Adi Shankara
INSTITUTE OF ENGINEERING AND TECHNOLOGY
Ph: 0484-2463825
Email: info@adishankara.ac.in
Website: www.adishankara.ac.in

NATIONAL BOARD OF ACCREDITATION
Till 30-06-2025
Rref F.No.26-56-2016-NBA
Dt: 26/08/2022

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

EXPLORE, DREAM, DISCOVER

ISSUE 61 MONTHLY NEWSLETTER MARCH 2023

GENESIS

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

WORKSHOP ON DIGITAL MARKETING

A workshop on digital marketing, enabling students to understand the digital platforms that are increasingly incorporated into marketing plans in everyday life, was conducted by NEST cyber group, at ASIET for final year ECE students on 15-03-2023. One of the key objectives of the workshop was to raise brand awareness digitally, that is, the extent to which customers and the general public are familiar with and recognize a particular brand online, because of its impact on consumer decision-making.
The role of digital interaction in customer behavior was elaborated in the workshop. Also, the use, convenience, and influence of social media in digital marketing were explained.

AWARDS AND RECOGNITIONS

CERD SPS FUNDING

The following team has achieved a phenomenal accomplishment by getting selected for funding of Rs. 18250 from Cerd SPS for their project, I**mplementation of 2 - Way Interactive Digital Notice Board.**

Students:
1.Abhirami K B, S-8 ECE A
2.Gopika Rajeev, S-8 ECE-A
3.Devikalekshmi J Shenoi, S-8 ECE-A
4.D Keerthana Prasad, S-8 ECE-A
Principal investigator: Dr. Ajay Kumar,
Co-investigator:Albins Paul

ABHIRAMI K B

GOPIKA RAJEEV

DEVIKALEKSHMI J SHENOI

D KEERTHANA PRASAD

Dr. Ajay Kumar

Albins Paul

AWARDS AND RECOGNITIONS

Happy to announce that an MoU has been signed with NEST group on March 8th. The MOU will help enable both parties to work together and lay out each one's expectations and responsibilities through student training/workshops, internships, certification programmes, add-on courses, etc.

TECH TALKS

STAFF ZONE

Signal Processing

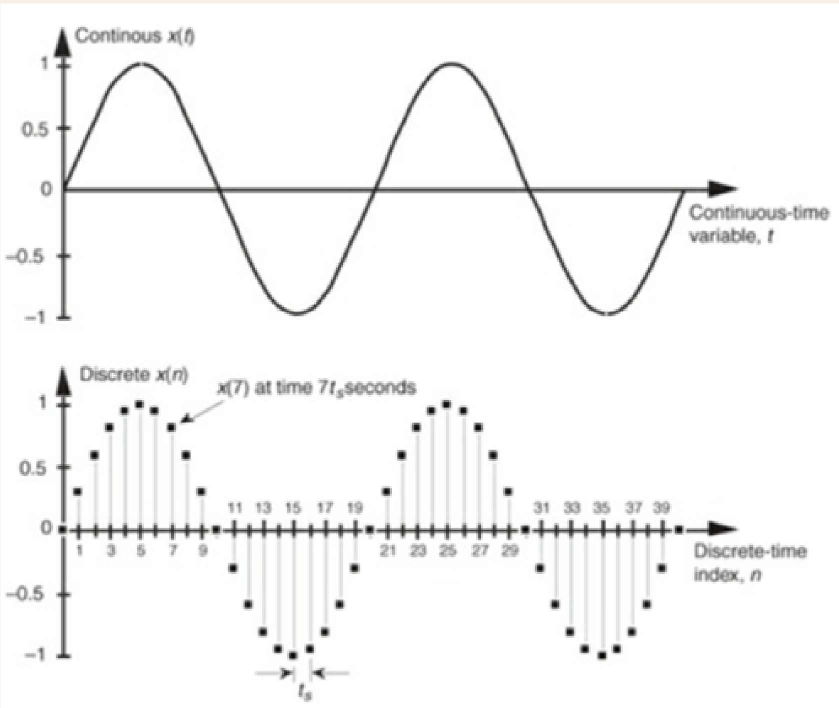
Jaimy James , Assistant Professor
ECE DEPT.

A signal is a way of conveying information. Gestures, semaphores, images, and sounds, all of these can be signals. Technically, we can define a signal as a function of time, space, or another observation variable that conveys information.

Basically, signals are of three forms:

- Continuous-Time/Analog Signal
- Discrete-Time Signal
- Digital Signal

Continuous-Time/Analog Signal



Signal processing involves converting or transforming data in a way that allows us to see things in it that are not possible via direct observation. Signal processing allows engineers and scientists to analyze, optimize, and correct signals, including scientific data, audio streams, images, and video.
Why is signal processing important in communication?
Signals need to be processed so that the information that they contain can be displayed, analyzed, or converted to another type of signal that may be of use. In the real-world, analog products detect signals such as sound, light, temperature or pressure and manipulate them
It is used in a wide variety of technological equipment but is an especially critical aspect of noise suppression and voice enhancement communication equipment.

Signal processing is a field of engineering, mathematics, and computer science that deals with processing, analyzing, and manipulating analog and digital signals. Signals can be audio, video, sensor data, images, and many other types of data. Signal processing techniques are used in a wide range of applications, including telecommunications, audio and video processing, image processing, speech recognition, and control systems. Some common signal-processing tasks include filtering, noise reduction, compression, and feature extraction.

Signal processing has a long and fascinating history, dating back to ancient civilizations. Here is a brief overview of some of the key developments in the field:

1. Ancient civilizations: Early civilizations such as the Egyptians, Greeks, and Chinese used various forms of signal processing, such as sound reflection, to amplify and distribute sound in large public spaces.
2. 19th century: The telegraph, invented in the early 19th century, allowed for the transmission of electrical signals over long distances, marking the beginning of modern signal processing. In the latter part of the century, the telephone and radio were invented, paving the way for further developments in signal processing.
3. Mid-20th century: The advent of digital signal processing (DSP) in the mid-20th century marked a major shift in the field. Digital signal processing allowed for the manipulation and analysis of signals using computers, opening up new possibilities for signal processing applications.
4. Late 20th century: The late 20th century saw the development of various signal processing techniques, such as Fourier analysis, wavelets, and filter design, which are still widely used today.
5. 21st century: In the 21st century, signal processing has become increasingly important in a variety of fields, including telecommunications, audio and image processing, and biomedical engineering. The field continues to evolve rapidly, with new techniques and applications being developed all the time.

Overall, the history of signal processing is a rich and varied one, reflecting the ways in which humans have sought to understand and manipulate signals for thousands of years. The history of signal processing can be traced back to the early 20th century when the first practical applications of signal processing began to emerge. Here is a brief overview of the key milestones in the history of signal processing:

1. Telegraphy: The development of telegraphy in the early 19th century was a significant step forward in the transmission of signals over long distances. It laid the foundation for the development of more sophisticated signal processing techniques.
2. Telephone: The invention of the telephone in the late 19th century allowed for the transmission of voice signals over long distances. This led to the development of more advanced signal processing techniques, such as Fourier analysis.
3. World War II: During World War II, the development of radar technology and the need to process radar signals quickly led to the development of digital signal processing techniques.
4. Digital signal processing: In the 1960s and 1970s, digital signal processing began to emerge as a powerful tool for processing and analyzing signals. The development of the Fast Fourier Transform (FFT) algorithm was a key milestone in this area.
5. Modern signal processing: Today, signal processing techniques are used in a wide range of applications, from speech and image processing to biomedical engineering and telecommunications. The development of artificial intelligence and machine learning techniques is also enabling the development of more advanced signal processing algorithms.

Overall, the history of signal processing is closely linked to advances in technology and the need to process and analyze signals more efficiently and accurately.

Signal Processing Techniques

There are many techniques used in signal processing, including:

1.Filtering: This involves removing unwanted frequency components from a signal. There are many types of filters, including low-pass, high-pass, band-pass, and band-stop filters.

2.Fourier analysis: This is a method for representing a signal as a sum of sinusoidal functions. It is used to identify the frequency components of a signal and to analyze its properties.

3.Noise reduction: This involves removing or reducing unwanted noise or interference from a signal. Techniques for noise reduction include filtering, averaging, and the use of noise-canceling algorithms.

4.Compression: This involves reducing the size of a digital signal by removing redundant or unnecessary information. Compression is often used to reduce the size of audio and video files for storage or transmission.

5.Modulation: This involves encoding information onto a carrier signal for transmission over a communication channel. There are many types of modulation, including amplitude, frequency, and phase modulation.

6.Demodulation: This is the process of extracting the original information from a modulated signal. It is the inverse of the modulation process.

The three categories of signal processing?

- Audio signal processing
- Digital image processing
- Speech processing.

