



DhaneKula Institute Of Engineering & Technology

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Computer Science & Engineering

Tomorrow's World Through Today's Education

DEPARTMENT OF
**Computer
Science**

NEWSLETTER

THE Leaflet

VOLUME

6 (2019-2020)

issue.

4 (DEC-JAN)

**NEWS
LETTER**

Principal's Message



Dear Parents and Students,

It is with great pleasure that I welcome you to our College (DIET) Newsletter.

As Principal I am hugely impressed by the commitment of the college and the staff in providing an excellent all-round education for our students with our state of the art facilities. We as a team working together, strongly promote the zeal towards academic achievement among our students. The cultural, sporting and other successes of all our students and staff are also proudly celebrated together.

I congratulate the staff and students who brought latest technologies and concepts onto the day to day teaching learning platform. As long as our ideas are expressed and thoughts kindled we can be sure of learning, as everything begins with an idea.

I appreciate every student who shared the joy of participation in co-curricular and extracurricular activities along with their commitment to curriculum. That little extra we do, is the icing on the cake. 'Do more than belong – participate. Do more than care – help. Do more than believe – practice. Do more than be fair – be kind. Do more than forgive – forget. Do more than dream – work.'

With a long and rewarding history of achievement in education behind us, our DIET community continues to move forward together with confidence, pride and enthusiasm.

I hope you enjoy your visit to the website and should you wish to contact us, please find details at the www.diet.ac.in/

Yours in Education,
Dr. Ravi Kadiyala
Principal

Message From HOD



**Dr. S. Suresh Professor & HOD,
Computer Science and Engineering**

Greetings from the Department of CSE, Dhanekula Institute of Engineering & Technology, Vijayawada.!

“It is a pleasure to be the head of the department of CSE. The department offers B-Tech (CSE) and M-Tech (CSE). The department has a team of highly experienced and motivated faculty members who are in process of tuning the young minds to make them globally competitive. The department is equipped with state-of-the-art laboratories where students can enhance their knowledge and skill. The strength of the department is highly motivated students who understand the dynamics of the industry and upgrade their skills accordingly. The scope of computer science is endless. The students of the computer science and engineering are highly demanded by the recruiters of the top companies. Depending upon the interest of the student, he/she may choose to go for higher studies or if employed can choose to do research, development, design, production, application, testing or management in the Information Technology industry. In our department we not only give emphasis on study but also apply our knowledge in understanding what computers are, how to efficiently program them, different tools and technologies, the interface between the computer and the user, the computer graphics, computer networking, managing the database, software engineering and testing them efficiently and more. Through innovative teaching-learning process a teamwork approach and leadership building experience, our students gain vital communication and critical-thinking skills. Our institution provides a platform for the students to enhance their employability skills through Industry Institute Collaboration." *I, Congratulate the team of faculty members and the students for their brilliant and original efforts. I wish all the Students and Faculty a great academic career.*

Dr. S. Suresh Professor & HOD,
Computer Science and Engineering,
Dhanekula Institute of Engineering & Technology,
Vijayawada - 531 139.

Department Vision: To empower students of Computer Science and Engineering Department to be technologically adept, innovative, global citizens possessing human values.

Department Mission:

To Encourage students to become self-motivated and problem solving individual To prepare students for professional career with academic excellence and leadership skills. To Empower the rural youth with computer education. To Create Centre's of excellence in Computer Science and Engineer

Program Educational Objectives(PEOs)

PEO1:Excel in Professional career through knowledge in mathematics and engineering principles.

PEO2:Able to pursue higher education and research.

PEO3:Communicate effectively, recognize, and incorporate societal needs in their professional endeavors.

PEO4:Adapt to technological advancements by continuous learning.

DEPARTMENT ACTIVITIES:

A 2- Day National level fest was conducted at college level during the period of 20 & 21st December 2019. Dept of CSE conducted several technical events like paper presentation, theme ballet, code hunt, technical quiz, keyword search etc..



Theme Ballet



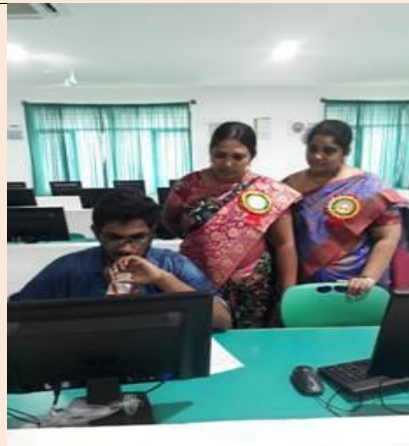
Keyword search



App Design



Paper presentation



code Hunt



Technical Quiz

Exploring practical learning@skill development Program in cse

The Department of CSE organized Designing Thinking Program during ' 6th & 7th January, 2020. Dr.K.Ravi Principal of Diet, inaugurated the program ,students and faculty are attended that program



