



Research on Advancements in Web Development using HTML5

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ABSTRACT :

HTML5 has become widely used in the web landscape serving as a version of HTML that enhances the online experience, for both users and developers. It has brought changes to web development compared to its predecessor, HTML 4.01 which was introduced in 1999. HTML 4 XHTML, CSS and the HTML DOM Level 2 have made room for the capabilities of HTML5. This latest version was created to provide a range of multimedia content without relying on plugins or proprietary technologies. With HTML5 users now have access to a set of features including animations, graphics, music, movies and even the ability to create web applications that work seamlessly across different platforms. Notably standardizing HTML5 has opened up opportunities for real time collaboration within web browsers making life easier, for web developers and enhancing the user experience.

I. INTRODUCTION :

Introducing their proprietary technologies to enhance web functionality, some vendors have offered features superior to standard web standards, with the goal of developing rich internet applications. However, the web serves as a versatile and widely accessible resource that is compatible with numerous platforms. Therefore, there's a growing push to establish a unified standard that would remove the necessity of relying on these proprietary technologies. Distinct formats for running web applications are offered by various companies, including Adobe Systems'Flash, Apple's QuickTime, Microsoft's Silverlight, Google Gears, and Oracle's JAVAFX. To address this situation, the development of HTML5 is being led by the World Wide Web Consortium (W3C) in conjunction with the Web Hypertext Application Technology Working Group (WHATWG). This joint initiative strives to create a comprehensive standard that can perform tasks currently accomplished by proprietary technologies.

HTML5

Empowering dynamic and interactive web pages, HTML5 ushered in a transformative leap forward in web development back in 2004. This innovative technology blurs the lines between traditional web content and application development. In the realm of multimedia, HTML5 marks an important shift in web technology. It goes beyond previous versions by fully integrating audio, video, and animations into web pages. It even allows web applications to access geolocation data, operate offline, and store information in client-side databases. This seamless integration is what sets HTML5 apart from its predecessors and makes it a game-changer. [3]. With its inbuilt animation abilities and native backing for audio and video playback, HTML5 is greatly exceptional. Proprietary technologies have been obliterated, which has resulted in reduced dependence on external plugins and development ease, enhancing the user experience.



Fig1.HTML5 cross platform

Designed for web display, HTML5 offers cross-platform support. On a Smart TV, Tablet, Smartphone, or PC, pages can all be accessed with HTML5 (Fig-1). Browser support for HTML5 has been inconsistent during its development. Websites and designers have already started incorporating HTML5 features in their designs. Open formats for location-based services are also supported by HTML5. File formats like open XML and Scalable Vector Graphics (SVG) have the ability to be adjusted in size without losing quality. Graphics of superior quality and various formats. Developers and browsers reap a fundamental benefit, which is that... Without the obligation to master, they could accomplish more. can develop technologies proprietary licensing multiple Or Web-based applications, rich pages and enhanced forms are all part of the digital landscape.

HTML5 FEATURES

HTML5 provides new features that include

- Canvas – 2D/3D Graphics
- Audio & Video
- Location based Services
- Working Offline
- Web Workers
- Drag & Drop
- New Input Types
- New Elements

Canvas

HTML5 <canvas> element Via Java, graphics are drawn using the of Incorporating video and animations on web pages can be achieved through a script. Script should be utilized within Canvas, as it is solely designed to hold graphics. Canvas offers multiple techniques for creating 3D/2D images. These methods can be used to generate graphics. Paths, circles, boxes, text, and images can be drawn using this toolset. Fast rendering of graphics-heavy pages is achievable thanks to a specific feature.

```

<html>
<body>
  <canvas id="myCanvas" width="200" height="200" />
  <script>
    var canvas = document.getElementById("myCanvas");
    var ctx = canvas.getContext("2d");
    ctx.fillStyle = "red";
    ctx.fillRect(0, 0, 200, 200);
    ctx.fillStyle = "green";
    ctx.fillRect(50, 50, 100, 100);
    ctx.fillStyle = "blue";
    ctx.fillRect(75, 75, 50, 50);
  </script>
</body>
</html>