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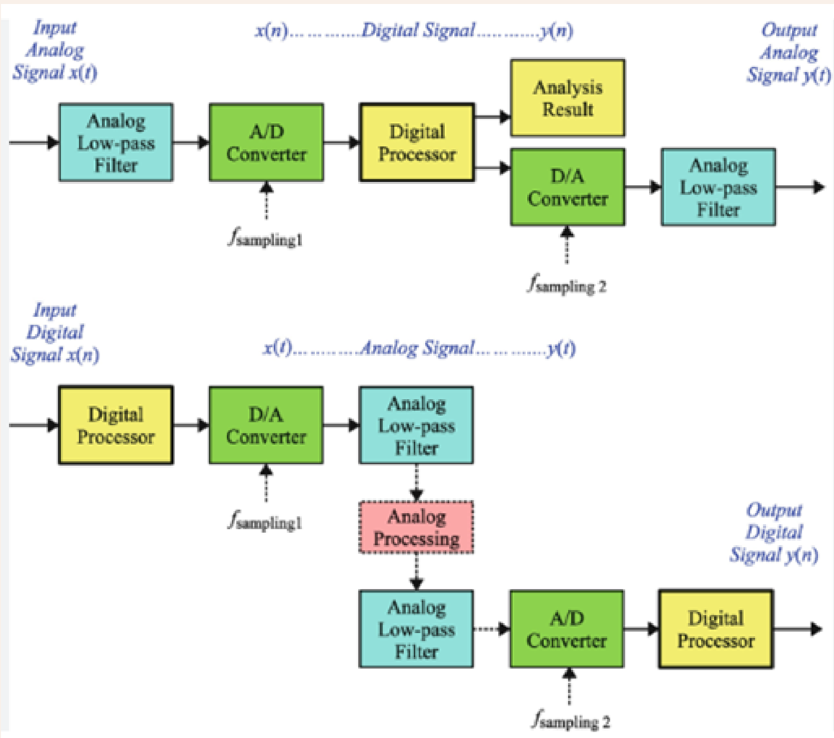

Applications

Signal processing techniques are used in a wide range of applications, including:

1.Telecommunications: Signal processing techniques are used in telecommunications to transmit, receive, and process signals over communication channels. This includes tasks such as modulation, demodulation, error correction, and signal amplification.

2.Audio and video processing: Signal processing techniques are used to enhance the quality and clarity of audio and video signals, as well as to extract features such as speech, music, and moving objects.

3.Image processing: Signal processing techniques are used to improve the quality and resolution of images, as well as to extract features such as edges, shapes, and textures.

4.Speech recognition: Signal processing techniques are used to analyze and interpret speech signals, enabling the development of systems that can transcribe speech or recognize spoken commands.

5.Control systems: Signal processing techniques are used in control systems to stabilize and optimize the performance of systems by processing feedback signals from sensors and actuators.

6. Biomedical engineering: Signal processing techniques are used in biomedical engineering to analyze and interpret signals from medical devices such as electrocardiograms (ECGs) and magnetic resonance imaging (MRI) scanners.

7. Financial engineering: Signal processing techniques are used in financial engineering to analyze and interpret financial data and to develop predictive models for financial markets.

8. The use of digital signal processing (DSP) in consumer electronics continues to expand. For example, DSP algorithms are used in noise-cancelling headphones, voice assistants, and smart home devices.

9. Advances in hardware technology are enabling faster and more efficient signal processing. For example, the development of specialized processing units, such as graphical processing units (GPUs), field-programmable gate arrays (FPGAs), and application-specific integrated circuits (ASICs), is allowing for real-time signal processing in a wide range of applications.

10. The field of quantum signal processing is also emerging, with researchers exploring the use of quantum computers to process and analyze signals. While this area is still in its early stages, it has the potential to revolutionize signal processing by enabling the analysis of large, complex data sets that are currently infeasible for classical computers.

11. Artificial intelligence (AI) and machine learning (ML) are being increasingly applied to signal processing. Researchers are developing new algorithms that can automatically process and analyze large amounts of data, such as images, videos, and audio recordings. These techniques are being used in a wide range of applications, including speech recognition, image and video compression, and autonomous vehicles.

