

Automated video building software - A Project by WPDeveloper

by

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An internship report submitted to the Department of Computer Science and
Engineering
in partial fulfillment of the requirements for the degree of
B.Sc. in Computer Science and Engineering

Department of Computer Science and Engineering
Brac University
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Declaration

It is hereby declared that

1. The thesis submitted is my own original work while completing degree at Brac University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. We have acknowledged all main sources of help.

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Abstract

Human brain is structured in such a way that it can easily catch and analyze graphical content. So that at present time building video content has become more popular around the world. For marketing, promotional purposes, describing something video can be an essential medium. Building video content is still a hard task for many people. For making building video easier we are making this automated video building tool.

In this project I was working in the rendering video content section. For rendering videos I needed to work in languages like php, python, javascript,bash, ffmpeg, GLSL for transitions effect in video etc.

The work was challenging but interesting. I learnt a lot of new things everyday and solved a lot of problems. For instance GLSL and ffmpeg were fully new things for me. I never heard of these things before joining the company. Through work and experiences I attained skills about new programming languages,work culture in a company, teamwork, leadership, interpersonal and research skills.

Everyday I was facing new challenges and getting satisfaction when the challenge was solved. Challenges I was facing like rendering html designed video, syncing text to speech and voice with the video, attaching proper animation in the video etc.

I was facing a lot of new challenges everything and solving lot of new problems in my own way, I recommend that as a student we should solve practical issues in class rather than theory as problem solving is the main key of doing software development related task, the problem could be fully new, unknown, if anyone know how to solve any problem easily the professional job will be more enjoyable and easy for students like us.

Dedication

I want dedicate all my efforts and struggles of the educational life to my dear parents; without them I'm meaningless. I love to remember my dear father here who passed way in Oct, 2020.

Also I devote the work of this internship report to respectable supervisor Nasir Nobin who taught and supported me in developing my personality as a competent professional.

Acknowledgement

Firstly, all praise to the Great Allah for whom my internship have been completed without any major interruption.

Secondly, to my supervisor Md. Nasir Uddin Nobin, Sr. Soft. Engrn., YIVE for his kind support and advice to complete my tasks in internship. He helped us whenever I needed help.

Thirdly, Dr. Md. Golam Rabiul Alam sir guided me on the whole time during the internship period

And finally to our parents without their throughout support it may not be possible. With their kind support and prayer we are now on the verge of our graduation.

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Chapter 1

INTRODUCTION

1.1 Preamble

We learn many things in our university and internships give the opportunity to the students to get the practical learning experience outside of the traditional classroom context, in which they can improve their abilities, build expertise through work in a professional environment and build interpersonal professional skill by working on real life projects. It allows students to apply their theoretical knowledge to more challenging real-world situations.

I was invited by Mr Nasir Uddin Nobin(Sr. Software Engineer of Yive Systems) to do the internship in an exciting project.I was really grateful to get the chance to do an internship under a skillful person like him in a renowned company of Bangladesh named WpDevelopers. Then I reached my supervisor Dr. Md. Golam Rabiul Alam sir attended the internship program and he approved it after giving the company and project details. BRAC University provides this internship opportunity for the following purposes.

- To give the student a taste of real world working experience.
- To give the student an opportunity to apply their learning in real problems.
- To make the students more ready for their future professional life.

As a running student, an internship is really a great experience as it really improves the thinking ability of the students and shows the guideline to the professional world. I improved my soft and hard skills a lot after joining the internship program and I think students should take this opportunity provided by BRAC University to improve them too.

1.2 Objective

The document is generated after working 6 months in WPDevelopers based on my experience with the company and it's generated as a requirement of an internship program under Computer Science and Engineering department of BRAC University. So the general objective of this document is to complete the internship program. Apart from this I generated this document to give an overview about WPDeveloper and discuss their products, working experience in WPDeveloper.

This report will also represent my accomplishments, project work, and professional development during my iInternship. In addition, anyone searching for a quick summary of WPDeveloper would find the information in this report beneficial.

1.3 Information Sources

The information I shared in this report was primarily collected by me while working on WPDeveloper. I collected that information while working there and interacting with others, also I used secondary sources in this report like information from the websites of WPDevelopers, internet etc.

1.4 Document Overview

I shared my work experience with WPDeveloper, apart from this I discussed my achievement and growth while working with the team. I discussed briefly about the project I was assigned while completing the internship and some of the challenges in the project and how I overcame those problems. In a nutshell this document will give a clear overview about WPDeveloper and detailed information about my growth while doing this internship.

Chapter 2

COMPANY'S PROFILE

2.1 Company Overview

With 60+ enthusiastic employees WPdeveloper is one of the best IT companies in Bangladesh with a great working environment. The company mainly develops wordpress related plugins. One of the products of this company named “Essential Addons for Elementor” has more than 9lakh active users. [2]The company mainly focuses on giving the best user experience by creating robust and user friendly wordpress plugins for making web development more fun and easier. WPdeveloper also has some software as service products like easy.jobs, YIVE etc.

It's really fun to work in that company. With 2 holidays every week, the company has a flexible work time schedule and work environment. Everyone in this company is friendly and cooperative. The company also follows a user centric leave system, If anyone needs a day off from work he can easily submit an application for the leave via email and it's done. During covid-19 lockdown the company is providing opportunities to work remotely.

In daily office life WPdeveloper provides many facilities. It provides unlimited tea and coffee for all of the employees. The company also provides lunch everyday. There are some indoor game facilities like table tennis, foosball available for refreshment purposes.

Every year the company arranges a yearly tour inside or outside the country which helps the company's all employees to get full refreshments.

The company has dedicated sections for completing all tasks. It has a dedicated marketing team who handle all kinds of marketing tasks, it has a developer team who is responsible for completing the development tasks and has a design team who are responsible for designing.

The company is an employee centric company which focuses on improving the company by improving employees' life. It believes if an employee becomes better day by day the company will make better progress. Everyone can expose their opinion in daily meetings about how the company can do better.

