FOURFLIX

A Project Report

Submitted by

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Under the guidance of

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in partial fulfilment of the requirement for

AWARD OF DIPLOMA
In
COMPUTER SCIENCE & ENGINEERING

केन्द्रीय प्रौद्योगिकी संस्थान कोकराझार
CENTRAL INSTITUTE OF TECHNOLOGY KOKRAJHAR
(Deemed to be University, MoE, Govt. of India)
BODOLAND TERRITORIAL AREAS DISTRICTS :: KOKRAJHAR :: ASSAM :: 783370
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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

केन्द्रीय प्रौद्योगिकी संस्थान कोकराझार

CENTRAL INSTITUTE OF TECHNOLOGY, KOKRAJHAR

(Deemed to be University, MoE, Govt. of India)

Kokrajhar – 783370, BTAD, Assam, India

CERTIFICATE OF APPROVAL

This is to certify that the project report entitled "**FOURFLIX**" submitted by **SOUMIK DAS (20190102027), MERINA BARO (201901020218), TERESA BASUMATERY (20190102007) and Raj Debnath (20190102015)** of Diploma 6th Semester to the department of Computer Science & Engineering of Central Institute of Technology, Kokrajhar is a record of bona fide work carried out by them under my supervision and guidance.

SIGNATURE

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Certificate by the Board of Examiners

This is to certify that the project work entitled "FOURFLIX" submitted by Name of SOUMIK DAS (20190102027), MERINA BARO (201901020218), TERESA BASUMATERY (20190102007) and Raj Debnath (20190102015) to the department of Computer Science & Engineering of Central Institute of Technology, Kokrajhar has been examined and evaluated. This project work has been prepared as per the regulations of Central Institute of Technology and qualifies to be accepted in partial fulfilment of the requirement for the award of Diploma.

SIGNATURE **SIGNATURE**

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ABSTRACT

FOURFLIX – A NEXT GEN OTT PLATFORM

FourFlix is a content sharing platform where people can share their own content and make it discoverable to their audience. The core concept of FourFlix is to provide individual content paging for every uploader while staying server-free/low maintenance and make it stand out from the crowd being a discrete entity. The concept of OTT platforms or Digital Content Libraries isn't new but our approach to it is. Unlike other video libraries available in the market like YouTube or VIMO it doesn't mix all the contents uploaded to it instead it makes separate pages for each and every content creator, so that audience of one content creator will only get the videos uploaded by that individual creator only. FourFlix also provides some rich features of top OTT platforms like NETFLIX, PRIVE VIDEO, etc. with ease whereas on those platforms only big registered production houses and companies can post. In this way both the Content Creator and Content Consumer can enjoy the goods of both sides and cons of none.

ACKNOWLEDGEMENTS

We would like to express our deepest gratitude to our guide, Mr. Mithun Karmakar for his valuable guidance, consistent encouragement, personal caring, timely help and providing us with an excellent atmosphere for doing our project. In spite of the busy schedule, he has extended his cheerful and cordial support to us, without which we could not have completed our project work.

We express our heartfelt thanks to our Head of the Department, Dr. Amitava Nag who has been actively involved and very influential from the start till the completion of our project.

We would also like to thank all teaching and non-teaching staffs of the Computer Science & Engineering Department for their constant support and encouragement.

Last but not the least, it is our great pleasure to acknowledge the support and wishes of our friends and well-wishers, both in academic and non-academic spheres.

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Abbreviations

IoT	**I**nternet **o**f **T**hings
RFC	**R**equest **F**or **C**omments
IEFT	**I**nternet **E**ngineering **T**ask **F**orce
HTML	**H**yper**T**ext **M**arkup **L**anguage
CSS	**C**ascading **S**tyle **S**heets
JS	**JavaScript**
ES6	**E**CMA**S**cript version **6**
AJAX	**A**synchronous **J**avaScript **A**nd **X**ML
CDN	**C**ontent **d**elivery **n**etwork
API	**A**pplication **P**rogramming **I**nterface
DOM	**D**ocument **O**bject **M**odel
REST	**Re**presentational **s**tate **t**ransfer
JSON	**J**avaScript **O**bject **N**otation
URL	**U**niform **R**esource **L**ocator
IDE	**I**ntegrated **d**evelopment **e**nvironment
UI	**U**ser **I**nterface
UX	**U**ser E**x**perience
CMS	**C**ontent **M**anagement **S**ystem
SDK	**S**oftware **d**evelopment **to**olki**t**
GUI	**G**raphical **u**ser **i**nterface
SEO	**S**earch **E**ngine **O**ptimization
CLI	**C**ommand-**l**ine **i**nterface
SDLC	**S**oftware **D**evelopment **L**ife-**C**ycle
RAD	**R**apid **A**pplication **D**evelopment

Chapter 1

Introduction

FOUFLIX is an OTT Platform where people can upload videos and share it with their respective audience, unlike other video libraries available in the market like YouTube or VIMO it doesn't mix all the contents uploaded to it instead it makes separate pages for each and every content creator, so that audience of one content creator will only get the videos uploaded by that individual creator only. Every uploader have their discrete page of FOURFLIX and users may switch links as their wish whenever they want. It helps individual content creator to make their content more discoverable and standout from the crowd. With FOURFLIX one can customize their page as much as they want and the way they want their contents to be displayed, with google ads plugin, creators can also monetize their page and make income from it from the very first day of start whereas in platforms like YouTube one can start earning only after compiling their criteria which takes decent amount of time. FourFlix also provides some rich features of top OTT platforms like NETFLIX, PRIVE VIDEO, etc. with ease whereas on those platforms only big registered production houses and companies can post. Because of its high customizability and less complexity, it can serve the content to the viewers without any need of high-end servers. Being server-free is one of the core features of FourFlix, it takes user input of content through its admin page and embedded's the link to its page in such a way that although the viewer will be consuming the content through FOUFLIX it will be using the resources of the drive that the link is shared from. So, this was a small intro of FOUFLIX, now let's dig in and understand each aspect of it in-depth module wise.

1.1 Objectives

The objectives of our project are listed below:

- Separate/Discrete content page for each individual sudo-user
- 0 to almost no distraction for end user, only the content availed by the admin is served. (Complete control over content page)
- Low cost and 0 maintenance of page – no need of seperate web-development or server setup.
- Ease of uploading and managing content while keeping good end-user performance.
- Pride of having a quality stand-alone page with rich features and quality of top OTT platforms.

……..

1.2 Motivation

So, let’s understand it with a simple example. Let’s assume a professor takes our class for C++ language, he also takes DBMS class for Btech batch, Python for MTech and Data Science for PHD batches. Also, every year a few subjects gets added or removed. Now let’s say some of his/her good students may miss few classes, some students may happen to forget some points from the lecture and on the other hand, some are just not good enough to cop up with the speed or flow of the lecture while taking notes. But at the end, all they need or demand to you is to give them a recap of the lecture or explain them a few points from it, which is indeed not possible to do when the number of students are so high and neither its online classes going on so that teachers can send the recordings of the class. So, here’s where our FOURFLIX comes to the light, we wanted to solve this problem and release the burden from teachers we came up with the base idea of FourFlix.

