile fiber applications, since fibers are subjected to much stretch and bending during use.Smart wearables are consumer-grade connected electronic devices

that may be embedded into clothing.One of the most important issues of e-textiles is that the fibers should be washable. Electrical components would thus need to be insulated during washing to prevent damage.A new class of electronic materials that are more suitable for e-textiles is the class of organic electronic materials, because they can be conducting, as well as semiconducting, and designed as inks and plastics.Some of the most advanced functions that have been demonstrated

in the lab include:

·Organic fiber transistors: the first textile fiber transistor that is completely compatible with textile manufacturing and that contains no metals at all.

·Organic solar cells on fib

Applications

Health monitoring of virtual signs such as heart rate,repiration rate, temperature, activity, and posture. data acquisition

·Monitoring personnel handling hazardous materials

·Tracking the position and status of soldiers in action

·Military app – Soldier's bullet proof jackegt ; if the wearer is shot,the material can sense the bullet's impact and send a radio message back to base

·Monitoring pilot or truck driver fatigue

·Innovative fashion (wearable tech)

·Regainsensory perception that was previously lost by accident or birth

Some E-textile Products are :
Heated Apparel. ...
·Wearable Tech in Space. ...
·A Shirt With an Integrated Heart-Rate Monitor. ...
·Applications in Medicine. ...
·Compression Shorts that Measure Running Metrics. ...
·A Backpack With a GPS Transmitter. ...
·A Gaming Vest That Simulates Real Combat.etc

STAFF ACHIEVEMENTS

Jaimy James

- Published a paper "A Survey on VLSI Architecture and Design for Data Compression" on 5th December 2022

Aswathy N

- Was a Reviewer for IEEE conference ICERECT 2022

STUDENTS ACHIEVEMENTS

Name	Course attended	Conducted By	Date
ANNMARIA POULOSE	Certificate of participation	Google Developer Student Club	13/10/2022
JAISON T POULOSE	Arduino Foundations	LinkedIn	10/12/2022
JAISON T POULOSE	Python Programming	LetsUpgrade	01/12/2022
JAISON T POULOSE	First prize in Idea Pitching Compition	IEEE SB ASIET	18/11/2022

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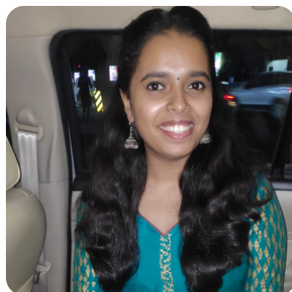DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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