

CopyTxT - A CLOUD-BASED ONLINECLIPBOARD

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Abstract

Our project CopyTxT is a cloud-based online clipboard that requires only a device with a browser and network support to be accessed. Upon having a lot of online clipboards in existence, we focused mainly on ease to handle and unique features like code syntax highlighter. Our objective for this project is to make the sharing of text content and code snippets more feasible and secure. We solved this issue using React.js, FastAPI, and MongoDB. Our work on this project resulted in the creation of a website that acts like an online clipboard. Users can just paste any text or code snippets on copytxt.online, and the data will be saved on the cloud and a unique retrieve ID will be generated. We can get the saved data from anywhere in the world through our website. Along with the syntax highlighter, it is more convenient for sharing code snippets, and we can prevent the alteration in syntax during message sharing. We conclude that it was a successful project where we built a unique cloud-based online clipboard that can highlight the code syntax and has data security.

Keywords: CopyTxT, online-clipboard, cloud, code-snippets, syntax-highlighting, share.

1.INTRODUCTION

Clipboards are used in Windows, macOS, Android, IOS, and other devices to access previously copied text information when needed quickly. On the other hand, online clipboard [1] websites are used to share clipboard information across multiple devices over the internet. CopyTxT [7] is an online clipboard website that exchanges the information from your clipboard between different devices. Through most of these websites, users can share text clipboard [12] data across multiple devices with ease. Although, some websites only let users share clipboard data between twodevices or devices connected over the same network. Apart from text data, CopyTxT [17] lets users share code

snippets with other devices. The process of establishing connections and sharing clipboard data between devices is also quite simple in all these online clipboards. Users can also find a good set of additional tools on CopyTxT that allow them to encode URLs, create QR-Codes, etc. CopyTxT can be accessed by visiting copytxt.online. It has additional features such as syntax highlighting for almost all programming languages and a QR-Code[20] generator that converts any URL into a downloadable QR-code in png format.

2.RELATED WORKS:

2.1 QR-Code:

QR codes are becoming an increasingly popular way to share information. They are easy to use and can be read by a number of different devices. Since our project deals with transferring data from one device to another, Having a QR-Code will be a huge advantage. A QR-Code (QRC) is a particular kind of matrix barcode. Denso Wave, a Japanese automobile manufacturer, created it in 1994. This makes the process of retrieving data from one easy. Currently, the QR-Code generator is separately built and can be accessed using a button on the About page. In the next iteration, the clipboard will generate a QR-Code along with the retrieved ID.

2.2 Syntax Highlighter:

CopyTxT contains features such as a syntax highlighter for all the programming languages. It will be more useful if we want to transfer code snippets from one device to another. It also auto-copies the data if we click on the output text area, and a pop-up toast will confirm that the respective code or text is copied into the local clipboard.

2.3 Revealing the Copy-and-paste Habits of End Users:

Users frequently need to move data across apps, and using the clipboard to copy and paste data makes this process quite simple. However, using the clipboard can also cause mistakes and inefficiencies in user operations [9]. We investigated how end users use the clipboard through cut, copy, and paste operations in order to understand and fix these issues. In order to conduct this study, clipboard interactions were recorded while end users went about their daily business. From the clipboard usage

data, we have discovered various usage patterns that characterize how data is transported within the desktop environment. [18] These patterns aid in our understanding of end-user behavior and point up potential areas for the development of clipboard assistance capabilities.

2.4 Recording User Input from Interfaces under Windows and Mac Os:

Event and timing logs are helpful for analyzing user interfaces, assessing software, and contrasting input methods. [23] A technology called Recording User Input (RUI) is used to document how users interact with computers. It is produced there. For Windows and the Carbon framework for Mac OS X, use the Net framework with C#. RUI works with applications that run on Windows or Mac OS X and operates in the background (10.3 Panther and later versions). We employ a human-robot interaction interface to demonstrate its application and provide two straightforward tests that RUI passes and that other timing software ought to pass: preventing 0 msec timings and gamma (or gamma-like) distribution-following time distributions.

2.5 A Longitudinal Analysis of Clipboard and Drag-and-drop Use in Desktop Application:

On contemporary computer operating systems, data flow between and across desktop programs enables effective data-centric work. To shift this data, utilize the clipboard's cut, copy, and paste functions or a more direct drag-and-drop method. Results from a 90-day longitudinal log study of 17 people's interactions with the clipboard and drag-and-drop are presented in this publication. The frequency, timing, and kind of actions, the mode of interaction, and whether the user's computer setting has an impact on these results are all described in the study. The majority of data transfer for multi-screen users happens on the same screen. [6] Different applications use drag-and-drop and clipboard operations, and the clipboard operations used are consistent with prior results. We discovered that drag-and-drop operations are less frequent than clipboard actions (and that drag-and-drop is rarely used by some participants).