STUDENTS ACHIEVEMENT:


It is proudly say that our Students were encouraged to do various MOOCS courses like NPTEL .A good number of students have qualified and got good scores. head of the department and principal has appreciated the students who got qualified in NPTEL

Sl.No	Roll.No	Student Name	Year & Sem	Section	Course Name
1	178T1A0501	ADUSUMALLI SWATHI	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
2	178T1A0507	BHOGADULA LAKSHMI SOWJANYA	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
3	178T1A0508	BODA NAGA SAI PRAVEEN	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
4	178T1A0515	DAMIREDDY LAKSHMI RAGHAVI	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
5	178T1A0517	DASARI ANVITA	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
6	178T1A0518	DEVINENI KAVYA PREETHI	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
7	178T1A0524	GANDHAM ALEKHYA	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
8	178T1A0527	GULIPALLI PRADEEP KUMAR	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
9	178T1A0528	GUNTAKA KEERTHI POORNA	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
10	178T1A0530	J HEMANTH KUMARA SWAMY	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
11	178T1A0532	KANDRU SAMPATH	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
12	178T1A0533	KARUKONDA ASHA	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
13	178T1A0539	KOLLIPARA LAKSHMI LAHARI	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
14	178T1A0540	KOLLU YASWANATH KUMAR	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
15	178T1A0543	KOTHA RAJA SEKHAR	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
16	178T1A0544	KOTHARU GOPI MANI SRI	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
17	178T1A0545	KUMMARI SHIVA KUMAR	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
18	178T1A0546	KUNAPARAJU DHANUNJAY RAJU	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
19	178T1A0547	MADDASANI DAYA RANI	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
20	178T1A0550	MANDAVA DEEKSHA	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019

21	178T1A0555	MARTHI CHANDINI SAI MEGHANA	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
22	178T1A0556	MATHANGI MOHANTHY RAJVEER	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
23	178T1A0559	MULASA MANI VENKATA SAI	III-II	A	JOY OF COMPUTING USING PYTHON NOV 2019
24	178T1A0563	KUMMARI NAVEEN	III-II	B	PRACTICAL MACHINE LEARNING WITH TENSORFLOW
25	178T1A0570	MUSUNURU SIRILAKSHMI	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
26	178T1A0573	NALLAGATLA MANASWI	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
27	178T1A0575	NANDIGAM NEELIMA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
28	178T1A0576	NASIKA CHINMAYEE	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
29	178T1A0577	NUKALA LALITHA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
30	178T1A0579	PALASA MAHESWARI	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
31	178T1A0581	PALLOTHU SAI SRAVYA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
32	178T1A0583	PASULA JAHNAVI	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
33	178T1A0584	PATHAN AJIMUNNISA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
34	178T1A0585	PAVULURI RUSHITHA SRI	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
35	178T1A0588	PERAM JAYAHLADINI	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
36	178T1A0590	POTHARLANKA LAHARIKA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
37	178T1A0592	PUTCHAKAYALA LINEESHA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
38	178T1A0594	REPANI PRASANNA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
39	178T1A0595	SANKA ALEKHYA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
40	178T1A0596	SHAIK IMRAN	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
41	178T1A0598	SHAIK THASLIMA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
42	178T1A05A1	SUNKARA SRAVYA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
43	178T1A05A2	SURAPANENI SAI PRIYANKA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019

44	178T1A05A3	SYKAM BHANU SRI	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
45	178T1A05A4	TALAGADADEEVI DINESH	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
46	178T1A05A7	THOTAKURA VENKATA SAI NIHARIKA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
47	178T1A05B0	UPPALURI YASASWINI	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
48	178T1A05B1	VINUTHNA VADLANI	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
49	178T1A05B2	VAJJAPARTHI LAVANYA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
50	178T1A05B3	VANKADARU KUSUMA PRIYANKA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
51	178T1A05B4	VARRE SUSHMA	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
52	188T5A0503	POTNURI YAMINIDEVI	III-II	B	JOY OF COMPUTING USING PYTHON NOV 2019
53	168T1A05A0	ADARSH SIDDABATTULA	IV-II	B	PROGRAMMING IN C++ NOV 2019
54	188T1A0506	BADE NAVYA	II-II	A	INTRODUCTION TO PROGRAMMING IN C NOV 2019
55	188T1A0559	Y GOPI SAI KRISHNA	II-II	A	JOY OF COMPUTING USING PYTHON NOV 2019


Toppers



BADE NAVYA 92%

TOP 2 % OF CERTIFIED CANDIDATES

COURSE NAME: INTRODUCTION TO PROGRAMMING IN C



ADARSH SIDDABATTULA 86%

TOP 5 % OF CERTIFIED CANDIDATES

COURSE NAME: PROGRAMMING IN C++

Placements:

The software giant selected final year students of DIET till now for the Academic year 2019-20. The Management, Director, Secretary, Principal, HOD & Faculty congratulated the selected candidates on their superlative achievement.

