International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 09 Issue: 06 | June – 2025 SJIF Rating: 8.586 ISSN: 2582-3930

SKETCH 2 CODE

Mrs.M.Vasuki [1], Dr. T. Amalraj Victoire [2], R. ANGELIN JESSY FLORENCE [3]

1Associate Professor, Department of Computer Applications, Sri Manakula Vinayagar Engineering College (Autonomous), Puducherry 605008, India, vasukimca@smvec.ac.in

[2] Associate Professor, Department of Computer Applications, Sri Manakula Vinayagar Engineering College (Autonomous), Puducherry 605008, India, amalrajvictoire@gmail.com

[3]Post Graduate student, Department of Computer Applications, Sri Manakula Vinayagar Engineering College (Autonomous), Puducherry 605008, India, angelinjessy1173@gmail.com

Abstract-This project presents a next-generation Integrated Development Environment (IDE) that revolutionizes web development by transforming hand-drawn sketches into fully functional HTML code. Leveraging deep learning,By integrating the SketchNet model—a Convolutional Neural Network (CNN) trained to recognize web elements from sketches—and the SWIN Transformer, which captures long-range image dependencies, the IDE ensures accurate and real-time interpretation of various sketching styles. Users can draw interface components directly within the IDE, which instantly processes and translates them into functional code with live previews. This innovative approach bridges the gap between design and development, providing a faster, more intuitive workflow that empowers designers to transform creative ideas into working web interfaces with minimal effort.

Designers can intuitively sketch elements such as buttons, text boxes, and layouts directly within the platform. These sketches are instantly analyzed, converted into accurate HTML structures, and rendered live within the IDE for real-time feedback and adjustments. This seamless transition from sketch to code reduces the gap between design and implementation, accelerates prototyping, and simplifies the development process. By combining visual creativity with automated code generation, the IDE empowers both designers and developers to bring ideas to life more efficiently, making it a powerful tool for modern web interface design.

1.INTRODUCTION

In the evolving landscape of web development, bridging the gap between creative design and functional implementation remains a key challenge. This project introduces a next-generation Integrated Development Environment (IDE) designed to revolutionize the development workflow by converting hand-drawn interface sketches directly into fully functional HTML code. By harnessing the power of deep learning, the system integrates the SketchNet model—a Convolutional Neural Network (CNN) adept at recognizing web elements from sketches—and the SWIN Transformer, which enhances accuracy by capturing long-range image dependencies.

Within this innovative IDE, users can freely sketch UI components such as buttons, text boxes, and layouts. These sketches are instantly interpreted, translated into structured HTML, and rendered in real-time for immediate feedback. This seamless transformation from visual design to functional

code not only accelerates the prototyping process but also empowers designers and developers to collaborate more effectively. By merging intuitive sketch-based input with automated code generation, the proposed IDE offers a faster, more accessible, and highly efficient approach to modern web interface design.

Web development has witnessed significant advancements over the years, yet the process of translating creative UI/UX designs into functional code continues to be a time-consuming and error-prone task. Traditionally, designers use tools like Figma, Adobe XD, or Sketch to create mockups, which are then manually converted into HTML/CSS by developers—a workflow that often results in communication gaps, inefficiencies, and delays.SWIN Transformer, which enhances the model's ability to capture long-range dependencies and fine-grained features within sketches, ensuring reliable interpretation even with varied drawing styles.

The IDE takes the recognized elements and dynamically generates accurate HTML code, rendering a live preview of the interface on the fly. This real-time feedback loop empowers users to iterate quickly, make adjustments, and refine designs without switching tools or writing code manually. The system bridges the longstanding gap between UI design and front-end development, allowing for a more intuitive, creative, and productive workflow.