Chapter 2

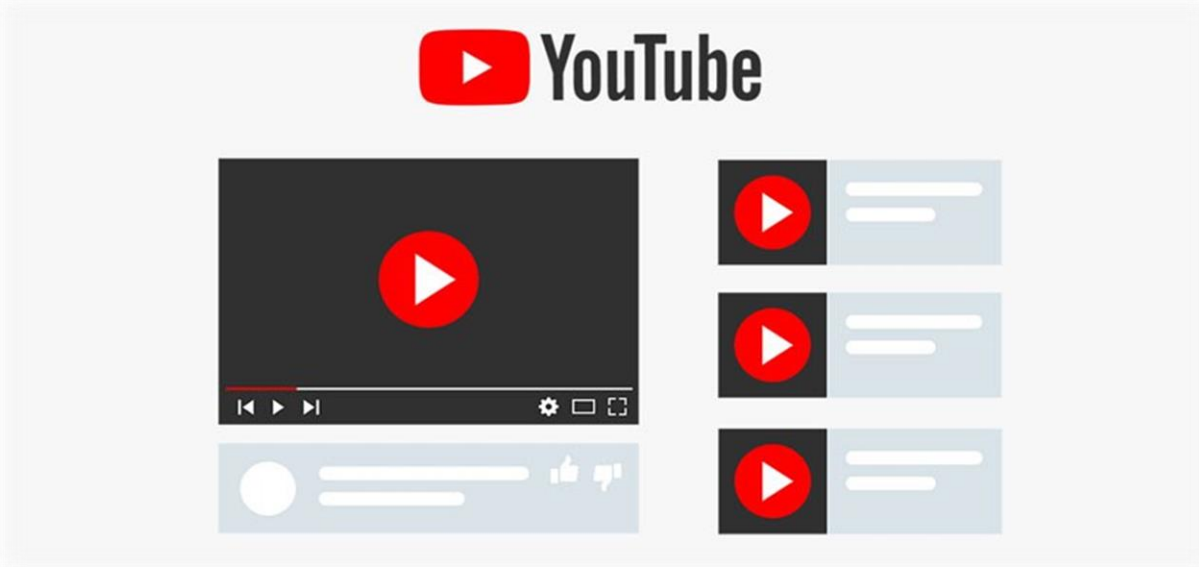
Literature Survey

2.1 What are the existing solution to this?

FourFlix is the first of its kind and it is our very own creation so, there's not really anything to preset as previous work done in this field, the work done in the field or industry of OTT platforms and Educational/Digital libraries doesn't really have any relation between and the core concepts of those also doesn't really collide at any point at all but here's the concept that we got inspired from and improvised on- In many colleges and universities aboard like Harvard, Oxford or MIT digital lecture management is done i.e. all classrooms and galleries are equipped with permanent video camera at the end of the room well aligned that captures whole sessions lecture to lecture with the whole interaction of the teacher with the class, now every time a teacher enters the class he/she just inserts his/her memory to the pre-installed camera setup and at the end of the session ejects it and takes it away and the same repeats for the next teacher, at the end of the day the teachers uploads their daily lectures to the college's assigned YouTube channels and share the link with the students the same way they share other materials or google meet links so that now a student can get an exact recap of the class remotely whenever they want.

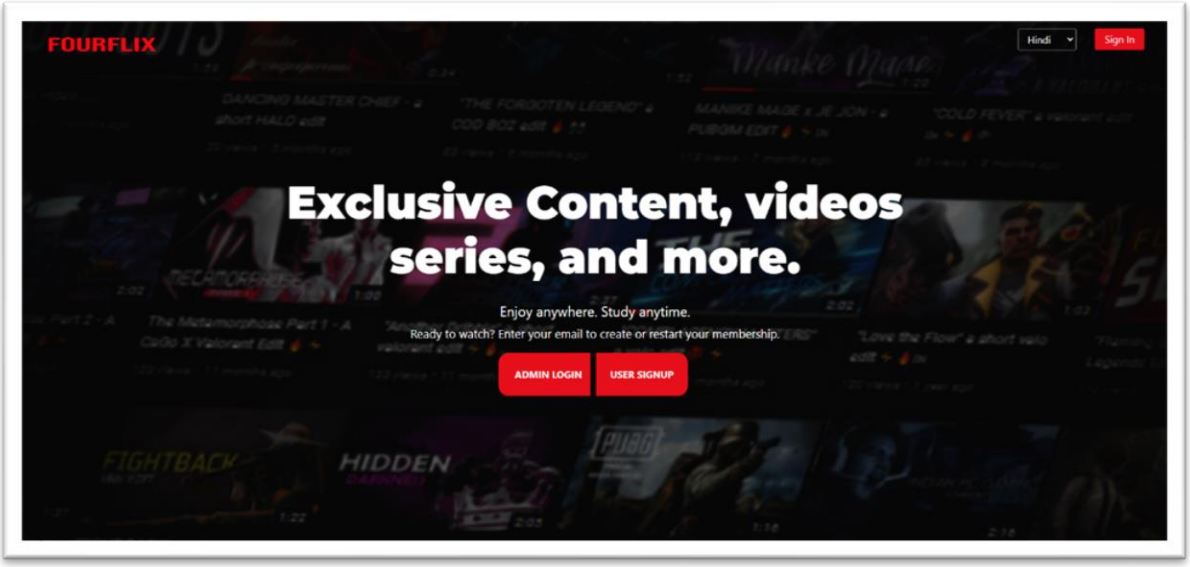
2.2 Problems in current practice:

At first glance the current practice seems to be a very good and well proved solution but there are some drawbacks and complications, one of which is distraction from main content. YouTube is a giant library and its main tendency is to hold you on screen as much as time possible to generate as much as ad revenue possible which it indeed it serves very well but as a result students gets attracted to some unwanted videos and ends up watching it by postponing the study. On the other hand some students try to find the subjects related stuff from other sources and ends up getting either some good info or some very wrong guidance from random people on internet, also many teacher just doesn't like the fact that their study materials are getting stacked on the same place with the entertainment stuff. Now if they want to consider the other options like NETFLIX, PRIME VIDEO or DISNEY+, it's simply not possible for individual to upload there, only big production houses and companies can make use of it and neither it's possible for them to afford a Full-Stack Web-Developer to just make a website for them or to rent a server to host the contents online 24hrs. Now for such mentioned problems our FourFlix is an absolute answer.



2.3 Our approach to it:

To alter the drawbacks and limitations of the current system what we did in FourFlix is that we gave teachers all the rich features of the other OTT platforms like: the comfort of discrete site or individual content paging with 0 to no distractions, availability of only verified content that the teacher wants to be available to his/her students but also with the ease of content management like YouTube to upload and manage the contents hassle-free. In this way both the teachers and students can enjoy the goods of both sides and cons of none. Now to be more specific, in FourFlix teachers can easily upload their lectures/sessions through the admin page just by listing/filling all the sections mentioned in it like (Video link, Title, Description, tags, etc.), afterwards a sharable page link will be generated just like google meet/zoom links but here on this new page all the content availed by the teacher only will be available in such a organized manner that it will look identical to a separate web page solely developed for the respective teacher, also will all the blissful features of top OTT platforms on the market and now this link can be shared among the students and the students can start consuming the content anytime anywhere at ease. Other than that for security and saturation of audience admin can manage users by enabling authentication link in it. So that students will be asked username and password to get to the home page of it.