2.6 Working with the Clipboard:

The ability to create software that can graphically interact with your system and other apps is one of the key advantages of GUIs . [5] The use of dialogue boxes to open and save files to your computer, change fonts or colours, and send images to a printer has been demonstrated in earlier chapters . You will learn how to use the drag -and-drop and clipboard features to expand the functionality of your software.

3.MATERIALS AND METHODOLOGY:

The Application is developed as a SPA (Single Page Application) for the front end to render the content from the API (RestAPI) and send the content from the user to the server using RestAPI. We used FastAPI to develop the RestAPI to store the content in the NoSQL database (MongoDB). This application is continuously built and deployed using GitHub Actions workflow using Firebase for the front end and Heroku for the backend API. The username and password are stored in the GitHub secrets, this will prevent exposing the database credentials and users' data.

3.1 Rest API:

We developed this application with HTTP / 2 protocol and with asynchronous code for the efficiency of the application. In the /paste URI endpoint we get the data from the user and generate the unique retrieve id and push the document to the database. After storing the data the function will return the unique retrieve id to the frontend application. We serialize the metadata from the user input and store it in the MongoDB collection with `clipboard.insert_one()` command. / retrieve for sending the data from the database to the user . We are querying the database with the `retrieve_id` received from the user using `clipboard.find_one()` method. If there is no document linked with the `retrieve_id` that the to the frontend application.

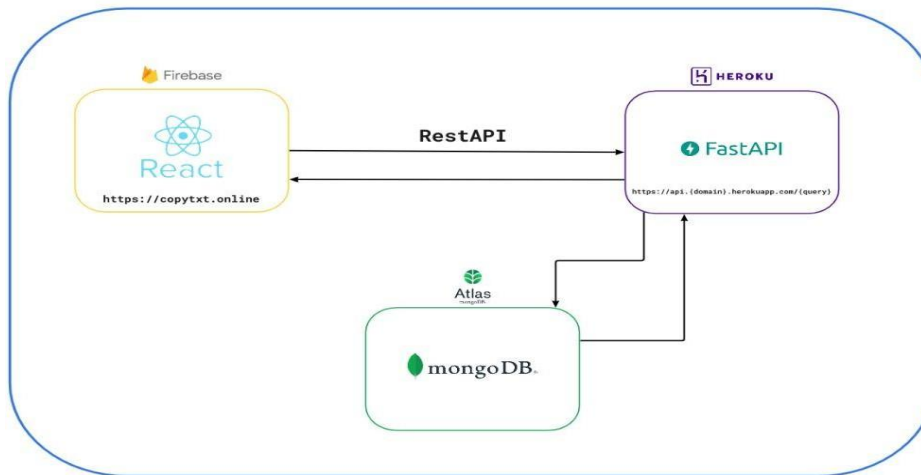


FIG.3.1 ARCHITECTURAL DIAGRAM

3.2 Database:

We used MongoDB which is a NoSQL document-based database that stores data in JSON format. We used PyMongo - a Python SDK for MongoDB for performing CRUD operations in MongoDB. ReactJS (A JavaScript web framework) is used in the front-end which uses JSX format to render the Single Page Application. JSX blends HTML and JavaScript together. In ReactJS every JavaScript file is a reusable component that follows the DRY (Don't Repeat Yourself). The core development of a frontend application is inside the /src directory. We split the components of the application into multiple javascript files. These will help us to reuse the components in the whole project. We assembled every component and mapped the routings of the application and render it inside the <div> tag in a /public directory. Separate the components of a page into different directories, this will make the development of a specific page easier.

3.3 Firebase and Github Actions Integration:

A GitHub workflow is a configurable automated process that will run one or more jobs. A YAML file is checked inside our repository and will run when triggered by an event push to the main branch, or they can be triggered manually, or at a defined schedule.

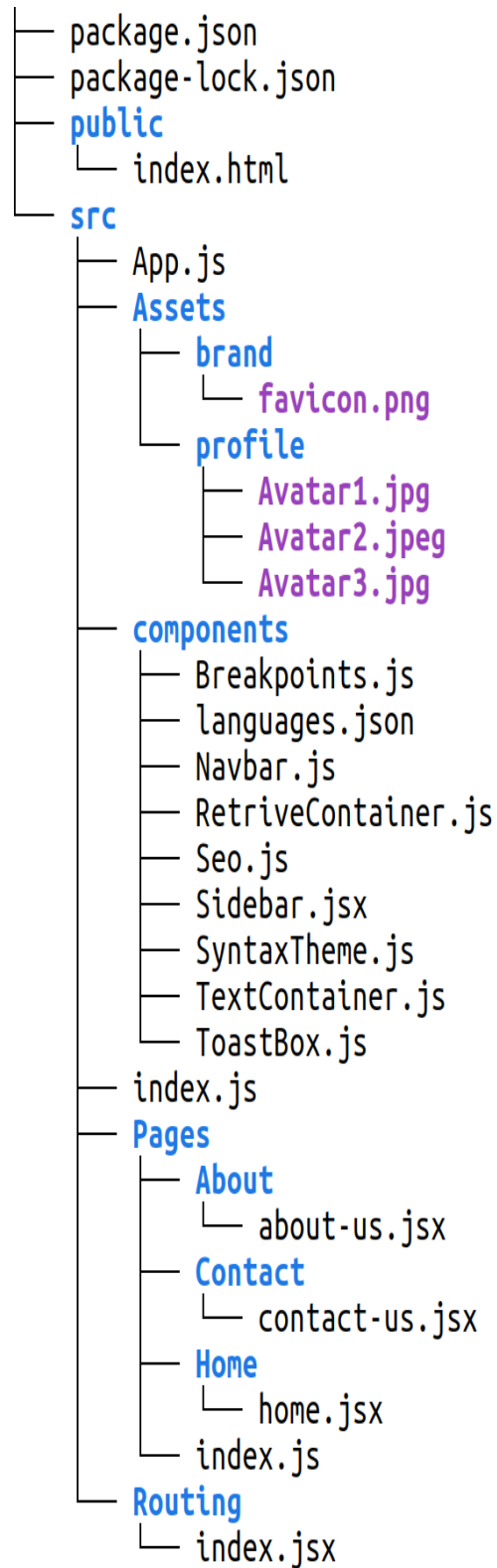


FIG.3.2 PROJECT STRUCTURE

4.FEATURES:

4.1 Syntax highlighter:

Syntax highlighting determines the color and style of source code displayed in the Visual Studio Code editor. It is responsible for colorizing keywords like `if` or `for` in Python differently than strings and comments and variable names. Syntax highlighting can also draw attention to syntax errors. A highlighted source code is easier to scan when you can distinguish parts of it by color. For instance, identifying comments within a code block is easier with syntax highlighting.

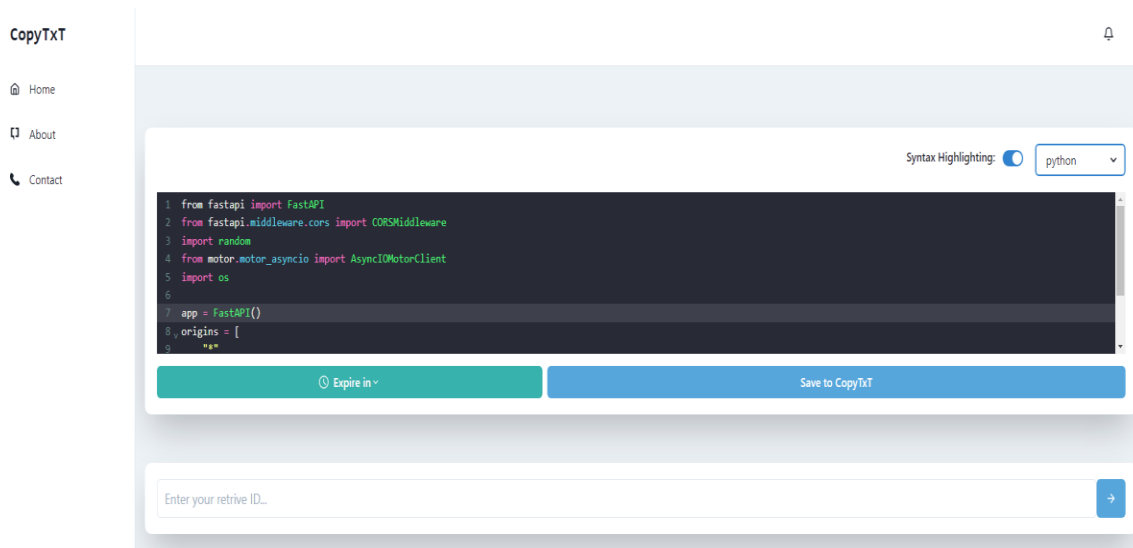


FIG 4.1 Syntax Highlighter

4.2 Toast notification

It is a small message that shows up in a box at the bottom of the screen and disappears on its own after a few seconds. It is simple feedback about an operation in which the current activity remains visible and interactive. It basically is to inform the user of something that is not critical and does not require specific attention and does not prevent the user from using the app device. Toast Notifications should stay on the screen for 5–6 seconds, so that they do not block the information behind them for too long,