Sl.No	Roll.No	Student Name	Company Name
1	168T1A0569	Md.Inamullah	Cognizant/TCS
2	168T1A0583	P.Swathi	NTT-Data/Phytec
3	168T1A0565	M.Bhavani	TCS/Shell-Pro
4	168T1A0586	P.Roshini	Shell-Pro/ Phytec
5	168T1A0590	P.Namratha	Shell-Pro/ Phytec
6	168T1A0588	P.Harshini	Shell-Pro/Talentio
7	168T1A0582	P.Sumanth	Wipro/Snovasys
8	168T1A0568	Md.Ayesha	Phytec
9	168T1A0584	P.Ravi Kumar	Phytec
10	168T1A0504	A. Sai Narmada	Phytec
11	168T1A0508	B. Siri Krishna	Phytec
12	168T1A0527	E.Jasmine	Phytec
13	168T1A0541	K.Ramya Deepthi	Phytec
14	168T1A0542	K.Sai Sri	Phytec
15	168T1A0553	K.Krishna Tulasi	Phytec
16	168T1A0557	L.Ishwarya	Phytec
17	168T1A0561	Md.Rehana	TCS/Wipro/Infosys
18	168T1A0589	P.Chandana	TCS
19	168T1A05A6	U.Bhavani	TCS
20	168T1A0560	M.Easwar	TCS
21	168T1A0528	G.Brahma Reddy	TCS/Wipro/Infosys
22	168T1A0536	G.Himaja	TCS
23	168T1A05B0	V.Yamuna	TCS/Wipro
24	168T1A0566	M.Venkatswarlu	Wipro
25	168T1A0501	A.Jahnavi	Wipro/Infosys
26	168T1A0521	Ch.Reshma	Wipro
27	168T1A0553	K.Krishna Tulasi	Wipro
28	168T1A0577	N.Hema girija	Infosys
29	168T1A0554	K.Aakanksha	Infosys
30	168T1A0534	G.Niharika	Shell-Pro
31	168T1A0502	A.SivaRam	Shell-Pro
32	168T1A0513	B.Likitha	Shell-Pro
33	168T1A0535	G.Kunda Priya	Shell-Pro
34	168T1A0536	G.Himaja	Shell-Pro
35	168T1A0544	K.Mohini Swetha	Shell-Pro
36	168T1A0556	K.Chaitanya sai	Shell-Pro

4-1 Toppers List

		
168T1A0561 8.64 CGPA	168T1A0583 8.36 CGPA	168T1A0570 8.23 CGPA

3-1 Toppers List

		
188T1A0583 9.0 CGPA	188T1A0550 8.71 CGPA	178T1A0573 8.57 CGPA

2-1 Toppers list

			
188T1A0512 9.05 CGPA	188T1A0511 8.91 CGPA	188T1A0506 8.91 CGPA	188T1A0560 8.82 CGPA

Faculty Achievements:

The Management of Dhanekula Institute Of engineering & Technology encourages the faculty to actively participate Various FDP's, Conferences and other related workshops. Faculty were also encouraged to do MOOCS courses like NPTEL etc, to upskill their knowledge and expertise. Faculty will be reimbursed the registration fee for the above mentioned activities as per the norms of Dhanekula Institute Of engineering & Technology Management.

S.no	Name of Faculty	Name Of workshop/FDP attended	No of days From-To
1	Dr.S.Suresh	R-Programming	1 day
2	Dr.A.Srinivasa Rao	R-Programming	1 day
3	Dr.K.Satheesh	R-Programming	1 day
4	Dr.M.Tanooj	R-Programming	1 day
5	Mr.P V Hari Prasad	Discrete Mathematics (NPTEL)	12 weeks
		R-Programming	1 day
6	Mrs.V Swathi	Joy Of Computing Using Python(NPTEL)	12 weeks
		Python for data science(NPTEL)	12 weeks
		Artificial Intelligence	1 week(5)
		R-Programming	1 day
7	Mrs.M.Hima Jyothi	Joy Of Computing Using Python(NPTEL)	12 weeks
		R-Programming	1 day
8	Mrs.L.N.B.Jyostna	Joy Of Computing Using Python(NPTEL)	12 weeks
		Artificial Intelligence	1 week(5)
		R-Programming	1 day
9	Ms.N.Sri Laxmi	Joy Of Computing Using Python(NPTEL)	12 weeks
		R-Programming	1 day
10	Mrs.S.Naga Sindhu	Software Engineering(NPTEL)	12 weeks
		R-Programming	1 day
11	Mrs.K.Sandhya Rani	Software Engineering(NPTEL)	12 weeks
12	Mrs.Ch Padmini	Ethical Haking(NPTEL)	12 weeks
13	Ms.U.Sirisha	Ethical Haking(NPTEL)	12 weeks



