Advance Web Development Technologies

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Abstract
The Web Development is essential part of computer it provide the user interface and the information through whole world. In this paper it is discussed to updating of the technology use to develop a web page. The general idea of the new version of HTML (Hyper Text Markup Language), i.e. HTML5, and other tools presented in this paper is the formal specification and the establishment of uniform solutions for technologies and functionalities which have already been in use through various hacks and plug-ins proposed by web developers. Many of these functionalities will now be implemented in browsers. The applications can access these functionalities through newly defined application programming interfaces. The new version of HTML enforces strict separation of the page content from its style. The styling can only be done using CSS (Cascading Style Sheets) language. The new CSS version has a modular structure, in which different modules define different styling features. The development cycles of the individual modules are independent as well as their support and implementation in various browsers.

I.   Introduction

The basic component of web development is HTML and concept of the World Wide Web is inseparably tied with the Hyper Text Markup Language (HTML) - the language for describing web pages. Web development is the work involved in developing a Web site for the Internet (World Wide Web) or an intranet (a private network). HTML uses markup tags for describing structural semantics of a web page by denoting its elements: sections, paragraphs, headings, tables, lists, interactive forms and others. Elements with their corresponding attributes can be nested one in another, forming a typical tree structure. HTML enables also the inclusion of external resources into web documents, such as images, videos and other objects, which also become parts of a web page. One of the good practices in modern web development is separate definitions of structure and style. The general structure of web pages and their content are defined in HTML, while its final presentation and style are in the domain of CSS (Cascading Style Sheets). Such separation enables better flexibility and control over the final appearance of a web page and it also reduces the complexity of HTML record and eliminates the redundancy in style definitions. The separation of the content from the style enables more web pages to share the same style and also a single page to use many different styles at the same time. Besides CSS, a scripting language JavaScript is often in combination with HTML. JavaScript is interpreted by a web browser and provides web pages with interactivity and dynamics. The JavaScript code can interact with the DOM (Document Object Model) through the various API (Application Programming Interface) libraries based on a mechanism of user triggered events. In the 1989 majority of web pages were static and intended primarily for reading and browsing while the first decade of the new century brings more dynamic web pages and applications. Users not only browse the Web but also contribute to it by producing and uploading their own content. The new way of interaction with Web calls also for the evolution of web languages with the main intention to formalize some of the already established good practices in web development.

HTML5

HTML5 is the latest and most enhanced version of HTML. Technically, HTML is not a programming language, but rather a markup language. The majority of its features and functionalities have been defined through specifications, but some of them are also result of good development practices and the implementations of HTML in the popular browsers. HTML5 is the next major revision of the HTML standard superseding HTML 4.01, XHTML 1.0, and XHTML 1.1. HTML5 is a standard for structuring and presenting content on the World Wide Web.

      The new standard incorporates features like video playback and drag-and-drop that have been previously dependent on third-party browser plug-ins such as Adobe Flash, Microsoft Silverlight, and Google Gears. The general idea suggested by the web developers is to implement the key functionalities for such interfaces in browsers themselves and remove the dependence on various proprietary plug-ins. It is expected that HTML5 will achieve the candidate for recommendation status in 2012 and become a recommendation in 2022. Although the work on HTML5 will not be completed yet in the next few years, more and more of its functionalities are supported by web browsers.

      The latest versions of Apple Safari, Google Chrome, Mozilla Firefox, and Opera all support many HTML5 features and Internet Explorer 9.0 will also have support for some HTML5 functionality.

      The mobile web browsers that come pre-installed on iPhones, iPads, and Android phones all have excellent support for HTML5.

HTML5 introduces a number of new elements and attributes that can help you in building modern websites. Here is a set of some of the most prominent features introduced in HTML5.