but allows the user to read the message. They should not be interactive, you don't have to think about it or type about it, and should be shown just to inform you with text/icons or both.

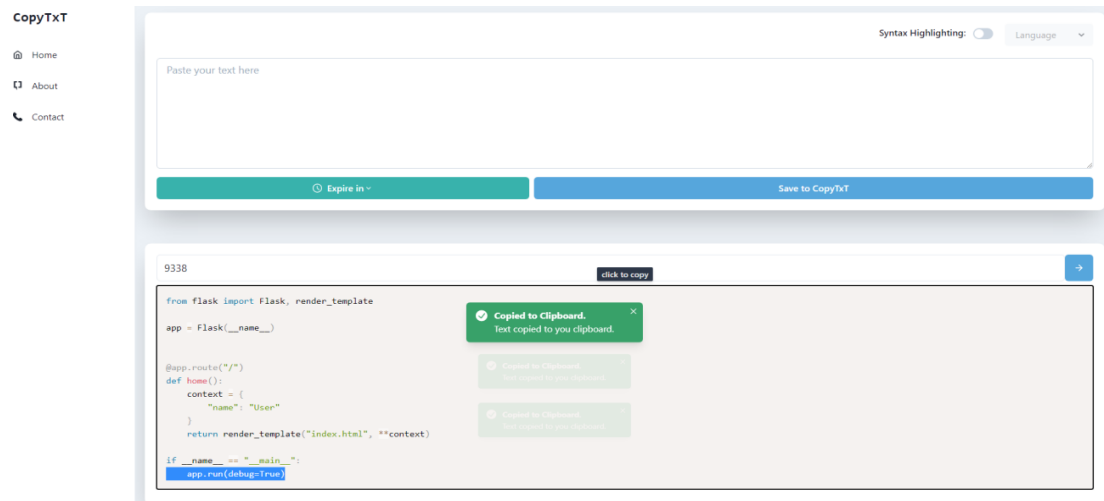


FIG 4.2 Toast notification

4.3 Download option

We can download the generated QR-Code as a png file, so that we can share it with anyone in a preferred way. Png format is widely accepted so it is very convenient to share anywhere

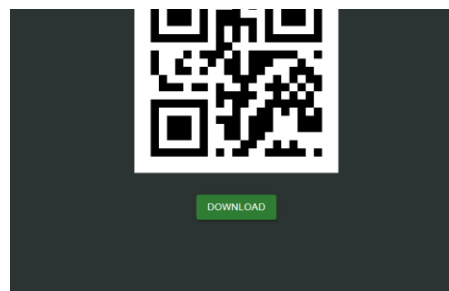
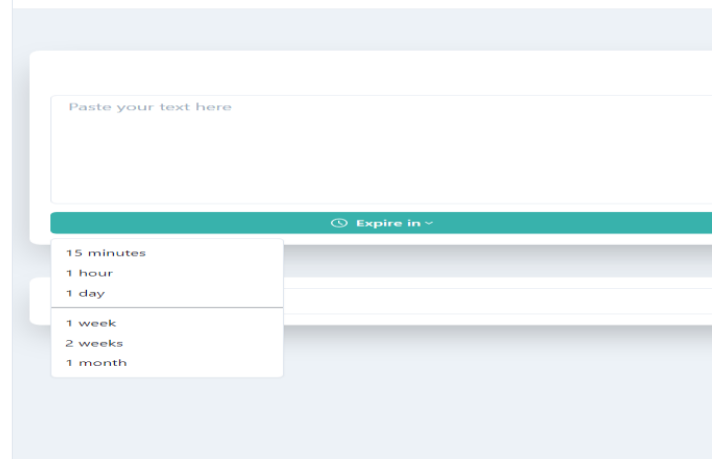


FIG 4.4 QR-Code Download option

4.4 Auto Expiring

We can specify the lifespan of our data, that is the data stored will be deleted automatically. The time range can be selected between 15 minutes to 1 month. This feature is implemented using MongoDB TTL index.



