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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
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CSE(AI&ML)- SPECTRUM

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‘Web Technology Framework’

Welcome to the March 2026 edition of CSE(AI&ML) Spectrum.

In this copy of monthly bulletin we are exploring topic–‘**Web Technology Framework**’.

The internet has revolutionized the way we communicate, work, and access information. Over the years, the web has undergone significant changes, evolving from a simple system of hyperlinked documents to a complex and dynamic platform that powers everything from social media to e-commerce. The evolution of web technologies has been rapid and has led to the development of new tools and frameworks, enabling developers to create more sophisticated and feature-rich web applications. In this blog post, we will explore the history of web technologies, starting from the early days of the web to the present day, and discuss the impact that these technologies have had on the web as we know it today .

Need of Web Technology

Web technology was invented to address the growing need for a system that would allow for easy sharing and access of information across different locations and devices. The internet, which serves as the foundation for web technology, was initially developed by the United States Department of Defense in the 1960s as a way to share information between research institutions. However, it wasn't until the development of the World Wide Web by British computer scientist

Tim Berners-Lee in the late 1980s that the potential of the internet for widespread sharing of information began to be realized. The World Wide Web was designed to be a system that would allow users to access and share information across different locations and devices using a common set of protocols and standards.

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- [Web 1.0 - Static Web](#)



Fig 1. flitpay.com

Web 1.0, also known as the “Static Web,” was the first stage of the World Wide Web’s evolution. It was characterized by the creation of basic, static websites that provided information to users but did not allow for much interaction or user-generated content. During this time, the web was primarily used for information dissemination, with businesses and organizations using websites to promote their products and services.

Here are some of the key features of web 1.0:

1. **Static Web Pages:** Web 1.0 was primarily made up of static web pages, which were created using HTML markup language. These pages were designed to be viewed in a web browser, and typically included text, images, and links to other web pages.
2. **Limited Interactivity:** Web 1.0 websites were mostly designed for one-way communication, meaning that users could only view the content on the page but couldn’t interact with it. For example, they couldn’t leave comments, share content, or contribute to the website in any way.
3. **Lack of User-Generated Content:** Web 1.0 websites were created and controlled by webmasters, who had full control over the content and layout of the site. Users could not contribute their own content or create their own pages on the site.
4. **Basic Functionality:** Web 1.0 websites had limited functionality, with most sites simply providing information about a company, product, or service. E-commerce was in its infancy, with only a few companies offering online shopping.
5. **Dial-up Connections:** In the early days of web 1.0, most users accessed the internet using slow dial-up connections. This made it difficult to access large amounts

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of content or view multimedia files, such as images and videos.

- [Web 2.0 - The Dynamic Web](#)



Fig 2. flitpay.com

Web 2.0, the second stage of the World Wide Web’s evolution, emerged in the early 2000s and brought about a paradigm shift in the way we use the internet. Unlike web 1.0, which focused primarily on one-way communication and static web pages, web 2.0 is characterized by a focus on user-generated content, social networking, and dynamic, interactive experiences. It has enabled the development of new business models and opportunities for innovation, and has transformed the way we connect with each other and share information online. One of the key implementations of web 2.0 is the rise of social media platforms, such as Facebook, Twitter, and Instagram. These platforms allow users to create profiles, connect with each other, and share content in real-time, creating a more dynamic and engaging online experience. Another important implementation of web 2.0 is the development of cloud computing, which enables users to access and share data and applications over the internet.

Additionally, web 2.0 has facilitated the development of e-commerce and online marketplaces, such as Amazon and eBay, which allow users to buy and sell goods and services online. Overall, web 2.0 has enabled a more collaborative and interactive web experience, bringing about new opportunities for innovation and creativity. Web 2.0 relies on a variety of technologies to create the dynamic, interactive experiences that users have come to expect.

“Flitpay is secure cryptocurrency exchange in India where you can buy/sell Bitcoin and other cryptocurrencies with INR”

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Here are some of the key technologies used in web 2.0:

1. **AJAX:** AJAX (Asynchronous JavaScript and XML) is a technique used to create interactive, dynamic web pages without requiring a full page reload. AJAX allows web pages to update in real-time, making it an essential technology for web 2.0 applications.
 2. **APIs:** APIs (Application Programming Interfaces) are a set of protocols and tools used to build software applications. Web 2.0 relies heavily on APIs, which allow developers to access and integrate third-party services and data into their applications.
 3. **Rich Internet Applications (RIAs):** RIAs are web applications that have the functionality and user experience of desktop applications. RIAs typically use technologies such as Adobe Flash, Microsoft Silverlight, or HTML5 to create interactive, multimedia-rich experiences.
 4. **Social Networking Platforms:** Social networking platforms, such as Facebook, Twitter, and LinkedIn, are a key component of web 2.0. These platforms use a combination of technologies to enable users to create profiles, connect with each other, and share content in real-time.
 5. **Cloud Computing:** Cloud computing allows users to access and share data and applications over the internet, without the need for local storage or processing power. Cloud computing has enabled the development of a wide range of web 2.0 applications and services, including online storage, collaboration tools, and software as a service (SaaS) applications.
 6. **Open Source Software:** Open source software, such as Linux and Apache, is a key component of web 2.0. Open source software is freely available and can be modified and distributed by anyone, making it an essential part of the collaborative and open nature of web 2.0.
- [Web Securities](#)

Web security refers to the measures taken to protect websites, web applications, and web services from cyber attacks, data breaches, and other security threats. Web security is becoming increasingly important as more businesses and individuals rely on the internet to store and transmit sensitive information. There are several types of web security threats, including:

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1. **Malware:** Malware refers to any software that is designed to harm or disrupt computer systems. This can include viruses, Trojans, and ransomware, which can infect websites and steal sensitive data.
2. **Phishing:** Phishing is a type of social engineering attack that attempts to trick users into providing sensitive information, such as login credentials or credit card numbers.
3. **Cross-Site Scripting (XSS):** XSS attacks involve injecting malicious code into a web page in order to steal data or gain access to sensitive information.
4. **SQL Injection:** SQL injection attacks involve inserting malicious code into a web application’s database, allowing attackers to access or modify data.

