Capstone Project

ISBA Outreach CRM

Aidan Taggart, Charese Deleon, Henry Lissner, and Rebekah Rajadurai

Elevator Pitch:

We're helping the LMU ISBA community optimize their outreach to alumni and related contacts with our user-friendly interface that consolidates relevant contacts with our database.

ISBA Subfields:

1. IT Management aligns with the project's focus on managing alumni data effectively while ensuring proper access levels are in place. Given the sensitive nature of the data, it was important to restrict access within the ISBA community as well so students, faculty, and administrators have different levels of access to information. Therefore it was important to implement authentication measures to safeguard the confidentiality and integrity of the nonpublic data, ensuring it remains securely locked.

2. Storage and Data was a crucial component of this project as we utilized a MySQL database to store collected data and integrate it with the front-end interface. Much of the project's infrastructure relied on MySQL, so there was collaboration with the ISBA Outreach Data Engineering and ISBA Outreach Data Analytics Teams. The website's functionality depended on their work that cleaned and managed the data using SQL.

3. Software Development was the major component of the project when creating the front end of our website. HTML/Javascript/CSS and Javascript's React were involved in designing, coding, and testing our web application. This was how the features of the search functionalities and user input forms were implemented. We also used Google Firebase to host and deploy our website, benefitting from its hosting and Single-Sign on (SSO) authentication capabilities. Firebase's firestore database served as a dependable data storage solution that preserved the inputs made on the website.

Problem:

Real Problem Definition: The problem we are solving is the inefficiency and lack of organization in alumni outreach efforts within the LMU ISBA community. Currently, alumni data may be spread across various sources, making it challenging for faculty, students, and administrators to access and utilize this information effectively. This results in inconsistency in communication, missed opportunities for engagement, and difficulty in tracking interactions with alumni.

Previous Work: Past efforts within the LMU ISBA Society's E-board involved manual methods such as maintaining spreadsheets or contact lists to manage alumni data.

Learnings from Previous Work: Previous efforts highlight the importance of centralizing alumni data and streamlining outreach efforts. Our solution extends previous work by providing a specialized platform tailored to the needs of the LMU ISBA community, offering advanced search functionalities, user input options, and analytics insights specific to the ISBA field.

Impact on the Customer: The solution improves efficiency and effectiveness in alumni engagement, facilitating collaboration, mentorship, and professional opportunities within the LMU ISBA network. Faculty members, students, and administrators benefit from streamlined communication channels, better access to alumni networks, and enhanced tracking of interactions, leading to stronger relationships and increased opportunities for collaboration and career development.

Current Customer Approach: Currently, the LMU ISBA community may rely on manual methods or LinkedIn. These methods are time-consuming, prone to errors, and lack specialized features tailored to the needs of the ISBA community.

Resource Cost: The resource cost of the problem includes both time and financial resources. Faculty members, students, and administrators may spend significant time manually managing alumni data, searching for contacts, and coordinating outreach efforts. Additionally, missed opportunities for collaboration and engagement may result in wasted time and potential funding opportunities.

Ranking of Problems by Importance:

1. Inefficiency in alumni outreach efforts: High importance, as it directly impacts the effectiveness of engagement and collaboration within the LMU ISBA community. This also contributes to missed opportunities for ISBA students' academic and professional development.
2. Missed communication and tracking: Medium importance, as it affects the ability to maintain strong relationships with alumni and track engagement metrics.
3. Missed opportunities for collaboration: Medium importance, as it hinders the potential for research collaborations, mentorship, and industry partnerships within the ISBA network.

Solution

Layman’s terms:

Imagine you're trying to keep track of all your old classmates and stay connected with them. But instead of having a neat, organized list of everyone's contact information, it's scattered across different places like your phone, email, and social media. It's hard to remember who's doing what, where they work, or how you can reach them. That's where our solution comes in.

We've created a special online hub just for the LMU ISBA community, where you can easily find and connect with alumni and other related contacts. It's like having a digital directory of all your former classmates, professors, and industry contacts in one place. You can search for specific people based on their job, industry, or skills.

This platform is restricted to be used within the LMU ISBA community. It has different levels of access between students, faculty, and administrators, ensuring the information of the contacts on the website are securely locked within the web application. It also limits the type of information displayed depending on the user's access level. For example, if a student is logged in, the website will display the contact’s first name, last name, and LinkedIn URL, meanwhile a faculty member and administrator will be able to view more information such as first name, last name, LinkedIn URL, and email. The website will detect a user’s access level based on their login, as a student’s email will end with @lion.lmu.edu, while a faculty member or administrator will have a login email ending with @lmu.edu.