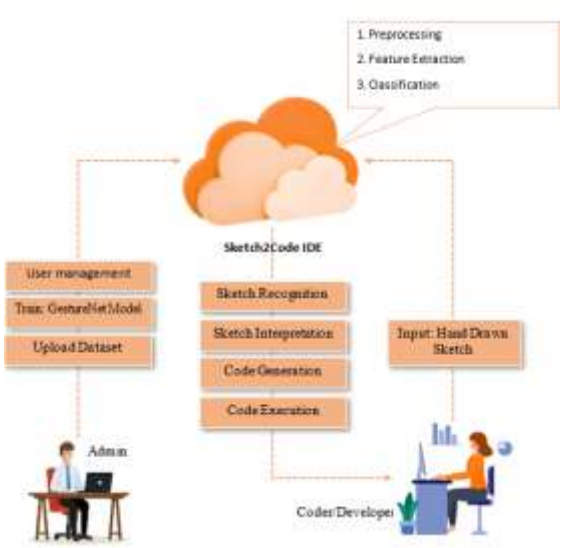

Figure 1: Architecture Diagram

2. PROPOSED SYSTEM

The proposed Sketch2Code IDE aims to revolutionize the design-to-code process, fostering collaboration between designers and developers. By combining advanced deep learning models with a user-friendly interface, the system empowers designers to actively participate in the coding process, making web development more efficient, interactive, and accessible.

• User-Friendly IDE

Sketch2Code IDE provides a user-friendly Integrated Development Environment (IDE) tailored for designers. The intuitive interface includes dedicated drawing tools, a code editor, and a preview window. This design allows designers to seamlessly sketch web elements directly within the environment, fostering a more interactive and collaborative design-to-code workflow.

• Optimized Sketch Recognition

The system is committed to continuous improvement, particularly in refining the SketchNet model. This ongoing optimization focuses on enhancing the accuracy of recognizing a diverse range of web elements and effectively handling ambiguous sketches

• Real-Time Sketch Detection

SketchNet model and the SWIN Transformer, to enable real-time and accurate recognition of hand-drawn web elements in sketches. The SketchNet model, based on Convolutional Neural Network (CNN) architecture, serves as the foundation for efficient and precise detection. Additionally, the SWIN Transformer enhances the detection process by capturing long-range dependencies within the sketches, contributing to improved accuracy and reliability.

• Dynamic HTML Code Generation

A key feature of the proposed system is the dynamic generation of HTML code The IDE ensures that the generated code adheres to industry standards, maintains syntactical correctness, and incorporates essential security best practices. This functionality allows designers to witness the translation of their sketches into executable code in real-time.

• Real-Time Code Execution

providing designers with the ability to instantly visualize and interact with the generated HTML code. This real-time feedback loop empowers designers to iterate on their designs seamlessly, offering immediate insights into how their sketches translate into functional code.

2.2 PROPOSED TECHNIQUE WORKS

1. Feature Extraction and Recognition

Recognizes shapes and maps them to predefined component classes (e.g., rectangle → button, line + box → input field).

2. Code Generation

The semantic map is converted into:

HTML tags (e.g., <button>, <input>,)

CSS for styling and layout (e.g., position, color, font)

2.3 ADVANTAGE OF THE PROPOSED SYSTEM

1. Deep Learning-Powered Sketch Recognition

Combines SketchNet (CNN) for detailed shape recognition and the SWIN Transformer for contextual understanding of layouts.

Accurately interprets diverse hand-drawn styles, even with imperfect or overlapping sketches.

2. Real-Time Sketch-to-Code Conversion

Instantly generates HTML and CSS as the user draws.

Provides live previews, allowing users to visualize changes without refreshing or recompiling.

3. Context-Aware Element Detection

Understands not only individual elements but also their spatial relationships (e.g., nested containers, grouped buttons).

Generates responsive layout code that mimics actual UI behavior.

4. Intuitive Drag-and-Drop & Sketch Interface
Supports both freehand sketching and traditional UI component placement.
Smooth interaction with tools like pen, eraser, shape detector, and undo/redo options.

5. Smart Code Optimization
Produces clean, semantically correct HTML/CSS.
Uses AI to apply best practices such as accessibility, responsive design, and minimal inline styles.

6. Modular & Extensible Design
Users can define custom sketch symbols and train the system to recognize new components.
Plugin-based architecture supports export to frameworks like React, Angular, or Vue.

7. Collaborative & Cloud-Based Support
Multi-user collaboration features allow real-time sketching and editing in teams.
Cloud integration enables sketch/code saving, versioning, and remote access.

