



Research and Application of Animation Visualization Based on HTML5 Algorithm

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Abstract. The history of animation began in the late 19th century. At that time, it was a new way to present films. In those days, there was no screen or projector. The only way to watch movies is through magic lanterns and shadow plays. These are very simple ways to display images on paper and cloth, without sound effects. In this era, people's lives are changing rapidly due to the progress of technology. Animation is an art form that uses drawings, models, pictures, videos, or other methods to create motion without using camera motion or movie recording techniques, such as live action movie production. As technology develops and becomes more complex, so does technology. The most important thing everyone uses is the visual representation of things, because without it, they cannot easily understand. In this paper, we will introduce the research and application of animation visualization based on HTML5 algorithm.

Keywords: HTML5 technology · Visual animation · graphic display

1 Introduction

Animation can also make data vivid and intuitive. With the explosive growth of information data, data visualization, as an important means of data display and analysis, how to improve the efficiency of information transmission has become increasingly critical. There are many design methods to improve the effectiveness of static visualization charts in existing related research [1]. However, in some scenarios (such as describing the process, showing changes or unfolding narratives), it is difficult to express data laws efficiently by simply using static primitives and text. At this time, visual animation can be used to improve the perceived effectiveness of data and bring readers data experience that other visual means do not have. Scientific animation design can effectively attract and maintain readers' attention, and provide effective context information during the change process (for example, in the smooth transition process of changing elements, other elements maintain their original visual state, and will not re analyze and render due to the state switching of changing elements, resulting in flickering), so that readers can accurately identify and track the changes of elements and establish the relationship between element states, And then guide readers to understand the data information conveyed in visualization. For example, through the transition of the intermediate state, it can help readers to clarify the rules of data change, or show the accumulation process of data over time [2].

The lack of abstract description of the relationship between data, visual coding and time sequence in visual animation leads to the increase of user creation cost, and the consistency between output animation and data perception is not guaranteed. Users need to manually calculate the visual attribute values of each element at each time node according to the data. For example, in order to build an animation in which elements appear in sequence according to data values, users need to group elements according to data attribute values, and then define animation effects for each group and calculate animation time. This process will lead to an increase in user creation costs as the number of elements and the complexity of animation increase. Because the entities are not connected according to the data relationship, users can specify any animation parameters for different entities, which may lead to inconsistency between the output animation and data perception, resulting in ambiguity. During the creation process, it is difficult for users to imagine and understand the current animation content without previewing, and the interaction is complex and inefficient. For example, in the keyframe based interactive tool, it is necessary to repeatedly switch the time track corresponding to different visual attributes of each element to adjust the attribute values at each time point to achieve the animation effect [3]. At the same time, entities with the same animation parameters need to be repeatedly defined. Property changes at any time.

2 Related Work

2.1 HTML5 Technical Algorithm

HTML5 outline algorithm refers to an algorithm that extracts document outline by processing h1-h6 header elements in section, article, aside, nav and other block elements. As a SEOER who deeply studies semantic tags, it should be able to have a keen insight into the important role this algorithm will play in the SEO process. And apply it to the daily process of website optimization [4]. As shown in Fig. 1 below, we can understand all divs as section elements and generate a new outline structure.

Define block<section>label:

Section represents a block, which is used to identify sections in a document. It is often used to partition content on a page, such as chapters, headers, footers, or other parts of the document.

Define the article block<article>tag:

Article represents an article, which is used to identify a complete, independent and forwarding content in the page.

Define the sidebar<aside>label:

The side represents the side, which is used to identify the content other than the content. The content of the aside should be related to the content nearby. For example, the auxiliary information part of the current page or article can include references, side ads, navigation bars, and other similar parts different from the main content related to the current page or main content.

To define navigation<nav>tags:

Nav stands for navigation bar, which is used to identify the link group of page navigation. A page can have multiple nav elements as navigation for the whole or different

parts of the page. Specific application fields include: main menu navigation, sidebar navigation, page turning navigation, etc.

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<section>

  <h1>Bob Dylan
  Albums</h1>

  <p>Some text</p>
  <section>

    <h2>Blood on the Tracks</h2>

    <p>Some text</p>

  </section>
  <section>

    <h2>Highway 61 Revisited</h2>

    <p>Some text</p>

  </section>
  <p>Some text</p>
</section>

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Fig. 1. Section element outline structure

After mastering HTML5+CSS3 technology, you can write a static page. If you want to achieve dynamic effects, you need to use JavaScript technology [5].

2.2 Animation Examples

The expressiveness of visual animation is determined by two orthogonal factors (visualization and animation), so this section selects animation examples that can show the diversity of design space. On the one hand, these examples include all kinds of visual charts created by D3, Vegas lite and Characterizer; On the other hand, they cover a series of animation types proposed by Amini et al., including creation, deconstruction, circulation, accumulation, transition, detail scaling, annotation, and multi view animation. Since each animation instance may integrate multiple animation types, this section will distinguish between instances by visual chart type and animation type.

DPI: Provide an intuitive and clear way to display visual animation. As a universal tool, the existing animation creation tools based on keyframes will show the animation on the pure timeline interface in an abstract way. For example, in Adobe After Effects and Adobe Premiere, keyframes are represented as a diamond node on the timeline.

This abstract way makes it almost impossible for users to understand the animation they are currently creating without previewing it. In contrast, HTML5 uses explicit visual components to represent animation primitives and corresponding animation effects (such as time, animation effects, etc.) to promote users' understanding of the currently specified animation process. In addition, HTML5 also contains an animation creation panel, which integrates storyboards and timelines to display the animation process in an intuitive and accurate way in accordance with the visual standard expression of animation. The process of using explicit visual components in HTML5 is shown in Fig. 2.