2.2 First day of joining WPDeveloper

I was very excited to visit WPDeveloper on the first day. I visited WPDevelopers office with my supervisor Nasir Uddin Nobin. Luckily we met our founder M Asif Rahman in the lobby and my supervisor Nasir Uddin Nobin introduced me to Asif

bhaia, yes we don't call everyone 'bhaia' in WPDeveloper and that emphasizes how friendly the company is. Asif bhaia talked with me with a beautiful overwhelming smile on his face while we were sharing the lift. Then after entering the office I was introduced to other office members. Then I met with Nazmul H. Rupok bhaia, CEO of WPDeveloper, he is really a humble person.

On the day of joining the office arranged a pizza party for one of the milestone has achieved and I got a beautiful chance to met all the employees in a single ground, I interacted with most of the people by myself. After talking most of the employees in the office I felt happy that I'm going to start my internship journey with a bunch of awesome peoples.

WPDeveloper is located in a very nice location at Mirpur DOHS with a great view from the balcony. After entering the office I felt very comfortable with the office environment and interior. It's a really work friendly office environment with all the necessary things. For instance there is a nice green artificial grass in the floor of the corridor where anyone can sit anytime, if anyone feels sleepy while working unlimited coffee is available. If the coffee doesn't work there are bean bags available for taking a quick nap.

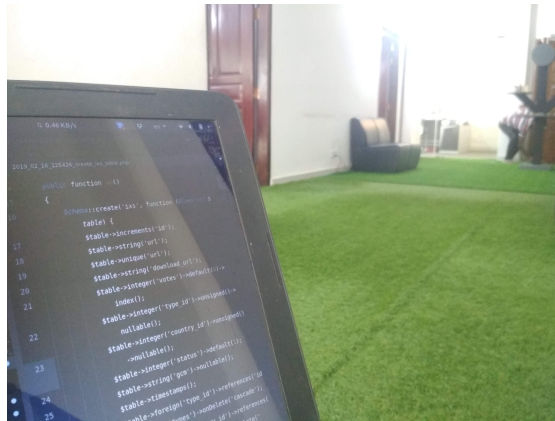


Figure 2.1: WPDeveloper Lobby

Office weather is also relaxing to watch as the office is surrounded by a nice lake and natural beauty.



Figure 2.2: View From Office

On the first day, I was amazed to see all the office facilities and environment and it

gave me a feel that my internship journey is going to be very nice with this lovely office. improve them too.

2.3 Products And Customers Overview

Wordpress is one of the most popular CMS in the world which can be used to easily develop a blog or website. WPDeveloper mainly sells add-ons and plugins for wordpress. With 25+ wordpress related products it has 3million+ active customers and 24 million+ products downloaded. Customers mainly use these products to easily build and customize their wordpress websites. Apart from this WPDeveloper also has some software as service products like Easy.jobs - Easy Job Hiring Solutions, YIVE - Automated video Building solution etc. These SAAS products also serve thousands of happy customers. Also, WPDeveloper already sponsored many wordpress events worldwide including WordCamp Kolkata 2019,WordCamp Kuala Lumpur 2018, WordCamp Ahmedabad 2018,WordCamp Europe 2019. [1]



Figure 2.3: Wordcamp Sponsorship

Chapter 3

WORKPLACE DETAILS

3.1 My Responsibility

In the first few days I was not assigned to any particular tasks, I explored the office and got to know other employees working here. Then after some days I was assigned a task by Mr Nasir Uddin Nobin to understand one of the projects the company already did, based on that project I would work on the future one. After successfully understanding that project I was assigned for doing the automatic video render related tasks in our video automation project. I learned many things like ffmpeg, javascript based video rendering in browser, git, shell script etc and successfully completed my part of rendering that project.

With the flexible working time I was able to balance my study and work perfectly. Also, my supervisor gave me support to continue my study smoothly, like he gave me paid leave for my final exams.

3.2 Organization Structure

The company has 60 team members and it's growing so fast. Currently the company structure can be illustrated as below figure

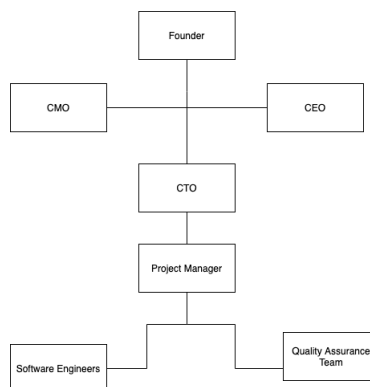


Figure 3.1: Organization Structure

3.3 Communication

The company uses a slack app for the primary communication of the company. All kinds of announcements related to the company are posted over slack where everyone can react and express their feelings together. Also, for knowing if everyone reached the office or not as the company has flexible timing the company uses slack for daily check in and check out. Any employee can communicate with other employees through slack. For tracking the leave and vacation the company uses Zoho People app, where anyone can send a leave application.

3.4 Remote Office

In the COVID - 19 first outbreak in 2020, the company was operated remotely. Every employee worked from home at that crucial time. Still in an emergency any employee can join the office remotely though it's not encouraged to do so. In the remote office an employee should give his updates about remote work-space for getting properly synced with others.

3.5 Work-space Facilities

3.5.1 Unlimited Coffee and Tea

In the office there is a tea and coffee machine situated for providing unlimited tea and coffee, anyone can have a cup of coffee and enjoy the view of the lake anytime he wants.



Figure 3.2: Coffee With Nice View

3.5.2 Lunch Facilities

WPDeveloper has its own chef who cooks delicious lunch everyday for all the employees. The employee should let the office know if he should take the lunch for the next day or not in slack, based on his vote he will be provided lunch. This pre-booking was needed to prevent food wastage as the office supports remote employees. The lunch time generally starts from 1:30 pm everyday and everyone enjoys lunch together in the office from that time.

3.5.3 Indoor Playground

There is an indoor playground available in the office to play table tennis, futsal. The play time usually starts from 3p.m everyday. Anyone can participate and play. The office also arranges tournaments every year. My team became the champion of the table tennis(double) tournament of 2020.



Figure 3.3: Playground



Figure 3.4: Tournament

3.5.4 Birthday Celebration

I love the way WPDeveloper treats an employee's birthday by celebrating the birthday with a cake gifted from the office. Every employee attends the celebration and wishes the person a wonderful birthday.



