



## A Review of Current Front-End Development Technologies.

*Shreshtha Bhatt<sup>1</sup>, Dr. Vishal Shrivastava<sup>2</sup>, Dr. Akhil Pandey<sup>3</sup>, Dr. Vishal Shrivastava<sup>4</sup>*

<sup>1</sup>B.Tech. Scholar, <sup>2,3</sup>Professor, <sup>4</sup>Professor

Computer Science & Engineering, Arya College of Engineering & I.T. India, Jaipur

[shreshthabhatt5@gmail.com](mailto:shreshthabhatt5@gmail.com), [vishalshrivastava.cs@aryacollege.in](mailto:vishalshrivastava.cs@aryacollege.in), [akhil@aryacollege.in](mailto:akhil@aryacollege.in), [vishalshrivastava.cs@aryacollege.in](mailto:vishalshrivastava.cs@aryacollege.in)

### ABSTRACT

The aim of this research paper focuses on the analysis of the front end development technologies. With the rapid transformation towards the online mode, web developers are able to create websites that can be accessed from anywhere. However, the goal to deploy a website is not just creating an attractive front-end, it is to achieve responsiveness, compatibility across different browsers/devices, selection of right frameworks and optimization in terms of loading time, response speed, and user internet experience. This research paper provide an overview of all the features of current front-end technologies we are using in the development of website.

**Keywords:** HTML(Hyper Text Markup Language),CSS(Cascading Style Sheet),Javascript ,Responsive Front end framework, Web frontend development technology, Optimization technology. [1]

### 1. Introduction

In Web Development, front-end plays a crucial role creation of websites as it is the face of a website. Over the last few years, the way in which developers create websites has acutely changed despite which HTML, CSS and JavaScript continue to be the backbone of the front-end development languages. Front-end development languages have optimized over time giving better results although, further optimizations are still require. At present, developers use different frameworks to achieve responsiveness, interactive behaviour and improved efficiency. Fig.1 depicts the main web front-end development components involved in creation of a good frontend.

#### 1.1 HTML5 :-

The HTML stands for (Hypertext Markup Language) . It is the foundation of the website which provided the structure of each and every page. HTML was used to form the layouts of the website which includes the placement of images, videos, text and other elements. It was used to create the multiple section of the website such as homepage, shop, about us, login page, signup page etc. It helped in defining the different sections and subsections , headings and subheading as well as content that goes into them.

#### 1.2. CSS3 :-

CSS stands for Cascading Style Sheets . The CSS is used in the website for defining, the stylings and layouts of each webpage, which includes the colours, fonts, different backgrounds, and other design elements . It was also used to defined the different sections of the website in the area of visual appearance, for example, header or footer navigation menu, and all the content areas that are present in the webpages all are styled by the CSS , it allowed us to set the font sizes styles, as well as the backgrounds, borders ,padding and margin of each element. It was also used to make our website little responsive, ensuring that our website will look good on almost all devices with different screen sizes by making a Website responsive we tried to provide a consistent and attractive user experience for all the devices also be used to create animations and other interactive effects on our website. [1]

#### 1.3. JavaScript :-

JavaScript was used in the website for enhancing user enter activity and for providing the dynamic functionality to all the webpages it was also used for validating user inputs like ensuring that a user enters a valid email address or user name or password. It was also used to provide real time feedback when her user submits a form or displaying the progress of file upload or download in the file etc. it was also used to implement various features like scrolling effects menus making a website, more interactive and engaging and also for fetching the data from the server without the need for the page to refresh.

Language/Framework	Description
HTML5	For the layout of the website.
CSS3	For the visual appearance of the website.
JavaScript	For the animations and effects plus some added functionalities.

#### 1.4. JAVASCRIPT FRAMEWORKS USED IN ACHIEVING

**INTERACTIVE FRONT-END:-** JavaScript permits clients or users to communicate with webpages along with providing interactive touch to the frontend. JavaScript is a scripting language which is used for client side validation in which we can use function like alert (), prompt () to take input for the user . In this study, we discuss the three popular JavaScript frameworks like Angular, Vue and React.