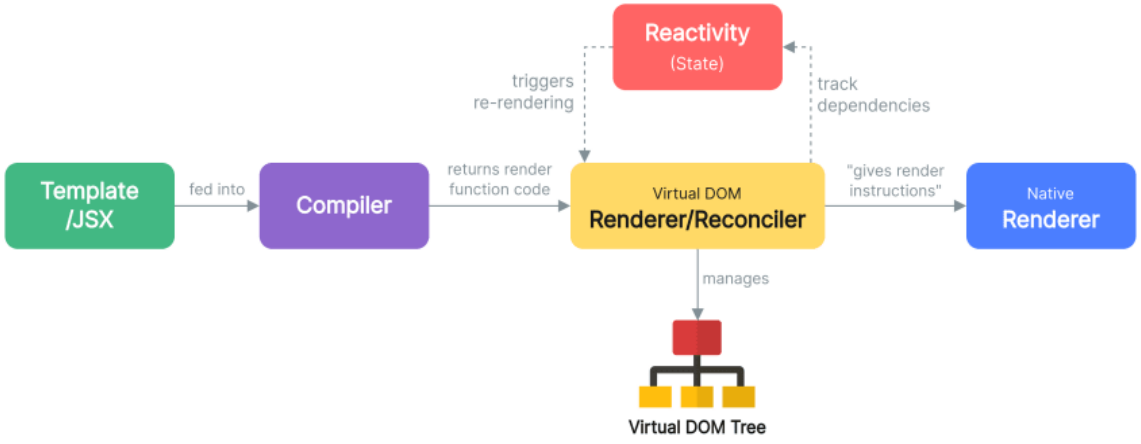
Chapter 3

Software Details

In-dept details of the working states and development stages of our website

3.1 System Architecture

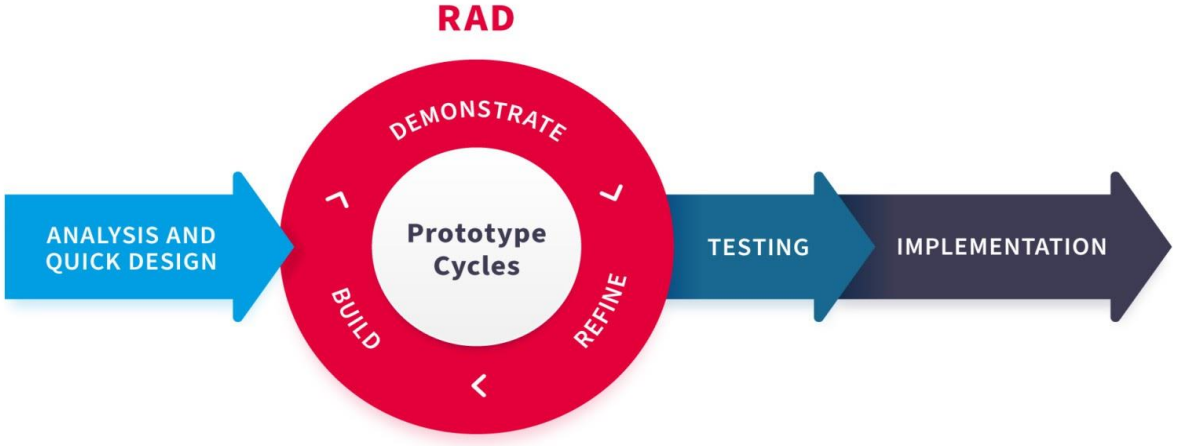
So, starting from basic structure of our site- we have used HTML for the base body of our website, we have used CSS frameworks like Tailwind & Bootstrap for styling and adding custom animation to our site, we also have used Affinity designer for the initial wireframing and UI/UX designing of our site, and lastly ES6 JavaScript with jQuery library for logic implementation in our website. For now, we have hosted our website through git pages temporarily, it does contain some limitations but by the time we get its back-end completely functional we are at least getting able to get our site to go live.



The above diagram is an example of the working principle of FourFlix, State – s1 (Default Template) gets initialized to s2 (Compiler), in s3 (Renderer) it displays the content page as it is and user get the s4 (Native/Browser Render) but if sudo-user makes any changes in the admin page, the state reacts/triggers in s3 itself to initialize Virtual Document Object Manipulation, now the contents gets replaced with the new ones and it enters s3 (reconciler) again to re-render the page and display (s4) it accordingly to user.

3.2 SDLC (Agile & RAD)

So, now let's have look at the development cycle of our project, we primarily have followed the AGILE SDLC model till now for its initial development but once we get our final drafts ready for alfa testing, we will be using the RAD Software Development Cycle or i.e. Rapid Application Development SDLC model for our project. This model is based on the combination of iterative and prototyping model and has no or minimum planning involved. RAD is again among the best SDLC methodology for projects with Modularized systems, code generating or manipulation functionality, and not so frequently changing requirements. The reason behind using RAD is, as mentioned earlier in most cases the end-user will only be needing to add, remove, rename or manage his/her content on the web, other than that there will be almost no change in the structure of the website. Because of these limited requirements there's very less code complexity and almost no need of new plan or srs generation, all the above-mentioned requirements can easily be achieved with JS DOM or Document Object Model manipulation and simple Database commands. Although at the current stage we don't really have the admin page live because the back-end is indeed needed to be completed and connected for that but one can still do changes in the web through git push and pull features in the console. Although the back-end is not completed it isn't really untouched for now, most of the features on-screen like the authentication system, mobile screen optimization and etc. are mostly working or partially getting the work done.



3.3 Hardware Components

Hardware components used for the project:

- ❖ Main PC (Development Environment)
    - AMD Ryzen 5 5600X 8 core 16 Thread 4.6 Ghz 7nm CPU
    - 16gb DDR4 3200mhz RAM
    - Nvidia RTX 3070 Ti GDDR5 8gb GPU
    - 2 TB NVME SSD
    - Samsung 27inch 144hz Curved Monitor
- ❖ Temporary Server (My NAS drive)
    - Synology DiskStation DS418 Play Network Attached Storage Drive
    - Seagate 4tb NAS 5900RPM Internal SATA Hard Drive
- ❖ Testing Devices (Smart Phone and Tablets)
    - Apple iPhone 13 256gb
    - Honor Pad 5 4/64gb
- ❖ Content Recorder (Digital Camera)
    - Cannon EOS 200d
- ❖ LAN Fiber Connection
    - Jio 200mbps Fiber Optic

3.4 Software/Tools used

The software, tools, and languages used for this project are as follows:

❖ Languages

- HTML- The Hypertext Markup Language or HTML is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets and scripting languages such as JavaScript. We used it for the basic structure of our site.
- CSS- Cascading Style Sheets is a style sheet language used for describing the presentation of a document written in a markup language such as HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript. We used it to style our site.
- JAVASCRIPT- JavaScript, often abbreviated JS, is a programming language that is one of the core technologies of the World Wide Web, alongside HTML and CSS. As of 2022, 98% of websites use JavaScript on the client side for web page behavior, often incorporating third-party libraries. We used it for logic implementation in our site,.

❖ Tools

- Bootstrap 5- Bootstrap is a free and open-source CSS framework directed at responsive, mobile-first front-end web development. It contains HTML, CSS and JavaScript-based design templates for typography, forms, buttons, navigation, and other interface components. We used it as our main styling framework.
- jQuery- jQuery is a JavaScript library designed to simplify

HTML DOM tree traversal and manipulation, as well as event handling, CSS animation, and Ajax. It is free, open-source software using the permissive MIT License. As of May 2019, jQuery is used by 73% of the 10 million most popular websites. We used it as our main logic implementation library.

❖ Softwares

- ATOM- Atom is a free and open-source text and source code editor for macOS, Linux, and Microsoft Windows with support for plug-ins written in JavaScript, and embedded Git Control. Developed by GitHub, Atom is a desktop application built using web technologies. Our primary IDE for HTML & CSS.

- VSCODE- Visual Studio Code, also commonly referred to as VS Code, is a source-code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. Our primary text editor for JS.

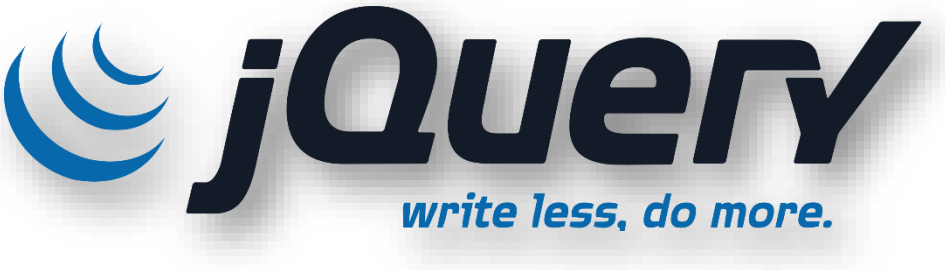
- VMware- VMware, Inc. is an American cloud computing and virtualization technology company with headquarters in Palo Alto, California. VMware was the first commercially successful company to virtualize the x86 architecture. We used it to test our site in various environments.

- GitHub Desktop- GitHub Desktop simplifies the development workflow with git's version control. We used it for the version control of our project.

- Firefox Developer Edition- The browser made for developers. All the latest developer tools in beta, plus experimental features like the Multi-line Console Editor and WebSocket Inspector. A separate profile and path so you can easily run it alongside. We used it as our primary test browser.

- Affinity Designer- Affinity Designer is a vector graphics editor developed by Serif for macOS, iPadOS, and Microsoft Windows. It is part of the "Affinity trinity" alongside Affinity Photo and Affinity Publisher. We used it to develop our custom statics.

- Davinci Resolve Studio- DaVinci Resolve is a color grading and non-linear video editing application for macOS, Windows, and Linux, originally developed by da Vinci Systems, and now developed by Blackmagic Design following its acquisition in 2009. We used it to build our custom animations.



3.5 Hardware and Software Requirements

Hardware, Software and other requirements for usage of the application:

- Content Uploader or Admin User
  - Laptop or Computer
    - Minimum Specs:
    - Linux/Windows or MacOS
    - 1 gigahertz dual core CPU
    - 1 gigabyte ddr2 ram
    - .net Framework 4.7
    - any browser with WDDM 1.0 driver
    - 800 x 600 Display output
  - Digital Camera
    - Minimum 480p recording capacity
  - Content and Thumbnail
    - Max 1920x1080p resolution for video
    - Max 1280x720p resolution for image
    - Mp4 file format for content
    - Jpeg file format for thumbnails
  - YT account (Public/Unlisted)
    - For video links (not embedded)
  - Good Internet Connection
    - Minimum 2mbps stable connection

- Content Viewer or End- User
  - Mobile/Tablet
    - Android/IOS
    - 500-megahertz single core CPU
    - 500-megabyte Lpddr1 ram
    - Widevine L1 support
    - 5inch Display
  - Auth Link
    - Shared by your teacher
  - Good Internet Connection
    - 6mbps stable connection

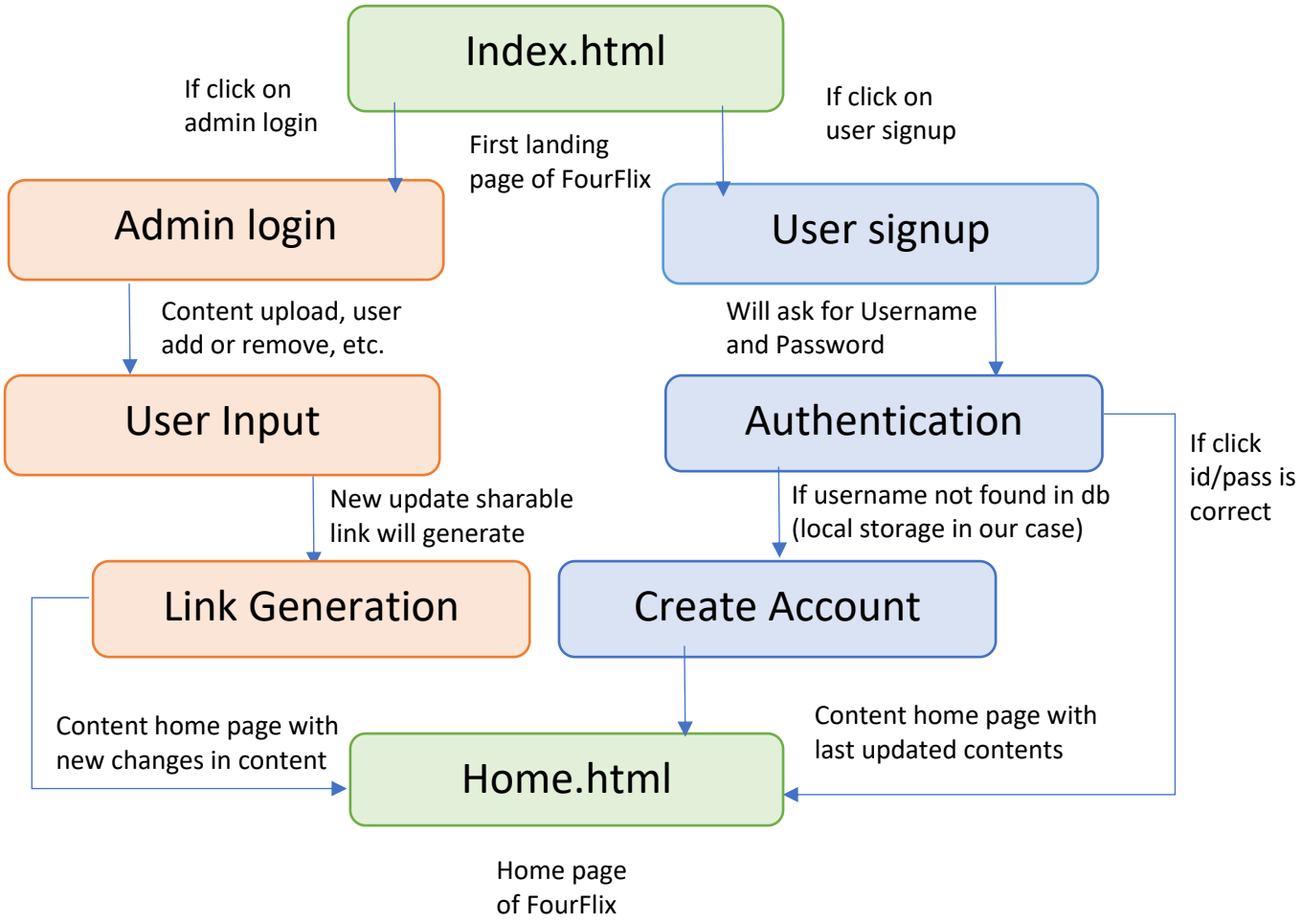
Chapter 4

Implementation and Results

How we implemented our project along with different results obtained

4.1 Implementation Details

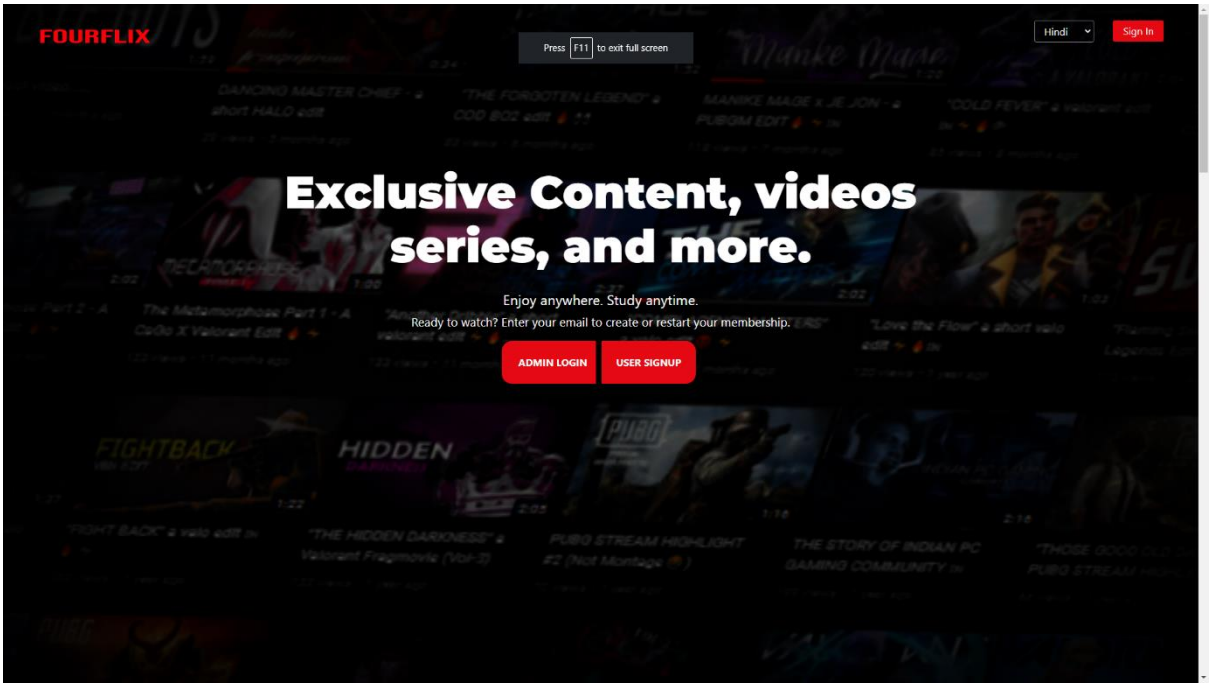
The following figure demonstrates how we have implemented all the above have mentioned features and modules in FourFlix:



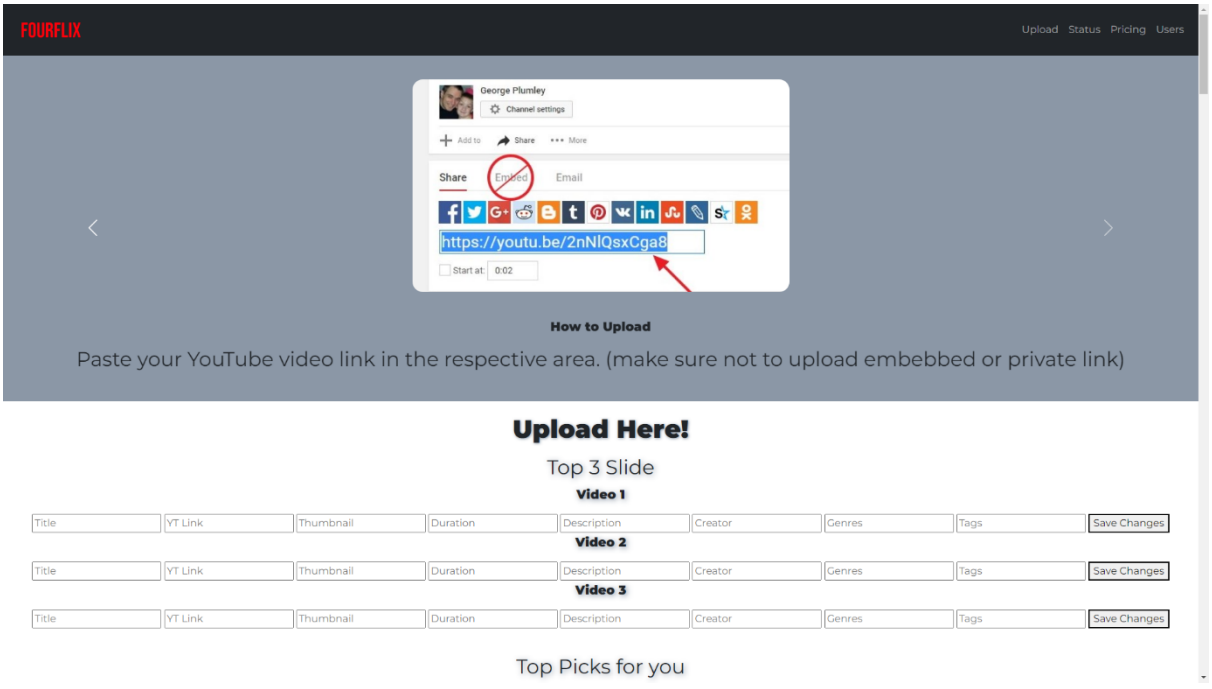
Now let's have a look at the outcomes we got after implementation of all the modules in coded form. Initial glance of the progression of our website till now:

4.2 Results

Here, the net landing page we mentioned above for all users:
https://falconethics.github.io/OTT-Platform-FOURFLIX/

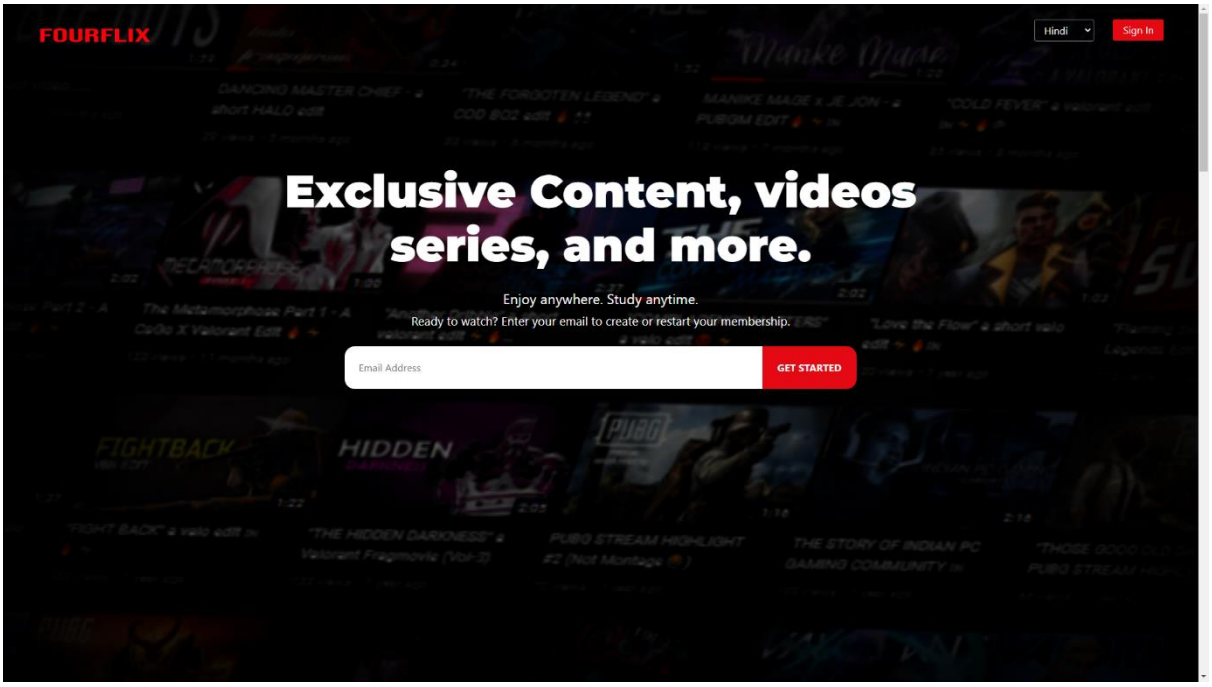


Now if we select admin login we will be redirected to the admin page:
https://falconethics.github.io/OTT-Platform-FOURFLIX/admin.html



Here we can upload, manage or add user to our site.

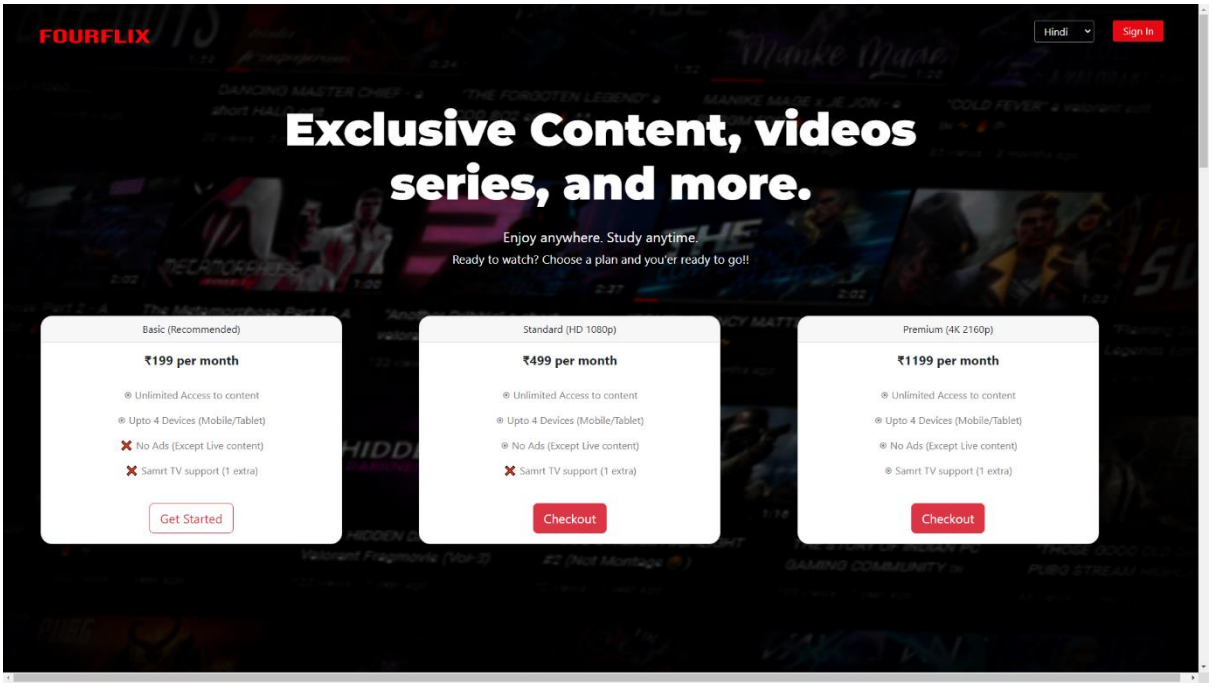
But if we select User Signup then we will be redirected to authentication page:
https://falconethics.github.io/OTT-Platform-FOURFLIX/login.html



Now if we enter correct username and password we will get to our desired home page:
https://falconethics.github.io/OTT-Platform-FOURFLIX/home.html

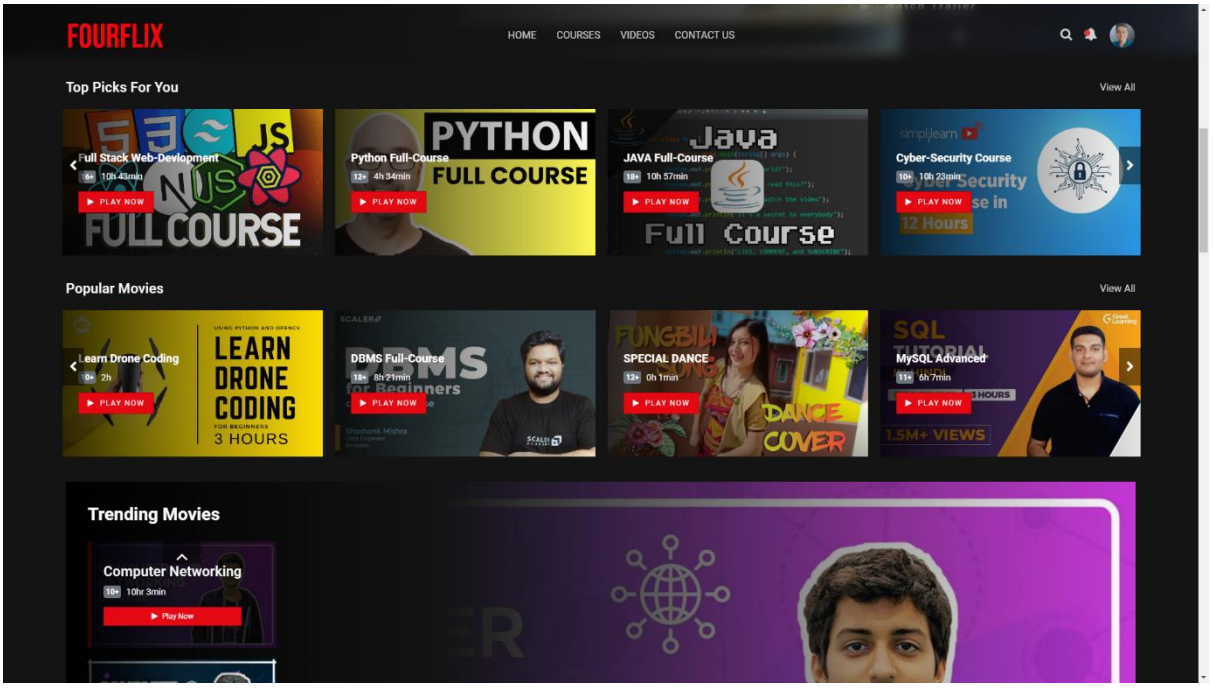
But if we gave wrong username or some email address that's not already added then it will

redirect us to the signup page and create a automatically create a new account for us: https://falconethics.github.io/OTT-Platform-FOURFLIX/signup.html

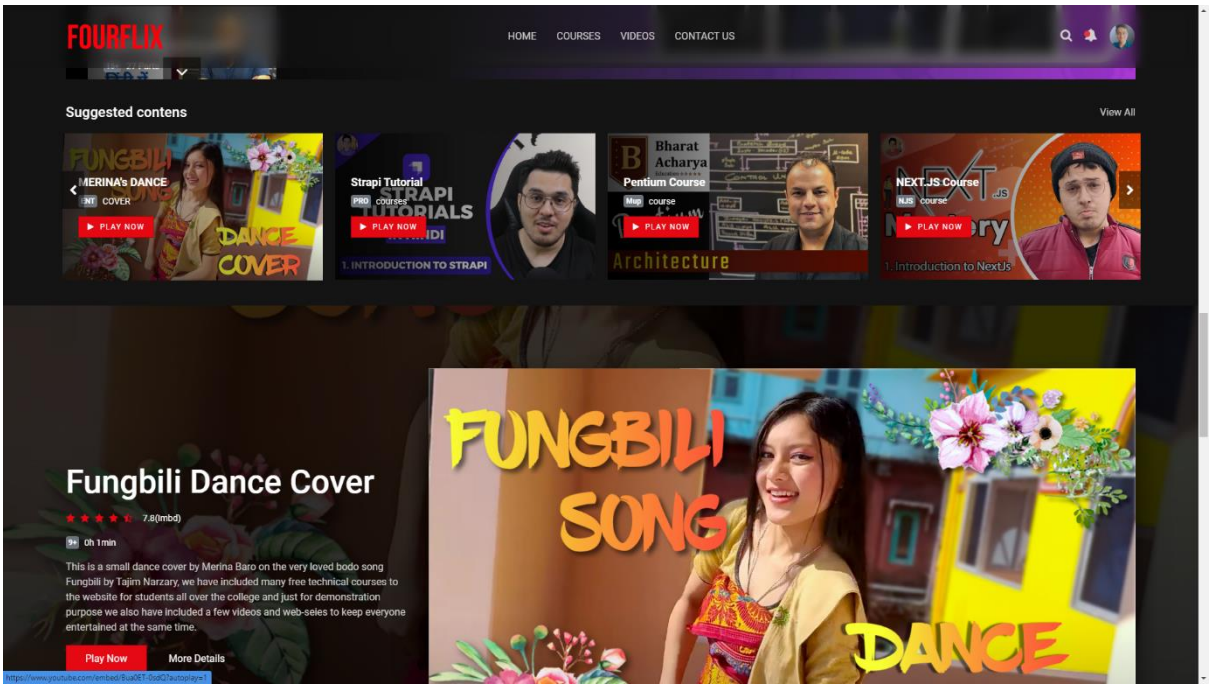


That was all about our initial end results but below are some demonstrations of the available rich features of FourFlix like Parallax, Series Listing, discrete content paging and etc. Although the back-end is not completed yet, it isn't really untouched. For now most of the features on-screen like the authentication system, mobile screen optimization and etc. are mostly working or partially getting the work done.

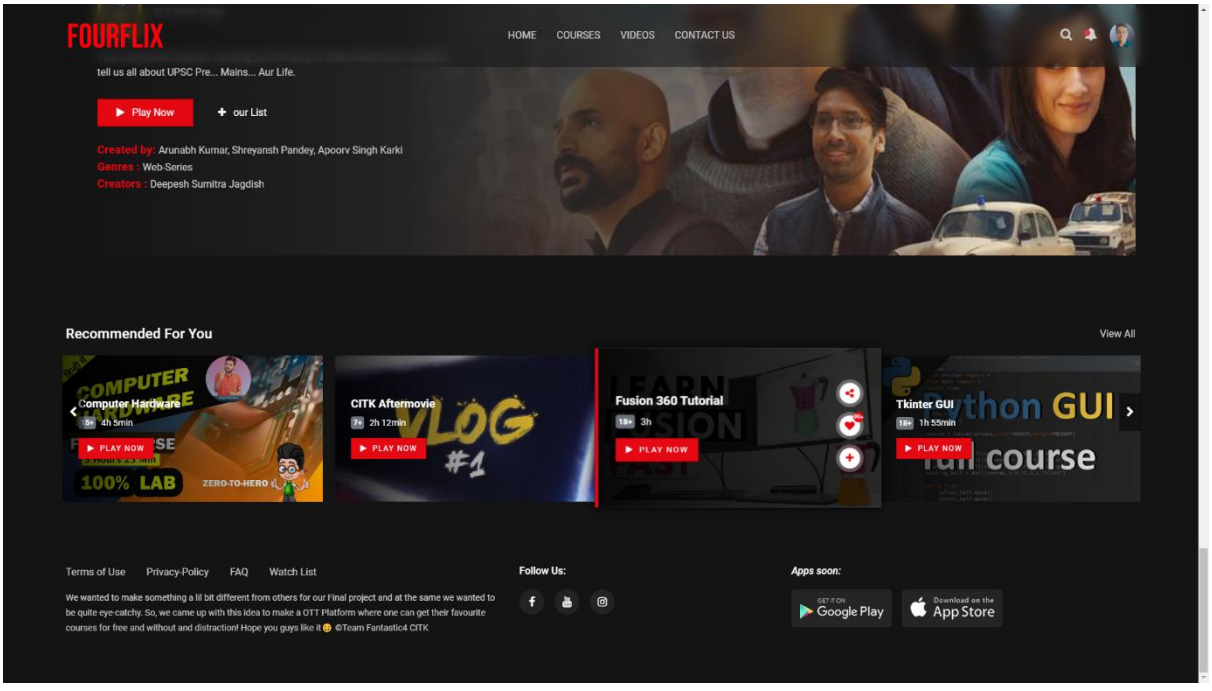
Top picks and popular videos section – Here the contents are changed based on the number of views and rating it has got:



Paralex section – Here only the content or special video that the admin wants to showcase is a walled to make it standout from other ones on the list:

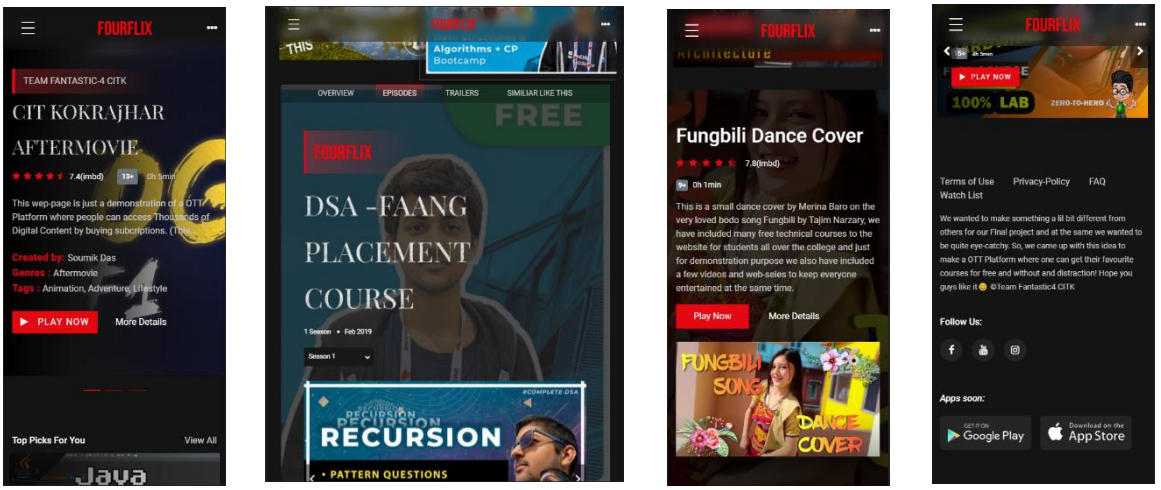


This is the end part of the website with the series section- here admin can add playlist videos, these are showcased in a way to make it look like some production series:



Here's a sneek peek of it's scrren size optimization in mobile screens (landscpae mode):

Portrait mode (Smartphones and Tablets) –



4.3 Future plans

We are giving out efforts to learn headless CMS like Strapi for now and mostly we will be able to get it mastered soon to implement the required code in our site. Just for instance Headless CMS are basically an alternative to Frameworks like Node.js or angular, it makes it possible for Front-end web developers to do Full-Stack work through page linking, API masking and dashboarding of back-end without actually writing the code from scratch in Python Flask, PHP or WordPress with MariaDB. And as a result, teachers will be able to upload their content form the admin page easily, manage their students/users, analysis the viewer details like: watch time, max duration and playback or repetition, auth link generation, discrete page generation and etc. We have also planned to make it an web3 website with Ethereum solidity to make it reach its ultimate goal to be an freemium server-free content sharing platform but for that we first need to achieve a decent number of end-users to eventually make them peers/seeders of our blockchain. Other than that, we are also planning to create an IOS and Android version of our webapp to make it even for accessible and customizable.

Chapter 5

Conclusion and Scope

5.1 Future Scope

It is predicted that within 2025 online learning will the primary way of learning and will be adapted by all governing bodies and during that time platforms like our FOURFLIX will eventually become the primary platforms of teaching. This will boost the market of online content library as well as hybrid OTT solutions like us. It is said with so much confidence by many because online teaching enables some very promising and much needed features. Here are some most reliable reasons to believe in this prediction:

Quick access from anytime, anywhere

Since digital courses require only a laptop, smartphone or tablet with an internet connection, students can easily learn from anywhere at convenient times. This flexibility ensures working professionals can pursue new courses while simultaneously working full time jobs – they can learn during weekends or in their free time.

Cost-effectiveness

Online education is much more cost-effective. Students just have to pay the course fee and be done with it. There are no other charges like hostel fees, library fees, maintenance fees, etc. Since you study at your own time, it helps to save time as well.

Learn at own space

Everyone learns at a different pace. In a classroom where everyone taught

together, many students find it difficult to follow the lessons. This is a serious disadvantage of traditional education. When they learn online, everyone can learn at their suitable pace. Students can clarify their doubts by live chats or forums as well.

5.2 Conclusion

From detecting the problems in the present system to solving it with FourFlix, we have been through a lot of thinking process to execute it and implement it with flawlessly and without being stuck. We gave a lot of our time in planning stage rather than execution stage because we knew if we take up this project it won't be easy because it will be a in-direct competitor of OTT Platforms like Netflix and as a result will also require software development period similar to those, so even if we somehow manage to get all the required back-end skills it will indeed not be possible to absolutely complete the project in a span of 4-5 months. Lastly, we would like to state that we are really aware that there's a lot of back-end work is still remaining and it's still nothing that big considering our vision for it but at the end we only want to say in answer to that it is our first time doing something like this, we neither have any experience or any knowledge on how to execute stuff like this, whom to contact, whom to ask or what to do and nor we had any of the needed skills for this subject in the past semesters, basics of web-tech is what we just have got in this ongoing semester, we did whatever we can and we will do whatever is needed to make it ready to be published or do whatever changes needed or asked by any of you teachers to make it reach your expectations and our academic goals.

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References

Although the core concept of the project is our very own creation of mind but here are some considerable references, we made use of:

1. Harvard's CS50: Introduction to Computer Science - David J. Malan https://pll.harvard.edu/course/cs50-introduction-computer-science?delta=0
2. Netflix, Inc. is an American subscription streaming service and production company. https://www.netflix.com/browse
3. YouTube - YouTube is an American online video sharing and social media platform headquartered in San Bruno, California. https://www.youtube.com/
4. WIX - Wix.com Ltd. is an Israeli software company, publicly listed in the US, that provides cloud-based web development services. It allows users to create HTML5 websites and mobile sites through the use of online drag and drop tools. https://www.wix.com/
5. Full-Stack Web Development Boot Camp with HTML, CSS, JavaScript, Node, React, MongoDB, Web3 and DApps – Dr. Angela Yu https://www.udemy.com/course/the-complete-web-development-bootcamp/
6. Complete Strapi Course by CodeWithHarry - https://www.youtube.com/playlist?list=PLu0W_9lII9ajKKSG5aROCiw9iro5vK-gE
7. Git, GitHub, & GitHub Desktop – Coder Coder YT https://www.youtube.com/watch?v=8Dd7KRpKeaE
8. Affinity Designer Guide- Danilo Fiocco - Illustration https://www.youtube.com/watch?v=JvC82Jl1fuA
9. Bill Gates: how online courses can radically improve education by 2030 – The Verge https://www.youtube.com/watch?v=Hrd0NiWMIjk
10. Online learning could change academia – TED TALKS | Tyler Dewitt https://www.youtube.com/watch?v=aGiIIGjlHg0
11. Because the concept was unique, we needed to learn lots of small and big technical skills. So, it's really hard to memorize all and make all of them present/list here at once.