Figure 3.5: Birthday Celebration With Cake

3.5.5 Achievement Celebration

WPDeveloper celebrates its special achievement by giving a pizza party or arranging special food. It's really a happy moment to enjoy the achievements together as a team.



Figure 3.6: Pizza Party At Office

3.5.6 Special Coffee

WPDeveloper also added special coffee for the employees and added a cafe called WPCafe in the office. From this cafe employees can enjoy premium coffees like espresso, americano, cappuccino etc.

3.6 Conclusion

In a nutshell, WPDeveloper provides an enthusiastic, energetic and employee friendly workplace which is getting better day by day. There is no chance to become bored of anything as the place is full of energy and positiveness, everything is great and it can be a perfect workplace for a person.

Chapter 4

MY CONTRIBUTIONS

4.1 Project Overview

I worked on a software as service named YIVE by WPdeveloper. The full form of YIVE is “Your Automated Video Empire”. It’s an automated video building platform. The goal of YIVE is to provide automatic video building solutions to the user so users can use that video for marketing,seo and other purposes.

The project’s main goal is to make a good video automatically by using minimum effort from the user. Also if the user wants we can broadcast our automated generated videos to users required platforms like youtube, facebook etc.

- The project requirements will be like below.
- User will provide a simple keyword
- We will crawl on the web by user’s given keyword for searching relevant images, videos or articles.
- We will generate videos by using that content.
- The user can edit the generated automated video as they need, they can replace the image, text or videos. Also users can attach their own content in the video. For supporting this feature we will scrap content slide by slide so users can edit any of their slides easily.
- Apart from automated video users can create their own manual video by using their own content, they just need to generate slide by slide content and we will render those slides to a video.
- Users can use our provided text to voice service to give voice over in their video.
- Users can use our provided background music and control the sound of the background music.
- Automated video upload/distribution to digital platforms using users given credentials.

4.2 System analysis and design

We planned the project output as the following structural diagram 4.1

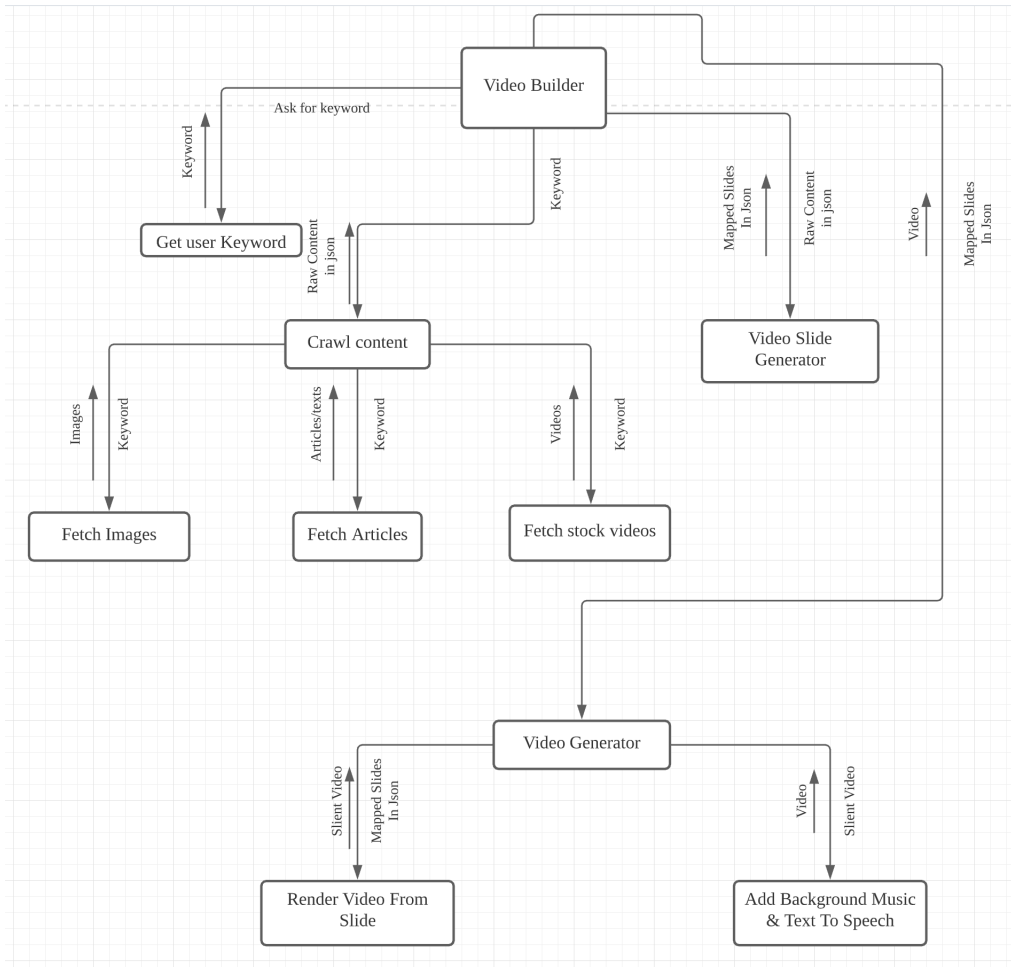


Figure 4.1: Structure Diagram

4.3 Project Responsibilities

As a competitive programmer I always love to do challenging tasks, so after discussing with my project supervisor I was assigned to complete one of the challenging tasks of the project. My supervisor was always helping me and providing effective suggestions to complete this task from his experience.

I was assigned to do the automatic video render related tasks of this project. Necessary contents for generating videos will be provided to me as structured JSON format and I rendered those contents and gave the final video as output.

The final output contained text overlay animation, animations while changing the video scene, text to animation, voice over. Everything was described in the JSON file and my part was to follow json files structure and use content provided and generate a video.

Instructions like text animation position, text animation duration, video animation duration everything was described on that single structured file like this 4.2

```
1  {
2    "output": "demo1.mp4",
3    "width": 640,
4    "height": 480,
5    "audio_bg": "input/1.mp3",
6    "audio_bg_volume": 0.1,
7    "parts": [
8      {"effect": "effect_1" ...},
32     {"effect": "effect_1" ...},
51     {"effect": "effect_1" ...},
76     {"effect": "effect_1" ...},
95     {"effect": "effect_1" ...},
119    {"effect": "effect_1" ...}
144  ]
145 }
```

Figure 4.2: Video Info In Json

4.4 Implementation

I used browser based html recording for rendering the video based on the instructions provided in the json file generated using Video Builder UI. All the instructions about generating the html file are provided in the json file, I needed to parse them and show the html output in the browser and record the html output animations for provided time.

