

Automatic Html Code Generation from Mock-Up Images Using Machine Learning Techniques

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Abstract

Background: The project work entitled as Automatic html code generation from mock-up images using Machine Learning, basically, the main objective of this project is the design cycle for a web site starts with creating mock-ups for individual web pages either by hand or using graphic design and specialized mock-up creation tools. The mock-up is then converted into structured HTML or similar markup code by software engineers. This process is usually repeated many more times until the desired template is created. In this study, our aim is to automate the code generation process from hand-drawn mock-ups. As a first step of designing of website is start to build the mock-up images for the particular web pages by operated with the hands or using mockup developer tools. It is efficiently used for the developer to transferring web pages mock-up to the coding. It's generating the proposed system to creating the wireframe to the layout interfaces there are two techniques mostly used first is computer vision and second is deep systematic analysis. The automatic code generation is time reducing and cost effective. We have design structured an outline the design. Hand drawn mock-ups are processed using computer vision techniques and subsequently some deep learning methods are used to implement the proposed system.

Objectives: In this Automatic html code generation from mock-up images using Machine Learning, main objective is to generate HTML code from hand drawn mock-up images using Machine Learning.

Conclusions: Thus, the study Machine Learning helped to gain knowledge on both the theory and practical part. Every concept was clear and brought some interest for further learning. As stated earlier, the actual process of creation of web page takes more time and should meet the requirements, which makes developers exhausted. In order to avoid facing those circumstances, Automatic html code generation from mock-up images using Machine Learning is introduced which is great advantage.

Keywords: Mock-up images, User, Object Detection, Web pages.

1. Introduction

Nowadays, the internet is most important in our day-to-day life. Websites are presents in every fields. The design cycle for a website opening is done by creating mock-up for separate webpage either

drawing by hand or by drawing in paint designs and intensive mock-up formation apparatus. The mock-up images were then transformed to HTML by software engineer. This proceeding is recast extra instant as far as the wanted template is not obtained. Our main target is to equip html code out of hand drawn images. We use convolution neural network; computer vision technique and also deep learning was used for our proposed system. There are websites for practically any subject, from knowledge to social work, games to training, and so on. Companies' websites are brought to the forefront for financial objectives, such as product promotion or advertising. Official institutions, on the other hand, strive to provide more efficient services in today's world websites review the institution, hotels, business, people, etc. Websites are use in each and every factor. From education to knowledge, from training to social work. At the front end of every site that concert with the user. It is actual relevant to give a surface a certain attraction in the user, it is very easy to use and it has sufficing advanced attribute. In other way, creating webpage which gives active respond expertly for this it required a very tiring pathway. In the developing of webpage, many software engineering developers are working together to design the front view of the webpage. Software designer-built code to design the webpage basis on the draft. The resulting webpage can convert depend on feedback received by the as in user.

For the elements built the code with same feature with page format converting instant turn into the steps difficult. This emerges the need for expanding more improved feature in a webpage format. The proposal of structured the webpage by crating automatic code is very interesting as a research subject. Generation of automatic webpage minimize coding instant, steps price as well as resource. So, by this way thanking to the speedy pattern steps, the final website is created in a very less time period. In our study, methods were used for automatically developing the hand drawn images by generating code for it.

2. Objectives

Usually, to write the code for applications, we write lots and lots of code and end up exhausted. And also, if there is any requirement from client again whole code should be corrected. It is completely waste of time and lack of proper information. To avoid such conflicts, a proper site is being created, the main disadvantages of existing systems are,

- Lack of correct information.
- It takes huge time.
- Less accurate.

The Automatic html code generation from mock-up images using Machine Learning is being created to overcome the disadvantages of existing system like less accuracy, lack of information, etc. The advantages of proposed system are

- Time saving.
- It offers better security

- It can save network bandwidth.
- Leads to lower operational costs.
- IT team can manage and control the devices.
- Accurate information.