P VENKATA HARI PRASAD 80%

TOPPER OF CERTIFIED CANDIDATES

COURSE NAME: DISCRETE MATHEMATICS

STUDENTS ARTICLES

What is Data Warehousing?

A Data Warehousing (DW) is process for collecting and managing data from varied sources to provide meaningful business insights. A Data warehouse is typically used to connect and analyze business data from heterogeneous sources. The data warehouse is the core of the BI system which is built for data analysis and reporting.

How Datawarehouse works?

A Data Warehouse works as a central repository where information arrives from one or more data sources. Data flows into a data warehouse from the transactional system and other relational databases.

Data may be:

Structured

Semi-structured

Unstructured data

The data is processed, transformed, and ingested so that users can access the processed data in the Data Warehouse through Business Intelligence tools, SQL clients, and spreadsheets. A data warehouse merges information coming from different sources into one comprehensive database.

By merging all of this information in one place, an organization can analyze its customers more holistically. This helps to ensure that it has considered all the information available. Data warehousing makes data mining possible.

Data mining is looking for patterns in the data that may lead to higher sales and profits



G. Krishna Sai, 3rd CSE

(178T1A0525)

WHAT IS RASPBERRY PI?

The Raspberry Pi (/paɪ/) is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote teaching of basic computer science in schools and in developing countries.[6][7][8] The original model became far more popular than anticipated,[9] selling outside its target market for uses such as robotics. It does not include peripherals (such as keyboards and mice) or cases. However, some accessories have been included in several official and unofficial bundles.[9] Most Pis are made in a Sony factory in Pencoed, Wales.[16] Some are made in China and Japan.[17]



Generations of released models[edit]

The Raspberry Pi Zero, a US\$5 model first introduced in 2015



The Raspberry Pi 3 B+, introduced in 2018



The Raspberry Pi 4 B, introduced in 2019 Processor speed ranges from 700 MHz to 1.4 GHz for the Pi 3 Model B+ or 1.5 GHz for the Pi 4; on-board memory ranges from 256 MB to 1 GB random-access memory (RAM), with up to 4 GB available on the Pi 4. Secure Digital (SD) cards in MicroSDHC form factor (SDHC on early models) are used to store the operating system and program memory. The boards have one to five USB ports. For video output, HDMI and composite video are supported, with a standard 3.5 mm tip-ring-sleeve jack for audio output. Lower-level output is provided by a number of GPIO pins, which support common protocols like I²C. The B-models have an 8P8C Ethernet port and the Pi 3, Pi 4 and Pi Zero W have on-board Wi-Fi 802.11n and Bluetooth. Prices range from US\$5 to \$55.

The first generation (Raspberry Pi 1 Model B) was released in February 2012, followed by the simpler and cheaper Model A. In 2014, the Foundation released a board with an improved design, Raspberry Pi 1 Model B+. These boards are approximately credit-card sized and represent the standard mainline form-factor. Improved A+ and B+ models were released a year later. A "Compute Module" was released in April 2014 for embedded applications. The Raspberry Pi 2, which added more RAM, was released in February 2015.

Raspberry Pi 3 Model B was released in February 2016 with a 1.2 GHz 64-bit quad core processor, on-board 802.11n Wi-Fi, Bluetooth and USB boot capabilities.[21] On Pi Day 2018 the Raspberry Pi 3 Model B+ was launched with a faster 1.4 GHz processor and a three-times faster gigabit Ethernet (throughput limited to ca. 300 Mbit/s by the internal USB 2.0 connection) or 2.4 / 5 GHz dual-band 802.11ac Wi-Fi (100 Mbit/s).[15] Other features are Power over Ethernet (PoE) (with the add-on PoE HAT), USB boot and network boot (an SD card is no longer required).

Shiva Kumar

(178T1A0545)

3rd CSE-A



The Cisco Catalyst

The Cisco® Catalyst® 9120 Series Access Points are the next generation of enterprise access points. They are resilient, secure, and intelligent.

We are more dependent on our wireless networks than ever before. Additional devices connect to the network every year and the Cisco Catalyst 9120 Series Access Points will provide a seamless experience anywhere for everyone. Going beyond the Wi-Fi 6 (802.11ax) standard, the Catalyst 9120 provides integrated security, resiliency and operational flexibility as well as increased network intelligence.

