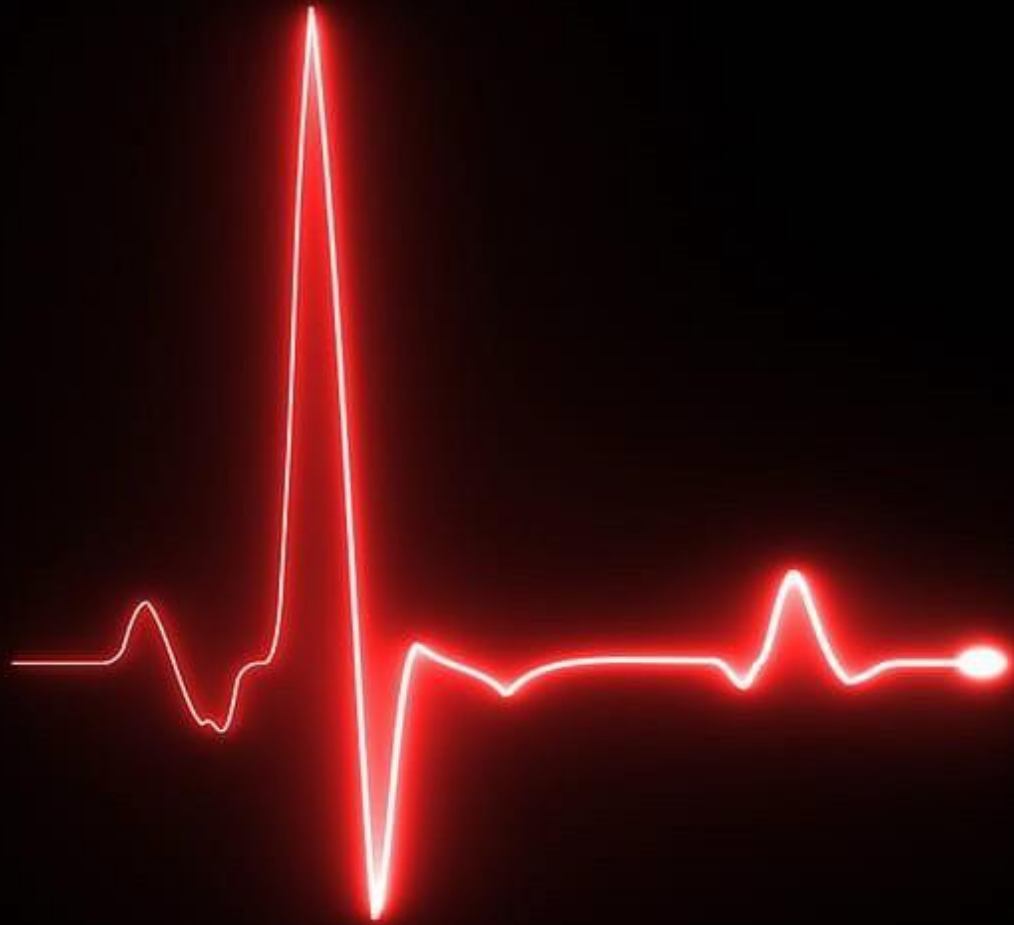


THE PULSE

NEWSLETTER
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



Vision

To emerge as a centre of academic excellence in the field of Electronics & Communication Engineering to address the dynamic needs of the industry upholding moral values.