3. System Components

There are four system components or modules in this project. The four system modules are,

1. Upload data sets files
2. Object Detection and Cropping
3. Object Recognition
4. HTML Builder

1. UPLOAD DATA SETS FILES

Admins are allowed to upload the CSV files with the tags given. Once the file is uploaded, In SQLAlchemy ORM, the Object Relational Mapper is introduced and fully described. If you want to work with higher-level SQL which is constructed automatically Create Engine stored the Data Base. we have to upload mockup images. These images are stored in database.

2. OBJECT DETECTION AND CROPPING

After reading the input file, it is converted to gray scale format. Then, Gaussian Blur was applied 2 times to them with 3x3 rectangle kernel. After the threshold process was carried out, rectangle was drawn by applying the contour detection algorithm to determine the objects by applying morphological transformations. In this way, the components in the input image have been detected. The detected components were cropped to be transferred to the CNN model. In the stages of morphological transformations, 8 iteration dilation was performed with 4x4 rectangle kernel. Then erosion process was applied with 3x3 ellipse kernel for 4 iterations and dilation process was performed with 1x10 rectangle shaped kernel for 2 iterations. Finally, a 10x1 rectangle shaped kernel was used for dilation process. The input file is the image that is uploaded, and it is read and converted to grayscale format. The noise is then reduced using the Gaussian function. They are transformed into morphological changes. Cropped and sent to the CNN model are the discovered components. At this stage, morphological alterations such as dilatation and erosion are carried out.

3. OBJECT RECOGNITION:

The model was transferred by using the elements of components in our component dataset. Dataset be made up of four distinct kind of component which is textbox, checkbox, buttons, dropdown and etc. Cropped components reorganization process are done by given cropped component to the CNN model. CNN model has several layers for filtering such as convolution layers with 4*4 kernel & then there is max pooling process with 2*2 kernels which is used for the extraction after that factorization

is done by using BILSTM layer for the correlation of extraction. After that pool full connected layer and last one is the dropout layer, all the layers working together to train the model. This whole process is done by directly importing keras library in our code.

4. HTML BUILDER:

After the reorganization process the recognized component were converted successfully to the HTML code by using the Bootstrap framework. This all process done by using help of the coordinate from the output of the counter finding algorithm. In this HTML builder algorithm first of all we create the template for the header & footer of the websites after that we recognize how many components are there in one row with the co-ordinate of component. Then we labelled the code of that each component for their template code after that the body section HTML code was generated. Lastly header & footer were combined so that the HTML code is generated.

4. System Design

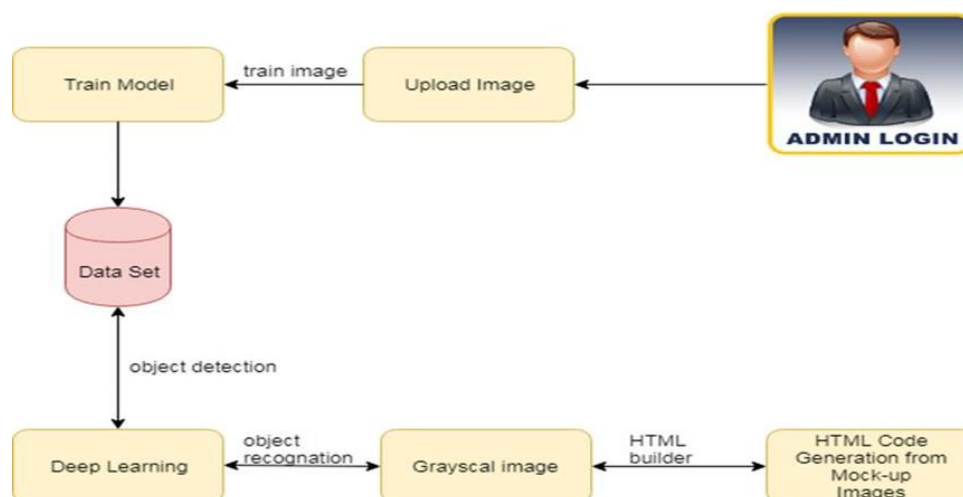


Fig 1. System design for Automatic html code generation from mock-up images using Machine Learning

In this project, we have mainly admin. Admin is the one who manages and maintains all the data in the website. Admin is the person who validates and helps in code generation.