Here is the structure diagram for this implementation. 4.3

4.5 UI For Changing The HTML Elements

We created a Builder UI 4.4 4.5 from here user can change the value of the video elements slide by slide

4.5.1 HTML Rendering

For rendering the video I needed to render the provided json file to a html file and show the file based on the parameters passed in the json file. The json file contains multiple parts for the html generation. 4.6 Here every element in the parts json contains the following values

4.5.2 Input

This input field contains the following parameter- -background image to generate the html file - effect applied to the image - duration of the effect -duration of the generated html file part in full video

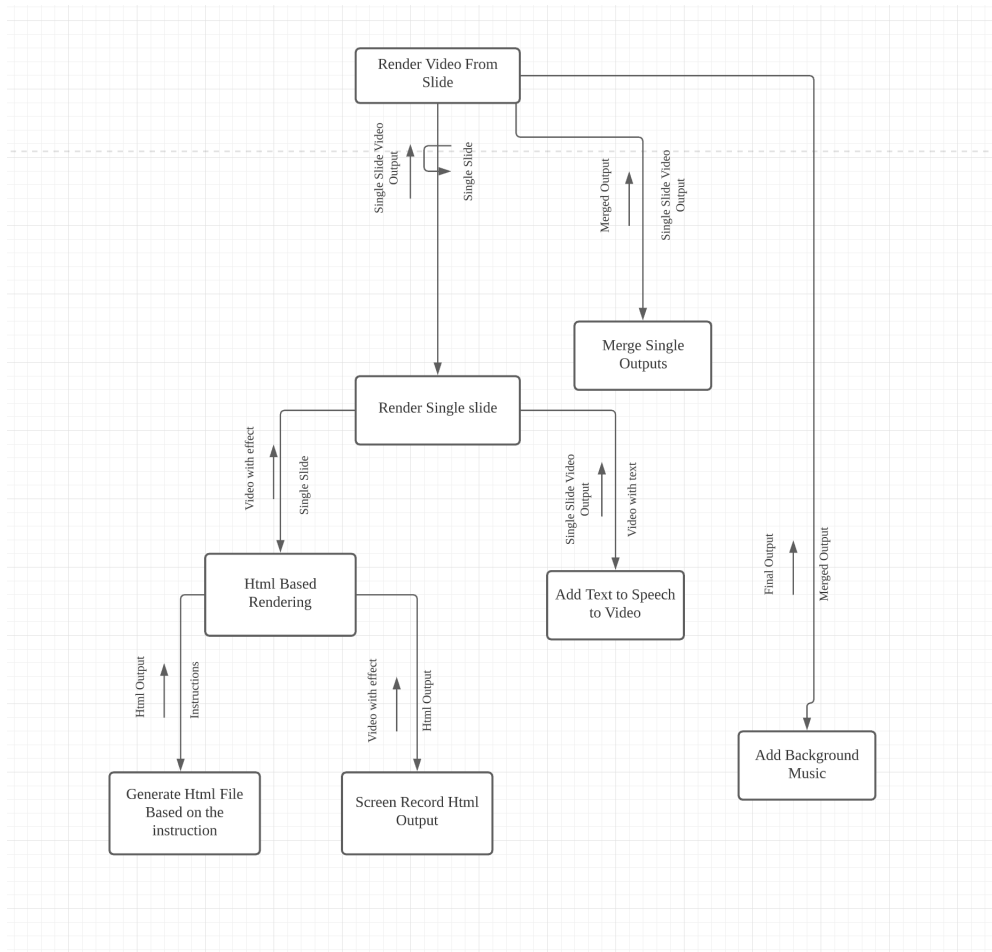


Figure 4.3: Structure Diagram For Video Rendering

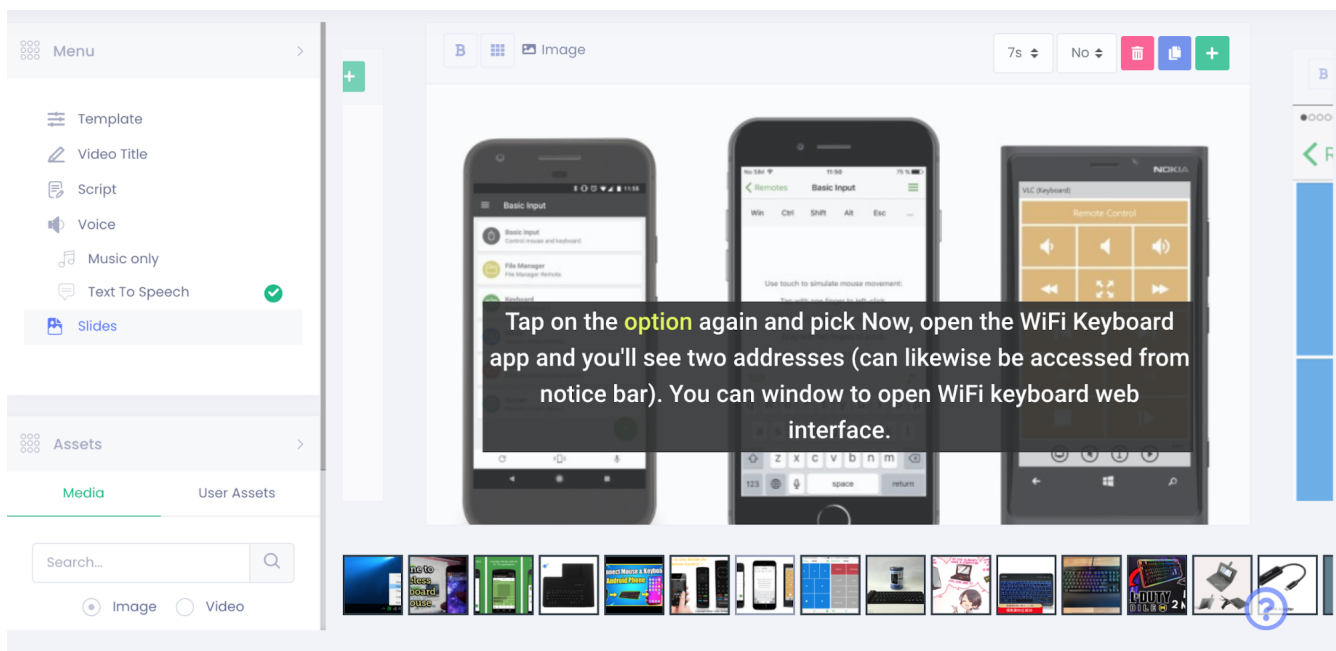


Figure 4.4: UI For Changing The Video Element

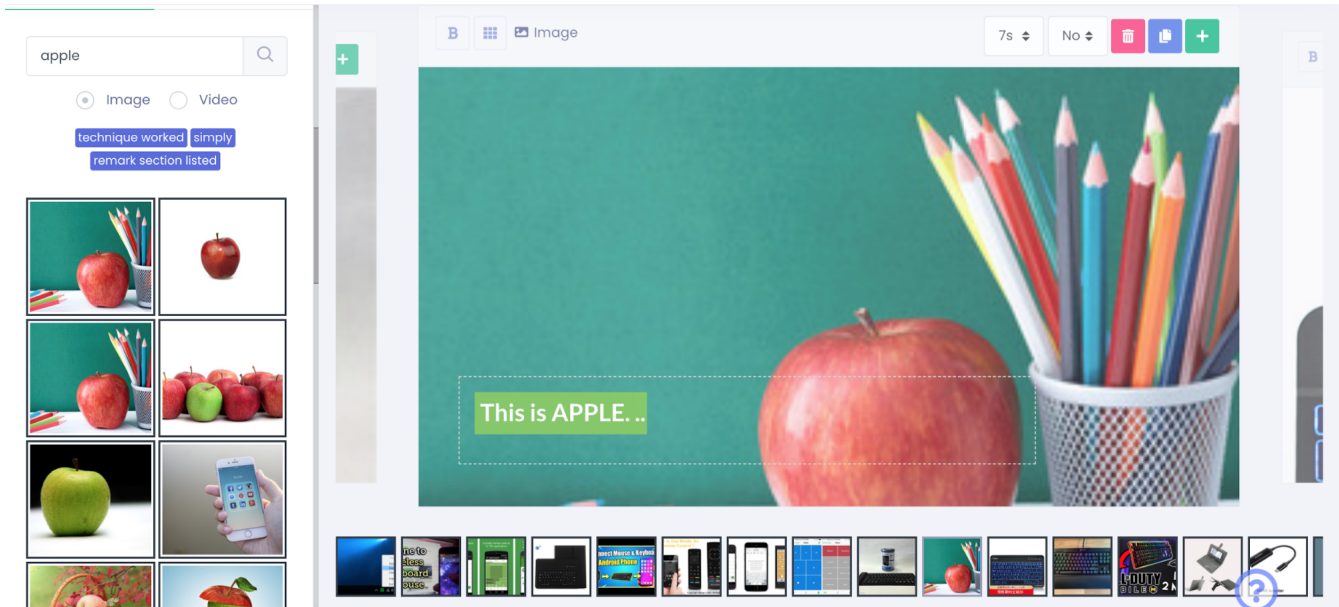


Figure 4.5: User Can Update/Change From the UI

```

{
  "output": "effect_3_alignment.mp4",
  "width": 640,
  "height": 480,
  "audio_bg": "input/1.mp3",
  "audio_bg_volume": 0.1,
  "parts": [
    {"effect": "effect_3..."},
    {"effect": "effect_3..."}
  ]
}

```

Figure 4.6: Slide parts in json array

```

"parts": [
  {
    "input": {
      "image": "input/1.jpg",
      "effect": "zoom_out",
      "zoom_duration": 6,
      "smooth": 5,
      "zoompan_up_to": 0.6,
      "zoom_x_direction": "left",
      "zoom_y_direction": "center",
      "audio": "input/speech1.mp3",
      "duration": 10
    },
    "effect": "effect_1",
    "text": "For this reason, you should be careful that <b>fadein+fadeout</b> is not greater than the duration of the audio",