Mission

- Impart in-depth knowledge in Electronics & Communication Engineering to achieve academic excellence.
- Develop an environment of research to meet the demands of evolving technology.
- Inculcate ethical values to promote team work and leadership qualities befitting societal requirements
- Provide adaptability skills for sustaining in the dynamic environment

FACULTY CONNECT

The Ever-Expanding Frontier of Flexible Wearable Devices: A Look into the Latest Trends

Introduction

The world of wearable technology undergoes continuous evolution, and one of the latest trends captivating tech enthusiasts and consumers alike is flexible wearable devices. These cutting-edge gadgets combine portability, comfort, and functionality, seamlessly integrating technology into users' daily lives. In this article, we will delve into the latest advancements in flexible wearable devices, exploring their applications, benefits, and the exciting future they hold in the realm of technology. Over the years, wearable technology has experienced a remarkable transformation, shifting from bulky and inflexible devices to sleek and flexible wearables that seamlessly blend into our everyday routines. The latest trend in flexible wearable devices has ushered in a new era of mobility and functionality, enabling users to stay connected, monitor their health, and enhance their overall experience like never before. This article will delve into the advancements, applications, and future prospects of flexible wearable devices. The surging popularity of flexible wearables can be attributed to the growing demand for unobtrusive technologies that seamlessly fit into diverse lifestyles. Conventional wearable devices, while functional, often posed limitations in terms of size, comfort, and design. To address these concerns, flexible wearables have harnessed innovative materials like bendable polymers and flexible displays to create lightweight and versatile devices that effortlessly conform to the contours of the human body.

What are Flexible Wearable Devices?

Flexible wearable devices belong to a category of wearable technology that incorporates bendable, stretchable, and sometimes rollable components. Unlike conventional rigid wearables, such as smartwatches and fitness trackers, these devices are constructed using innovative materials and engineering, allowing them to adapt to the human body's contours, thus providing a more comfortable and less obtrusive user experience. The latest trend in flexible wearable devices is largely driven by advancements in materials and fabrication techniques. Engineers and researchers have been conducting experiments

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with various materials like graphene, elastomers, and nanomaterials to create wearables that possess not only flexibility but also durability and resistance to wear and tear. Furthermore, the application of additive manufacturing techniques, like 3D printing, has facilitated the development of intricate and customized designs, empowering wearables to be tailor-made to suit individual needs and preferences.

Applications in Health and Fitness

One of the primary domains in which flexible wearables have gained significant traction is health and fitness. The devices' capability to adapt to the body's movements makes them ideal companions for tracking various health metrics. These wearables offer a new level of accuracy and convenience to users striving to maintain their health, from flexible patches that monitor vital signs to wearable bands that analyze sweat for hydration and electrolyte levels. The health and fitness applications of flexible wearables represent one of the most significant areas of growth. They have revolutionized the way we approach personal health management by continuously monitoring vital signs, tracking physical activity, and analyzing sleep patterns. Fitness bands and smartwatches with bendable screens have become indispensable companions for health-conscious individuals, providing real-time insights and motivation to achieve fitness goals. Moreover, these wearables have created new opportunities for continuous glucose monitoring in diabetic patients, and some manufacturers are even exploring the concept of integrating insulin delivery systems into flexible patches

Sports and Performance Enhancement

Flexible wearables have made substantial contributions to the world of sports and performance enhancement. Athletes now have the opportunity to don biometric garments that incorporate sensors capable of measuring various performance metrics, including muscle activity and heart rate. By providing real-time data, these wearables empower athletes and coaches to make informed, data-driven decisions, optimize training routines, and enhance injury prevention measures more effectively.

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Communication and Connectivity

Communication and connectivity have witnessed a further revolution with the advent of flexible wearables. Unlike traditional smartphones and smartwatches, which face limitations regarding screen size and portability, flexible wearables, such as smart bands equipped with rollable displays and wristbands featuring flexible screens, offer a more immersive and convenient communication experience. With a simple flick of the wrist, users can effortlessly access notifications, messages, and calls, ensuring seamless connectivity even while on the move.

Fashion and Aesthetics

One of the captivating aspects of flexible wearables is their ability to blend technology with fashion. Designers are currently exploring the integration of flexible displays and LED lighting into clothing and accessories, effectively transforming them into interactive fashion statements. These innovative garments can change colors, display patterns, and synchronize with music, offering users an exciting and unique way to express themselves. In addition to their impact on health and fitness, flexible wearables have also left a significant mark on the fashion industry. Prominent fashion designers have joined forces with technology companies to create smart clothing that seamlessly combines aesthetics with functionality. These fashionable wearables are capable of monitoring biometric data, controlling music playback, and even providing haptic feedback to enhance experiences at events or performances. By blending style with cutting-edge technology, these wearable devices are effortlessly integrating into everyday clothing.