5. System Requirements

The functional requirements are

- Graphical User interface with the User.
- **Upload mockup image:** Images are uploaded to the application.
- **Verification:** Verifying whether correct image is uploaded or not

Non-functional requirements for this project are:

- **Precision:** Precision is used in implementing processes and project activities. Precision is a

goal that most organizations want to achieve.

- **Accuracy:** Accuracy is defined as the closeness of the measured value to a known standard, precision is defined as the measure of exactness.
- **Performance:** Performance is defined as how quickly does the system respond to users' actions, or how long does a user wait for a specific operation to happen.
- **Security:** Application will allow only valid users to access the system

6. Results and Discussions

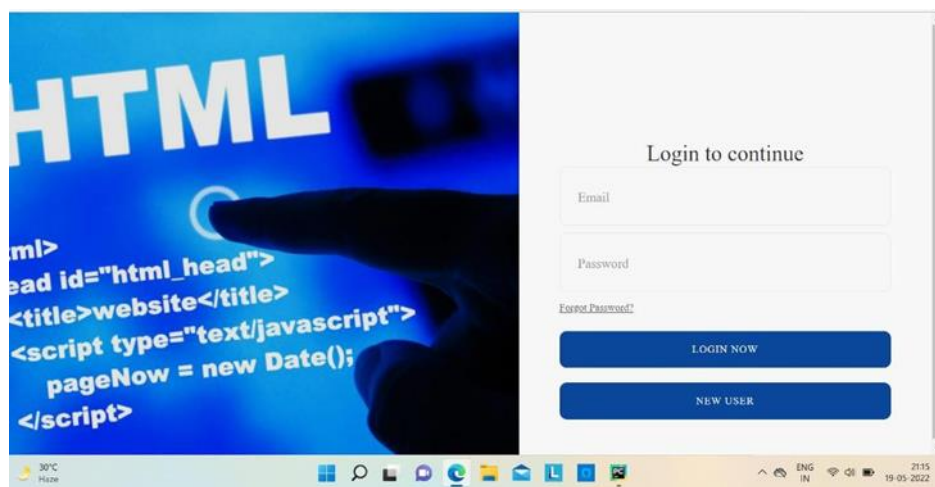


Fig 2. Admin login

- Here the page is for Admin login using username and password After login the admin can upload the mockup images, the images should be in specified dimensions and upload the image.

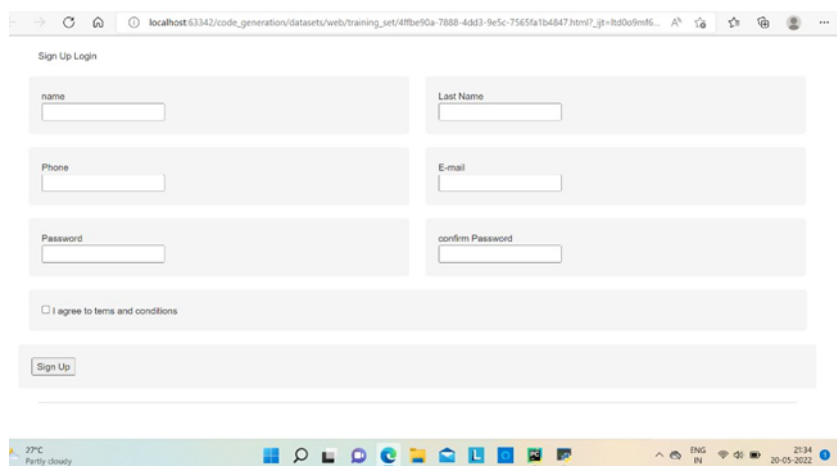


Fig 3. HTML page of the given image.