Technology tools and platforms used:

- Programming Languages: HTML/CSS/JavaScript, SQL, Python
- Key packages: React, React Bootstrap, Concurrence, Nodemon, Calendar
- Data Storage: MySQL database, Google Firebase
- Software/Tools:
    - Open-source software: DBeaver, MySQL Workbench
    - APIs: LinkedIn API
- Hosting: Cloud based - Google Firebase (free of cost)
- Data:
    - General description: LinkedIn data and client-provided data from ISBA community
    - Source: API, client provided

Technical Terms:

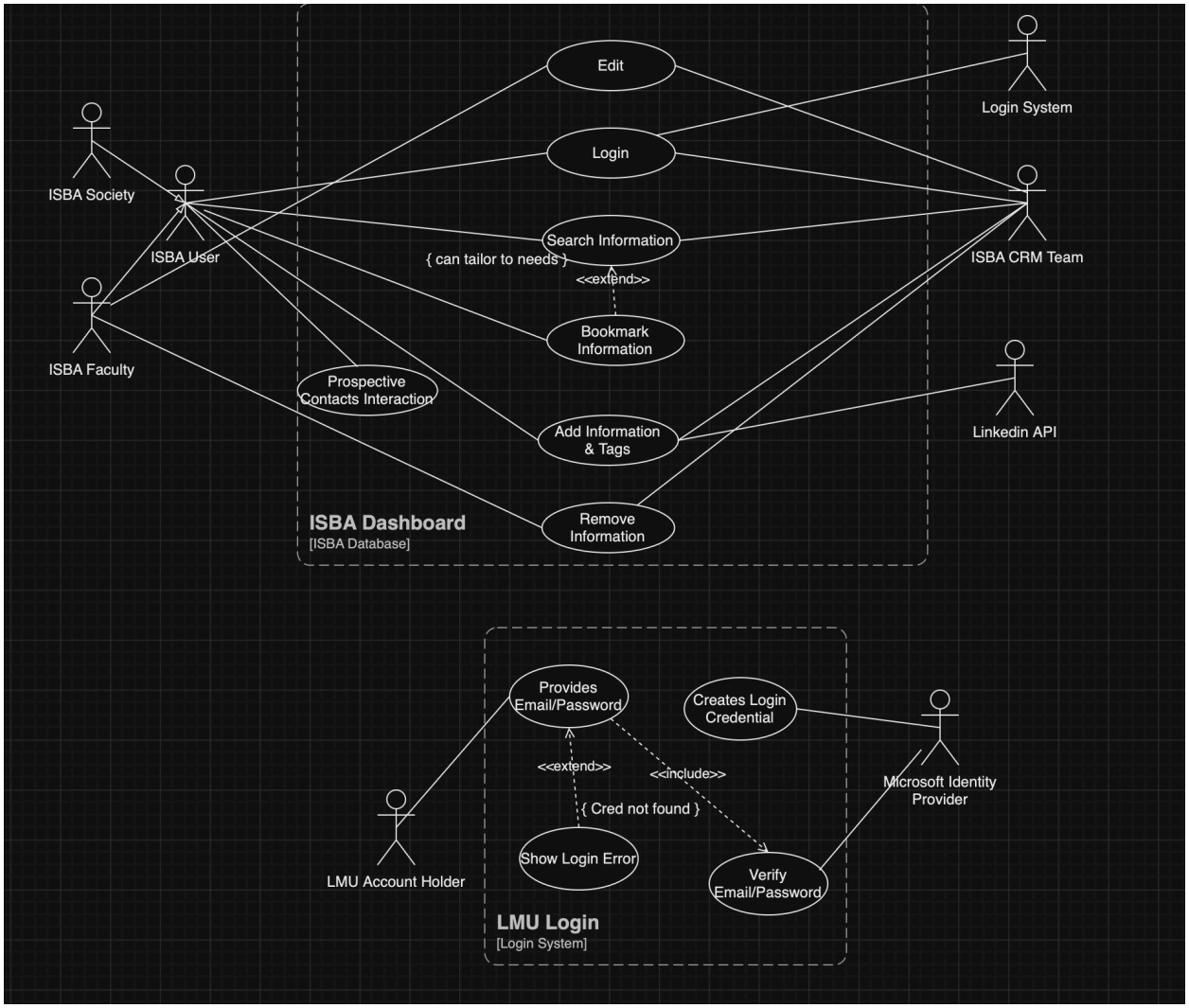
The solution to our problem of inefficient alumni outreach within the LMU ISBA community involved the development of a comprehensive alumni engagement platform. Here's how we tackled it from a technical perspective:

1. Data Collection and Storage:
    - We utilized Python to interact with the LinkedIn API and collect relevant alumni data, including employment history, skills, and contact information.

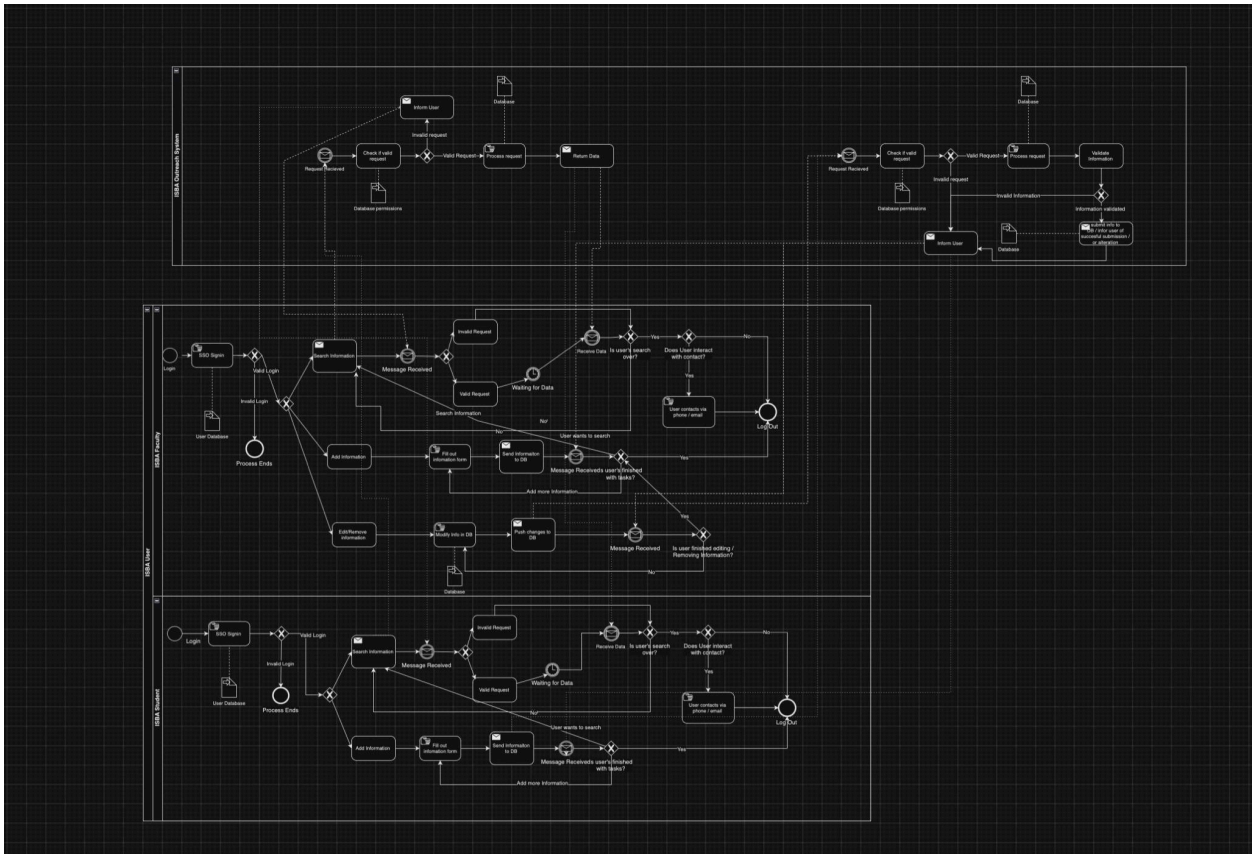
- The collected data was stored in a MySQL database, providing a scalable and secure storage solution for managing alumni information

2. Front-End Development:
    - Using HTML, CSS, and JavaScript, we developed a responsive web interface for the alumni engagement platform. This interface allows users to search for alumni, view their profiles that include contact information.
3. Back-End Development:
    - We ran separate servers for the front-end and back-end development. The back-end system communicates with the MySQL server, where we run queries to get the data we want from the API.
4. Integration with External APIs:
    - We leveraged the LinkedIn API to enrich alumni profiles with real-time data, ensuring that the information displayed on the platform remained current and accurate.
5. Hosting and Deployment:
    - The platform was deployed on Google Firebase
    - We created a gmail account so future capstone groups and ISBA professors can access and work with Firebase to continue this project.
    - Email: isbaoutreach@gmail.com
    - Password: ISBACRMOutreach2024

UCD


Edit
Login
Search Information
{ can tailor to needs }
<<extend>>
Bookmark Information
Prospective Contacts Interaction
Add Information & Tags
Remove Information
ISBA Dashboard
[ISBA Database]
ISBA Society
ISBA User
ISBA Faculty
Login System
ISBA CRM Team
Linkedin API
Provides Email/Password
Creates Login Credential
<<extend>>
<<include>>
{ Cred not found }
Show Login Error
Verify Email/Password
LMU Account Holder
Microsoft Identity Provider
LMU Login
[Login System]

BPMN



Methodology:

The **Software Development Life Cycle (SDLC)** framework was involved in guiding the various stages of this project. By following this framework, the team was able to plan, develop, deploy, and maintain the interface, ensuring the successful delivery of a high-quality solution that meets the needs of the LMU ISBA community.

1. **Planning**: In the planning phase, the project objectives, requirements, and scope were defined based on the initial proposal and stakeholder's interests. This involved meeting with the stakeholders Dr. Seal, Dr. Mangal, and Professor Mukherjee, outlining the features and functionalities of the interface, determining the target users, and establishing success criteria.
2. **Analysis**: During the analysis phase, the team conducted a thorough analysis of user needs, system requirements, and available resources regarding the LMU ISBA community's alumni outreach. This included gathering requirements from stakeholders and assessing technical feasibility.
3. **Design**: In the design phase, the team created detailed design specifications for the interface and database. We created a mockup wix website to visualize the user interface and functionality. Additionally, a use case diagram and a business process diagram were developed to help identify and understand the various interactions, functionalities, and processes involved in handling alumni data, ensuring a comprehensive approach to our system design.
4. **Development:** The development phase involved the development of the interface, database, and backend functionality. Using technologies such as React, JavaScript, and MySQL, the team built the front end of the website, implemented search functionalities, user input forms, and interactive elements, and developed the database schema and queries for storing and retrieving alumni data.

5. **Testing**: Throughout the development process, testing was conducted to ensure the quality, functionality, and usability of the interface. This included unit testing, integration testing, and user acceptance testing to identify and address any bugs, errors, or usability issues.
6. **Implementation**: Once development and testing were complete, the interface was deployed. This involved setting up hosting infrastructure, configuring servers, and deploying the website with Firebase.
7. **Maintenance**: After deployment, ongoing maintenance and support was given to address any issues, implement updates or enhancements, and ensure the continued usability and performance of the interface. This involved monitoring system usage, collecting user feedback, and iteratively improving the interface. Firebase presented multiple issues that required maintenance.

Next Steps/Future Improvements:

Moving forward, there are several potential enhancements and future improvements we envisioned for the project. Our goal was to develop a calendar feature that would combine and display all events within LMU CBA and ISBA. This would enable alumni to schedule events and mentorship meetings without encountering scheduling conflicts. Users would also have the option to book appointments directly through the calendar interface. The aim of this feature was to ensure that the entire ISBA community remains well-informed about upcoming events and avoid scheduling conflicts. Another goal was creating an inbox feature where users could conveniently view and manage their messages with contacts, similar to the messaging inbox

functionality in LinkedIn. This would facilitate communication and networking within the ISBA community. Although we had plans to implement this feature, time constraints prevented us from completing it within the project timeline. Further exploration and development would have been required to integrate this functionality into the platform.

Learning Resources

Rebekah - “I took the CMSI 2021, Web Application Development class in my sophomore year which gave me basic knowledge of HTML/CSS/Javascript and React. Generally I used ChatGPT to help me fix errors while coding. I had to learn how to implement Microsoft OAuth with Firebase when incorporating the single-sign on authentication. I looked through Firebase’s documentation, youtube videos, and used ChatGPT to assist me. I also had to learn new packages that had to be used in order to create our web application. I learned how to use React bootstrap through React’s documentation and by watching youtube videos. I seeked help by meeting with the computer science tutors in the Keck Lab and by attending office hours with Dr. Toal and Dr. Dionisio. In the process of trying to figure out the Microsoft authentication I was unable to at the very last minute since our Firebase deployment suddenly stopped working. I hope to fix this issue during this last week of classes so that we can get Microsoft authentication to work, but for the time being the website is currently configured with Google authentication.”

Charese - “I took my first programming class of Web Development with Professor Mukerjee in Spring 2023, and it gave me a basic understanding of HTML and CSS with limited understanding of Javascript, Bootstrap, and React. Because we were unable to spend a sufficient amount of time in React, I knew there was much to learn. When creating the foundation of the website, I had to extensively learn React through Youtube videos, Stack Overflow, React Bootstrap website, and ChatGPT to debug my code. I searched on Youtube how to create a website using React. I used this Youtube video, as well as many others, to help me create the foundation of the website. https://www.youtube.com/watch?v=tOK9l5uP06U. I would also search

how to create different features in a React website such as the navigation bar, a popup window, and creating a button and textbox. I also began searching the process of creating a booking calendar but was unable to implement it, as we shifted our focus to connecting to the database and having a working search function. In addition, I would seek help by meeting computer science tutors in the Keck Lab and attending office hours with Dr. Dionisio. Also, in the beginning of this project, I created a GitHub account and learned from Aidan about the process of push and pull requests. When we first had a React website, it had been a while since we took a web development class. So when we all needed to get connected, I referred to some notes I took in the Web Development class, which helped us get connected to the localhost."

Aidan - "My experience with Web Development came from the CMSI Web Development class that I took with Dr. Dionisio. I had experience working with React from that class and I also learned the fundamentals of HTML/CSS/Javascript. I was also most familiar with using Git so I was able to guide my other team members on how to use it. I still had to refresh my memory with web development so Dr. Toal's notes were quite useful. Working with the computer science Keck Lab tutors and Dr. Dionisio was extremely helpful for me as well. I was able to work on creating the forms page and connect submitted user inputs to the Firebase. I wanted to do this so that it would not go directly to the database and potentially have a broken or invalid LinkedIn URL that would mess up the database. We thought that it would be better if administrators would manually input the user's request to ensure the integrity of the database. Overall, this project was a great learning process for me as we ran through many frustrating issues, but with lots of trial and error combined with knowledge gained from ChatGPT and Youtube videos, we were able to make our website."

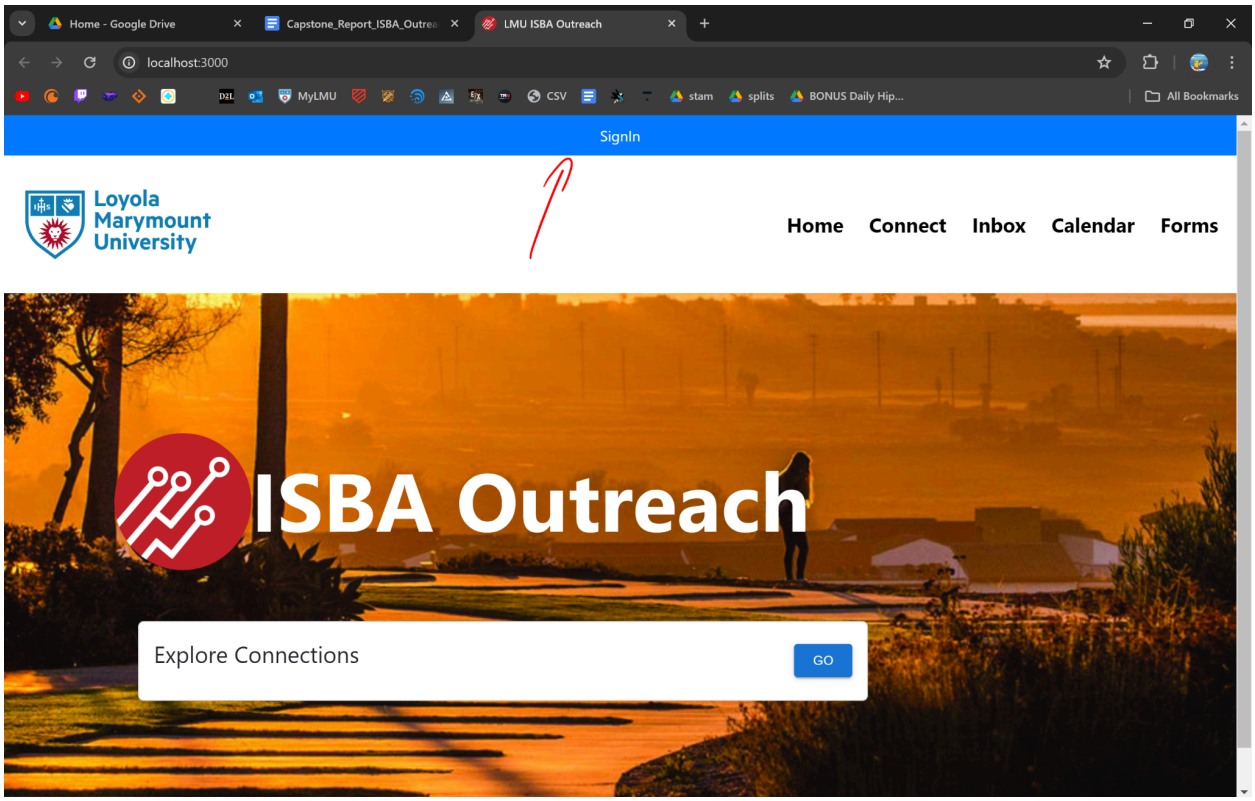
Henry - “Before this project, something related to web application development was my Senior year in high school. And though that was in my second semester, with COVID and generally just the test of time, coming into this project I had no idea how to even begin developing a website. So, needless to say, I needed a lot of help. Luckily, in the beginning, my fellow group members were a big help in at least getting me started. So, from the start, I had to learn all about things like React, bootstrap, and Firebase. I actually went through some of the tutorials that exist on Dr.Toal’s website in order to get a sort of grasp on the situation and skills that I’d need to develop to help with the capstone project. Outside of that, ChatGPT and YouTube were two key resources for me. Youtube tutorials helped me lay down the foundation of what I wanted to accomplish and ChatGPT helped me make changes to that foundation more quickly and effectively. The main task that I took on in this regard, was making sure the front-end website was able to connect to the backend database and display all the data properly. From this task, I learned a lot about how to use react and different packages, like Nodemon to interface with the database. And then how to use JavaScript and CSS to make sure the website looked good and functioned appropriately with the data we acquired. All things considered, I’m pretty happy with the results. While I think I could have done better I feel that I met my own expectations, for what I believed I would be capable of contributing to this project and then some.”

How-to

Welcome to LMU ISBA Outreach! We aim to bridge the gap between the LMU ISBA Community and ISBA contacts; whether they're alumni or any associated contacts through our website. Here's to creating connections!

Instructions

1. **Sign-in using your Google or Microsoft account**
    a. To sign-in, hover to "SignIn." It will look like this.



    b. Please use a valid Google or Microsoft account.
        i. If you are registering using a Google account.

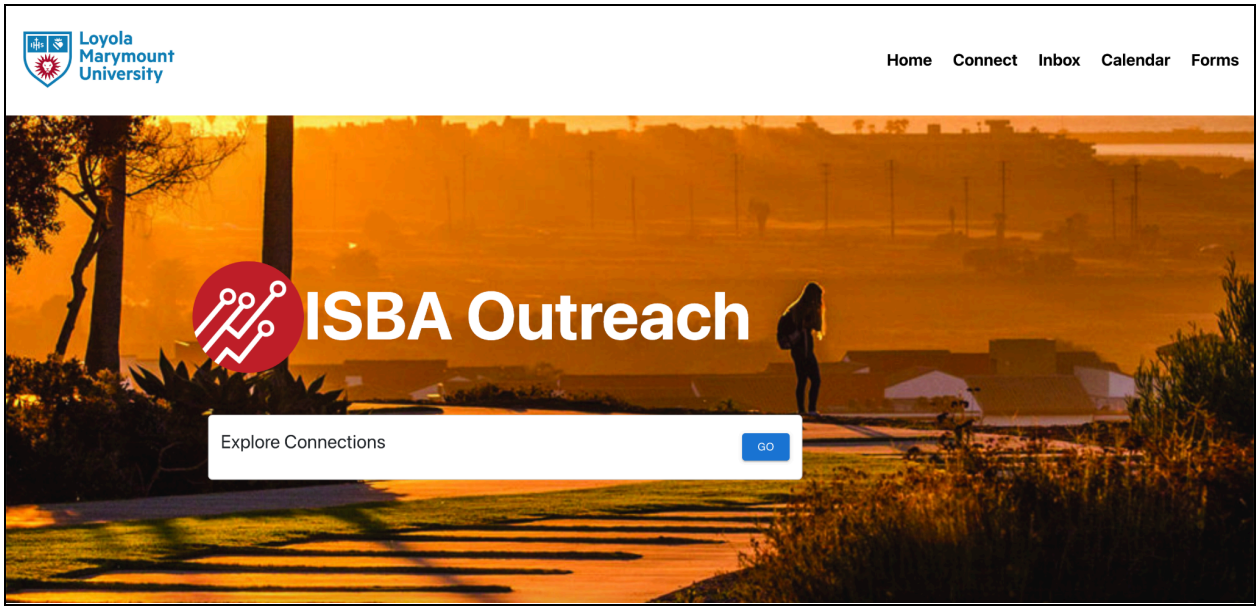
1. *Note: There are only a few members who have this access as we want to limit public Google account members who have access to this data.*

ii. If you are registering using a Microsoft account, please use your LMU email. This should end with either "@lion.lmu.edu" (if you are a student) or "@lmu.edu"(if you are a faculty member or administrator). Example: "jdoe1@lion.lmu.edu" or "jdoe@lmu.edu".

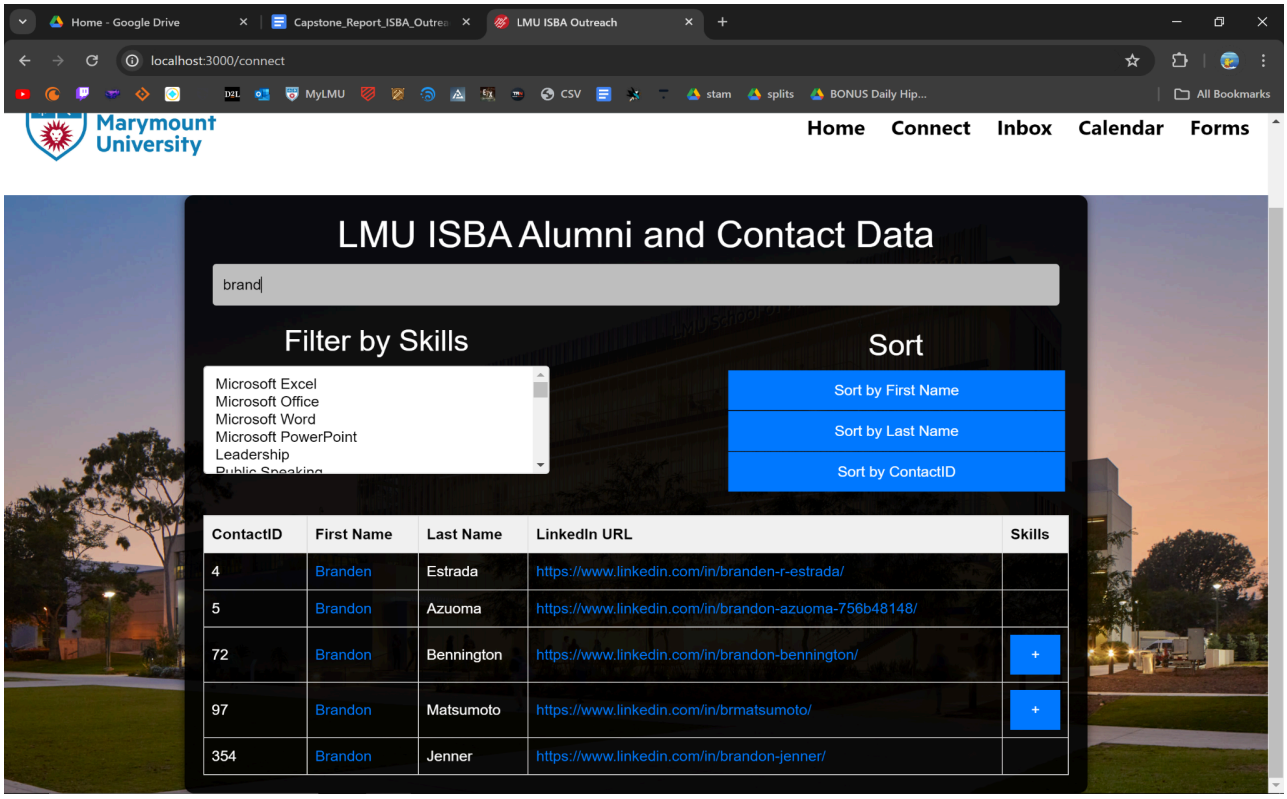
2. Navigating the Homepage

a. The homepage will look like this.