Wearable Electronics in the Workplace

Flexible wearables are increasingly being adopted in various workplaces, contributing to improved productivity and safety. Among the significant applications, physically demanding job roles witness notable benefits with the utilization of wearable exoskeletons. These exoskeletons provide vital support to workers' movements, alleviating fatigue, and mitigating the risk of injuries. Furthermore, the incorporation of

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integrated sensors enables constant monitoring of employees' well-being, ensuring adherence to safe working limits.

Advancements in Materials and Battery Technology

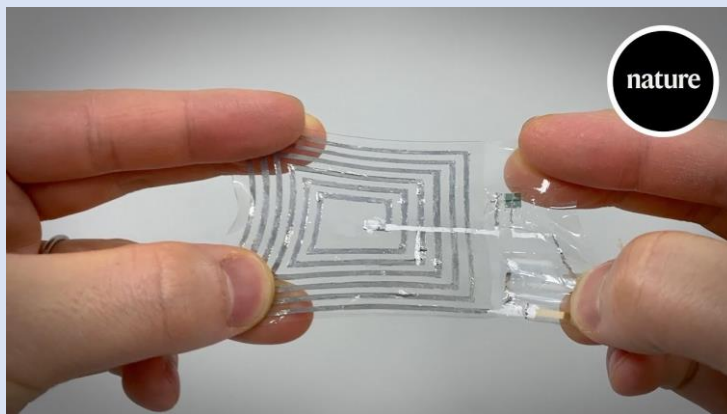
The progress of flexible wearables heavily relies on the advancements in materials science. Ongoing research focuses on exploring novel materials, such as graphene, stretchable silicon, and conductive textiles, to enhance the comfort and durability of wearables. An enduring challenge in wearable technology lies in addressing battery life. Nevertheless, the latest trend in flexible wearable devices showcases remarkable improvements in energy efficiency. By integrating ultra-low-power processors and energy harvesting technologies, like solar cells and piezoelectric materials, battery life has been significantly extended. Consequently, users can enjoy prolonged use without the constant concern of recharging their devices. Likewise, battery technology plays a vital role in wearable devices. Efforts are being dedicated to developing flexible batteries that can power these devices without compromising their flexibility. Innovative solutions, such as energy-harvesting fabrics and flexible super capacitors, are being seamlessly integrated into wearables, opening the path for more sustainable and long-lasting devices.

Challenges and Future Prospects

Despite the promising progress, flexible wearable devices encounter several challenges. A key concern revolves around balancing durability and longevity with maintaining flexibility. Additionally, there is a crucial need to address data privacy and security, particularly considering the sensitive health and personal data these devices gather. Looking forward, the future of flexible wearables appears bright. As technology continues to advance, we can anticipate these devices becoming even more advanced, featuring improved energy efficiency, enhanced functionality, and seamless integration into our daily routines. The convergence of flexible electronics with artificial intelligence and the Internet of Things (IoT) will usher in a new era of wearable technology, reshaping industries, and transforming our interaction with technology.

Conclusion

Flexible wearable devices represent an exciting frontier in the world of wearable technology. Their ability to adapt to the human body, combined with their diverse applications in health, fitness, fashion, and the workplace, makes them a game-changer in the tech industry. As researchers and engineers continue to push the boundaries of materials science and battery technology, we can look forward to a future where flexible wearables seamlessly blend into our lives, enriching our experiences and empowering us with data-driven insight. The latest trend in flexible wearable devices signifies a paradigm shift in how we interact with technology. As we move towards a more connected and mobile world, flexible wearables have become an essential part of our lives, offering convenience, functionality, and style. From health and fitness applications to communication and connectivity, these devices continue to shape and redefine the way we perceive and utilize wearable technology. With ongoing advancements, the future prospects for flexible wearables are boundless, promising a world where technology truly enhances and enriches our daily experiences.