    "text_color": "#FFFFFF",
    "move_from": "left",
    "move_to": "top",
    "text_align": "bottom-left",
    "background_color": "#211490",
    "background_color_transparent": "10",
    "accent_color": "#F7F773",
    "text_size": 36,
    "font_file": "input/Roboto-Regular.ttf"
  }
]

```

Figure 4.7: Single part of provided Json file

4.5.3 Text

Text overlay to the generated html file

4.5.4 Effect

Effect applied to the text

4.5.5 Text Color

Color applied to the html text

4.5.6 Text Align

Alignment of the generated text

4.5.7 Background Color

Background color of the text

4.5.8 BG Transparency

Transparency of the background color

4.5.9 Text Size

Size of the generated text

```

1  {
2  "url": "http://yive3.test/storage/uploads/user-4/images/20210605-cd29bb3c-8dec",
3  "text": "&nbsp;This is a apple",
4  "type": "image",
5  "effect": "zoomIn",
6  "duration": "7000",
7  "thumbnail": "http://yive3.test/storage/uploads/user-4/images/20210605-cd29bb3c-8dec",
8  "text_color": "black",
9  "transition": "fadegrayscale",
10 "text_position": "top-left",
11 "backgroundcolor": "lightblue",
12 "text_transition": "typing"
13 }

```

Listing 1: Json Data For Rendering Html

4.5.10 Font

Font applied to the text

Based on this values I generated the HTML output of the video slides.

4.6 Rendered HTML Pages

Based on the json file generated from video builder UI I generated the HTML output using php and javascript.

I used PHP to convert the json to appropriate HTML and javascript for adding all the items in place, adding special effect/animation, showing text overlay and text animation.

Here is the example of rendered HTML output.

