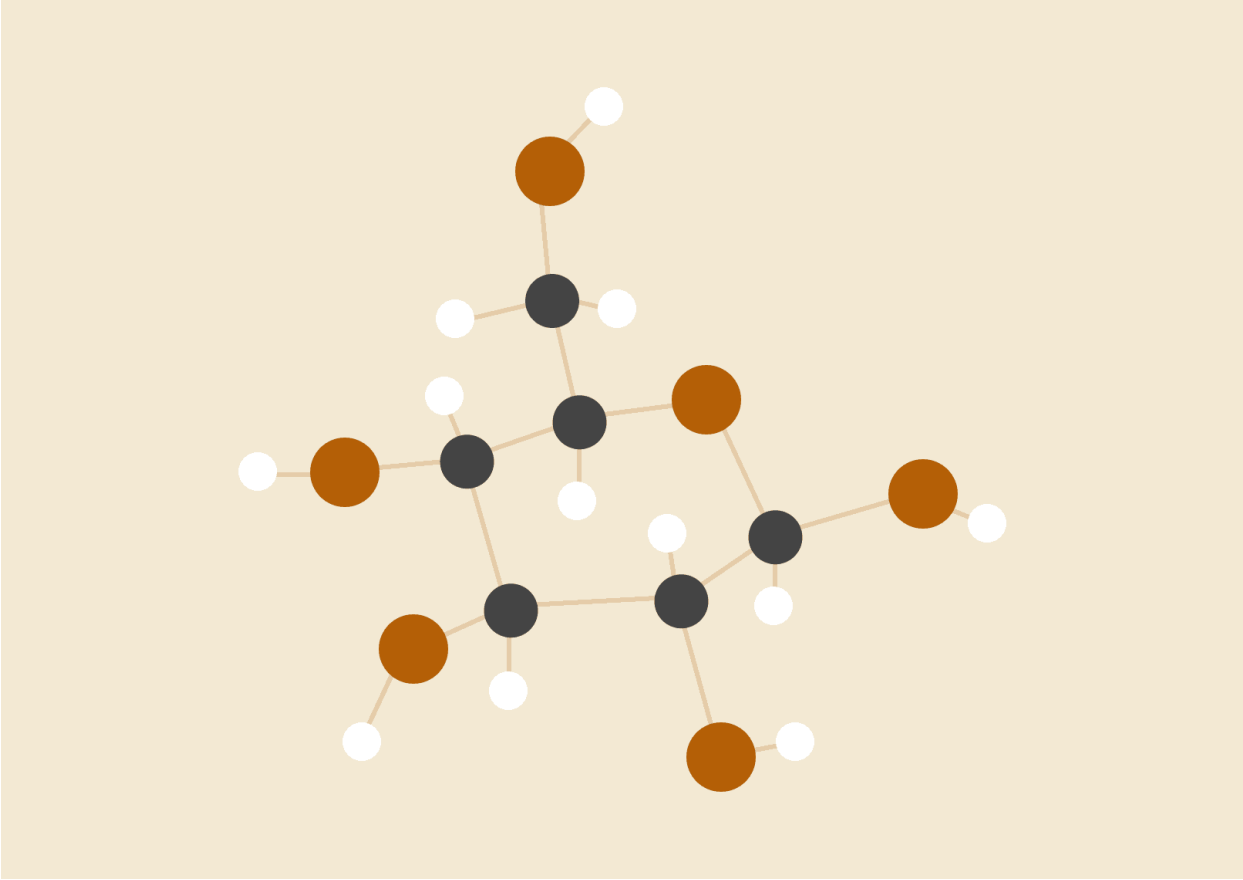
TransLateX

Lab E Final Report



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12.13
PUI

INTRODUCTION

Welcome to TransLateX, a revolutionary platform designed to transform the way handwritten mathematical equations are processed and translated into digital LaTeX format. My website serves the primary purpose of providing users with a seamless and efficient tool to scan handwritten mathematical expressions, offering a quick and accurate solution for converting them into a format that is widely used in digital environments.

At TransLateX, I convey the power of technology in simplifying complex tasks. The website enables users to effortlessly upload images of handwritten math equations, facilitating an automated process that translates them into LaTeX—a markup language commonly employed for mathematical notations in digital documents, presentations, and more.