Extending Cisco's intent-based network and perfect for networks of all sizes, the Catalyst 9120 scales to the growing demands of IoT while fully supporting the latest innovations and new technologies. Not only that, but the Catalyst 9120 is the leaders in performance, security and analytics.

The Catalyst 9120 Series Access Points, paired with Cisco DNA, are enterprise-class products that will address your current and future needs. These access points are the first step in updating your network and are able to take better advantage of all of the features and benefits that Wi-Fi 6 provides.

Key features:

- Four radios: 5 GHz (4x4) Flexible radio with 2.4 or 5 GHz (4x4), Unified RF Engine and 802.15.4 for IoT
- OFDMA and MU-MIMO
- Multigigabit support
- Internal, external antenna and also external antenna for professional installations
- Available with optional embedded wireless controller

Future feature support:

- IoT ready (BLE, Zigbee, and other multiprotocol 802.15.4 devices)**

** = Future Support

The Cisco Catalyst 9120 Series Access Points support both orthogonal frequency-division multiple access (OFDMA) and multiuser multiple-input, multiple-output (MU-MIMO), delivering more predictable performance for advanced applications and IoT. Additionally, with up to 2.5 Gbps with NBASE-T and IEEE 802.3bz Ethernet compatibility, the Cisco Catalyst 9120 Series can seamlessly offload network traffic without any bottlenecks. With Cisco's Multigigabit technology, you can use your existing Category 5e or 6 cabling to achieve speeds up to 2.5 Gbps, allowing for higher throughputs with minimum cost. And with different antenna choices, you're able to decide which option works best for you.

Table 1. Features and benefits

Feature	Benefits
Wi-Fi 6 (802.11ax)	The IEEE 802.11ax emerging standard, also known as High-Efficiency-Wireless (HEW) or Wi-Fi 6, builds on 802.11ac. It delivers a better experience in typical environments with more predictable performance for advanced applications such as 4K or 8K video, high-density, high-definition collaboration apps, all-wireless offices, and IoT. Wi-Fi 6 is designed to use both the 2.4-GHz and 5-GHz bands, unlike the 802.11ac standard.
Cisco RF ASIC	Cisco RF ASIC is a fully integrated Software Defined Radio (SDR) that can perform advanced RF spectrum analysis and delivers features like CleanAir, Wireless Intrusion Prevention System (WIPS), Fast Locate*, DFS detection. (* - Future)
Uplink/downlink OFDMA	OFDMA-based scheduling splits the bandwidth into smaller chunks called Resource Units (RUs), which can be allocated to individual clients in both the downlink and uplink directions to reduce overhead and latency.
MU-MIMO technology	Supporting four spatial streams, MU-MIMO enables access points to split spatial streams between client devices, to maximize throughput.
BSS coloring	Spatial reuse (also known as Basic Service Set [BSS] coloring) allows the access points and their clients to differentiate between BSSs, thus permitting more simultaneous transmissions.
Target wake time	A new power savings mode called Target Wake Time (TWT) allows the client to stay asleep and to wake up only at prescheduled (target) times to exchange data with the access point. This offers significant energy savings for battery-operated devices, up to 3x

Feature	Benefits
	to 4x compared to 802.11n and 802.11ac.
Intelligent Capture	<p>Intelligent Capture probes the network and provides Cisco DNA Center with deep analysis. The software can track over 240 anomalies and instantaneously review all packets on demand, emulating the onsite network administrator. Intelligent Capture allows for more informed decisions on your wireless networks.</p>
Flexible Radio Assignment	<p>Allows the access points to intelligently determine the operating mode of serving radios based on the RF environment. The access points can operate in the following modes:</p> <ul style="list-style-type: none"> ● 2.4-GHz and 5-GHz mode: One radio will serve clients in 2.4-GHz mode, while the other serves clients in 5-GHz mode. ● Dual 5-GHz mode: Both radios inside the access point operate on the 5-GHz band, maximizing the benefits of Wi-Fi 6 and increasing client device capacity.
Dual 5-GHz radio support	Enables both radios to operate in 5-GHz client serving mode, allowing an industry-leading 5.2 Gbps (2 x 2.6 Gbps) over-the-air speeds while increasing client capacity.
Smart antenna connector	An intelligent second physical antenna connector is included on Catalyst 9120 Access Points with an external antenna. This connector provides advanced network design flexibility for high-density and large open-area environments such as auditoriums, convention centers, libraries, cafeterias, and arenas/stadiums, allowing two sets of antennas to be connected and active on a single access point.
Cisco Embedded Wireless Controller	The Catalyst 9120 Wi-Fi 6 access points is available with a built-in controller. The Cisco Embedded Wireless Controller on Catalyst 9100 Access Points provides an easy-to-deploy and manage option that does not require a physical appliance. The control resides on the access point so there is no added footprint or complexity. And, because it uses Catalyst 9800 code, it's easy to migrate your network as your needs grow.
Multigigabit Ethernet support	Provides uplink speeds of 2.5 Gbps, in addition to 100 Mbps and 1 Gbps. All speeds are supported on Category 5e cabling for an industry first, as well as 10GBASE-T (IEEE 802.3bz) cabling.
Bluetooth 5	Integrated Bluetooth Low Energy (BLE) 5 radio to enable IoT use cases such as location tracking and wayfinding.
Container support for applications	Enables edge computing capabilities for IoT applications on the host access point.
Apple Features	Apple and Cisco have partnered to create an optimal mobile experience for iOS devices on corporate networks based on Cisco technologies. Using new features in iOS 10, in combination with the latest software and hardware from Cisco, businesses can now more effectively use their network infrastructure to deliver an enhanced user experience across all business applications.