4.6.1 HTML rendered outputs

This is the html output 4.8 for input **json 1**

This is the html output 4.9 for input **json 2**

4.7 Record Rendered HTML

Firstly I showed the generated html file in browser on server using virtual display then I used timecut, a open source javascript library to record those rendered html output from the virtual display based on the recording duration. Timecut uses frame by frame recording mechanism for recording from browser in a specific resolution given by user then merge all the frames by using FFMPEG an output the recorded file in mp4 format. 4.10

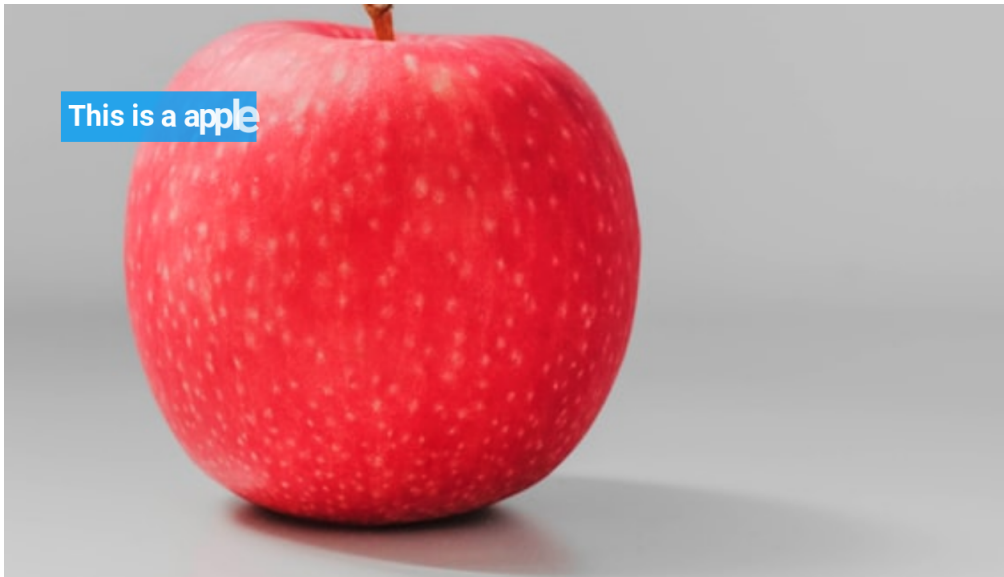


Figure 4.8: Html Output 1

```
1  {
2  "url": "http://yive3.test/storage/uploads/user-4/images/20210605-cd29bb3c-8dec",
3  "text": "&nbsp;This is a apple",
4  "type": "image",
5  "effect": "zoomIn",
6  "duration": "7000",
7  "thumbnail": "http://yive3.test/storage/uploads/user-4/images/20210605-cd29bb3c-8dec",
8  "text_color": "black",
9  "transition": "fadegrayscale",
10 "text_position": "top-left",
11 "backgroundcolor": "lightblue",
12 "text_transition": "typing"
13 }
```

Listing 2: Json Data For Rendering Html 2

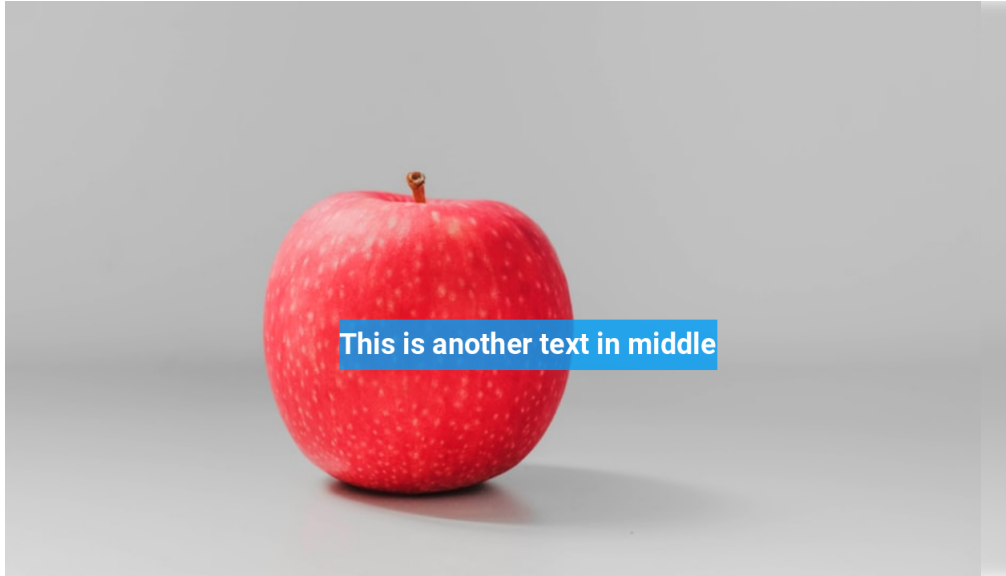


Figure 4.9: Html Output 2 (Text in middle)

4.8 Generating a complete video

Finally, When the user choose to render a video after completing the slide, I followed the procedure for giving the user the final video output.

- Generated HTML of every slide as discussed previously
- Recorded HTML and got the video output based on the vieo duration of slide
- Merged all the slides output using FFMpeg
- Attached background music to the video based on users choice.
- If user choose to add text to speech to the video, I generated text to speech of every slide individually and merged the text to speech in a single file based on every slide duration for preventing syncing issue of the video.
- Then finally merged the video and text to speech using FFMpeg and got the final video output which we provided to the user

Here is the activity diagram 4.11 for this full process

4.9 Challenges

In the project, we were using html,css and javascript for designing text overlay animation over content and video animation.

Html design part was easy but rendering those html elements to video was a complex task. There is no such service available to convert html content directly to video. So the challenge was, we designed our animation and video effects but we were not getting a clue how to convert those designs to video. One of the solutions of this problem was using ffmpeg to animate texts and generating video effects but by this way we were losing our cool text animation and video effects we already designed using html. So we needed a way to make html animation to the video converter.