##### 1.4.1 Angular :-

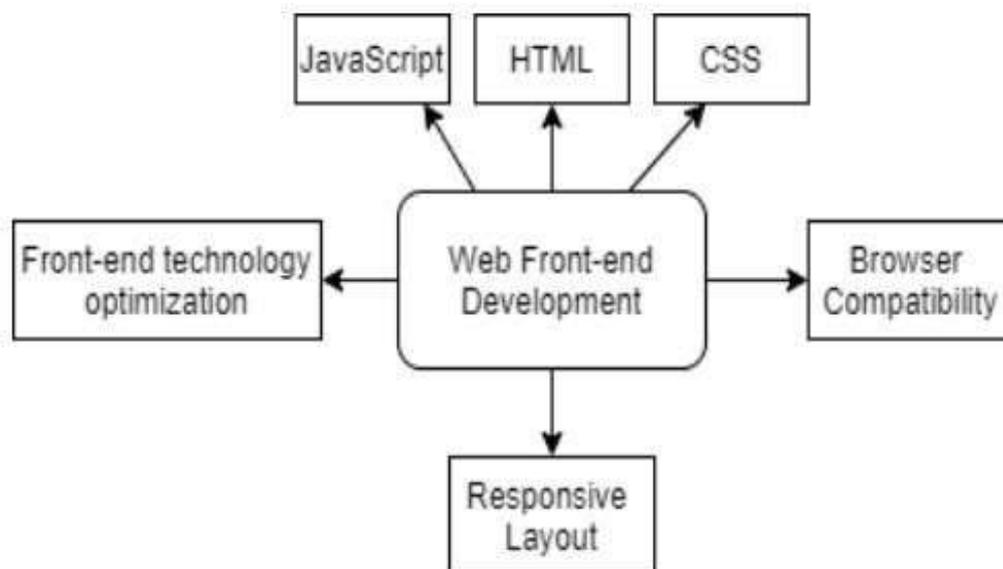
Angular is an open-source framework which is developed by google that extends itself to HTML DOM making it more responsive and interactive to user actions. It is a structural framework used for creation of interactive dynamic websites.

##### 1.4.2 Vue:-

Vue is an open-source Model-View-Viewmodel framework. It is the one of the most famous frameworks among developers as it is used in creation of interactive front-end and singlepage applications. Vue provides an easy integration into larger projects error free.

##### 1.4.3 React:-

React is an open-source JavaScript library used in building of small as well as medium -sized applications it is also very famous among developers. It provides many features that help in creation of user-friendly and creative websites. [2]



**Fig -1: Web Front-end Development Components**

## 2.Methodology

### 2.1 Literature Survey:

The foundation for the development of Front- end of a website was completely depend on the HTML

(Hyper Text Markup Language) and CSS (Cascading Style Sheet) in the early 1990. Then in the Late 1990 and early 2000s Java script actually came into existence.

### 2.2 Recent Trends and Changes:

There is a lot advancement happen in the development of front end for websites in the last few year . The shift on component based architecture become dominant change which is allow user to create reusable UIs and improve the scalability and maintenance of code. There are some prime example of these trends which are REACT, VUE , ANGULAR etc.

## 3 Case Study-

### 3.1 Netflix :-

Netflix is one of the biggest streaming Platform in the world . It uses the Vue.js for developing its interactive user interface .Vue.js is integrated in Netflix front end which is responsible for delivering dynamic content .Vue.js reactivity system enables Netflix to update recommended of content in real times . It also provides personalised and engaging view experience .

### 3.2 Airbnb –

Airbnb, a global vacation rental platform, adopted React for its user interfaces, providing a more interactive and engaging experience for its users. By transitioning from a traditional server-rendered approach to a single-page application (SPA) architecture using React, Airbnb made the booking process smoother and faster.

## 4. Comparative Analysis (React , Angular and Vue)

	React	Angular	Vue
1. Developed by.	Facebook	Google	Evan You
2. Language	It uses Javascript .	It uses TypeScript .	It also uses Javascript .
3. Learning Curve	It is relatively easy to learn . It has more straightforward APIs.	Angular is typically hard to learn than React and Vue.	Vue is easier for beginners to pick up.
4. Data Binding	It provides One way data binding .	It provides Two way data binding .	It also Provides Two way data binding but it is more lightweighted .
5. Scalability	It is suitable for both small and large language.	It is mainly preferred for large and complex applications.	It can be used for small and medium-sized application .