Note: Features available in a future releases – Target Wake Time, BSS Coloring, Uplink/downlink OFDMA, Cisco Intelligent Capture

Resilient - steady performance in demanding environments

Networks infrastructure that upgrade to Wi-Fi 6 enabled devices will get up to four times the capacity boost needed to support the additional devices connected to the network as well as the data that they generate. Wi-Fi 6 will offer multi-gigabit performance which will feature a seamless connectivity with higher throughput compared to the 802.11ac standard. This means you'll see your network performance run smoother. With support for BSS coloring, the new standard eases high device dense deployments by allowing simultaneous transmissions, ultimately increasing network capacity, customer interactions, and value-add services. BSS coloring allows the limited channels in the 2.4 GHz to have better spectral re-use benefiting IoT and 2.4 GHz clients.

Trustworthy systems built with Cisco Trust Anchor Technologies provide a highly secure foundation for Cisco products. With the Catalyst 9100 Series, these technologies enable hardware and software authenticity assurance for supply chain trust and strong mitigation against man-in-the-middle attacks that compromise software and firmware. Trust Anchor capabilities include:

- Image signing: Cryptographically signed images provide assurance that the firmware, BIOS, and other software are authentic and unmodified. As the system boots, the system's software signatures are checked for integrity.
- Secure Boot: Cisco Secure Boot technology anchors the boot sequence chain of trust to immutable hardware, mitigating threats against a system's foundational state and the software that is to be loaded, regardless of a user's privilege level. It provides layered protection against the persistence of illicitly modified firmware.
- Cisco Trust Anchor module: A tamper-resistant, strong cryptographic, single-chip solution provides hardware authenticity assurance to uniquely identify the product so that its origin can be confirmed to Cisco.

Cisco DNA Support

Pairing the Cisco Catalyst 9120 Series Access Points with the Cisco Digital Network Architecture (Cisco DNA) allows for a total network transformation. Cisco DNA allows you to truly understand your network with real-time analytics, quickly detect and contain security threats, and easily provide networkwide consistency through automation and virtualization.

Cisco DNA with Software-Defined Access (SD-Access) is the network fabric that powers business. It is an open and extensible, software-driven architecture that accelerates and simplifies your enterprise network operations. The programmable architecture frees your IT staff from time-consuming, repetitive network configuration tasks so they can focus instead on innovation that positively transforms your business. By decoupling network functions from the hardware, you can build and manage your entire wired and wireless network from a single user interface. SD-Access enables policy-based automation from edge to cloud with foundational capabilities. These include:

- Simplified device deployment
- Unified management of wired and wireless networks
- Network virtualization and segmentation
- Group-based policies
- Context-based analytics

The Cisco Catalyst 9120 Series Access Points support Software-Defined Access, Cisco's leading enterprise architecture.

Working together, the Cisco Catalyst 9120 Series and Cisco DNA offer such features as:

- Cisco DNA Spaces
- Cisco Identity Services Engine
- Cisco DNA Analytics and Assurance

The result? Your network stays relevant, becomes digital ready, and is the lifeblood of your organization.



Dhanujay
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3rd CSE-A

AUGUMENTED REALITY(AR)

Augmented reality (AR) is an interactive experience of a real-world environment where the objects that reside in the real world are enhanced by computer-generated perceptual information, sometimes across multiple sensory modalities, including visual, auditory, haptic, somatosensory and olfactory. AR can be defined as a system that fulfills three basic features: a combination of real and virtual worlds, real-time interaction, and accurate 3D registration of virtual and real objects.