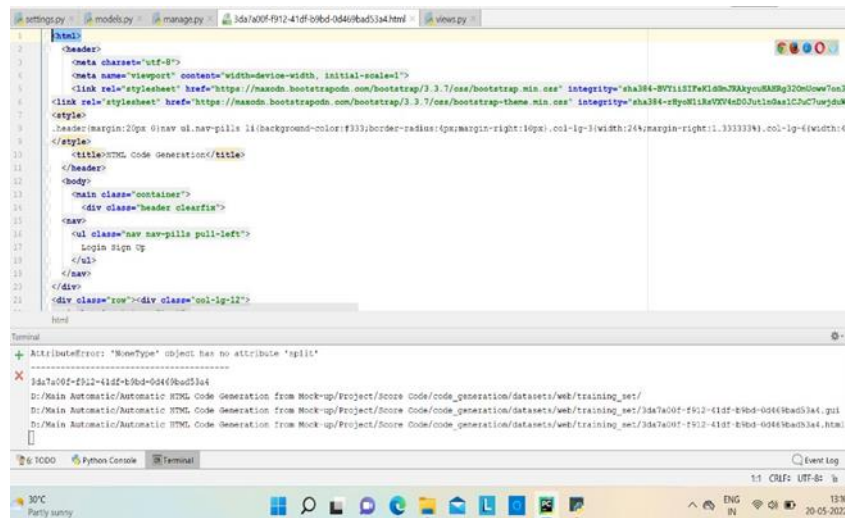


Fig 4. HTML code of the input Image

- According to the input we gave, code will be generated. The related code can be seen in the database.

Converting web page mock-ups to their mark-up code with minimum time and labor cost has become a significant topic in recent years when the artificial intelligence has been rapidly revolutionizing the industry by entering almost every field. In this study, we have developed a system that takes hand drawn web page mock-ups and gives a structured HTML code. To that end, a data set consisting of images containing various hand-drawn sketches of web page designs was used. This data set, which consists of 186 samples in total, has also been utilized in the creation of a corresponding that contains the components contained in each image. Thus, the data set, which was created by grouping all the components in 4 different classes, was used as training data for the CNN model to perform the process of object recognition. In this study, the components in the picture were cropped by performing object detection with image processing techniques. It was determined which components were obtained by our trained CNN model. Finally, the purpose of generating HTML code was achieved using our HTML builder script with the help of the coordinates came from the algorithms of contour finding. As a result, after the training phase of 200 epoch, accuracy and validation accuracy were obtained

7. References

- [1] MicrosoftAILabs,[online]:
<https://github.com/Microsoft/ailab/tree/master/Sketch2Code/model/images>.
- [2] T. A. Nguyen and C. Csallner, "Reverse Engineering Mobile Application User Interfaces with REMAUI (T)", 2015 30th IEEE/ACM International Conference on Automated Software Engineering (ASE), pp. 248-259, nov-2015.
- [3] S. Natarajan and C. Csallner, "P2A: A Tool for Converting Pixels to Animated Mobile Application User Interfaces", Proceedings of the 5th International Conference on Mobile Software Engineering and Systems - MOBILE Soft '18, pp. 224-235, 2018
- [4] T. Beltramelli, pix2code: Generating code from a graphical user interface screenshot, CoRR, vol. abs/1705.07962, 2017.
- [5] K. P. Moran, C. Bernal-Cárdenas, M. Curcio, R. Bonett and D. Poshy-vanyk, "Machine learning

based prototyping graphical user interfaces for mobile apps", IEEE Transactions on Software Engineering, pp. 1-1, 2018.

- [6] S. P. Reiss, Y. Miao and Q. Xin, "Seeking the user interface", Automated Software Engineering, vol. 25, no. 1, pp. 157-193, mar 2018.
- [7] Sketch2code. Microsoft AI Labs. [Online]. Available: <https://github.com/Microsoft/ai-lab/tree/master/Sketch2Code/model/images>.
- [8] ONLINE. Available: <https://github.com/> [7] S. P. Reiss, Y. Miao, and Q. Xin, "Seeking the user interface," Automated Software Engineering, vol. 25, no. 1, pp. 157–193, mar 2018. [Online].
- [9] A. Karpathy and L. Fei-Fei. Deep visual-semantic alignments for generating image descriptions. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, pages 3128–3137, 2015.
- [10] S. Hochreiter and J. Schmidhuber. Long short-term memory. Neural computation, 9(8):1735–1780, 199