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HTML Code Generation from Mock-up Images Automatically using Machine Learning Techniques

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Abstract: The design cycle for a website begins with the creation of individual web page mock-ups, which can be done by hand or with the help of graphic design and advanced mock-up creation software. Software engineers then translate the mockup into standardised HTML or equivalent markup code. This procedure is usually repeated several times before the desired prototype is obtained. The aim of this research is to automate the code generation process from hand-drawn mock-ups. Hand drawn mock-ups are processed using computer vision techniques and subsequently several deep learning approaches are used to incorporate the proposed framework. Our device achieves 96 percent process accuracy and 73 percent validation accuracy.

I. INTRODUCTION

Because of today's technological advancements, the importance of Internet web pages has increased significantly. Nowadays, websites represent the personalities of states, organisations, cultures, and individuals. There are websites in almost every area, from knowledge to social work, games to training, and so on. Companies' websites are brought to the forefront for financial reasons, such as product marketing or advertising. Official institutions, on the other hand, strive to provide more efficient services. Any web site has a "web page" at the front-end, which is the part of the site that communicates with the user.It's critical to serve a page that grabs the user's attention, is simple to use, and has enough usable functionality. However, creating web pages that effectively respond to these needs is a time-consuming process. Graphic designers, software specialists, end-users, corporate authorities, and people working in a variety of fields are needed to create web pages. Typically, the process begins with graphic designers or mock-up artists creating a mock-up design of the user interface in accordance with the institution's needs, either on paper or using graphic editing software. On the basis of these draughts, software experts compose code for web sites. The web pages that result can change as a result of the feedback received from the end users. There are a lot of routine tasks in their operation. The process of rewriting code for components with identical functions and page configurations that change over time is tedious. This highlights the need to investigate more accessible web page design options.. The concept of creating a webpage by automatically generating code is gaining traction as a research topic. Programming time, operation, cost, and resource usage are all reduced when webpages are generated automatically. The final website is produced in less time as a result of the quicker radical design levels..

A public dataset of hand-drawn images of websites obtained from Microsoft AI labs was used to build an algorithm to automatically generate HTML code for hand-drawn mock-ups of webpages. Its goal is to recognise the components generated in the mock-up and encode them according to the webpage hierarchy.The images in the dataset are analysed using computer vision techniques, and the data is trained using a deep neural network model involving convolutional neutral networks. Following that, a structured HTML code is created. Our model has a methods accuracy of 96 percent and a validation accuracy of 73 percent.

II. EXISTING SYSTEM

An algorithm was built in this study to automatically generate HTML code for a hand-drawn mock-up of a web page. Its aim is to identify the mock-up drawing's components and encode them according to the web page hierarchy. The proposed scheme is trained and checked using a public dataset of hand-drawn images of web sites collected from Microsoft AI Labs' Github page [1]. The images in the dataset are analysed using computer vision techniques, and the data is trained using a deep neural network model involving

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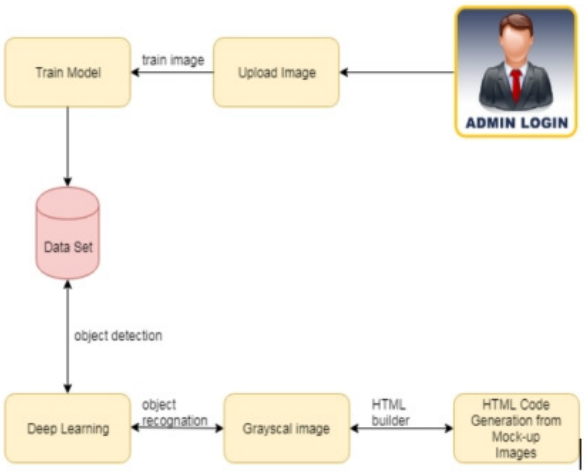
convolutional neural networks. Following that, a structured HTML code is created. Our model has a process accuracy of 96 percent and a validation accuracy of 73 percent.

The rest of the paper is laid out as follows: The second section of the paper examines similar research in the literature. Sections III and IV describe the dataset and methods. In Section V, the collected data and findings were presented. In Section VI, the conclusion section, evaluations are used..

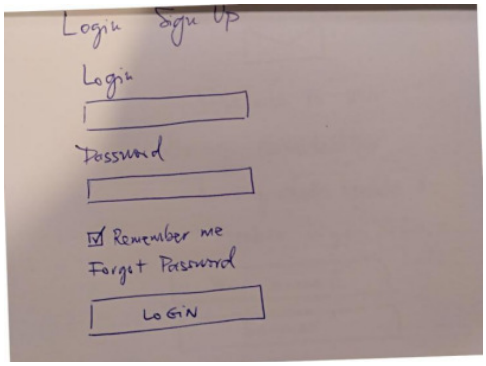
III. PROPOSED SYSTEM

REMAUI is an algorithm that recognises the elements of a mobile app's user interface, such as buttons, textboxes, and pictures, and generates the code for them using screenshots of the app window or conceptual drawings. The first study in the field of translating screen images or drawings to code for mobile devices was performed by computer vision and optics researchers. Despite its efficiency, the REMAUI method does not support cross-page transitions or page-level animations. The P2A algorithm was developed by the authors of [3] to correct the REMAUI algorithm's flaws. The authors developed the pix2code algorithm in [4] with the aim of transforming a web page's graphical interface to structured code using deep learning with convolutional and recurrent neural networks. The method has been successfully tested on Android, iOS, and other mobile devices. [5] uses the ReDraw algorithm to translate mock-ups of mobile device screens into standardised XML code. In the early stages of their implementation, computer vision approaches are used to distinguish individual GUI components The second stage involves classifying the detected components according to their characteristics, such as toggle-button, text-area, and so on. At this point, there is a lot of convolution. In the final step, the XML code is generated by combining the kNN algorithm with the web programming hierarchy. Github [6] and other open source code libraries are also commonly used for distributing code and applications. It is standard practise to look at this repository and reuse code while starting or creating software projects. Since these libraries use shared code, the number of times the same code is written by different people is reduced. The authors of [7] employ SUISE, a search engine that allows users to construct a graphical interface using simple drawings and keywords.This interface is then looked up in existing libraries to see if there are any interfaces that are similar. These interfaces are converted to executable codes, and the end user may choose the most suitable interface.

Microsoft just released a system for converting hand-drawn mock-ups of simple web pages into HTML code [1]. They have made their code and dataset accessible online, despite the fact that there is no literature to explain their work.



INPUTIMAGE :



GRAY SCALE IMAGE:

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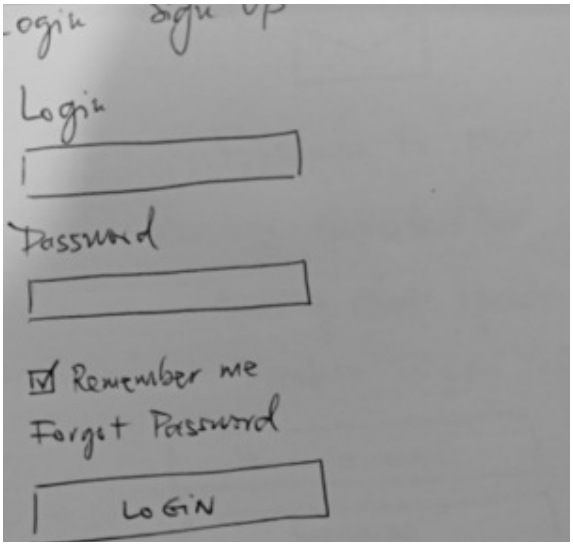

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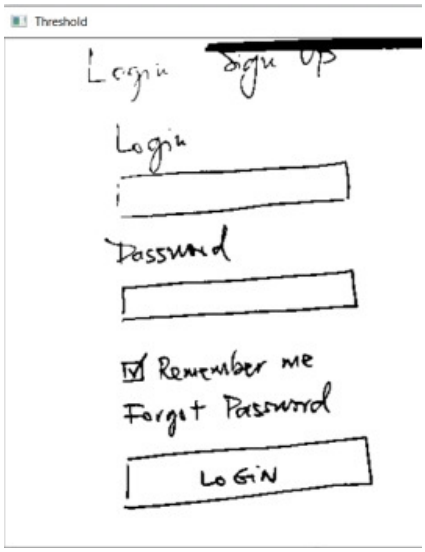
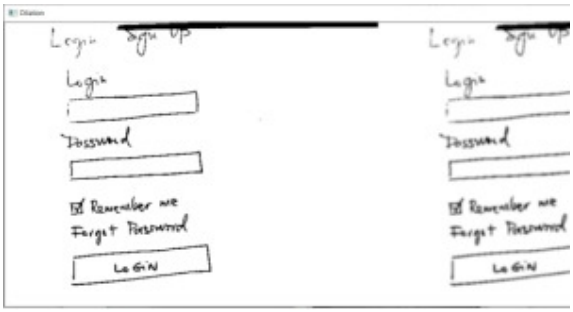
THRESHOLD:

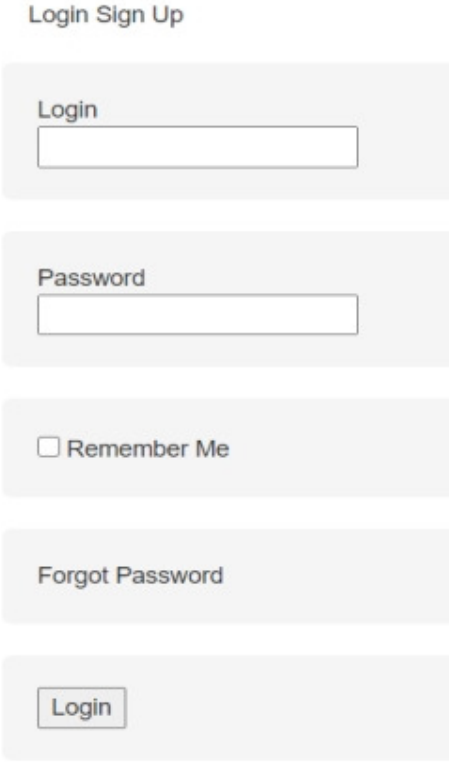


DILATION:



EROSION:

OUTPUT IMAGE:



CONCLUSION:

In recent years, when artificial intelligence has been rapidly revolutionising the industry by entering almost every sector, converting web page mock-ups to their mark-up code with the least amount of time and labour cost has become a significant issue. In this research, we created a framework that converts hand-drawn web page mock-ups into structured HTML code. A dataset of photographs containing various hand-drawn sketches of web page designs was used to achieve this.

This dataset, which contains a total of 186 samples, was also used to create a corresponding dataset that contains the components found in each image. As a result, the dataset was used as training data for the CNN model to perform the object recognition process, which was generated by grouping all of

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the components into four separate groups. The components in the image were cropped in this study using object detection and image processing techniques.

Our qualified CNN model was used to assess which components were collected. Finally, the aim of generating HTML code was accomplished using our HTML builder script and the coordinates obtained from the contour finding algorithms.

As a result, accuracy and validation accuracy were 96 percent and 73 percent, respectively, after a 200-epoch training period.

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