5. RESULT AND DISCUSSION:

The UI in Fig.5.1 displays a simple text box that accepts text and code snippets from the user to save them in the cloud. Also, it contains a toggle button for syntax highlighting features and a dropdown enables us to choose the language we use. It has two buttons, one is for choosing the lifespan of our content and the other one is for submitting our content.

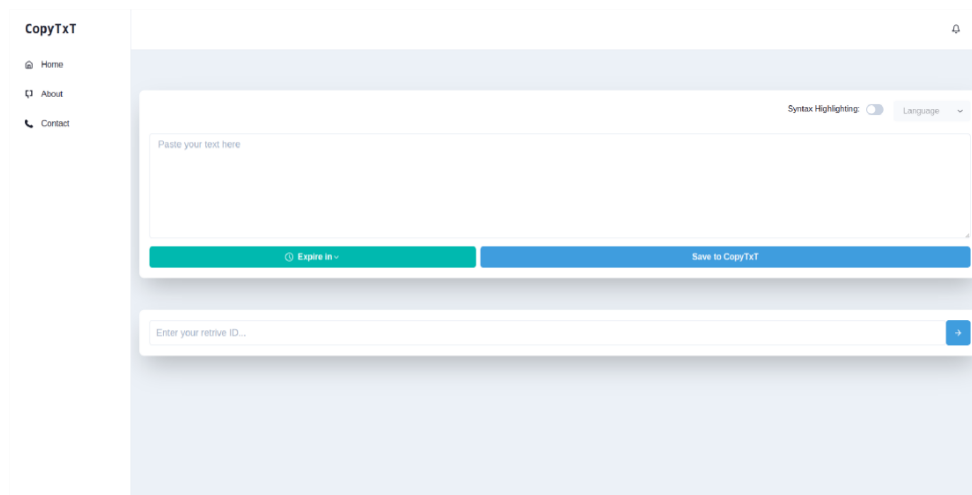


FIG 5.1. User Interface

The syntax highlighting feature is supported for almost all programming languages with the help of a dropdown.

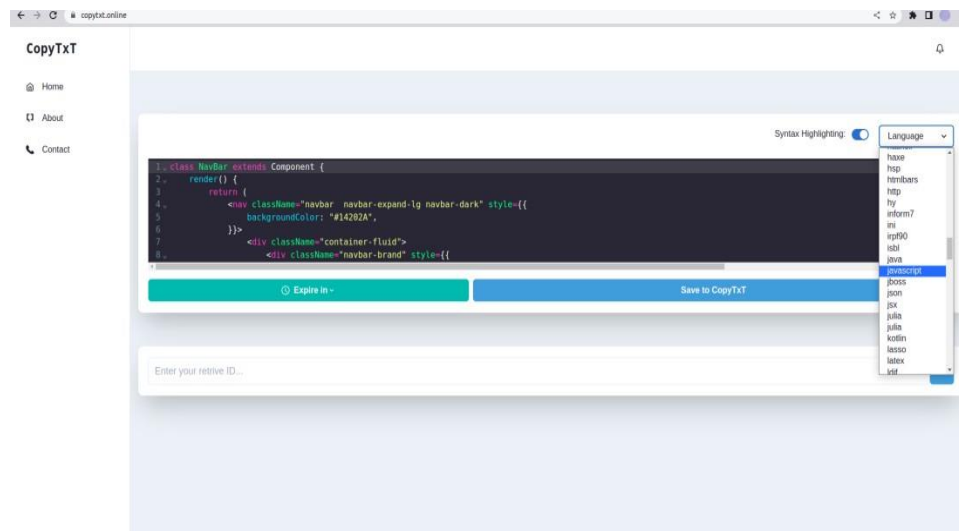


FIG 5.2. Syntax Highlighting

6.CONCLUSION

This study examined how an online cloud-based clipboard works and how data transfer is done using various devices throughout the world. The only things that are required are the devices that need to be connected to internet facilities and the devices that need a web browser to browse the website. With that, we can send the data or retrieve it wherever we want, and we can access the data with any type of device we want. The most unique feature of this project is syntax highlighting. The highlighter provides support for almost all the programming languages, from which the users can opt according to the project they are working on. Another significant feature of this project is that the users can set time limits from 15 minutes to 1 month, this time limit can be manually adjusted by the users. The data stored on this website will be deleted automatically according to the time limit set by the users. To conclude, this project is an online clipboard that can be used by anyone to transfer text or code snippets across the globe without using any user credentials.

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