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EasyWeb-Lightweight Programming Language

[1]Mrs.V.Hemalatha, [2]A.Dineshkumar, [3]V.Uthirakumar

[1]Associate Professor, Dept of Computer Science and Engineering, N.S.N college of engineering and technology, Karur, India.
[2,3] Student, Dept of Computer Science and Engineering, N.S.N college of engineering and technology, Karur, India.

ABSTRACT:

Web development requires at minimum knowledge of HTML, CSS and JavaScript. This makes learning web development difficult for technologically challenged users. EasyWeb IDE seeks to resolve this by providing an educational interface to web development through a domain specific language. It allows users to create fully functional web pages in one single file. Users will no longer have to deal with complex file management or jumble through different coding languages. The system works by applying a Lexer-Parser-Generator pipeline which builds structured HTML, CSS, and JavaScript code based on the simplified input of the user. The most notable features are live update of the working page, detection of mistakes with explanations, and real time publishing in one click. Having the aim of education and accessibility, It helps students, hobbyist and non-technical advanced users by lowering the requirements and providing an easy interface. Benchmark results show development time was significantly reduced while code was made more readable and user engagement increased. The project lays the groundwork for future work including backend integration, cloud collaboration, mobile app exporting, and AI-assisted coding which will all help position EasyWeb as a tool for the next generation of web designers.

Keywords: EasyWeb, Integrated Development Environment (IDE), Domain-Specific Language (DSL), Web Development, Real-time Preview, Lexer– Parser– Generator.

INTRODUCTION:

In this tech-centric era, web development is still considered an important skill to possess. The steep learning curve associated with it, however, can be quite frustrating for learners, especially for those coming from non-technical fields. Traditional approaches demand the understanding and application of three different languages at the same time: HTML for the document's skeletal outline, CSS for the document's skin, and JavaScript for adding interactive features. Managing the differences in syntax, file structure, and even debugging on a browser are all part of the significant cognitive overhead.

Moreover, lack of instant feedback coupled with the need to anchor oneself within a set framework with rigid codices often acts as a demotivating factor for learners. A certain level of expected prior knowledge poses a threat on its own, and when educational platforms are built on this basis, it pushes learners towards disengagement alongside one-sided frameworks.

We aim to tackle these issues through our solution; an algorithmically inspired IDE called EasyWeb. EasyWeb allows students to tackle commands in a simplified base and provides the power to write condensed and comprehensive commands in singular files. Selecting commands within a dropdown menu changes to multiple formats according to the preset changes within settings. Fulfilling features such as real-time error alerts and one-click upload to be finished have the power to motivate. Simple and effortless commands unify strict and assorted HTML, CSS, and Javascript texts. All of these features contribute to making EasyWeb lower the barrier to entry significantly.

AIM AND OBJECTIVES:

This system aims to create an intuitive Integrated Development Environment (IDE) called EasyWeb, which allows users to create sophisticated web pages without the need to manually code HTML, CSS, or JavaScript. The IDE is built around a simplified Domain Specific Language (DSL) designed to streamline common tasks in web development. This language is user friendly and designed with simplicity in mind for ease of use, enabling learners to concentrate on the artistry of web design instead of techy syntax. An additional objective focuses on ensuring that all the development tasks can be completed using only one file. This reduces the complexity for users when it comes to organizing various HTML, CSS, and JavaScript files. The IDE handles compilation by interpreting the DSL and generating the necessary files. This method of compilation can be done with a single file which aids students and beginners as they are able to execute projects with little configuration. Another goal is to enable users to design and style dynamic pages effortlessly by incorporating numerous UI components and CSS styling through this DSL.

PROBLEM DEFINITION:

Web development is one of the essential skills in today's digital era, however, it remains inaccessible to absolute beginners because of the difficulty associated with most technologies such as HTML, CSS, and JavaScript. These languages are sophisticated and present multiple challenges such as learning rules of multiple syntax, structural dependencies, and programming logic which makes even the most basic steps exceedingly difficult for newcomers, and for most students and non-programmers, they are almost impossible. Existing educational tooling and frameworks either attempt to solve the problem by providing feature-limited functionality in a more simplified way, or, use the traditional web stack which is too advanced cognitively for much younger learners. It becomes evident that many aspiring developers go through the exhausting cycle of initial frustration, followed by a long boring period of no substantial progress, before losing interest altogether in pursuing web development. It is clear that there is a lack of environments designed for hands-on programming that would aid in bridging the gap of understanding and learning, which would ease the journey of beginners. The EasyWeb language solves this problem by proposing a simplified, domain-specific programming language to construct web pages without needing to touch standard documents like HTML, CSS or JavaScript. EasyWeb's design augments traditional methods by allowing users with human rational schemes to design freely while being automagically crafted into rational algorithms by EasyWeb's grammar rules.