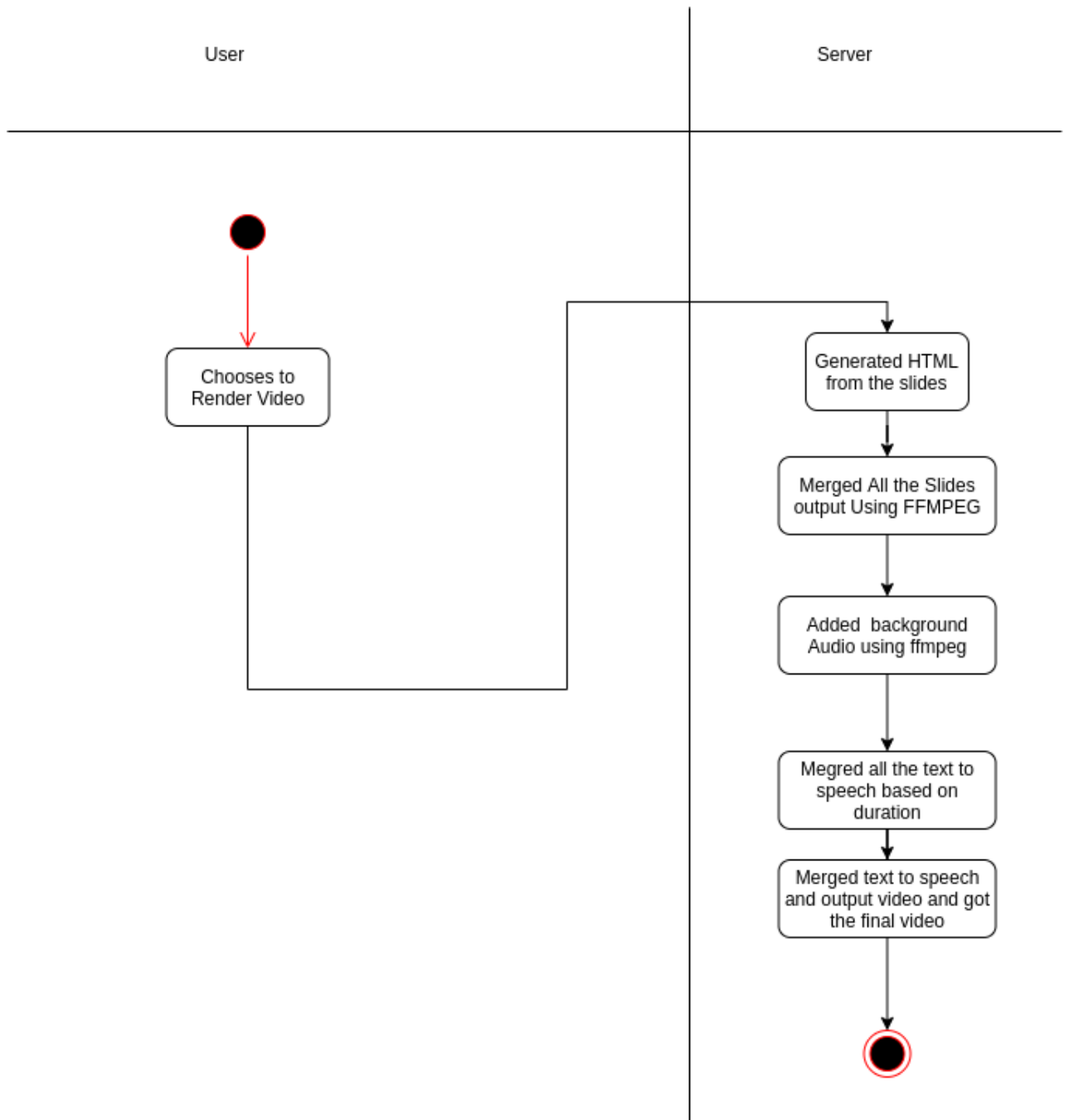


Figure 4.10: Activity diagram for render and record

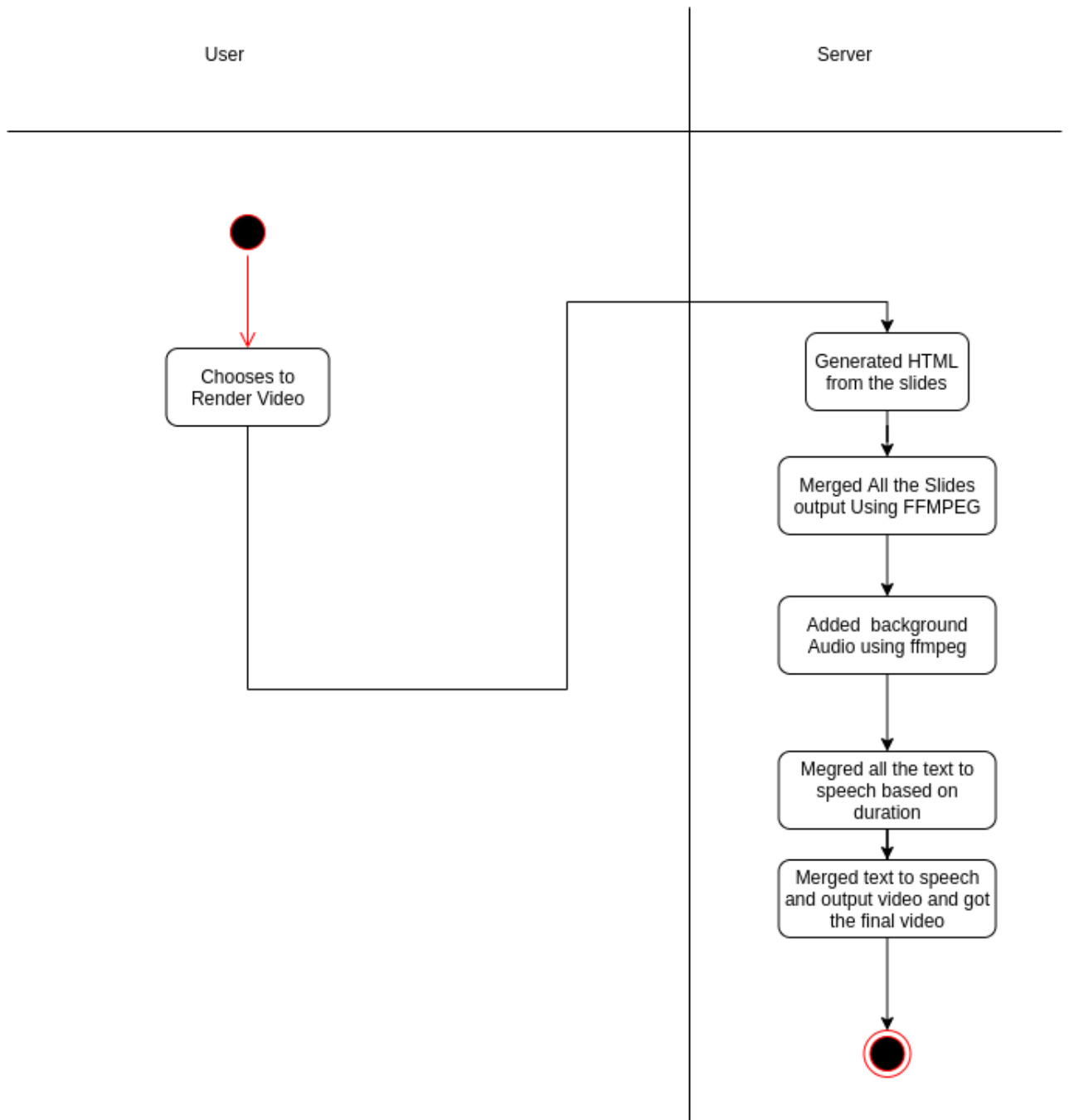


Figure 4.11: Activity diagram for final video output

After a lot of research we got a solution to convert those html to video by recording the browser screen automatically so that we can easily convert those html elements to video. We worked to build a way to open the browser in the server and inject our html contents on the browser, then finally record the browser screen in our described height and width. For this we used an open source web browser named “chromium” and a browser automation tool named puppeteer.

Another issue arrived after converting html animation to video, which was syncing text to speech with the rendered video as html recording was only giving us the video output without any audio. So we needed to sync text to speech with the text animation speed. We built an algorithm for syncing audio with video properly by calculating the animation time, animation type, text to speech duration etc.

Also other challenges we solved so far like adding background music to a video, the challenge was like sometimes the background music becomes shorter than the video so we need to repeat playing the background music until the video finished, sometimes the video becomes larger than the background music. So we needed to cut out the background music to match with the video size. We solved this issue with an algorithm.

Chapter 5

GROWTH

5.1 Professional Growth

5.1.1 Office Environment

Before joining WPDeveloper I didn't have any idea about the real life office environment, I learned about office environment and culture after joining WPDeveloper

5.1.2 Team Work

Teamwork is the key to bigger success. I felt this deeply after I started work at WPDeveloper. I learned more about teamwork and how a team operates its operation by collaboration from each other. I also became a team member and learned about teamwork from the inside.

5.1.3 Time Management

I learned about time management and following deadlines. I also learned to submit tasks on time and how not to miss deadlines. I improved my time sense a lot after I started working for WPDeveloper.

5.2 Technical Growth

I improved my technical skills and knowledge a lot after joining here. I worked with many new technologies I didn't know about after joining this company. This internship has given me a fantastic opportunity to learn a variety of technological abilities. I am confident in my ability to apply them to any of my tasks in future. The following are some of the major technical knowledge I improved throughout my internship.

5.2.1 Linux

I learned about many new things related to the linux operating system like how to set up nginx, mysql on linux. I also become flexible with the command line interface of linux.



Figure 5.1: Linux

5.2.2 Git



Figure 5.2: Github

We are working in a team on the same project, so code syncing is really important here. We used github for managing the project. I learned about how to sync projects with other collaborators like pushing to git, merging, fixing conflicts etc.

5.2.3 Shell Scripting

```
nothing to commit, working tree clean
→ YiveSites git:(dev) cd ..
→ sites cd yive3
→ yive3 git:(dev) ✗ gs
On branch dev