Future of Signal Processing

More data to process

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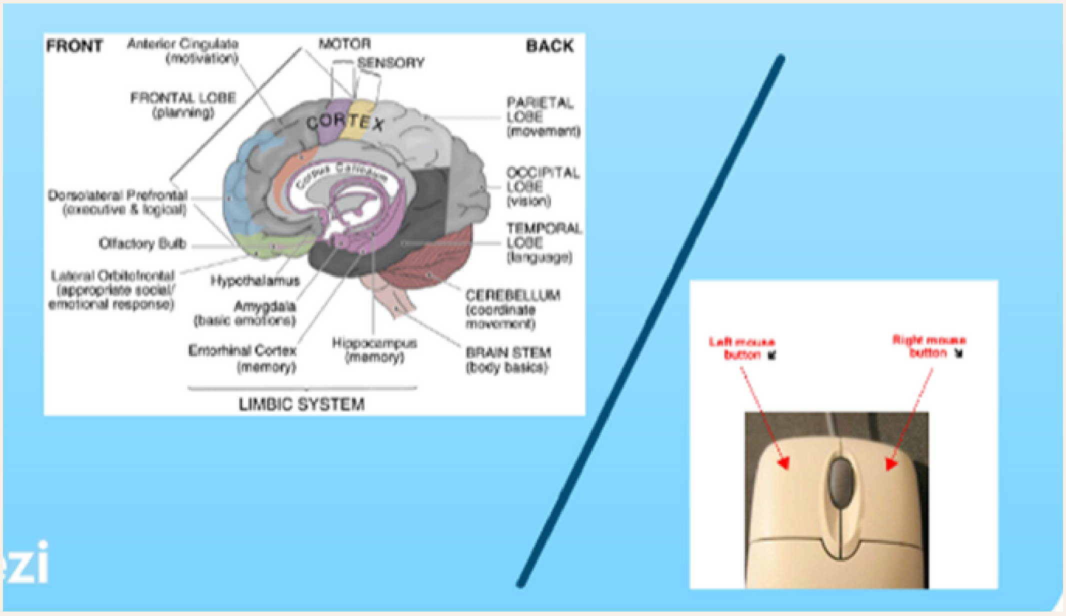
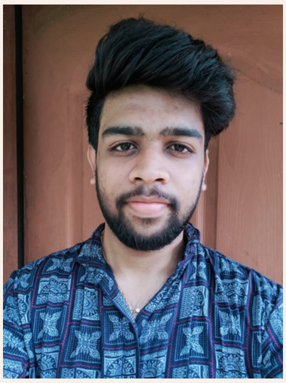


STUDENT ZONE



What will the smartphone look like in 10 years?

Dhanush
S4 ECB

The most likely answer, I'm afraid, is one of two options: it's either completely unknowable or disappointingly predictable.

The story of the smartphone thus far began with technological breakthroughs paired with ingenuity (Camera + Data = Instagram) but eventually evolved into a yearly cadence of iterative improvements (better camera). Ten years from now, when we gaze upon the devices in our hands (or, less likely, consider the implant in our spinal columns)

It's easy to underestimate how important iterative changes

Even with iterative updates, smartphones will be radically better than they are today, and they'll be different in some ways, too. The screens will be brighter and fold in different ways, the cameras will be so advanced that they'll threaten to obviate even higher-end SLRs, and the digital assistants inside them will be smarter.

Foldables

Before foldable devices really take off, a couple of things need to be figured out, starting with the issue of cost. The Samsung Galaxy Z Flip 3 takes folding phones a little closer to the mainstream with a $999 price tag, but that's still out of reach for many people, and the bigger foldables like the Fold 3 remain closer to $2,000. Manufacturers will need to be able to make those folding components more efficiently at a lower cost.

Smart glasses

The most tempting prediction to make is that in 10 years' time, the handheld smartphone as we know it will be replaced — or at least relegated to our pockets more often than not — by smart eyeglasses.
We're already on the path, though early attempts like Google Glass were too rudimentary, creepy, and strange-looking. More recent tries from companies like Focal still depend on the phone for too much of their functionality. Meta, the newly rebranded company behind Facebook, is continuing to explore the concept, and Apple's oft-rumored mixed reality glasses remain in development.

The main obstacle is being able to shrink all the necessary technology down into a pair that normal people would want to wear.

he main obstacle between existing and more capable smart glasses is being able to shrink all the necessary technology down into a pair that normal people would want to wear in public. Display technology also isn't quite where it needs to be just yet. Some past smart glasses have projected their UI onto the lens glass, but that's where things get bulky.

The other fundamental challenge is coming up with an interface that makes sense and feels like the right fit between your eyes and the outside world. Eye tracking would have to play some part in that. Think of how often you check your phone throughout the day. No one would want to be constantly futzing with swipe and tap gestures on their glasses that frequently. Voice dictation also needs to evolve beyond its current performance on mobile devices if we're going to be comfortable leaving our foldable phones or slabs at home.
Even if this is all figured out, the tried and true smartphone won't be history in 10 years — productivity and other tasks simply lend themselves better to a device with a screen and keyboard. –Chris

Ambient computing

In the most sci-fi-fueled visions of the next 10 years, a phone isn't something we carry around with us — it's everywhere. Every room in your home has a smart speaker, a screen, a lamp, and who knows what, that's connected to the network and ready to do whatever you would have asked of your phone.

Outside of the home is more of the same. We don't carry a personal device with us — it's in our cars, at our bus stops, in every public trashcan and streetlight. Rather than face the onerous task of taking a phone out of your pocket, unlocking it, opening the right app, and typing words on its little screen, the world around us will simply be equipped to do the tedious stuff for us.

ACHIEVEMENTS

STUDENT ACHIEVEMENTS

JAISON T PAULOSE of 2020-24 batch attended a course on VLSI System on Chip Design by Maven Silicon on 3/20/23.

EDITORIAL BOARD