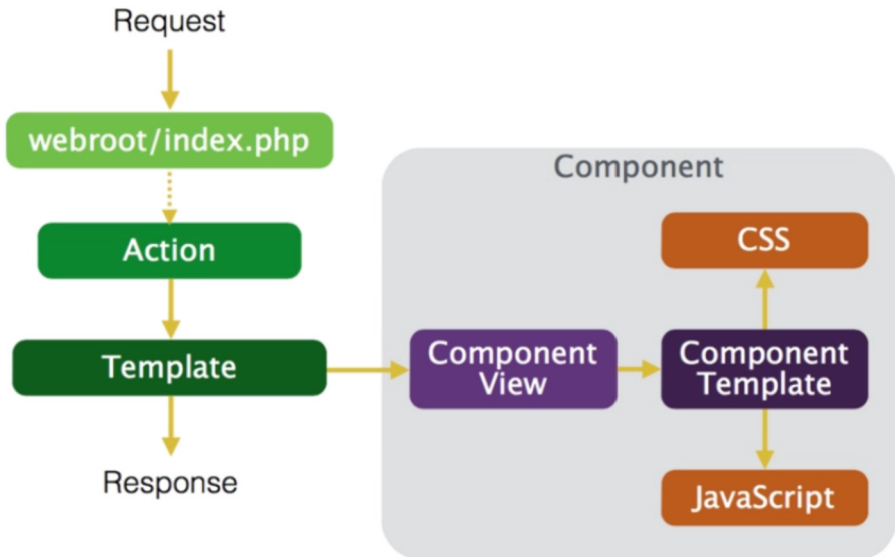


Fig. 2. HTML5 uses explicit visual component flow

3 Research and Application of Animation Visualization Based on HTML5 Algorithm

HTML5 is designed to help beginners who lack programming skills or are unfamiliar with animation to create rich graphic animation. In the process of using HTML5 to create animation, users first provide the dSVG file of the visualization chart as input, and complete the animation through key frame construction, key frame sequence generation, and animation parameter definition and adjustment. After completing the construction of key frames and key frame sequences through a series of selection operations with the help of the automatic completion function, users can adjust the animation process by directly interacting with the animation process described by the visual specification. The optimized Canis and its compiler provide good support for real-time preview and updating the description of visual specifications in the interaction process. At the same time, the visual specifications that are easy to understand and the intuitive interaction

mode formed with the help of automatic completion algorithm also greatly reduce the learning and interaction costs of users on the basis of ensuring the expressiveness of animation.

HTML5 almost completely replaces the use of Flash. Due to the performance of mobile application developers, ease of use and the cutting of open standards, it has also been greatly adjusted. HTML5's predecessor, HTML4, has many improvements, one of which is the inclusion of canvas elements for instant rendering of graphics on web pages. As shown in Fig. 3 below, HTML5 technology animation visualization key frame extraction.

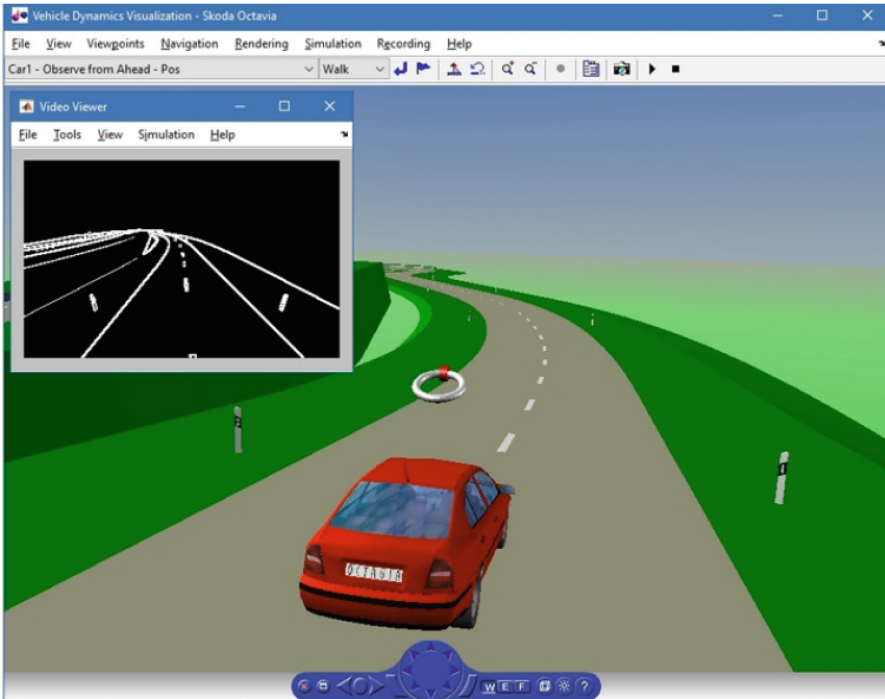


Fig. 3. HTML5 technology animation visualization key frame extraction

4 Conclusion

Html5 is the latest technology in web page development. Html5 has many advantages, such as faster load time, less bandwidth consumption and compatibility with mobile devices. In this article, we will discuss how to use animation visualization based on Html5 algorithm. After confirming the information structure, the animation arrangement part is relatively simple. InfoMotion provides a series of commonly used playing forms for users to choose. By default, the animation is played in the form of repeating units one by one.

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