What makes TransLateX particularly interesting and engaging is its blend of cutting-edge image processing technology with the elegance of LaTeX. Users can witness the magic of their handwritten equations being accurately interpreted and transformed into a format suitable for various digital applications. The interactive and user-friendly interface enhances the overall experience, making the conversion process both intuitive and efficient.

My target audience includes students, educators, researchers, and anyone dealing with mathematical notations. Whether you're a student looking to digitize your class notes, an educator creating digital content, or a researcher sharing mathematical findings, TransLateX is tailored to meet your needs.

Interactions

Image Upload Interaction

- Interaction Type: File Upload
- Reproduction: Click on the "Upload" box, select a handwritten math image onto the designated area, and observe the system processing the image.

Preview and Verification Interaction

- Interaction Type: Visual Confirmation
- Reproduction: After uploading an image, review the preview of the converted LaTeX equation on the screen. There will be an window popping up automatically.

Conversion Process Interaction

- Interaction Type: Automated Processing
- Reproduction: After uploading the image, click the “submit” button to witness the automated conversion process where TransLateX interprets and transforms the handwritten math into LaTeX format.

Copy LaTeX as Text

- Interaction Type: Copy Text to Clipboard
- Reproduction: Click on the "Copy" button to copy the converted LaTeX equation to clipboard. Verify that the downloaded file accurately reflects the mathematical notation.

History

- Interaction Type: Intuitive UI
- Reproduction: Navigate through the website using clearly labeled buttons and sections. Observe how the user interface guides you through the process without unnecessary complexity.

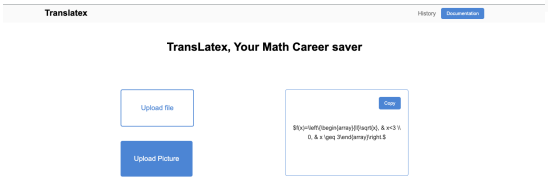
Responsive Design Interaction

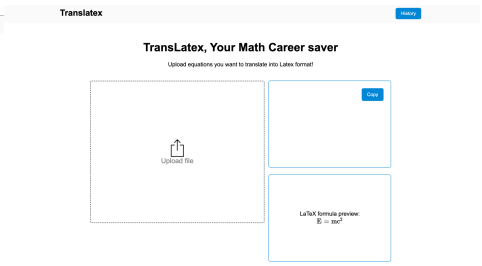
- Interaction Type: Responsive Web Design
- Reproduction: Access TransLateX from different devices (e.g., desktop, tablet, or smartphone) and notice how the layout adapts to different screen sizes, providing a consistent and user-friendly experience.

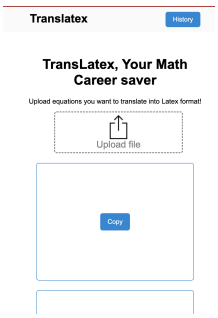
External Tool

1. MathPix API
    a. I use MathPix API to process the images that the user uploads. It is the core functionality that my website relies on. I created a backend server to host my API keys, and provide POST calls for the client side server. Every time when a user requests processing an image, an API token would be sent to the client server and be used to access MathPix service.
2. Express and Node.js
    a. In order to protect my API key, I created a backend server that hosts my API key and passes an API token to the client side using Node.js and Express.
3. React library
    a. This is what I used to created the front end application. In particular, I use the React-Latex rendering engine to render Latex code directly on my website.

Iterations







Previous Final Mobile

I conducted a number of usability testing with a lot of classmates diverging in their mathematical educational background to assess the clarity of the interface and the effectiveness of the conversion process. The main uprooting I focused on was the intuitiveness of each element(button, image preview, etc) on the website.

Besides I tried many different layouts and ended with a large file input box to make the entry point as clear as possible. I also make the screen responsive and adaptive to

mobiles, increasing the usability since it will be easier for users to take a picture and upload directly through cell phone.

Challenges

1. The main challenges I encountered was to implement the backend server and figure out how to deploy my backend to a cloud as it was the first time for me to figure such deployment. Eventually, I deployed the backend successfully to my server on Heroku.
2. There are a few functions I haven't figured out how to implement such as copying latex as image to clipboard. Those would be my future direction of researching.

Appendix: