Implementing New Features to Lou's List to Promote Interconnectivity within UVA

CS4991 Capstone Report, 2023

Richard Kim
Computer Science
The University of Virginia
School of Engineering and Applied Science
Charlottesville, Virginia USA
rmk9ds@virginia.edu

ABSTRACT

In the University of Virginia course, "Advanced Software Development Methods". My project group and I chose the project option of revamping the Lou's List website. The project goals were to 1. promote connections between UVA students and 2. improve the class scheduling process. My group and I used the Django framework in order to implement a class schedule builder, account system, and friends system. To implement these features, we used Agile Scrum development methods, Google Oauth, REST methods, PostgreSQL, and a firm understanding of MVC architecture. The completed project enabled users to create and save their own schedules and to add and remove friends. Users are also able to view and leave comments under their friends' schedules. Further improvement is needed in the cyber security department. We made sure account information was properly secured and CRUD access rights were only granted to the appropriate user roles, however we had an oversight in the form of Url traversal. Future improvements could be made in the form of class schedule exportation to UVA SIS feature for easier schedule building or a feature that promotes further connections between UVA students.

1. INTRODUCTION

With educational institutions and their communities undergoing rapid changes, the need for connectivity for students rises. The project in the course "Advanced Software Development Methods" at UVA emerged as a response to this rising need. The main goal of this project was the implementation of additional features to the already existing Lou's List website.

Lou's List is a well-known online platform and fundamental resource within UVA and has helped UVA students build their schedules since 2009. The reason for implementing additional features and improving website layout was to cultivate a sense of interconnectivity among UVA students as well as making the scheduling process not only easier but potentially collaborative as well. Using the Agile Scrum methodology, we aimed to create a website that would help students to not only create their ideal class schedules but also help forge meaningful connections with their peers.

2. RELATED WORKS

University students who experience loneliness can be impacted both mentally and physically. Some effects include depression, low sleep quality, and poor health behaviors (Zahedi, Sahebihagh, & Sarbakhsh, 2022). These side effects affect the quality of life for university students including their academic performance. Addressing issues of loneliness in university and college students is vital due to the number of students experiencing

loneliness during the school year. According to a study by Sodexo, "53% of current college students reported that they are currently concerned with feeling lonely, and 47% reported they are concerned with feeling isolated" (Sodexo USA, n.d.). UVA offers a program/course called Hoos Connected. Hoos Connected is a program where third and fourth years meet with underclassmen and facilitate connections and activities to lower loneliness among students in University of Virginia (Bacon 2022). In a similar method compared to Hoos Connected, my project intends to foster connections between UVA students through the friends system feature. Inspiration can be taken from the Hoos Connected program and be implemented into the project by taking into consideration the best methods of promoting connections.

3. PROJECT DESIGN

This project came in the form of a web application. The group came together on a single day to map out a plan for requirements elicitation to gather user interest on potential website layouts and preferred information to be displayed. After collecting data from 29 students the group and I started development after designing with the user feedback in mind.

3.1 Review of System Architecture

The web application my group and I worked on uses Django as the framework. The frontend is built using HTML, CSS, and Javascript and the backend has PostgreSQL for the production database and SQLite3 for the testing database with Python being the main language of choice. The app is also hosted on Heroku, allowing for multi-user utilization. Development was done using GitHub for source control management and GitHub CI for the build environment.

3.2 Requirements

Professor Mark Sherriff required that the web application support Google account authentication, a site-specific account for users and a friend system, as well as incorporate the SIS API.

3.2.1 Client Needs

Professor Sherriff further specified for this project option that: Students must be able to view and search classes, separated into logical categories. Students must be able to save a prospective schedule for a given semester. The system should prevent time conflicts and prevent signing up for multiple sections of the same course. Students should be able to "friend" other students to see their schedule and leave a comment on their schedule.

3.2.2 System Limitations

I was limited to using the Django framework and Python3. I also was limited to using PostgreSQL as the database of choice due to Heroku not allowing the use of SQLite3 when hosting the web application.

3.3 Key Components

The web application has many key components which were both required by Professor Mark Sherriff as well as required in order to be functional.

3.3.1 Specifications

The web application enabled users to log in through both Google OAuth, as well as create their own accounts within the application. Database management utilized PostgreSQL, and the friend system enabled users to view a friend's schedule. Users are allowed to create schedules from the class database retrieved from the SIS API, with the schedules shown in a calendar view. The ability to comment on schedules is an additional feature.

3.3.2 Challenges

Some security issues were found during the final presentations, specifically URL traversal.

3.3.3 Solutions

The solution has not yet been implemented but a fix such as checking a user's friend status to the URL requested user's schedule could be implemented to prevent URL traversal security risks.

4. ANTICIPATED RESULTS

Since this was a school project, real life impact could not be calculated. However, due to the cleaner display as well as several useful features being offered on the web application for potential users, increased use of the application can be predicted.

5. CONCLUSION

The Lou's List website does well in conveying information such as class availability, open spots, and class descriptions, but only does the job of making class scheduling easier for students by providing information. The web application my group I created improved the class schedule building process by offering a feature that allows students to build the schedule within the website instead of through SIS.

The project web application also promotes interconnectivity by encouraging interactions through a friend system which allows students to view and comment on their friends' schedules. Loneliness in colleges and universities is very prevalent and the improved Lou's List web application can be used as a stepping stone to alleviate loneliness starting at the University of Virginia.

6. FUTURE WORK

For further use of the web application, a substitute to the SIS API is necessary as the one provided by Professor Sherriff no longer works. Updated cybersecurity measures would also need to be taken to prevent user data breaches and unauthorized access to admin specific features such as database manipulation. Heroku hosting services would also need to be taken into consideration. The free trial used for final presentations for the class has expired and if the web application is to be continuously used, Heroku services would need to be acquired. Additional features promoting connectivity among UVA students can be done with a recommendation system for finding friends with similar classes and interests.

REFERENCES

Bacon, J. A. (2022, December 9). How UvA addresses student loneliness, depression. The Jefferson Council. https://thejeffersoncouncil.com/how-uva-addresses-student-loneliness-depression/

Sodexo USA. (n.d.). *More than 50% of Gen Z College students report feeling lonely according to Sodexo Student Lifestyle Survey*. https://us.sodexo.com/media/news-releases/gen-z-college-students-lonely.html#:~:text=53%25%20of%20current%20college%20students,a%2050%25%20increase%20from%202020.

Zahedi, H., Sahebihagh, M. H., & Sarbakhsh, P. (2022, October). *The magnitude of loneliness and associated risk factors among university students: A cross-sectional study*. Iranian journal of psychiatry. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9922349/