To prevent these and other web security threats, businesses and individuals can take a range of measures, such as using strong passwords, keeping software up-to-date, and implementing security protocols like HTTPS. Other web security solutions include firewalls, antivirus software, intrusion detection and prevention systems, and content security policies. Overall, web security is critical for ensuring the confidentiality, integrity, and availability of web-based information and services. By taking appropriate security measures, businesses and individuals can protect themselves from a range of web security threats and mitigate the risks associated with cyberattacks and data breaches.

As discussed, web 2.0 has brought about significant changes in the way people interact with the internet and with each other. However, with the growth of big data, the Internet of Things (IoT), and artificial intelligence (AI), a new, more intelligent web is needed — web 3.0. The Semantic Web, also known as web 3.0, is expected to revolutionize the way people use the internet, with a focus on data, machine learning, and personalized experiences

- [Web 3.0: The Semantic Web](#)



Fig 3. flitpay.com

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The third version of the web, known as Web 3.0, is still in its early stages of development. Web 3.0 is focused on the idea of the semantic web, which involves adding meaning and context to web content to make it more easily understood by machines. This will enable machines to more effectively process and analyze web content, leading to more intelligent and personalized experiences for users. Web 3.0 technologies, such as artificial intelligence and machine learning, will enable web applications to learn from user behavior and preferences, and to adapt their interfaces and recommendations accordingly. This will lead to more personalized and relevant experiences for users, as well as more efficient and effective web applications. Web 3.0 technologies include a range of advanced tools and protocols that enable the creation of a more intelligent and interconnected web. Some of the key technologies used in web 3.0 include:

1. **Semantic Web:** The Semantic Web uses advanced metadata and ontology to provide a more intelligent and intuitive web experience. This allows machines to understand the meaning behind data, making it easier to discover, share, and reuse information.
2. **Artificial Intelligence (AI):** AI is used in web 3.0 to create more personalized and intelligent user experiences. This includes chatbots, virtual assistants, and recommendation systems that can learn from user behavior and provide customized content.
3. **Big Data:** The growth of big data has led to the need for more sophisticated data management and analysis tools. In web 3.0, big data is used to provide insights and predictions that can help drive business decisions and improve user experiences.
4. **Blockchain:** Blockchain technology is used in web 3.0 to provide secure and decentralized transactions. This enables the creation of decentralized applications (dApps) and smart contracts, which can be used for a range of purposes, from financial transactions to supply chain management.
5. **Internet of Things (IoT):** The IoT is a network of connected devices that collect and exchange data. In web 3.0, the IoT is used to create more interconnected and intelligent systems, from smart homes to smart cities.

Overall, web 3.0 technologies are designed to create a more intelligent, personalized, and interconnected web that can support a range of new applications and use cases.

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- [Future of Web Technologies](#)

Here are some potential areas of growth and advancement in web technologies:

1. **Artificial Intelligence (AI):** AI is expected to play a significant role in the future of the web, with machine learning and deep learning algorithms becoming more sophisticated and efficient. This could lead to the development of more intelligent chatbots, recommendation systems, and personalized user experiences.
2. **Internet of Things (IoT):** The IoT is expected to continue to grow, with more connected devices and sensors being developed. This could lead to more efficient and effective systems for managing energy, transportation, healthcare, and other industries.
3. **Virtual and Augmented Reality (VR/AR):** VR and AR technologies are expected to become more advanced and widespread, with potential applications in gaming, education, healthcare, and other areas.
4. **Blockchain:** Blockchain technology is expected to continue to evolve and find new use cases, from supply chain management to identity verification and beyond.
5. **Quantum Computing:** Quantum computing is still in its early stages, but has the potential to revolutionize computing and web technologies in the future. Quantum computing could enable the development of more advanced machine learning algorithms and more secure encryption protocols.

- [Challenges and Controversies](#)

1. **Privacy and Security:** With the rise of IoT devices and the potential for large-scale data breaches, it's essential to ensure that web technologies are designed with security and privacy in mind.
2. **Artificial Intelligence Bias:** it's important to ensure that AI algorithms are developed and trained on diverse datasets to minimize bias.
3. **Digital Divide:** Ensuring that everyone has access to the web is essential to realizing the full potential of these technologies.
4. **Net Neutrality:** The principle of net neutrality is a controversial topic, with advocates arguing that all web traffic should be treated equally and opponents arguing that internet service providers should have more control over the content that is

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delivered over their networks.

5. Cybersecurity Threats: With the increasing sophistication of cyberattacks, it's essential to continue developing new and better ways of securing web technologies against potential threats.

- Conclusion

Web 1.0 introduced the basic framework for web technologies, allowing users to consume information and content in a relatively static environment. Web 2.0 revolutionized the web by introducing more dynamic and interactive experiences for users, as well as opening up new opportunities for businesses and entrepreneurs. With the development of artificial intelligence, the Internet of Things, virtual and augmented reality, blockchain, and quantum computing, the web is poised to become even more intelligent, interconnected, and efficient.

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