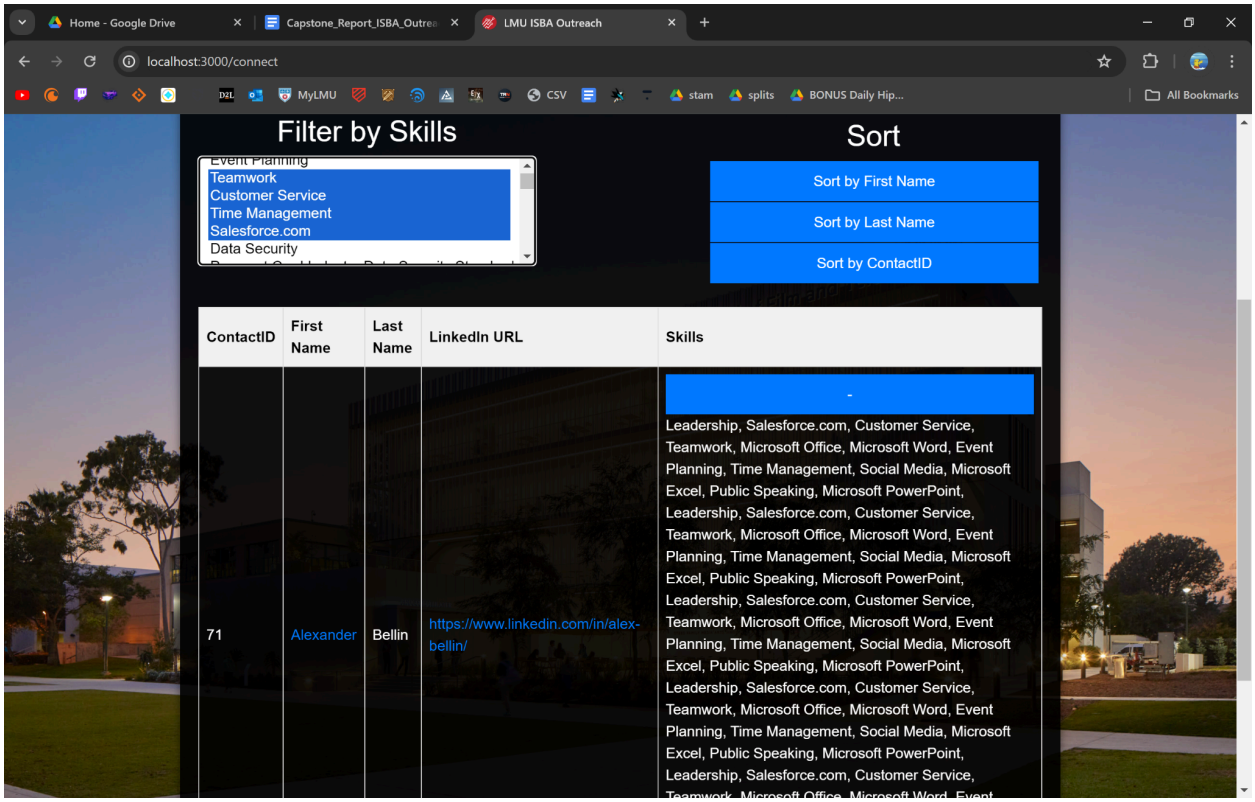
*i. Note: At the moment, the user is **unable** to select fields and search for contacts in the database using the popup that is shown when the user clicks on the "Go" button.*



3. **Using the Search Function in the Connect page**
    a. **By name**: to search for a certain contact by name, enter in their first name and related contacts and values will come up. Below is an example. To view an extensive view of skills the contact has, click the + sign.



    b. **By skills**: to search for certain skills a contact has, select the various skills you would want in a contact. Currently, multiple skills can be selected by holding the control key down or clicking and dragging to select multiple skills. Also, you can sort by first, last, or contactID. Though there is a slight bug—to reset the sorting filter, you need to click on the button twice after the initial sort to reset it. Below is an example of a contact with selected skills.