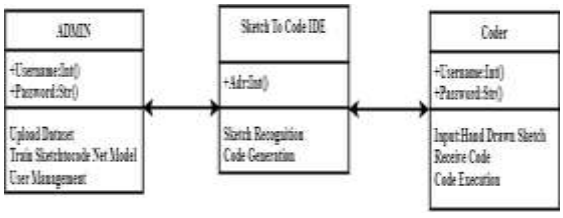

Figure 2: Proposed system

3.CONCLUSION AND FUTURE ENHANCEMENTS

This project introduces a groundbreaking approach to web development by integrating deep learning technologies into an IDE that converts hand-drawn sketches into functional HTML code. By utilizing the SketchNet CNN and SWIN Transformer models, the system demonstrates high accuracy in interpreting diverse sketching styles and translating them into real-time, functional web elements. This innovation not only bridges the gap between design and development but also streamlines the entire web interface creation process, enabling rapid prototyping and fostering creativity. Ultimately, the project showcases how AI-driven tools can redefine the user experience in modern web development workflows.

Future Enhancements:

1. Support for Additional Code Outputs:
Extend the system to generate not only HTML but also CSS, JavaScript, and frameworks like React or Vue for more comprehensive front-end development.

2. Sketch Correction and Suggestion Engine:
Integrate an intelligent correction system that can refine imperfect sketches and suggest improvements based on common UI patterns.

3. Voice and Gesture Integration:
Incorporate voice commands or gesture-based inputs for an even more accessible and hands-free development experience.

4. Responsive Design Support:

Enhance the system to generate responsive layouts that automatically adapt to various screen sizes and devices.

5. Collaboration Features:

Enable real-time collaborative sketching and code generation for teams, similar to Figma or Google Docs.

6. Export to Design Tools:

Add export functionality to popular design tools like Adobe XD or Figma, creating a two-way bridge between design and development.

7. Improved Model Training:

Continuously train the SketchNet and SWIN Transformer models on a broader dataset to improve recognition accuracy and adaptability to unique sketching styles.

8. Cross-Platform Deployment:

Develop mobile and tablet versions of the IDE for on-the-go sketching and prototyping.

4. REFERENCES

[1] V. Kalbande, K. Meshram, S. Somnathe, R. Deshmukh and M. Mohod, "Automatic HTML Code Generation from Mock-Up Images Using Machine Learning Techniques", Int. Res. J. Eng. Technol, vol. 8, no. 06, 2021.

[2] A. Deolekar, K. Dhanawade, R. Chavan and S. Bhambure, "UI Code Generation using Deep learning", Int. Res. J. Eng. Technol, vol. 8, no. 05, 2021.

[3] Z. Teng, Q. Fu, J. White and D. C. Schmidt, "Sketch2Vis: Generating Data Visualizations from Hand-drawn Sketches with Deep Learning", 2021 20th IEEE International Conference on Machine Learning and Applications (ICMLA), pp. 853-858, 2021.

[4] M. Dua, R. Yadav, D. Mamgai and S. Brodiya, "An improved RNN-LSTM based novel approach for sheet music generation", Procedia Comput. Sci, vol. 171, pp. 465-474, 2020.

[5] S. Patil, R. Pawar, S. Punder and J. John, "Generation of HTML Code using Machine Learning Techniques from Mock-Up Images", Int. Res. J. Eng. Technol, vol. 7, no. 03, 2020. [6] T. Bouças and A. Esteves, Converting web pages mockups to HTML using machine learning, 2020.

[7] Davit Soselia, Khalid Saifullah and Tianyi Zhou, Learning Ui-To-Code Reverse Generator Using Visual Critic Without Rendering, Nov 2023.

[8] Yong Xu, Lili Bo, Xiaobing Sun, Bin Li, Jing Jiang and Wei Zhou, "I mage2emmet: Automatic code generation from web user interface image", J Softw Evol Proc, vol. 2021, no. 33, pp. e2369, 2021.

[9] Gayatri Vitkare, Rutuja Jejurkar, Sammyaka Kamble, Yogeshwari Thakare and A.P. Lahare, Automated Html Code Generation From Hand Drawn Images Using Machine Learning Methods, vol. 04, no. 01, January 2022.

[10] L. Srinivasan, D. Selvaraj, D. Dhinakaran and T. P. Anish, "IoT-Based Solution for Paraplegic Sufferer to Send Signals to Physician via Internet", SSRG International Journal of Electrical and Electronics Engineering, vol. no. 1, pp. 41-52, 2023, [online] Available: https://doi.org/10.14445/23488379/IJEEE V10I1P104.