Your branch is up to date with 'origin/dev'.

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   app/GoogleAccount.php

no changes added to commit (use "git add" and/or "git commit -a")
→ yive3 git:(dev) ✗ gd
→ yive3 git:(dev) ✗
```

Figure 5.3: Shell Scripting

I learned about bash scripting after evolving in this project. I used bash scripting for automating setup deploying projects on the server. Also for creating the same project environment for multiple machines bash scripting is really important which I was able to understand after getting involved in this project.

5.2.4 FFMPEG

FFmpeg is a powerful language for video editing which I was able to realize after being involved in this project. I used FFmpeg for merging audio with video, merging



Figure 5.4: FFmpeg

multiple videos, adding blank audio to a specific video, adding background music to a video etc.

Apart from this my knowledge about laravel framework, php, mysql, javascript, html and css improved a lot after getting involved here.

5.3 Interpersonal Growth

5.3.1 Questioning

Understanding and integrating knowledge into our own way requires the ability to ask and express questions effectively. During my internship, it regularly occurred to me that my supervisor was attempting to teach me something. If anything didn't make sense to me, I asked questions until it did.

5.3.2 Logical Argument

When I was presenting an idea, I tried to present it in a logical way. I've always tried to avoid using faulty logical procedures because they cause people to be confused about my assumptions. During the first several weeks of my internship, I and my supervisor frequently had logical discussions about the project.

Chapter 6

CONCLUSION

6.1 Conclusion

In the book we only learn theory, without knowing the actual application, learning theory is boring. In the last 6 months this internship helped me to apply the knowledge which I learned till now, which was a really exciting opportunity for me. Learning while building something interesting is really fun. This internship opportunity really helped me to learn new things everyday. While working, I had new experiences everyday which forced me to think critically and do things in different ways. This project really helped me to increase my experience. I gained real software building experience here.. We released the project and got very good feedback from the end users. I was encouraged to be responsible and confident by the tasks on which I worked. The internship program assisted me in the sense that it enhanced my ability to function in a group setting. It is critical for a corporation to keep its functions as a unit and to value each teammate's creativity and contributions. I really want to conclude by thanking my supervisor Md Nasir Uddin as he guided me in the project in a great way.

6.2 Recommendations

WPDeveloper is a great place to gain professional experience. This can be a dream place to work with for a passionate person who loves to build something amazing. Their office environment, facilities, work ethics in one word everything about this company is great. I would love to recommend this office to anyone interested in doing an internship in a great palace while learning something new under some awesome leaders.

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