Augmented reality is related to two largely synonymous terms: mixed reality and computer-mediated reality. The primary value of augmented reality is the manner in which components of the digital world blend into a person's perception of the real world, not as a simple display of data, but through the integration of immersive sensations, which are perceived as natural parts of an environment. Augmented reality applications have spanned commercial industries such as education, communications, medicine, and entertainment. In education, content may be accessed by scanning or viewing an image with a mobile device or by using marker less AR techniques.

Augmented reality is used to enhance natural environments or situations and offer perceptually enriched experiences. With the help of advanced AR technologies the information about the surrounding real world of the user becomes interactive and digitally manipulated. Information about the environment and its objects is overlaid on the real world. This information can be virtual or real. Augmented reality also has a lot of potential in the gathering and sharing of tacit knowledge. Augmentation techniques are typically performed in real time and in semantic contexts with environmental elements.

Augmented reality has been explored for many applications, from gaming and entertainment to medicine, education and business. Example application areas described below include archaeology, architecture, commerce and education. Some of the earliest cited examples include augmented reality used to support surgery by providing virtual overlays to guide medical practitioners, to AR content for astronomy and welding.



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2nd CSE-A

BrainGate

INTRODUCTION:

BrainGate is a brain implant system developed by the bio-tech company, Cyber kinetics in conjunction with the Department of Neuroscience at Brown University. The development of the braingate system brain-computer interface is to enable those with severe paralysis and other neurological conditions to live more productively and independently. The computer chip, which is implanted into the brain, monitors brain activity in the patient and converts the intention of the user into computer commands. Currently the chip uses about 100 hair-thin electrodes that sense the electro-magnetic signature of neurons firing in specific areas of the brain.

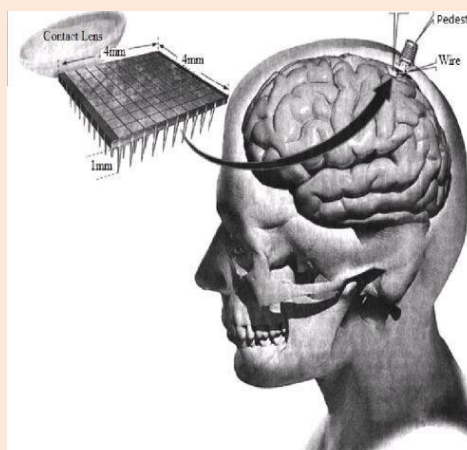
The activity is translated into electrically charged signals and is then sent and decoded using a program, which can move a robotic arm, a computer cursor, or even a wheelchair. Scientists are developing the brain gate systems underlying core technology in the neuroport system to enable improved diagnosis and treatment for a number of neurological conditions, such as epilepsy and brain trauma. Brain gate will be the first human device that has been designed to record, filter, and amplify multiple channels of simultaneously recorded neural activity at a very high spatial and temporal resolution. When a person becomes paralyzed, neural signal from the brain no longer reach their designated site of termination. However, the brain continues to send out these signals although they do not reach their destination. It is these signals that the brain gate system picks up and they must be present in order for the system to work.

WORKING

Basic requirements

The basic elements of BrainGate

1. The chip: A four-millimeter square silicon chip studded with about 100 hair-thin microelectrodes is embedded in the primary motor cortex-the region of the brain responsible for controlling movement.
2. The connector: When somebody thinks ,move cursor up and left his cortical neurons fire in a distinctive pattern the signal is transmitted through the pedestal plug attached to the skull.
3. The converter: The signal travels to an amplifier where it is converted to optical data and bounced by fiber optic cable to a computer.
4. The computer: Brain gate learns to associate patterns of brain activity with particular imagined movements up, down, left, right and to connect those movements to a cursor.



Brains behind BrainGate:

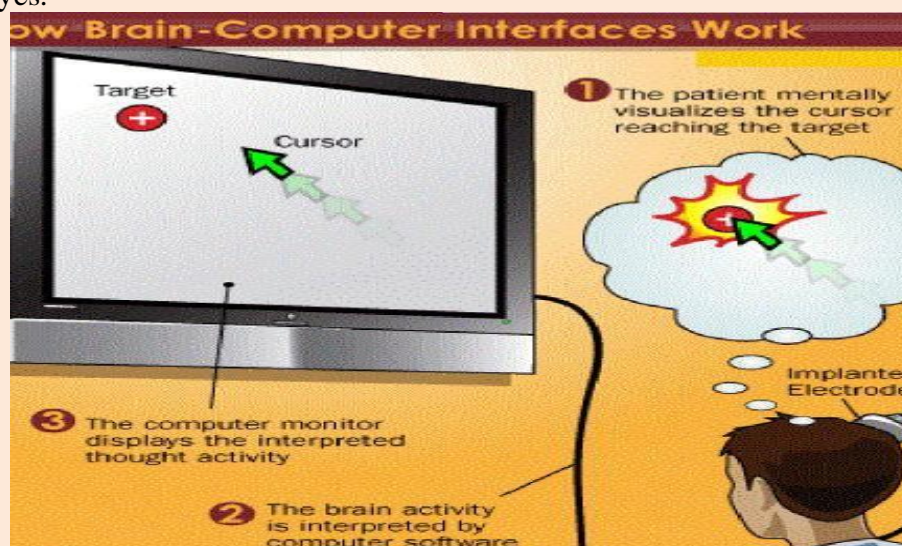
The person thinks of moving the computer cursor. Electrodes on the silicon chip implanted into the person's brain detect neural activity from an array of neural impulses in the brain's motor cortex. The impulses transfer from the chip to a pedestal protruding from the scalp through connection wires. The pedestal filters out unwanted signals or noise, and then transfers the signal to an amplifier. The signal is captured by an acquisition system and is sent through a fiber optic cable to a computer. The computer then translates the signal into an action, causing the cursor to move.

The BrainGate system is a neuromotor prosthetic device consisting of an array of one hundred silicon micro-electrodes; each electrode is 1mm long and thinner than a human hair. The electrodes are arranged less than half a millimetre apart on the array, which is attached to a 13cm-long cable ribbon cable connecting it to a computer.

The BrainGate neural interface system is a proprietary, investigational Brain-Computer Interface (BCI) that consists of an internal sensor to detect brain cell activity and external processors that convert these brain signals into a computer-mediated output under the person's own control. The sensor is implanted on the surface of the area of the brain responsible for voluntary movement, the motor cortex. The electrodes penetrate about 1 mm into the surface of the brain where they pick up electrical signals known as neural spiking, the language of the brain from nearby neurons and transmit them through thin gold wires to a titanium pedestal that protrudes about an inch above the patient's scalp. An external cable connects the pedestal to computers, signal processors and monitors. The technology is able to sense the electrical activity of many individual neurons at one time; the data is transmitted from the neurons in the brain to computers where it is analyzed and the thoughts are used to control an external device. Even 20 and 200 times a second and they work in teams.

The reason a BCI works at all is because of the way our brains function. Our brains are filled with neurons, individual nerve cells connected to one another by dendrites and axons. Every time we think, move, feel or remember something, our neurons are at work. That work is carried out by small electric signals that zip from neuron to neuron as fast as 250 mph. The signals are generated by differences in electric potential carried by ions on the membrane of each neuron.

Although the paths the signals take are insulated by something called myelin, some of the electric signal escapes. Scientists can detect those signals, interpret what they mean and use them to direct a device of some kind. It can also work the other way around. For example, researchers could figure out what signals are sent to the brain by the optic nerve when someone sees the color red. They could rig a camera that would send those exact signals into someone's brain whenever the camera saw red, allowing a blind person to "see" without eyes.



EEG - Electroencephalography

The easiest and least invasive method is a set of electrodes — a device known as an electroencephalograph (EEG) — attached to the scalp. The electrodes can read brain signals. However, the skull blocks a lot of the electrical signal, and it distorts what does get through.

It is the most studied potential non-invasive interface, mainly due to its fine temporal resolution, ease of use, portability and low set-up cost. A substantial barrier to using EEG as a brain- computer interface is the extensive training required before users can work the technology. Signals recorded in this way have been used to power muscle implants and restore partial movement in an experimental volunteer. They are easy to wear, non-invasive implants produce poor signal resolution because the skull dampens signals, dispersing and blurring the electromagnetic waves created by the neurons. Although the waves can still be detected it is more difficult to determine the area of the brain that created them or the actions of individual neurons.

Features

Brain Gate is a brain implant system developed by the bio-tech company Cyber kinetics in 2003 in conjunction with the department of Neuroscience at Brown University. The device was designed to help those who have lost control of their limbs, or other bodily functions, such as patients with amyotrophic lateral sclerosis (ALS) or spinal cord injury. The computer chip, which is implanted into the brain, monitors brain activity in the patient and converts the intention of the user into computer commands.

Currently the chip uses 100 hair-thin electrodes that sense the electromagnetic signature of neurons firing in specific areas of the brain, for example, the area that controls arm movement. The activity is translated into electrically charged signals and are then sent and decoded using a program, which can move either a robotic arm or a computer cursor.

According to the Cyberkinetics's website, three patients have been implanted with the Brain Gate system. The company has confirmed that one patient (Matt Nagle) has a spinal cord injury, whilst another has advanced ALS.

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