DBA3702 Descriptive Analytics in R

TechJ.SB

The number one Study Buddy to get your qualification for the tech-industry

Section SA1 - Group 4

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1. Introduction

1.1 Background

Singapore's digital economy is growing rapidly, making a substantial impact on gross domestic product (GDP) growth. From 2017 to 2022, this sector's contribution to GDP increased from 13% to 17.3%. In nominal figures, this represents nearly a doubling, rising from S$58 billion (US$42 billion) to S$106 billion (Tham, 2023). With a compound annual growth rate of 12.9% per year since 2017, the digital economy has demonstrated remarkable growth, surpassing the overall economy. This also signals a shift in job market demands.

A recent Ministry of Manpower report states that the most valuable transferable skills applicable to a wide range of jobs and industries in Singapore, includes those linked to e-commerce, artificial intelligence, digital marketing, and data analytics (Article: Outlook for the Tech Sector in Singapore, 2023). As the tech industry evolves, there is a need for specialised skills. To ensure that our youth are well-equipped for these roles, it is essential to provide them with an easily accessible database of curated free content, allowing them to explore their interests and learn the foundational skills needed. Our app, thus, aims to streamline this information search for tech career paths and educational materials, addressing this urgent need.

1.2 Current Market Practice and Pain Points

Given the contemporary unprecedented speed of technological advances in the tech industry, new and existing jobs require more specific skill sets. Nevertheless, acquiring these skills, without considering enrolling in specialized programs, has become more difficult given the fragmentation in the online education services. Firstly, this diversity can be overwhelming for learners who are unsure which platform to choose and leads to possible inconsistent learning outcomes and lack of standardization (Market Research Reports - Industry Analysis Size & Trends - Technavio, 2022). Additionally, it appears that there is no apparent platform available for students who wish to investigate a career path without incurring costs, while also gaining insights into their peers' current preferences and advancements.

Key players in the market are for example Coursera, edX, Udemy, Codecademy, freeCodeCamp, DataCamp, Eduonix Learning Solutions, although many others are present. This demonstrates the diversity of learning platforms available to interested customers. Nevertheless, none of them are focused on the tech industry solely. Hence, it is difficult for interested customers to find a particular course tailored to their needs. More importantly, with the exception of Coursera, which offers specific degrees tailored to jobs in the tech industry, no information is provided on how the course will help you or is linked to a particular job in the tech industry. Related to this is the varying teaching style. Coursera, edX, rely mostly on paid online courses, certifications, and degrees, with actual examinations and assignments, while this is not present for other providers, such as freeCodeCamp and Udemy for example. Hence, there is also a big discrepancy in monetary commitment between different providers, which makes the decision to enroll in a particular course more tedious.

1.3 Business Problem Statement

Considering the prevailing fragmentation in the online education marketplace, TechJ.SB aims to become the leading online education provider for tech industry job-related skills, offering a user-friendly platform. The objective is to provide high-quality, up-to-date educational materials tailored to individual customer preferences to support them in exploring and achieving their career goals.

2. Brief Description of the Product

2.1 Product Overview

TechJ.SB is a one-stop app tailored for pre-university students and university students, helping them to explore from a list of tech job categories consolidated from top tech employers' job databases. The app is divided into 2 tabs, User Profile and Video Recommendations.

Upon entering TechJ.SB, users can input their education level, current qualification, job interest, and current proficiency in programming skills, providing a customised experience.

The User Profile section has 3 sub-tabs. The "Competitiveness" sub-tab displays the distribution of job category preferences, most popular videos amongst the user base, and popularity of tech jobs *(Figure 1)*. The "Skills Needed" sub-tab has a network chart, showing the interconnectedness of skills across all job categories, outlining the transferability of skills learned across various domains *(Figure 2)*. This visualisation allows users to better understand the application of the skills they will be learning. The "Timeline" sub-tab allows users to indicate their daily available time, and the app will use it to project the total duration needed for users to complete the recommended video content *(Figure 3)*.

The Video Recommendations section uses the user's current level of expertise to recommend suitable content from YouTube that aligns with their learning curve. Based on their input, the user will see a corresponding list of videos and clickable links by skills *(Figure 4)*.

More details about the App will be described in Section 4, App Features and Functionality.

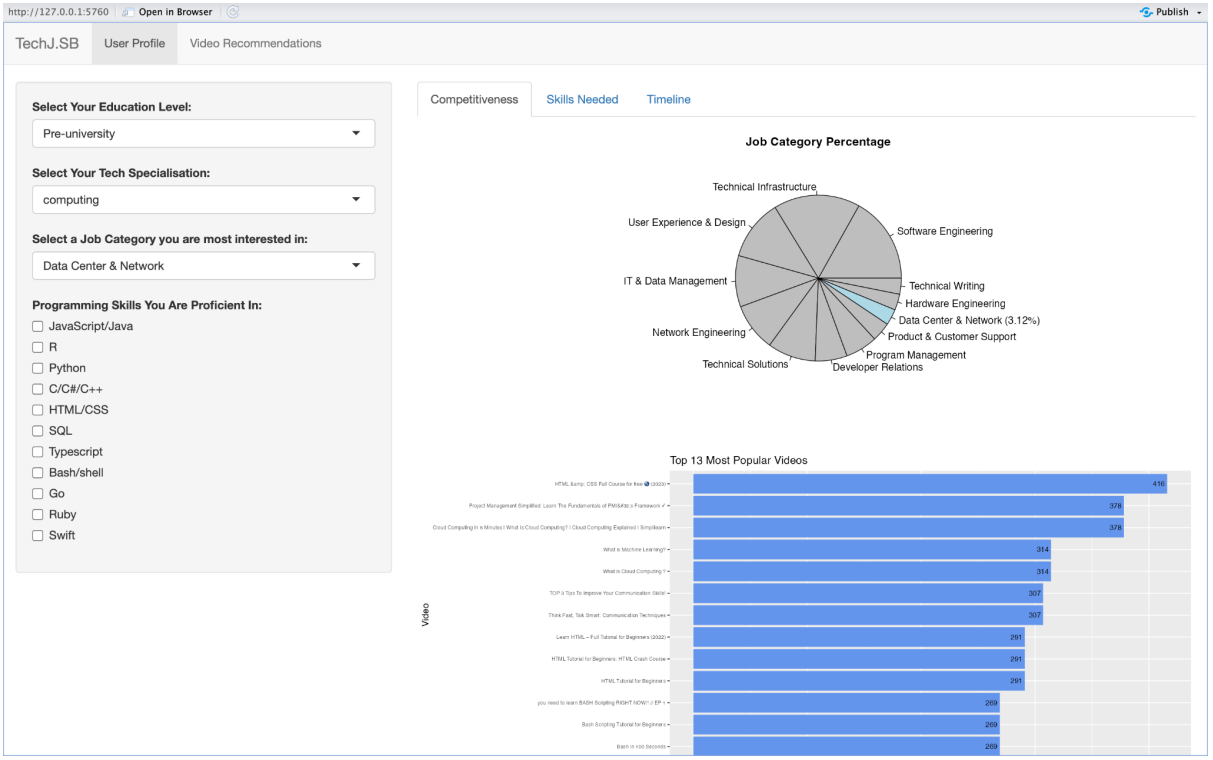


Figure 1: "Competitiveness" sub-tab

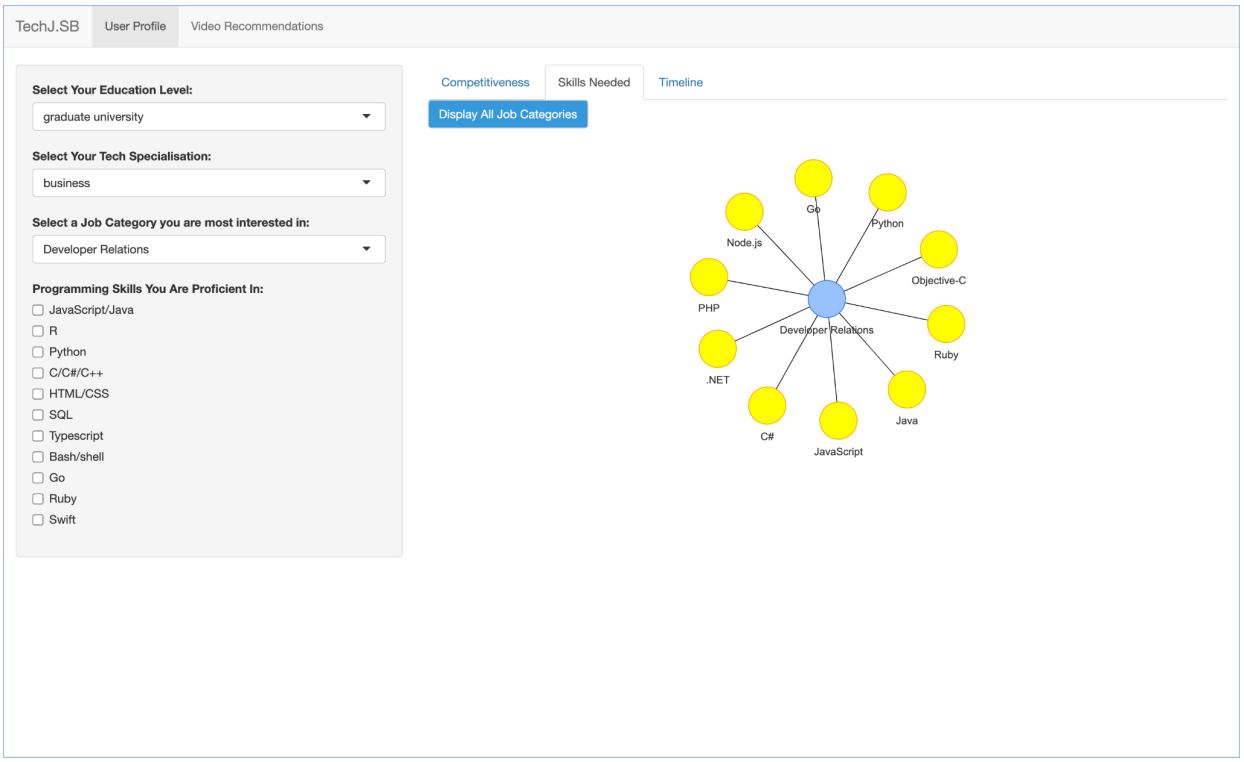


Figure 2: "Skills Needed" sub-tab

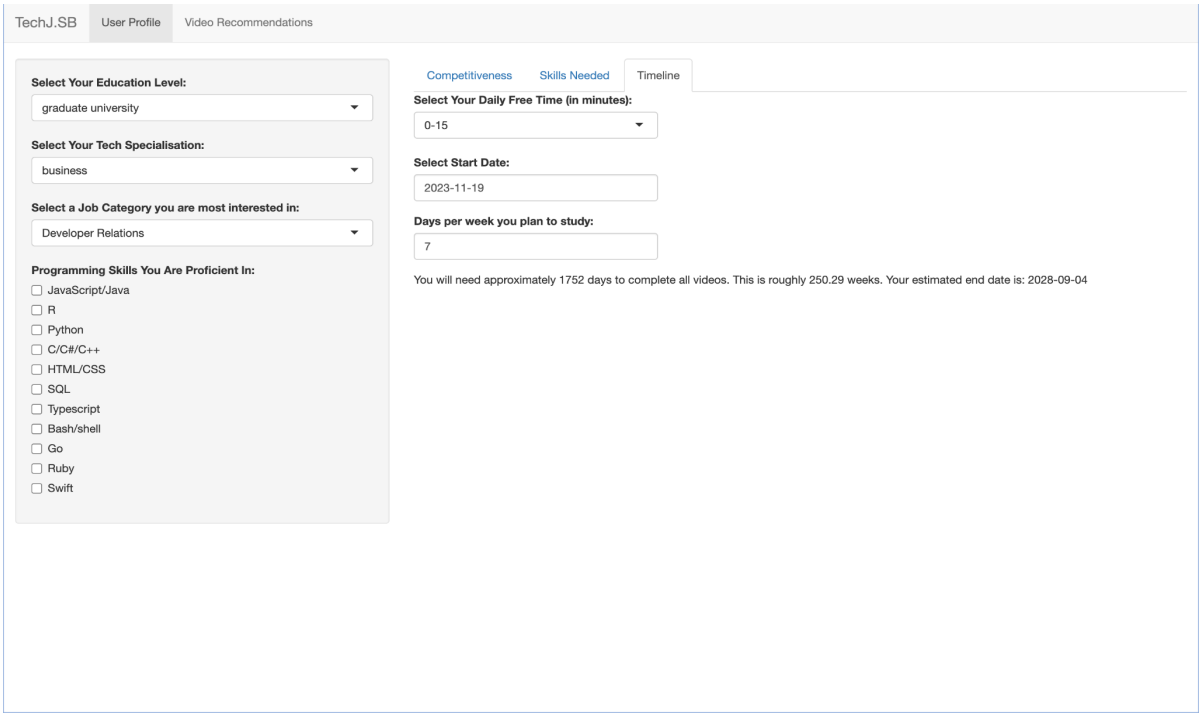
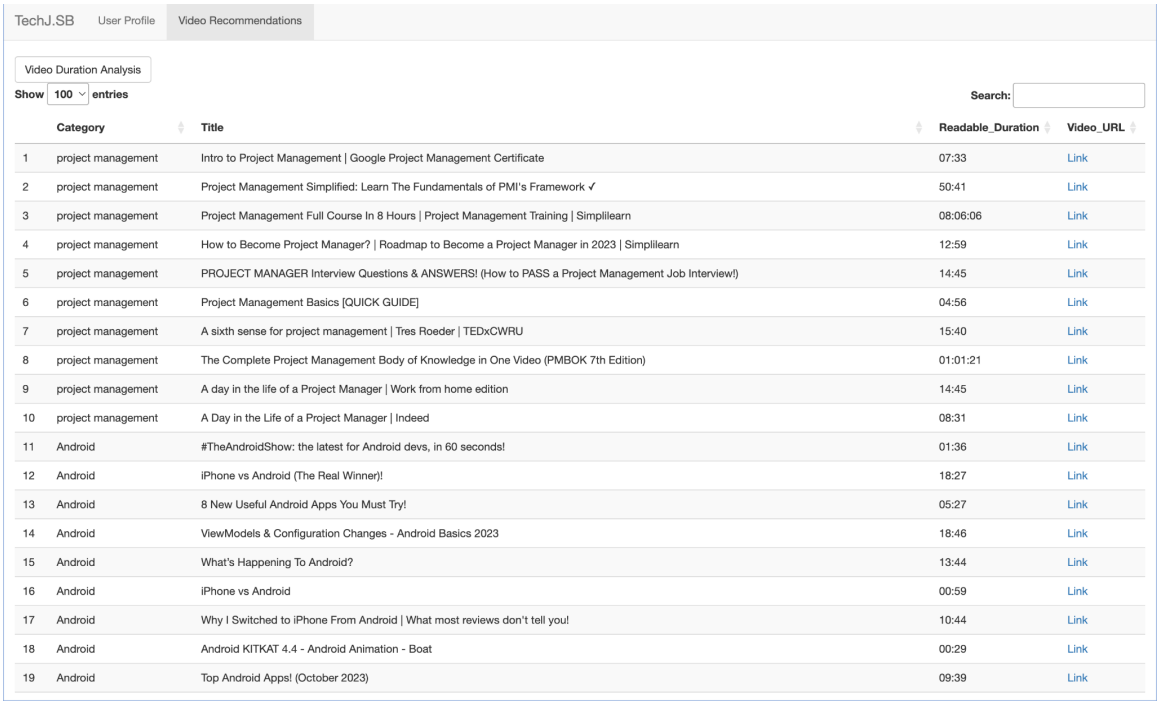


Figure 3 "Timeline" sub-tab



	Category	Title	Readable_Duration	Video_URL
1	project management	Intro to Project Management | Google Project Management Certificate	07:33	Link
2	project management	Project Management Simplified: Learn The Fundamentals of PMI's Framework ✓	50:41	Link
3	project management	Project Management Full Course In 8 Hours | Project Management Training | Simplilearn	08:06:06	Link
4	project management	How to Become Project Manager? | Roadmap to Become a Project Manager in 2023 | Simplilearn	12:59	Link
5	project management	PROJECT MANAGER Interview Questions & ANSWERS! (How to PASS a Project Management Job Interview!)	14:45	Link
6	project management	Project Management Basics [QUICK GUIDE]	04:56	Link
7	project management	A sixth sense for project management | Tres Roeder | TEDxCWRU	15:40	Link
8	project management	The Complete Project Management Body of Knowledge in One Video (PMBOK 7th Edition)	01:01:21	Link
9	project management	A day in the life of a Project Manager | Work from home edition	14:45	Link
10	project management	A Day in the Life of a Project Manager | Indeed	08:31	Link
11	Android	#TheAndroidShow: the latest for Android devs, in 60 seconds!	01:36	Link
12	Android	iPhone vs Android (The Real Winner)!	18:27	Link
13	Android	8 New Useful Android Apps You Must Try!	05:27	Link
14	Android	ViewModels & Configuration Changes - Android Basics 2023	18:46	Link
15	Android	What's Happening To Android?	13:44	Link
16	Android	iPhone vs Android	00:59	Link
17	Android	Why I Switched to iPhone From Android | What most reviews don't tell you!	10:44	Link
18	Android	Android KITKAT 4.4 - Android Animation - Boat	00:29	Link
19	Android	Top Android Apps! (October 2023)	09:39	Link

Figure 4: List of Recommended Videos

2.2 Marketing and sales strategy

Our marketing strategy is aimed at fostering the adoption and awareness of TechJ.Sb, positioning it as a good educational tool for Singaporeans. Our target audience is educational institutions and individual learners. Our message will focus on the app's extensive database

of tech job categories and customised learning experience. This helps to streamline the process of learning the necessary tech skills for their desired job category.

Our initial marketing efforts will be focused on engaging with local schools, pre-university education institutions and universities in Singapore, helping us to establish ourselves in Singapore's tech education landscape. In a later stage, when targeting through this channel becomes insufficient, the company will expand to paid online advertisements such as Facebook Ads. This helps us to reach out to our target audience, who are educators seeking to enrich their teaching tools and students looking to enhance their tech skills. Using its psychographic data, we can easily identify users who fit into the target audience and display our ad to them. In addition, we will use Google Search Ads, helping us to appear in tech education search queries. As our user base in Singapore expands, we plan to do more online advertising campaigns and also potentially expand into the overseas market.

The company will monetize the applications by employing a freemium business model. Users will have free accessibility to an initial set of recommendations and lessons for one job track. This allows the customer to gain value and then decide whether to proceed with subscribing to the app. The paid subscription model unlocks multiple job tracks, more advanced analytics such as job popularity, peer insights, and personalized prioritization of recommendations. To build the database regarding general statistics each individual customer, whether subscribed or not, should share their preferences with the company.

Another source of revenue of the company, although kept to a minimum, would be advertising space, specifically for educational content creators in related fields. To ensure the user experience is not disrupted, we will ensure the advertisements are relevant and limited in volume.

2.3 The management and operational structure

The company is run by the founding members, organized as a general partnership. Given an equal contribution to the development of the app every founding partner has equal say in the direction of the company. A more detailed outline of tasks of the partners will be produced after the initial pilot study of the app in the University of Singapore is completed successfully. This is determined by the amount of the subscribers the app accumulates over the time span of the trial run.

3. Data Collection and Preparation

3.1 Job categories and skills

As Singapore's best employer (Correspondent, 2022), the job categories and skills database from globally renowned tech firm, Google, were used to shortlist the top tech job categories and skills . The data was obtained from the following source:

https://www.kaggle.com/datasets/niyamatalmass/google-job-skills

Data was processed such that various job qualifications under a given category were consolidated and cleaned to generate a list of unique skills per job category.

3.2 Content/Videos by skills

By utilizing a set of distinctive skills extracted from Google jobs data as search keywords, a web scraping process was conducted to compile a list of the most-watched YouTube videos from https://www.youtube.com/ along with their durations. Subsequently, the collected data underwent further processing to eliminate any irrelevant results. The selection of the videos from YouTube was based on their high viewership, serving as an indicative measure of credibility and relevance. Furthermore, as newer videos become popular, the web scraping tool process can refresh the content on the website to provide more up-to-date content for its users to engage with.

3.3 Users data simulation

For the demonstration of the features of the app, data that will be provided by the user when using the app, was simulated. The distribution of education levels has been simulated based on the publicly available Singapore Education Statistics Digest 2022 (Ministry of Education Singapore, 2023). The same report was used to simulate gender across the different education levels specified.

For the specializations, it was assumed that students in the final year in secondary school or pre-university do not yet know what they want to do, resulting in equal probabilities across specializations awarded. For the other education levels it was assumed that distribution of students across specializations in NUS and Temasek are representative for the other schools as well (National University of Singapore, 2023; *Polytechnics - Intake, Enrolment and Graduates by Course — Data.gov.sg*, 2021). Furthermore, for the simulation of free time, or time available to spend on learning specific tech skills, no information could be found online. Hence, the simulation is based on personal experience and observations as and regarding fellow students. The same holds for information regarding internships already done in the tech industry. The simulation of tech dream jobs is based on the classification of the different potential jobs according to the Singaporean Government (*Singapore Industry Landscape Detail | Myskillsfuture.gov.sg*, 2023). Attitudes towards these different roles have been simulated categorizing them according to the classification of the Singaporean Government, whilst attributing higher weights to more in demand jobs (Preston, 2023). The assumption was made that the more a job is in demand the more a person would be drawn to the specific role given more job opportunity present.

Finally, regarding skills already acquired the data is limited to only proficiency in programming languages, given the difficulty of simulating more distribution of more general skills across the population. To approximate the proficiency in programming languages according to specialization and education level, higher probabilities of proficiency were awarded to more commonly used programming language (*Most Used Languages Among*

Software Developers Globally 2023 | Statista, 2023). Students specializing in computing were also awarded higher probabilities of proficiency based on their specialization.

4. App Features and Functionality

4.1 User Profile

The control panel at the left, includes a dropdown menu where users can select their desired job category from a comprehensive list, ensuring that the recommendations are relevant to their dream job. There is also a checkbox for users to select the programming skills they are already proficient in, which helps to refine the recommendations provided *(Figure 5)*.

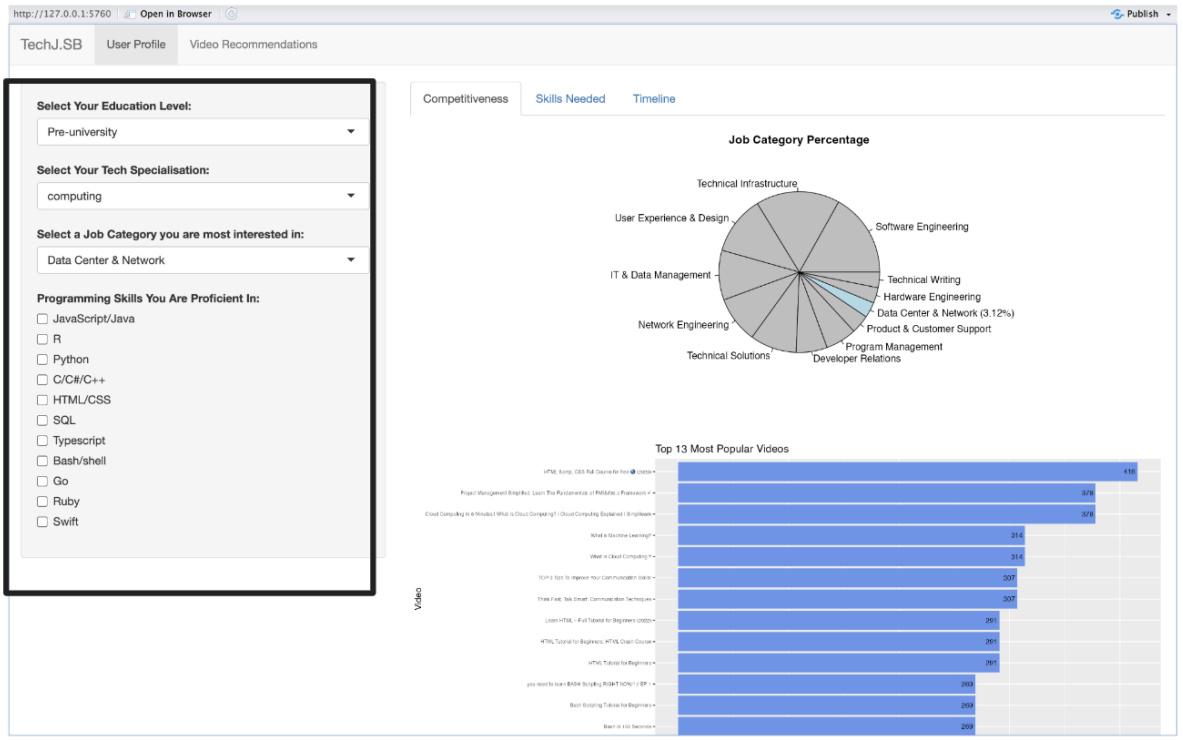


Figure 5: Control Panel

Competitiveness

Rationale: The feature provides individuals with greater insight regarding their dream tech jobs, such as popularity of each job amongst peers and the competition one might face, as well as popularity of videos useful to skill development for the related jobs. This allows our users to be of greater awareness regarding the field and make better informed decisions.

Functionality:

Popularity of Job Categories

The pie chart offers a breakdown of job categories within the tech industry, focusing on the percentage distribution of each category. By selecting a job category from the dropdown menu, the slice representing it will change in colour. This helps users to know the demand of certain tech roles amongst the user base.

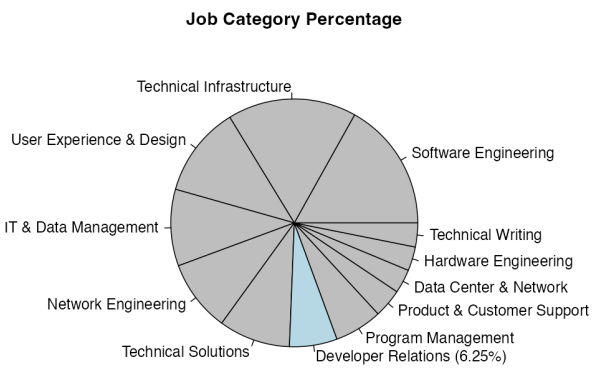


Figure 6: Distribution of Job Categories

Popularity of Videos

To illustrate the popularity of the videos, a horizontal bar chart was meticulously crafted to offer a visual representation of the view counts for the top 13 videos with the highest viewership *(Figure 7)*. Our analytical approach involved several key steps: initially linking job categories to dream tech jobs based on job nature and content *(Figure 8)*, then extracting the requisite skills for each dream tech job from a list of skills associated with each job category *(Figure 9)*. Subsequently, utilizing simulation data from users data, we identified users' aspirations for dream tech jobs *(Figure 10)* and extracted information on the skills necessary for those roles *(Figure 11)*. By subtracting the number of users already possessing specific skills for a given job *(Figure 12)*, we refined our analysis to a pool of individuals actively seeking content aligned with their specific skill needs (*Figure 13)*. Finally, we computed the view counts for the top 13 videos based on the list of courses by skills and the number of individuals requiring specific skills.

In our analysis, we observed that each video within the top 13 most popular list caters to the popularity of two to three different skills. These videos transcend the constraints of a singular skill focus, capturing the essence of diverse technical domains. The correlation between skills and the popularity of videos becomes evident as these visualizations underscore the substantial number of viewers accumulated by each video. This observation emphasizes the nuanced interplay between the skills addressed in the content and the audience's engagement, reinforcing the idea that videos addressing a combination of skills are particularly well-received.

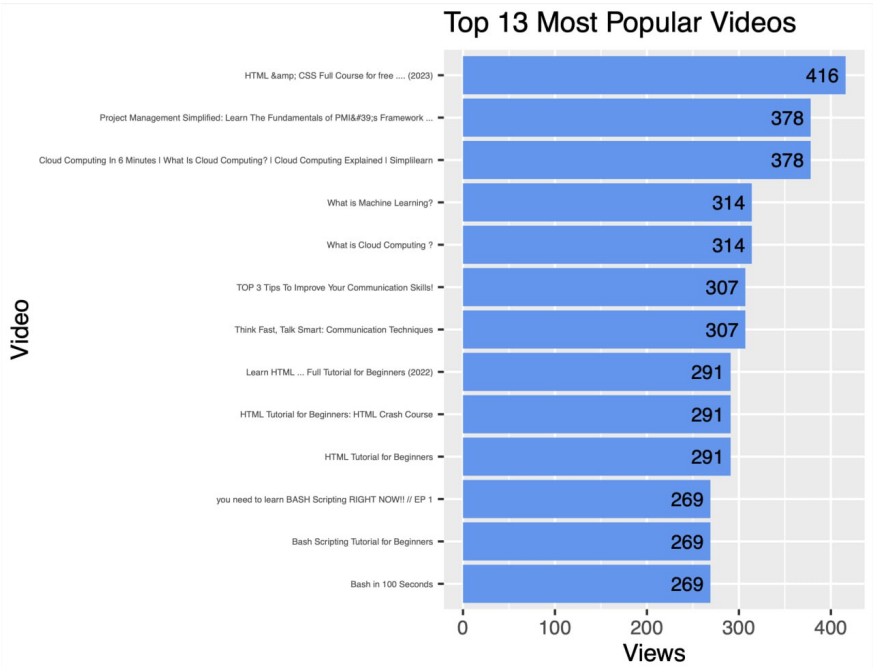


Figure 7: Top 13 Most Popular Videos

> Link job category to Dream.Tech.job

- IT Services
  - IT & Data Management
  - Technical Infrastructure
- Business Analytics
  - Product & Customer Support
  - Developer Relations
  - Program Management
  - Technical Solutions
  - Technical Writing
- Emerging Technologies
  - Hardware Engineering
- Telecommunications and Networks
  - Network Engineering
  - Data Center & Network
- Software and Applications
  - Software Engineering
  - User Experience & Design

Figure 8: Link job category to tech job

google_job_cat_skills_final_List of skills for each job cat

	Category	combined_qual1
1	Data Center & Network	communication
2	Data Center & Network	project management
3	Data Center & Network	requirement gathering
4	Data Center & Network	planning
5	Data Center & Network	scheduling
6	Developer Relations	Java
7	Developer Relations	JavaScript
8	Developer Relations	C#
9	Developer Relations	Objective-C
10	Developer Relations	Python
11	Developer Relations	Go
12	Developer Relations	PHP
13	Developer Relations	Ruby
14	Developer Relations	Node.js
15	Developer Relations	.NET
16	Hardware Engineering	SKILL
17	Hardware Engineering	Bash
18	Hardware Engineering	Pearl

Figure 9: Skills required for each tech job

	combined_qual1	Count
33	Go	323
43	Java	323
45	JavaScript	323
70	Python	323
24	communication	221
69	project management	221
4	agile project development	166
5	AJAX	166
8	AMBA protocols	166
12	AngularJS	166
13	ARM SoC	166
14	AV1	166
18	C	166
26	computer architecture	166
28	consumer cameras	166
30	CSS	166
34	HEVC	166

Figure 10: Users' aspirations for dream tech jobs

	Skill	Sum
1	Python	212
2	Go	64
3	SQL	73
4	Ruby	35
5	JavaScript	102
6	Java	102
7	HTML	41
8	CSS	41
9	Bash	48
10	shell programming	48
11	C	56
12	C#	56
13	C++	56

Figure 11: Skills necessary for job roles

	combined_qual1	Count
33	Go	259
24	communication	221
43	Java	221
45	JavaScript	221
69	project management	221
4	agile project development	166
5	AJAX	166
8	AMBA protocols	166
12	AngularJS	166
13	ARM SoC	166
14	AV1	166
26	computer architecture	166
28	consumer cameras	166
34	HEVC	166
37	HTML5	166
42	IP modeling	166
51	modern video codec	166

Figure 12: Subtraction of users already possessing specific skills for a given job

Top 13 Most Popular Videos

	Category	Title	VideoID	Readable_Duration	Video_URL
PT4H2M43S	HTML5	HTML & CSS Full Course for free (2023)	HGTJBPNC-Gw	04:02:43	https://www.youtube.com/watch?v=HGTJBPNC-Gw
PT4H2M43S1	CSS	HTML & CSS Full Course for free (2023)	HGTJBPNC-Gw	04:02:43	https://www.youtube.com/watch?v=HGTJBPNC-Gw
PT4H2M43S2	HTML	HTML & CSS Full Course for free (2023)	HGTJBPNC-Gw	04:02:43	https://www.youtube.com/watch?v=HGTJBPNC-Gw
2	project management	Project Management Simplified: Learn The Fundamentals of PMI's Framework ✓	ZKOL-rZ79gs	50:41	https://www.youtube.com/watch?v=ZKOL-rZ79gs
PT50M41S	program management	Project Management Simplified: Learn The Fundamentals of PMI's Framework ✓	ZKOL-rZ79gs	50:41	https://www.youtube.com/watch?v=ZKOL-rZ79gs
PT6M24S	network platform provi	Cloud Computing In 6 Minutes | What Is Cloud Computing? | Cloud Computing Explained | Simplilearn	M988_fsOSWo	06:24	https://www.youtube.com/watch?v=M988_fsOSWo
PT6M24S4	cloud design considers	Cloud Computing In 6 Minutes | What Is Cloud Computing? | Cloud Computing Explained | Simplilearn	M988_fsOSWo	06:24	https://www.youtube.com/watch?v=M988_fsOSWo
PT6M24S2	cloud technologies	Cloud Computing In 6 Minutes | What Is Cloud Computing? | Cloud Computing Explained | Simplilearn	M988_fsOSWo	06:24	https://www.youtube.com/watch?v=M988_fsOSWo
PT8M23S2	Machine learning	What is Machine Learning?	9gGnTQTYNaE	08:23	https://www.youtube.com/watch?v=9gGnTQTYNaE
PT5M23S1	Machine learning	What is Machine Learning?	HcqpanDadyQ	05:23	https://www.youtube.com/watch?v=HcqpanDadyQ
PT55S1	cloud technologies	What is Cloud Computing ?	LPwcPPfDU1Q	00:55	https://www.youtube.com/watch?v=LPwcPPfDU1Q
PT5M10S	cloud technologies	What is Cloud Computing ?	8C_kHJ5YEiA	05:10	https://www.youtube.com/watch?v=8C_kHJ5YEiA
PT11M	communication	TOP 3 Tips To Improve Your Communication Skills!	LsyfrGnBL4c	11:00	https://www.youtube.com/watch?v=LsyfrGnBL4c
PT11M1	communication skills	TOP 3 Tips To Improve Your Communication Skills!	LsyfrGnBL4c	11:00	https://www.youtube.com/watch?v=LsyfrGnBL4c
PT58M20S	communication	Think Fast, Talk Smart: Communication Techniques	HAnw168huqA	58:20	https://www.youtube.com/watch?v=HAnw168huqA
PT58M20S1	communication skills	Think Fast, Talk Smart: Communication Techniques	HAnw168huqA	58:20	https://www.youtube.com/watch?v=HAnw168huqA
PT4H7M30S	HTML5	Learn HTML – Full Tutorial for Beginners (2022)	kUMe1FH4CHE	04:07:30	https://www.youtube.com/watch?v=kUMe1FH4CHE
PT4H7M30S1	HTML	Learn HTML – Full Tutorial for Beginners (2022)	kUMe1FH4CHE	04:07:30	https://www.youtube.com/watch?v=kUMe1FH4CHE
PT1H9M34S	HTML5	HTML Tutorial for Beginners: HTML Crash Course	qz0aGYrrlhU	01:09:34	https://www.youtube.com/watch?v=qz0aGYrrlhU
PT1H9M34S1	HTML	HTML Tutorial for Beginners: HTML Crash Course	qz0aGYrrlhU	01:09:34	https://www.youtube.com/watch?v=qz0aGYrrlhU
PT39M6S	HTML5	HTML Tutorial for Beginners	FQdaUv95mR8	39:06	https://www.youtube.com/watch?v=FQdaUv95mR8
PT39M6S1	HTML	HTML Tutorial for Beginners	FQdaUv95mR8	39:06	https://www.youtube.com/watch?v=FQdaUv95mR8
PT12M14S	Bash	you need to learn BASH Scripting RIGHT NOW!! // EP 1	SPwyp2NG-bE	12:14	https://www.youtube.com/watch?v=SPwyp2NG-bE
PT12M14S1	Linux Shell	you need to learn BASH Scripting RIGHT NOW!! // EP 1	SPwyp2NG-bE	12:14	https://www.youtube.com/watch?v=SPwyp2NG-bE
PT12M14S2	shell programming	you need to learn BASH Scripting RIGHT NOW!! // EP 1	SPwyp2NG-bE	12:14	https://www.youtube.com/watch?v=SPwyp2NG-bE
PT47M57S	Bash	Bash Scripting Tutorial for Beginners	tK9Oc6AEnR4	47:57	https://www.youtube.com/watch?v=tK9Oc6AEnR4
PT47M57S1	Linux Shell	Bash Scripting Tutorial for Beginners	tK9Oc6AEnR4	47:57	https://www.youtube.com/watch?v=tK9Oc6AEnR4
PT47M57S2	shell programming	Bash Scripting Tutorial for Beginners	tK9Oc6AEnR4	47:57	https://www.youtube.com/watch?v=tK9Oc6AEnR4
PT2M33S	Bash	Bash in 100 Seconds	I4EWvMFj37g	02:33	https://www.youtube.com/watch?v=I4EWvMFj37g
PT2M33S1	Linux Shell	Bash in 100 Seconds	I4EWvMFj37g	02:33	https://www.youtube.com/watch?v=I4EWvMFj37g
PT2M33S2	shell programming	Bash in 100 Seconds	I4EWvMFj37g	02:33	https://www.youtube.com/watch?v=I4EWvMFj37g

Figure 13: Individuals actively seeking content

Popularity of Tech Jobs

This can be assessed based on user simulation data *(Figure 14)*. Business Analytics emerges as the most sought-after field with 157 users expressing interest. Following closely is Emerging Technologies with 113 users, indicating a growing fascination with cutting-edge advancements. IT Services, though slightly behind, still commands significant attention with 86 users, showcasing the enduring relevance of traditional tech support roles. Software and Applications attract 80 users, reflecting the consistent demand for skilled software developers. Lastly, Telecommunications and Networks garner 64 users, highlighting a substantial but comparatively niche interest. In summary, Business Analytics and Emerging Technologies lead the popularity chart, while IT Services and Software Development maintain strong positions, emphasizing the diverse appeal of these technical job categories *(Figure 15)*.

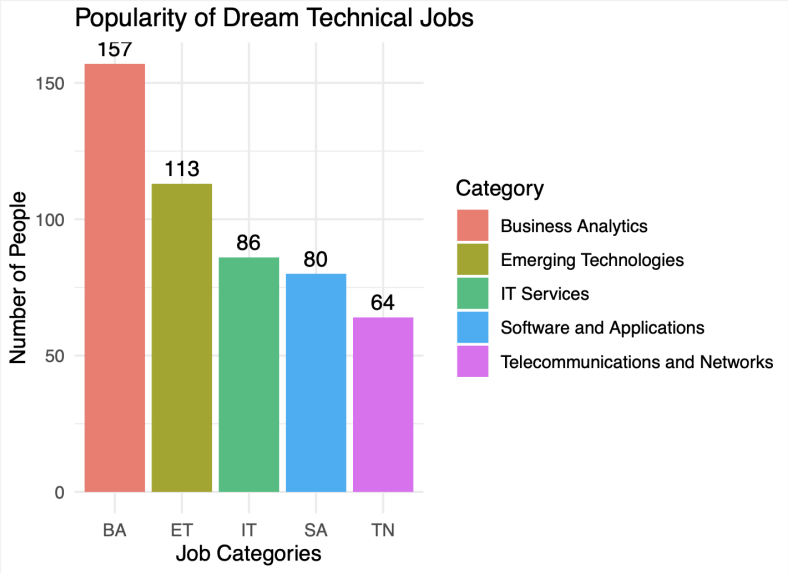


Figure 14: Popularity of Tech Jobs

	Category	Count
1	Business Analytics	157
2	Emerging Technologies	113
3	IT Services	86
4	Software and Applications	80
5	Telecommunications and Networks	64

Figure 15: Breakdown of count for each category

Skills Needed

Rationale:

For individuals contemplating their career paths and harboring curiosity regarding the skills requisite for specific jobs, this feature addresses such inquiries. According to the user's pre-selected job category, a visual network chart will be displayed, specifically designed to illustrate the skills required for the chosen job. Users can also explore the interrelationships of skills between different professions and see which specific skills are simultaneously required by multiple jobs.

Functionality:

Initially, users can select their desired job category from the dropdown menu *(Figure 16)*. The app will then generate a dynamic network chart, illustrating the prevalent skills necessary for the selected job *(Figure 17)*. For users who are interested in the interrelationships of skills across different job categories, they can select the “Display All Job Categories" button. An encompassing job skills network chart becomes visible, showing how distinct skills are interlinked across diverse jobs *(Figure 18)*. By clicking on specific skills, users can identify which jobs utilise those skills, allowing them to better understand the versatility and relevance of the skills (*Figure 19)*.

This feature provides users with a visual representation of the tech industry's skill landscape, enabling them to take a strategic approach for their professional development.

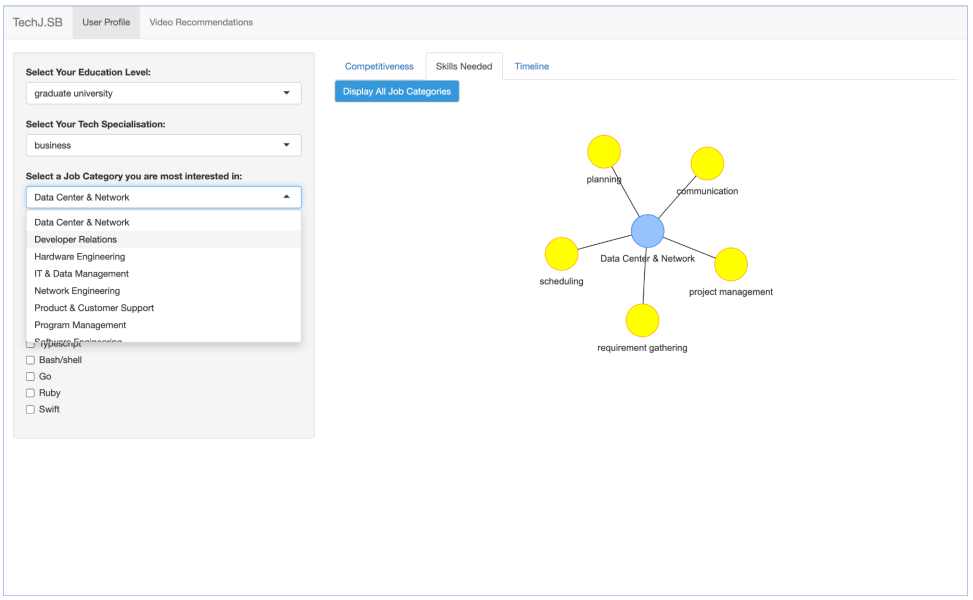


Figure 16: User selecting desired Job Category

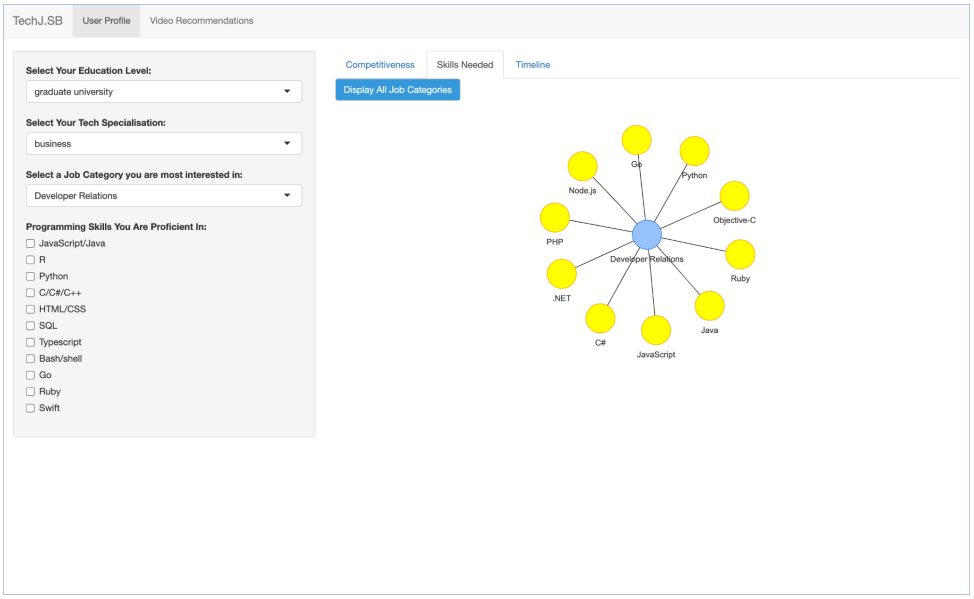


Figure 17: Network chart for selected Job Category

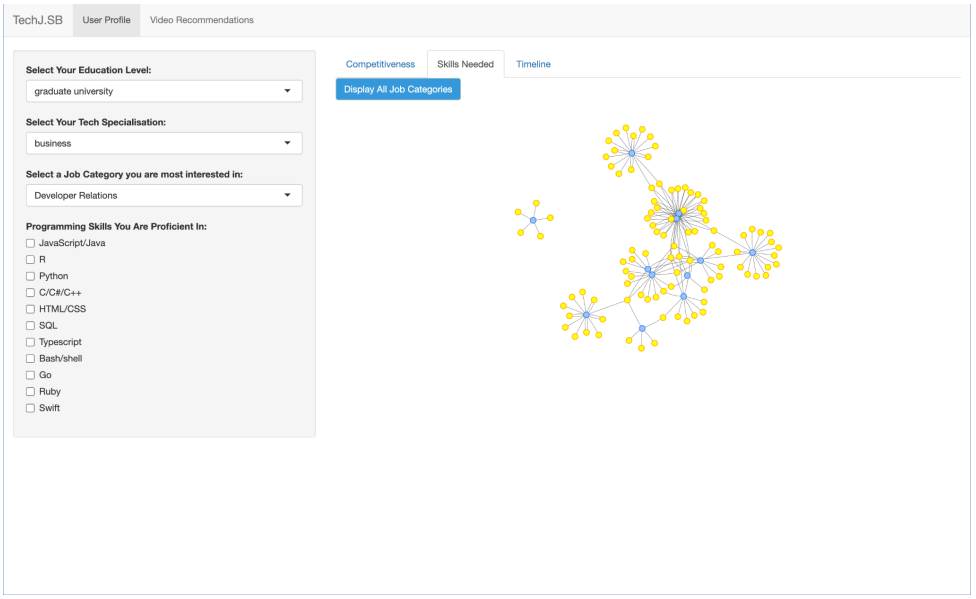


Figure 18: Complete Network Chart

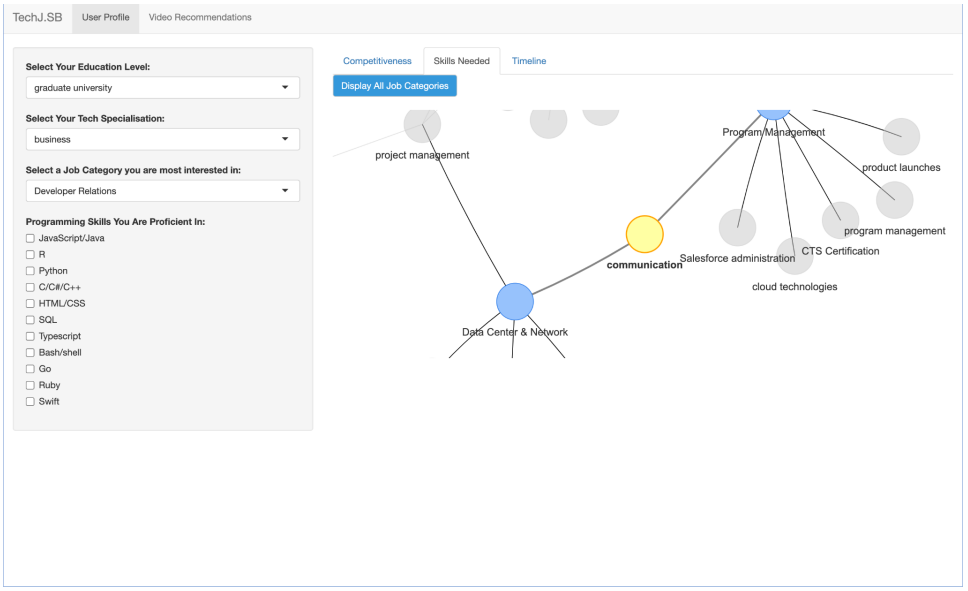


Figure 19: User select a skill in the chart to view the jobs that require it

Timeline

Rationale:

This helps users to manage their learning journey with TechJ.SB effectively. With time management being crucial for students, this feature helps them to have a realistic expectation for their learning progress and schedule their study sessions accordingly.

Functionality:

Users can select from a dropdown menu to indicate the amount of daily free time they have for learning *(Figure 20)*. The app will then calculate and show an estimation of the number of days and weeks it will take to view all the recommended videos for their desired job category. As the daily free time is a range, the estimation for the number of days is based on the mean

of the range selected. Users can select their start date and number of days per week they plan to study to get a better projection of the days they will take to complete. This feature also adjusts the recommended learning timeline based on the user's existing skills. If the user is already proficient in a programming skill required for their desired job category, the app will recalculate the estimated number of days to complete all videos.

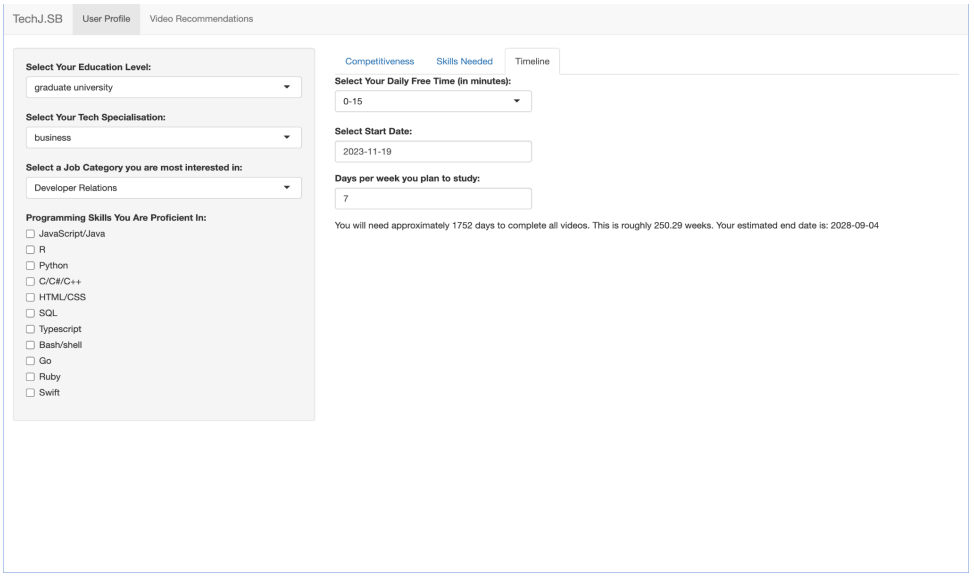


Figure 20: Users can select daily free time from dropdown menu

4.2 Video Recommendations

Rationale:

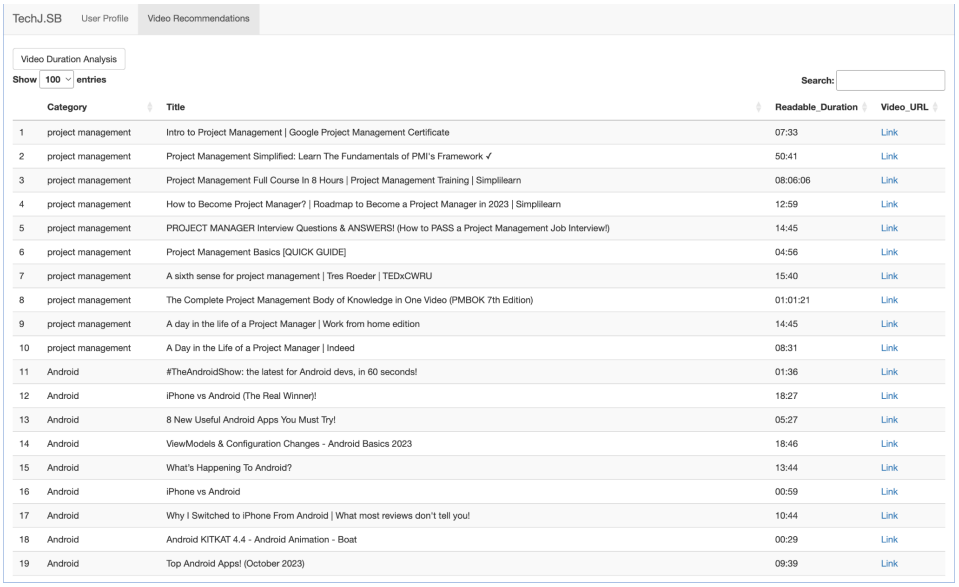
This feature is important for TechJ.SB's aim of having targeted learning for students interested in the tech industry. Based on the job category users selected at the "User Profile" tab, the top 10 most relevant YouTube videos for each skill that is needed for the job category will be shown. As users can quickly access a curated list of educational content, this saves time and ensures that their learning is focused and relevant. Additionally, being able to view the total duration required for each skill at a glance helps users to plan their study schedule and prioritise which content to watch first.

Functionality:

After users select their job interest, they can click on the "Video Recommendations" tab to view a list of videos *(Figure 21)*. This list is dynamically generated based on the job category selected beforehand. It displays video titles, categories, duration, and direct links for user convenience. Users can choose to display 5, 10, 25, 50 or 100 videos at once.

An additional function, the "Video Duration Analysis" button at the top left of the app, provides an overview of the total watch time by skill *(Figure 22)*. This helps with time management, allowing users to balance their learning on TechJ.SB with other activities. They can also hover over each individual bar to see the exact amount of time needed, rounded off to 2 decimal places.

If the user indicated proficiency in a programming skill required for their desired job category at the “User Profile” tab, the videos for those skills will not be shown.



	Category	Title	Readable_Duration	Video_URL
1	project management	Intro to Project Management | Google Project Management Certificate	07:33	Link
2	project management	Project Management Simplified: Learn The Fundamentals of PMI's Framework ✓	50:41	Link
3	project management	Project Management Full Course In 8 Hours | Project Management Training | Simplilearn	08:06:06	Link
4	project management	How to Become Project Manager? | Roadmap to Become a Project Manager in 2023 | Simplilearn	12:59	Link
5	project management	PROJECT MANAGER Interview Questions & ANSWERS! (How to PASS a Project Management Job Interview!)	14:45	Link
6	project management	Project Management Basics [QUICK GUIDE]	04:56	Link
7	project management	A sixth sense for project management | Tres Roeder | TEDxCWRU	15:40	Link
8	project management	The Complete Project Management Body of Knowledge in One Video (PMBOK 7th Edition)	01:01:21	Link
9	project management	A day in the life of a Project Manager | Work from home edition	14:45	Link
10	project management	A Day in the Life of a Project Manager | Indeed	08:31	Link
11	Android	#TheAndroidShow: the latest for Android devs, in 60 seconds!	01:36	Link
12	Android	iPhone vs Android (The Real Winner)!	18:27	Link
13	Android	8 New Useful Android Apps You Must Try!	05:27	Link
14	Android	ViewModels & Configuration Changes - Android Basics 2023	18:46	Link
15	Android	What's Happening To Android?	13:44	Link
16	Android	iPhone vs Android	00:59	Link
17	Android	Why I Switched to iPhone From Android | What most reviews don't tell you!	10:44	Link
18	Android	Android KITKAT 4.4 - Android Animation - Boat	00:29	Link
19	Android	Top Android Apps! (October 2023)	09:39	Link

Figure 21: List of recommended videos

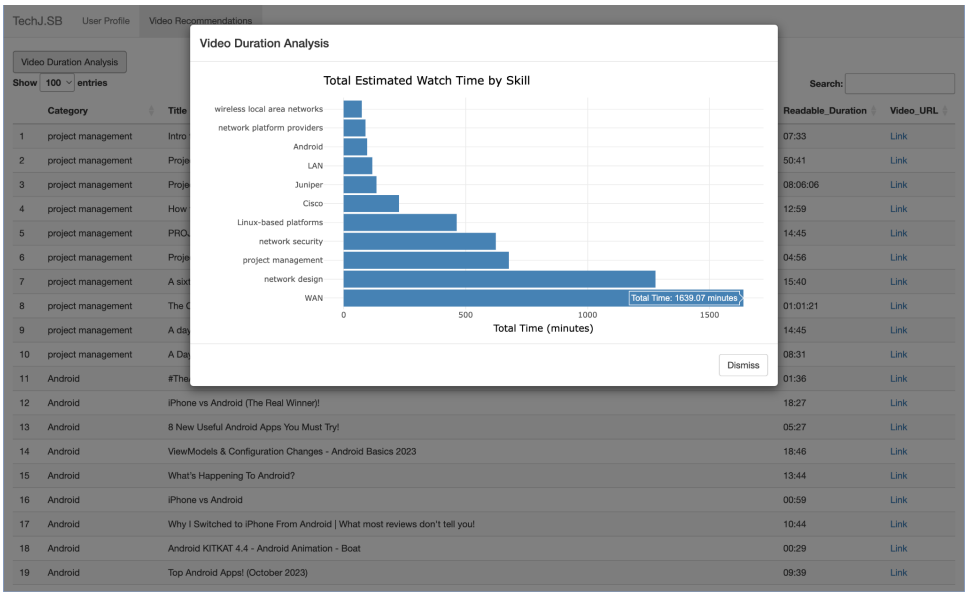


Figure 22: Total duration required for each skill

5. Limitations and next steps

5.1 Job category and skills

Our app’s job category and skills are limited to the data obtained from all of Google’s job postings across the world, leveraging on their hallmark standard as a benchmark for the tech industry. While the app’s listings will be a great start point for youth to explore their career

paths of interest, it is to be noted that the data may not encompass all the skills required in the tech industry. There may be other firm and domain specific skill sets that are not included in the app's recommendations.

Future updates will aim to integrate data from a wider range of tech firms across different sectors, such as social media and e-commerce, enabling our app to be more comprehensive.

5.2 Content data

YouTube is used as the only source of data for this version of the app as it is the most accessible free content via web scraping. As the company expands, it can form partnerships with other MOOCs such as Coursera, NLB/Udemy, and edX to scrape data and curate free content across multiple discrete sources for users to get exposed to new career paths.

5.3 User simulation data

The simulation of user data is limited in value given the strong assumptions it needs to make. In general, it is extremely hard to simulate attitudes and the intensity of the attitudes towards tech jobs, given their possible limited relationship with demographic characteristics. This also affects the time a particular person would want to spend on learning new skills, internships and which skills he or she has acquired so far. Hence, this highlights the importance of using actual user input for the app's general features. Nevertheless, the simulation of the data is useful for the demonstration of the services the app provides.

6. Conclusion

In conclusion, TechJ.SB stands as a transformative solution to the prevalent challenges in the online education market, particularly within the tech industry. By addressing the fragmentation and lack of specialization in existing platforms, the app aims to emerge as the primary online education provider for tech-related skills. TechJ.SB not only simplifies the overwhelming diversity of available courses but also pioneers a user-friendly interface and instructive data visualization to offer a tailored learning experience. With its unique approach of combining job category exploration, peer insights, and skill-specific up-to-date video recommendations, TechJ.SB positions itself as the go-to platform, ensuring users receive high-quality, up-to-date educational content aligned with their individual preferences and career aspirations. We believe that these functionalities will garner the app a large user base and make it a success.

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