- New Semantic Elements − these are like <header>, <footer>, and <section>.
- Forms 2.0 − Improvements to HTML web forms where new attributes have been introduced for <input> tag.
- Persistent Local Storage − To achieve without resorting to third-party plugins.
- WebSocket − A next-generation bidirectional communication technology for web applications.
- Server-Sent Events − HTML5 introduces events which flow from web server to the web browsers and they are called Server-Sent Events (SSE).
- Canvas − This supports a two-dimensional drawing surface that you can program with JavaScript.
- Audio & Video − You can embed audio or video on your webpages without resorting to third-party plugins.
- Geolocation − Now visitors can choose to share their physical location with your web application.
- Microdata − This lets you create your own vocabularies beyond HTML5 and extend your web pages with custom semantics.
- Drag and drop − Drag and drop the items from one location to another location on the same webpage.

II. Web structures

      The majority of web pages today use common structures such as headers, footers and sidebars to denote the semantic structure of the page. Because HTML versions in use today do not provide special markup for this purpose, web developers use div and span elements, assigning them a unique id and/or arranging them into classes. HTML5 introduces a set of new elements, which allow semantic marking of the document structure. They represent more specific replacement for the general div and span elements. The current and the new approach to structuring a web page is shown in Figure:
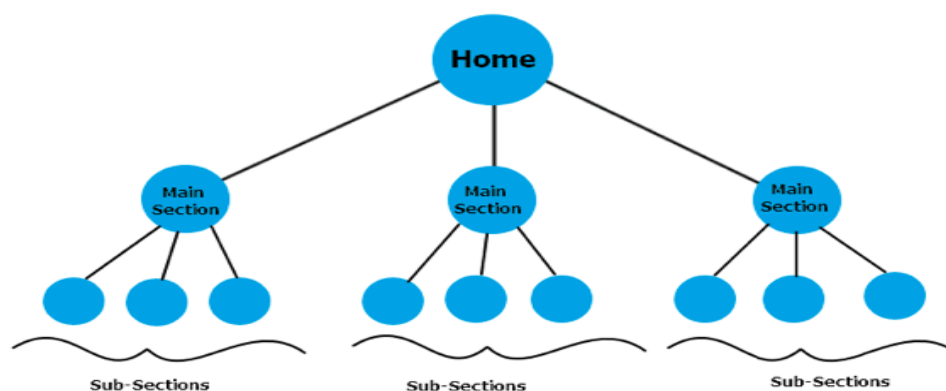
HTML5 enforces strict separation of content and styling of a web page, which is manifested in the absence of the presentational attributes (e.g. align, height, border, size) and elements (e.g. font, center, strike, u). Page styling and design can only be done with CSS. Frames are also not supported in HTML5, due to their negative impact on the usability of a web page. The elements and area have a new attribute, called ping. It defines the URLs (Uniform Resource Locators), where a browser can send a notification when the user visits a hyperlink. The user tracking is currently mostly performed through the server-side redirects, which causes a long waiting for a selected page. The ping attribute enables the user agent to inform the user which addresses will be notified. In case of privacy concerns, a user can turn off the notifications while he or she cannot influence the redirects. The other novelties in HTML5 also include new global attributes, relations in elements link and a, events and many others.

Web Forms

Web Forms are pages that your users request using their browser. These pages can be written using a combination of HTML, client-script, server controls, and server code. When users request a page, it is compiled and executed on the server by the framework, and then the framework generates the HTML markup that the browser can render. Web forms enable interaction between a web client and a web server. The data in the forms entered by the user is sent to a server, which responds according to the received values. The choice of the widgets used in forms is, however, limited. One of the good web development practices is the validation of more complex data on the client side. The latter is performed using JavaScript or any other client side scripting languages. To provide new form widgets and to avoid validation of data on both sides, several custom form widgets were developed that can be used through third-party JavaScript libraries.

The developer needs have encouraged the development of a new generation of Web forms, called Web Forms 2.0, which found their way into HTML5 specifications. New widgets are introduced as new values of the attribute type of the input element (tel, search, url, email, datetime, date, month, week, time, datetimelocal, number, range, color). Besides new widgets, HTML5 also introduces the enhancements of the existing ones as well as the automatic validation of the entered data. Regarding forms, two more novelties should be mentioned in this context. The first one has to do with the form elements, which do not have to be the descendants of the form element anymore. They can be placed anywhere in the HTML document instead and linked to a proper form by using their new form attribute. The second novelty concerns the use of the HTTP (HyperText Transfer Protocol) protocol methods when sending data to the server. Beside GET and POST, in HTML5 also PUT and DELETE methods are supported.

Accessibility

The major problem for such tools is reading and interpreting the content which uses advanced, frequently updated user interfaces developed with the combination of the technologies AJAX (Asynchronous JavaScript and XML), HTML and JavaScript. The assistive technologies do not properly understand the roles, states and properties of such widgets and cannot follow the dynamically updating content on the web pages. To overcome this problem, the Web Accessibility Initiative started the Accessible Rich Internet Applications project. Accessible Rich Internet Applications specifications define a semantic model, which enables the authors to semantically describe the widgets and their behavior, document structure and the areas that will be updated. In this way, the assistive technologies would gather enough information to make advanced web applications usable also to people with disabilities.

Audio and Video

HTML5 features include native audio and video support without the need for Flash.

The HTML5 <audio> and <video> tags make it simple to add media to a website.

```
<video src = "foo.mp4"  width = "300" height = "200" controls>
   Your browser does not support the <video> element.
</video>
```

HTML5 supports <audio> tag which is used to embed sound content in an HTML or XHTML document as follows.

```
<audio src = "foo.wav" controls autoplay>
   Your browser does not support the <audio> element.
</audio>
```

Before HTML5, playing of audio and video contents in a browser has only been possible by the use of third party plug-ins with the Adobe Flash being the leading technology. Besides introducing new elements for embedding audio and video contents in a web page, HTML5 also defines an interface for manipulation with such content without the need for plug-ins. The general solution was the selection of a common format supported by all browsers. The basic requirement for such format was that it should not be proprietary. It should also have good compression and picture quality as well as small processing requirements.

Graphics

The Web is about more than text and information, it is also a medium for expressing artistic creativity, data visualization, and optimizing the presentation of information for different audiences with different needs and expectations. The use of graphics on Web sites enhances the experience for users.

Examples of graphics include maps, photographs, designs and patterns, family trees, diagrams, architectural or engineering blueprints, bar charts and pie charts, typography, schematics, line art, flowcharts, and many other image forms.

In the recent web development the graphic rendering on the web pages has only been possible with the aid of plug-ins, such as Flash or Silverlight. With the HTML5, the functionality needed for graphical rendering is implemented in browsers in the form of Canvas and SVG (Scalable Vector Graphics) technologies. The graphical elements are completely integrated into HTML and are also a part of the document object model (DOM). Their style can be defined through CSS and can be manipulated through the JavaScript. Canvas enables dynamic rendering of graphics, e.g. graphs, bitmap images, animations and games, using scripting. The canvas element and its attributes width and height define a display region, which is then accessible through JavaScript code using Canvas API drawing functions. Canvas does not differentiate between the objects in the graphic and does not contain the relations between these objects (such as DOM). The basic elements of canvas graphic are pixels. The rendered graphic is therefore final and cannot be rescaled. The individual graphic objects cannot be accessed, manipulated or interacted with. In order to make any changes, the whole graphic must be redrawn.

III. Cascade Style Sheets (CSS)

CSS stands for Cascading Style Sheets. It is the language for describing the presentation of Web pages, including colours, layout, and fonts, thus making our web pages presentable to the users. CSS is designed to make style sheets for the web.

1994: First Proposed by Hakon Wium Lie on 10th October

1996: CSS was published on 17th November with influencer Bert Bos

1996: CSS became official with CSS was published in December

1997: Created CSS level 2 on 4th November

1998: Published on 12th May

The markup languages are used primarily to define basic structure of web documents and pages while on the other hand the final presentation and rendering are usually defined with CSS – a style sheet language which defines presentation semantics. The technique of designing web pages with CSS is almost 15 years old with the CSS 2.1 being the leading standard for the last 13 years. It is widely supported by the majority of web browsers and it evolved rapidly over the last decade. Along with the new markup languages the new CSS are being proposed as well. CSS3 is the new potential standard currently in the state of working draft or candidate recommendation. The massive specification of CSS3 standard is divided into several modules which are developed individually with different progress speeds and dynamics. Various modules enable browser vendors to implement them incrementally. Several CSS3 modules are already supported by the majority of modern browsers.