```

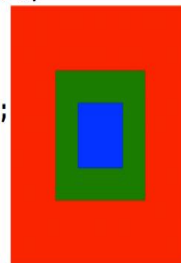


Fig2.HTML5 CANVAS

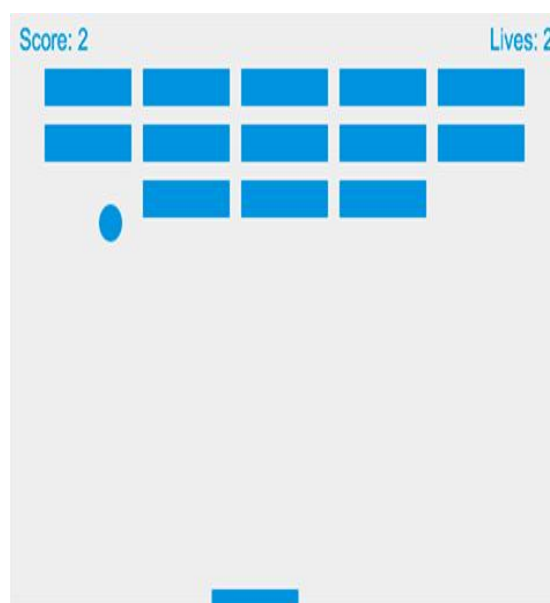


Fig 3.2D breakout game using canvas

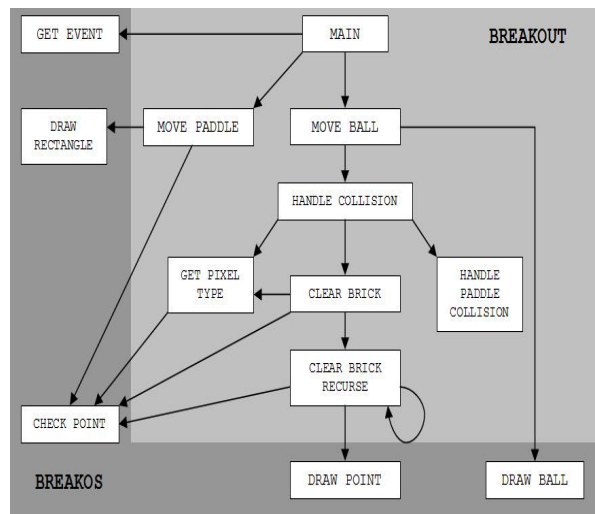


Fig4.Structure for 2D breakout game

SVG (Scalar Vector Graphics)

SVG, short for Scalable Vector Graphics, establishes a standard for web-based vector graphics. One of its standout features is its inherent ability to maintain image clarity consistently, regardless of whether the images are enlarged or compressed, ensuring that image quality remains uncompromised. SVG images offer various advantages, including their capacity to be easily searched, indexed, scripted, and compressed. They also possess remarkable scalability, making them flexibility for a range of applications. Additionally, SVG images can be printed at high resolutions with exceptional quality, and their zooming capabilities further enhance their utility (See Fig-5, 6).

Audio & Video

Before HTML5, audio files were added to the page by integrating background sound with the help of <bgsound> tag. The file was played while the page was viewed, and the user couldn't mute the sound. In HTML5, we can embed audio files using the <audio> tag, and there is no need to connect third-party plugins. The audio element can be controlled with HTML or Javascript and styled with CSS.

In previous version of HTML, videos were embedded into the site via third-party plugins, such as QuickTime, RealPlayer or Flash. HTML5 has a new tag, which is used to insert a video into the web page.

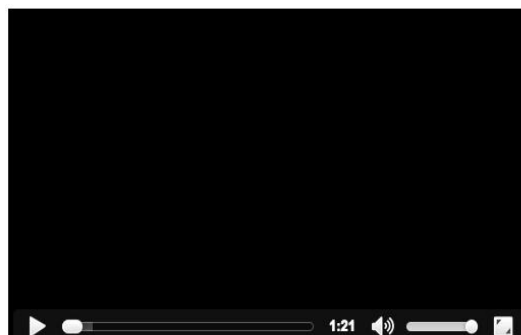
```

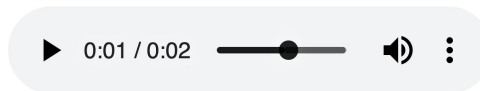
<audio controls>
<source src="guitar.mp3"
  Type="audio/mpeg">
</audio>
  
```

Fig7.output for audio tag

```

<video width="480" height="480" controls>
<source src="blank.mp4"
  Type="video/mp4">
</video>
  
```





Location-based Services

HTML5 geolocation is a browser API (application programming interface) that is utilized for obtaining the device geographic position (latitude and longitude coordinates). This can help detect the geo location of the visitor or user on a website or app

Working Offline

Offline web applications are made possible using the concept of caching. This HTML5 caching can be looked at like a super set of the simple browser caching. In HTML5, caching is done on the file basis and the developer has the flexibility to specify which of the files need to be cached. Also this feature helps in improving website speed, as most of the files will be cached on the client side.