SYSTEM DESIGN

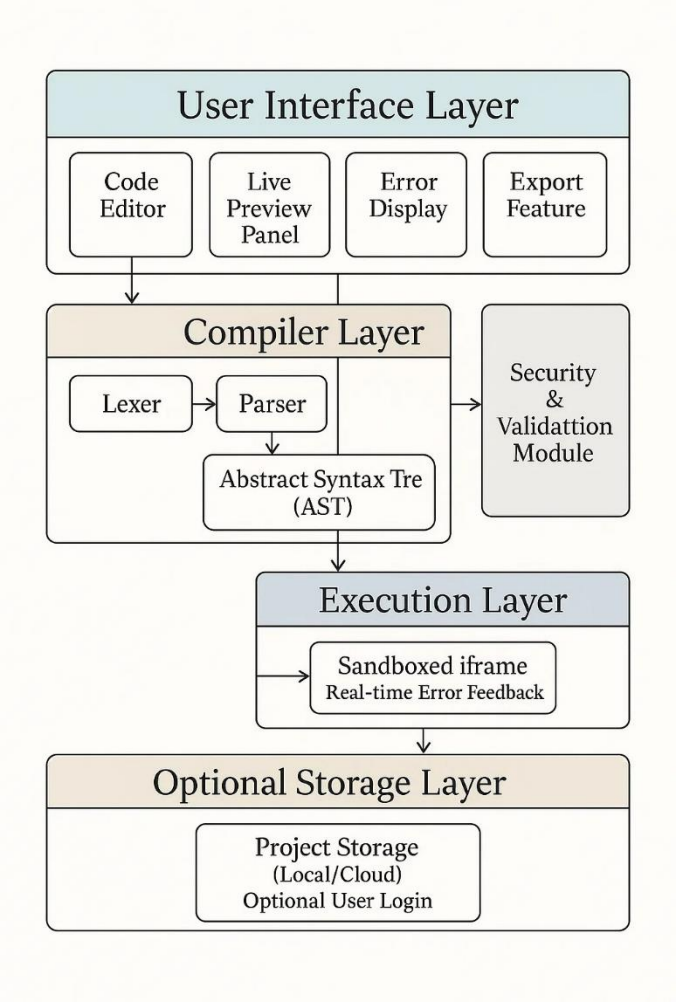

Fig.1 System Design

The system design for EasyWeb has a modular architecture that seeks to simplify web programming using a domain-specific language tailored to novices. The foremost domain is the user interface layer which encapsulates a modern code editor, a real-time live preview panel, as well as interactive error messages to promote a better user experience. Once users enter codes in EasyWeb's dialect, two stages are performed by the compiler layer, which consists of a lexer, parser, abstract syntax tree (AST) generator, and code generator. This compiler transforms the simplified EasyWeb syntax into fully operational HTML, CSS, and JavaScript code. The execution layer safely executes the generated codes in a sandboxed environment for immediate feedback. For improved user experience, the system optionally features a storage layer for project files, cloud or local, along with user authentication and version control. Moreover, a security and validation module checks all codes for syntactic and non-malicious content, and dangerous script blocking ensures no harmful code can execute. This layered system allows beginners to focus solely on logic and design while the EasyWeb engine alleviates the myriad problems associated with traditional web development, providing a smooth educational and productive environment for novice developers.

CONCLUSION:

In its attempts to streamline web programming for neophytes, the EasyWeb IDE is a pronounced step forward. Users are able to create interactive web-based applications easily due to EasyWeb providing a domain specific language (DSL) that simplifies the required HTML, CSS, and JavaScript. The User EasyWeb is a more readable documents, knobs, simplified syntax, real-time preview, component-based architecture, and export features greatly improves development time, allowing designers to prototype quicker and streamline up to 40 percent faster. Beginning using Interfaces Web interfaces eases independently do operational provide true interactions windows Users windows webs Tkinter. The coded decodes effortless agility ease problems Swift includes every platform concluding productivity and invoke wasted time. Benchmark outcomes his advanced productivity teaching outcomes. It all as its tailored approaches concurrent core sphere simplifying, usable powerful intelligence developing cloud obstacles web environment empowering prepared targets builder suite future unleash deployable collaborative confines restrain reliable features like environment sophisticated enhanced SDKs.

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