Copyright: Stretchy electronics go wireless for flexible wearables, <https://doi.org/10.1038/d41586-021-03757-z>

-Dr. Hari Murthy

Assistant Professor
ECE department

EVENTS

Highlights of the Month

- As a part of MAGNOVITE, department organized the technical event Fidelity (for ECE students) and non-technical event Aphid (for External students) on 2nd and 3rd March 2023.
- Organized a one-day workshop by Mathworks for ECE and ELCS students on 09-03-2023.
- Dr. Gokuraju Thriveni delivered an invited talk in the program Nanoscale Device Modeling organized by Saveetha Engineering College held on 10-03-2023.
- Dr. Jesuwant Sugesh attended a 5-day faculty orientation program at central campus during 13-03-2023 to 17-03-2023.
- Dr. Chidambaram, Dr. Deepak Jose, Dr. Sujatha S. and Dr. Syam Chandran K have participated in a 5-day Professional Development Program on Educational Video Creation during 13-03-2023 to 17-03-2023 at Kengeri Campus.
- Dr. Naveen Kumar delivered an invited talk in the Faculty Development Program “Advancement in RF, Microwave, Antenna, and 5G Application” organized by Atrial Institute of Technology, Bangalore, on 27-03-23.
- Dr. Sourav Roy has been granted a patent for the invention relating to “A system for Road Traffic Prediction and Optimal Alternate Path Selection and a Method Thereof”.
- Dr. Neethu P. S. published an article titled “Generative Paraphrasing Sentimental Analyser Using Novel Restbert Framework” in Scandinavian Journal of Information Systems, March 2023.
- Prof. Sushanth G. published an article titled “Experimental Investigations on Turbine-Generator Shaft Under Subsynchronous Resonance” in Lecture Notes in Electrical Engineering, March 2023.

STUDENT CONNECT

Determinism

Determinism and why it should be taught in universities determinism is the philosophical belief that all events, including human behaviour is ultimately determined by laws of physics. In other words, our choices or behaviours or likes and dislikes are predetermined by a combination of factors such as our genetics, environment, and past experience.

There are several reasons why this should be taught in universities. It encourages students to think critically about the factors that influence our behaviour, we can develop a deeper understanding of the complexity of human behaviour and thus our self. Now let us look at some points about why philosophy should take precedent over HED. It promotes empathy. Understanding the deterministic nature of human behaviour also helps students develop empathy and compassion for others. By recognizing the role that environment and past experience play in shaping individual nature, students develop a better level of understanding for each other and develop compassion. It also helps in practical applications. The study of determinism has practical applications in many fields. For example, understanding the determinants of behaviour helps more effectively address social problems such as addiction, crime and poverty etc. Determinism is a cross-disciplinary topic, from philosophy and psychology to physics and neuroscience. Teaching determinism at university can encourage students to think and explore the connections between different fields.

Despite these advantages determinism or philosophy is not always featured in college curricula. But I believe that teaching determinism and by extension philosophical topics rather than HED will have a greater net positive effect on the students and looking at it from the preservative of a student Philosophy as a subject is more likely to be taken up as a serious subject than HED.

Teaching determinism will not be easy It will be tough for students to comprehend, and it may also challenge their sense of agency and responsibility. However, I believe that these challenges are precisely what make determinism a beautiful, valuable and worthwhile topic to teach in college.

I would like to close of by strongly advocating the addition of such topics to the college curriculum. Not only will it promote critical thinking but also help students in understanding theme self by planting a seed of self discovery.

-Jinish John
7BTEC 2020-24 Batch

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Kindly share your thoughts and research experiences via e-mail to our team, and be featured in next month's issue!