Header
Navigation Menu

Content	Main Content	Content

Footer
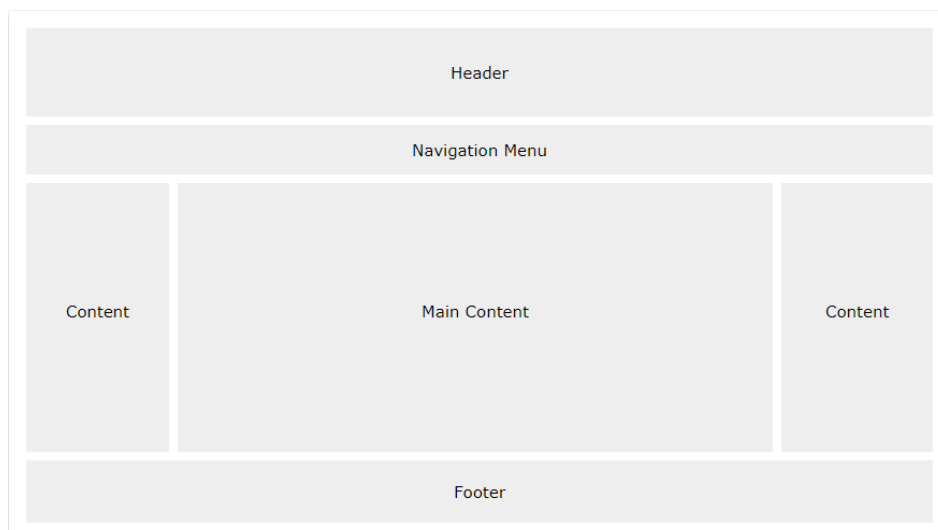
A module on Backgrounds and Borders enables the use of multiple backgrounds which can be resized and positioned relatively or absolutely. It enables the re-use of images in several different contexts and more accurate filling of various areas. The module enables also the borders to use gradients, rounded corners, shadows and even border images. The border-image property allows an image file to be used as border of an object.

APIs
Application Programming Interfaces (APIs) are constructs made available in programming languages to allow developers to create complex functionality more easily. They abstract more complex code away from you, providing some easier syntax to use in its place.

IV. APIs in client-side JavaScript
Client-side JavaScript, in particular, has many APIs available to it — these are not part of the JavaScript language itself, rather they are built on top of the core JavaScript language, providing you with extra superpowers to use in your JavaScript code. They generally fall into two categories:
Browser APIs are built into your web browser and are able to expose data from the browser and surrounding computer environment and do useful complex things with it. For example, the Web Audio API provides JavaScript constructs for manipulating audio in the browser — taking an audio track, altering its volume, applying effects to it, etc. In the background, the browser is actually using some complex lower-level code (e.g. C++ or Rust) to do the actual audio processing. But again, this complexity is abstracted away from you by the API.
Third-party APIs are not built into the browser by default, and you generally have to retrieve their code and information from somewhere on the Web. For example, the Twitter API allows you to do things like displaying your latest tweets on your website. It provides a special set of constructs you can use to query the Twitter service and return specific information.
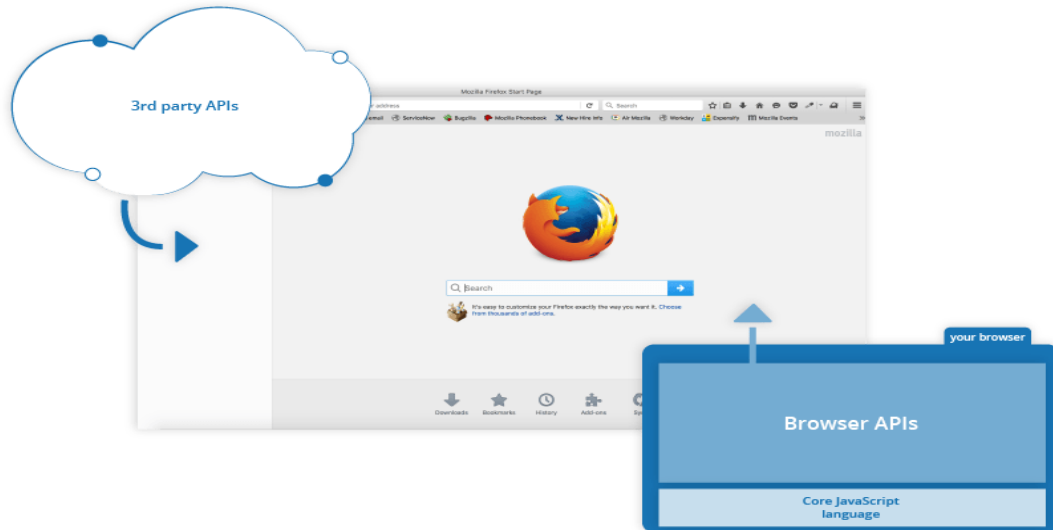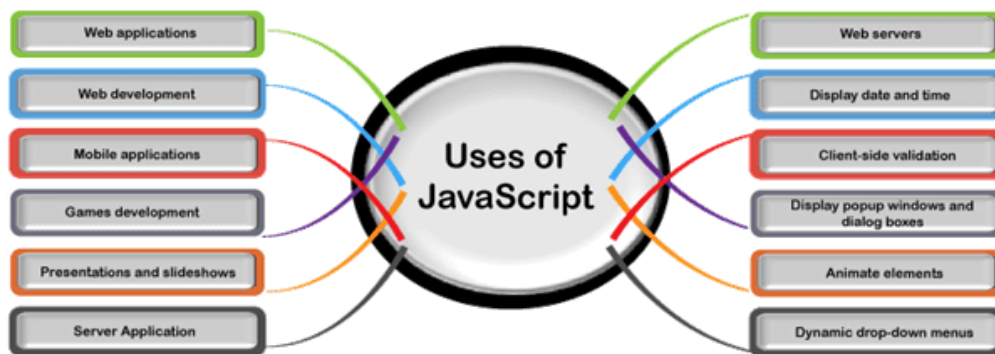
JavaScript

JavaScript is an open-source and most popular client-side scripting language supported by all browsers. JavaScript is mainly used for enhancing the interaction of the webpage with users by making it more lively and interactive. It is also used for game development and mobile application development.

JavaScript is a light-weight object-oriented programming language that is used by several websites for scripting the webpages. It is an interpreter, full-fledged programming language. JavaScript enables dynamic interactivity on websites when it is applied to an HTML document.

JavaScript helps the users to build modern web applications to interact directly without reloading the page every time. JavaScript is commonly used to dynamically modify HTML and CSS to update a user interface by the DOM API. It is mainly used in web applications.

JavaScript is commonly used for creating web pages. It allows us to add dynamic behavior to the webpage and add special effects to the webpage. On websites, it is mainly used for validation purposes. JavaScript helps us to execute complex actions and also enables the interaction of websites with visitors. Using JavaScript, it is also possible to load the content in a document without reloading the webpage.

The other uses of JavaScript are listed as follows:
o   Client-side validation.
o   Displaying date and time.
o   To validate the user input before submission of the form.
o   Open and close new windows.
o   To display dialog boxes and pop-up windows.
o   To change the appearance of HTML documents.
o   To create the forms that respond to user input without accessing the server.

V. Conclusion

Advance web technologies, now days make beautiful and attractive web sites. All tools discussed in this paper is very useful to design a dynamic and highly efficient web pages. The general idea of HTML5 and other tools presented in this paper is the formal specification and the establishment of uniform solutions for technologies and functionalities which have already been in use through various hacks and plug-ins proposed by web developers. HTML5 simplifies the implementation of such functionality through native browser support. The new notable trend on the Web today is the introduction of semantics in web documents. The web content is shaped and designed primarily to be read and understood by people, therefore a computer cannot provide any extensive help by analyzing, searching and processing the data. New development practices, rich web content and the need for semantics in web documents are already manifesting themselves in practice.

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