Home - Google Drive
Capstone_Report_ISBA_Outrea
LMU ISBA Outreach
localhost:3000/connect
MyLMU
CSV
stam
splits
BONUS Daily Hip...
All Bookmarks
Filter by Skills
Event Planning
Teamwork
Customer Service
Time Management
Salesforce.com
Data Security
Sort
Sort by First Name
Sort by Last Name
Sort by ContactID
ContactID
First Name
Last Name
LinkedIn URL
Skills
71
Alexander
Bellin
https://www.linkedin.com/in/alex-bellin/
-
Leadership, Salesforce.com, Customer Service, Teamwork, Microsoft Office, Microsoft Word, Event Planning, Time Management, Social Media, Microsoft Excel, Public Speaking, Microsoft PowerPoint, Leadership, Salesforce.com, Customer Service, Teamwork, Microsoft Office, Microsoft Word, Event Planning, Time Management, Social Media, Microsoft Excel, Public Speaking, Microsoft PowerPoint, Leadership, Salesforce.com, Customer Service, Teamwork, Microsoft Office, Microsoft Word, Event Planning, Time Management, Social Media, Microsoft Excel, Public Speaking, Microsoft PowerPoint, Leadership, Salesforce.com, Customer Service,

Bibliography

a. "What Is the Software Development Life Cycle (SDLC) and How Does It Work?" *Synopsys*, www.synopsys.com/glossary/what-is-sdlc.html. Accessed 15 Apr. 2024.

b. "Authenticate Using Microsoft with JavaScript | Firebase." *Google*, Google, firebase.google.com/docs/auth/web/microsoft-oauth. Accessed 17 Mar. 2024.

c. Vijayvargiya, Shrey. "Adding Microsoft Authentication Using Firebase." *Medium*, Nerd For Tech, 11 Apr. 2021, medium.com/nerd-for-tech/adding-microsoft-authentication-using-firebase-485f0bd1e3eb .

d. "Firebase Authentication | Register, Login, Signout with Email & Password." *YouTube*, YouTube, 10 Oct. 2023, www.youtube.com/watch?v=FjXzJ2wVs5g&t=55s.

e. Ayres, Brice. (2019, April 4). Build a website with React, React-Bootstrap, React-Router and Styled-Components. https://www.youtube.com/watch?v=tOK9l5uP06U. Date accessed 1 March 2024.

f. Navbars. *React Bootstrap Documentation.* https://react-bootstrap.netlify.app/docs/components/navbar/. Date accessed 19 February 2024.

g. CodAffection. (2020, August 17). *React Material UI Popup Dialog.* YouTube. https://www.youtube.com/watch?v=5akdtwtmjZM. Date accessed 16 February 2024.

h. "React Node.Js Mysql Crud Tutorial for Beginners." *YouTube*, YouTube, 18 Sept. 2022, www.youtube.com/watch?v=fPuLnzSjPLE&t=2393s.

Challenges

Understanding the desires of our stakeholders presented a significant challenge in this project. Despite all stakeholders being part of the ISBA community, each had their own unique ideas and visions. Deciphering the requirements for the minimum viable product while also considering potential enhancements was particularly difficult at first.

Another hurdle was connecting and aligning the database to the website. While it may seem straightforward with running queries in React, we encountered complexities in integrating the front-end and back-end. The front-end struggled to query its own data effectively, so to solve that issue we made two separate servers within the project, with one tasked with data collection and the other interfacing with it.

Implementing single-sign-on authentication with Microsoft Outlook was another challenge. Configuring Firebase with Microsoft login required an Application ID and Secret Key, so we met with the LMU ITS department. Although they provided assistance, there were delays in responses and multiple meetings were necessary to obtain the required information. At first they were hesitant to grant access, but eventually after requiring us to sign NDAs, they provided us with the necessary details. However, during the process of registering our web application on the LMU domain, the Firebase console malfunctioned, preventing the completion of Microsoft authentication. Consequently, we opted for Google authentication, as we were familiar with using that from Rebekah and Aidan's CMSI Web development class knowledge.

Lessons Learned

Version control played a crucial role in our learning journey. Initially, navigating Git posed challenges, and we encountered several issues along the way. However, through perseverance and patience, we gained invaluable experience. We also had to manage stakeholder requests effectively, ensuring that we incorporated all their ideas and feedback throughout the project. Overcoming obstacles required us to seek assistance from various resources. Fortunately, the faculty and administration we collaborated with were supportive and eager for our success. This experience taught us the importance of being proactive at LMU, as it can lead to significant support and guidance.

Recommendations to Improve the Capstone Project Experience

We think having a synchronous class meeting time at least once, possibly twice a week when registering for the capstone class would have been helpful. Because it was asynchronous, it was hard to find time between four people to meet with our advisor, Professor Mukherjee as there was no set class time. It was also hard to find time to meet and work together and would usually meet on the weekends. The synchronous class could have been even just an hour, so that students and the advisor would have a set and dedicated time to discuss necessary tasks to be completed or for any guidance on areas in the project where the students needed assistance. Although it was asynchronous, it would have been helpful to have announcements or reminders in Brightspace when items were due, whether it be a Sprint presentation or having to update task items on Jira/Confluence. Also, because the Sprint presentations were recorded, it would have been helpful to receive feedback from our stakeholders (after watching the recorded Sprint presentations), as our advisor, Professor Mukherjee was usually the only stakeholder in attendance during the live meeting.