[3]

## 5. Challenges

### 5.1. Curve :-

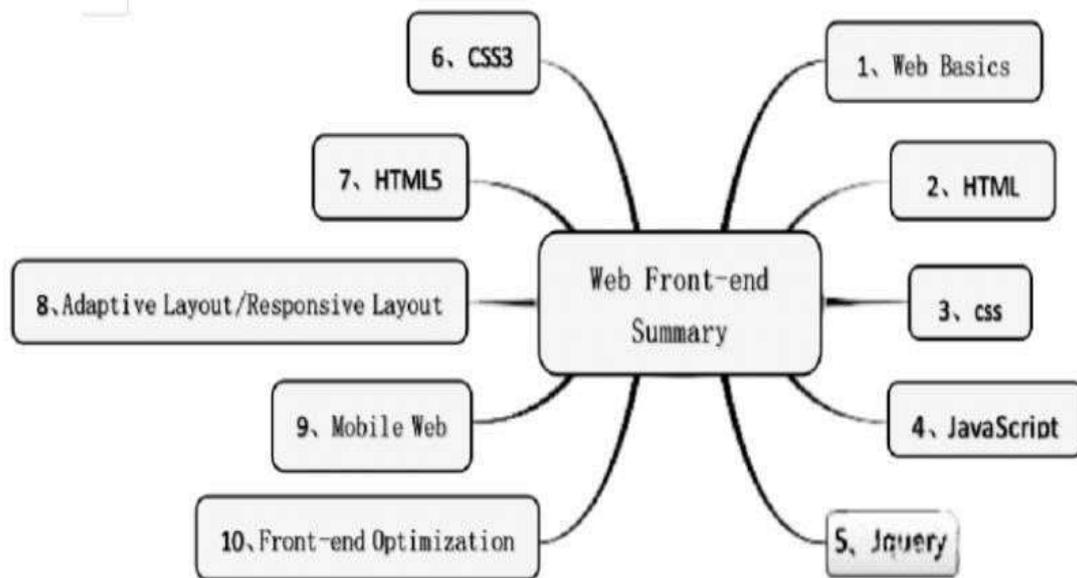
Newer technologies come with different learning curves which could impact on the performance of developer who are not familiar with them .

### 5.2 Compatibility :-

Ensuring compatibility on different platform can be a challenging task and it might be possible that new technologies will not perform consistently well on all platforms.

### 5.3 Security Concerns :-

Security will be one the main concern if front end technologies, especially Javascript framework do not implemented properly.



## 6. Conclusion

In this current era, the time is speedy and driven by new patterns of innovation in which the requirement to have developing arrangements has become a need. The world was at that point advancing over adjusting to online measures and the current pandemic sped it up to a degree where all exercises from schooling, government and private areas were led on the web. In this way, frontend assumes a crucial part in making of sites as it is the essence of a site or application which can draw in clients by its highlights, possibility, and straightforwardness. This paper discusses the key aspects of front-end development advances used to accomplish responsiveness and interactive nature along with strategies to accomplish better optimization in the direction of three main technologies. Of course, the involvement of few techniques (Bootstrap, Media Queries, Flow Layout) used to achieve responsiveness are very widely used and popular among the developers but these may not suitable for all types of websites, thus various kinds of new technologies are needed to improve it continuously as it's still not very mature and has good scope of development. To advance the improvement of Web front-end innovation we should consistently seek after the technical optimization, in order to furnish individuals with additional differentiated and customized network administrations.

## 7. References

- [1] "HTML and CSS: Design and Build Websites" by Jon Duckett
- [2] "JavaScript and JQuery: Interactive Front-End Web Development" by Jon Duckett
- [3] "Understanding client-side JavaScript frameworks - Learn web development| MDN, "http://developer.mozilla.org/,2021, https://developer.mozilla.org/enUS/docs/Learn/Tools\_and\_testing/Clientside\_JavaScript\_frameworks(accessed Mar. 22, 2021) .
- [4] V. Hutagikar and V. Hegde, "Analysis of Front-end Frameworks for Web Applications," Int. Res. J. Eng. Technol., vol. 07, no. 04, pp. 3317–3320, 2020, [Online]. Available: https://www.irjet.net/archives/V7/i4/IRJETV7I4639.pdf.