Web Storage

There are 2 mechanisms within WebStorage. The session storehouse is using the sessionStorage object to store the data on a temporary base into the cybersurfer storehouse space, specifically for a single active cybersurfer window or a tab. The data will be trashed when the active session ends and it happens when the stoner closes that being cybersurfer window or a tab. The original storehouse is using the localStorage object to store the data for our entire website on an endless base handed that the data should be limited to the specified space for the specific cybersurfer comity. That means the stored original data will be available on the coming day, the coming week, or the coming time until the specified date/ time or the duration will come to an end.

WEB Workers

In a HTML runner while executing scripts, the runner becomes unresponsive until the script prosecution is completed. Web Workers are principally an API specification that lets druggies produce background JavaScript vestments to reuse CPU ferocious tasks. These can't be intruded by other scripts or stoner relations. tyically in cybersurfers to handle all the JavaScript law a single thread is created and all of them are run on a single thread. Whether you're doing some computation or streamlining runner rudiments, it speedup the background task.

Drag and Drop

HTML5 comes with a Drag and Drop API that brings native drag and drop support to the cybersurfer, making it much easier to support on bias similar as mobile phones. This includes dragging of content and lines from outside the cybersurfer, e.g. drag and drop to upload lines or prints. In HTML5, drag and drop is part of the standard, and any element can be draggable. This is supported by numerous web operations

New Input Types

HTML5 introduced new input types for simplifying the web runner designing, indeed they've inbuilt support for CSS and JS. So, these new input types give better input control and attestations. The new input types handed are given below along with their HTML syntax

Input Type	Description
email	For entering an email address
tel	For entering a telephone number
url	For entering a URL
search	a text input field with line breaks automatically removed
number	For entering a floating point number
range	For entering an approximate value; represented by a slider
date	Enter the day, month, and year
datetime	For entering the day, month, year, hour, minute, second and microsecond based on the current timezone
datetime-local	For entering a date and time with no timezone
month	For entering the month and year with no timezone
week	For entering a week number with no timezone
time	For entering the time with no timezone
color	For specifying a color

TABLE 1
NEW INPUT TYPES IN HTML5

New Elements in HTML5

In HTML 4.01 several elements are outdated, never used, or not used the way they were pre planned. All these elements are abolished or re-written in HTML5.

The elements which are deprecated in HTML5 are as follows:

- <acronym>
- <applet>
- <basefont>
- <big>
- <center>
- <dir>
-
- <frame>
- <frameset>
- <isindex>
- <noframes>
- <s>
- <strike>
- <t>
- <u>

To better serve today's web requirements, HTML5 has also introduced new elements for drawing graphics, displaying media content, for better page structure and better form handling, and several new APIs for drag and drop, for finding your geological location, for storing local

data, and more. The new elements of HTML5 and their description are given below.

TABLE 2
NEW INPUT TYPES IN HTML5

Tags (Elements)	Description
<article>	Represents an independent piece of content of a document, such as a blog entry or newspaper article
<aside >	Represents a piece of content that is only slightly related to the rest of the page.
<audio>	Defines an audio file.
<canvas>	This is used for rendering dynamic bitmap graphics on the fly, such as graphs or games.
<command>	Represents a command the user can invoke.
<datalist>	Together with the a new list attribute for input can be used to make comboboxes
<details>	Represents additional information or controls which the user can obtain on demand
<embed>	Defines external interactive content or plugin.
<figure>	Represents a piece of self-contained flow content, typically referenced as a single unit from the main flow of the document.

Fig 9. Web Form created using HTML5 element

The plethora of HTML5 features outlined earlier offers a substantial advantage to both users and developers when it comes to crafting web applications, all without the need for external plug-ins [5].

Consider a scenario where an HTML form comprises 5 fields, as depicted in Figure 9. Typically, this would entail the creation of numerous validation scripts, implemented using scripting languages, to ensure data integrity and user input accuracy. However, to streamline and optimize this process, HTML5 emerges as the most effective solution.

II. CONCLUSION :

HTML5 introduces a range of innovative elements and features that empower developers to enhance interoperability and handle elements with precision, resulting in time and cost savings. This technology holds immense promise and has the potential to further expand the reach of the web, seamlessly spanning across desktop computers, mobile devices, and potentially even household appliances in the future. HTML5's capabilities have the capacity to blur the distinction between traditional desktop applications and their online counterparts.

However, it's important to acknowledge that HTML5 may face challenges in the days ahead. There's a concern that this open and versatile platform could become a target for malicious actors, providing them with opportunities to exploit vulnerabilities, potentially leading to security breaches and cyberattacks that resemble the common hacks we see today.

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Gwalior, Gwalior, M.P., India

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