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CS Senior Design I

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Capstone Assessment

For my senior design project, my team and I are developing a smart home control interface tailored to individual user profiles. The system will include features such as a customizable dashboard, device controls, routine management, and voice assistant integration. User profiles will be personalized based on factors such as family status—whether users have pets, children, or are couples—as well as their age, with simplified interfaces and routines designed for elderly users. Additionally, we plan to incorporate a conversational AI component to enhance user interaction. My primary responsibility is to design an intuitive, user-friendly interface that not only elevates the smart home experience but also leverages emerging technologies like 3D models or virtual reality for real-world demonstrations. As a computer science student with a strong interest in UI design and AI, this project offers an ideal opportunity to merge my technical expertise with my creative passions.

Throughout my college career, several courses have shaped my approach to software development and will guide my contributions to this project. In CS5167 User Interface I, I learned the fundamentals of React.js and how to design interfaces focused on user experience. EECE 3093 Software Engineering taught me the importance of software lifecycle processes,

specifically in project management tools like Jira and how to navigate working with a team on the creation of a full-scale software app. This class specifically taught us how to engage with a client in the creation of an app, and how to evaluate and adapt audience needs to our app design and development process which will be crucial in researching our audience and creating UIs that fit specific people's needs. Meanwhile CS4092 Database Design and Development equipped me with the skills to design and optimize databases to create a working full-stack application. We learned about relational databases and how to optimize their building. Courses like EECE4005 Web Programming Development & Hacking gave me deep insight on not only how to build a working full stack website, but also how to incorporate security measures into my website that are necessary when working with user's sensitive information. My academic foundation has given me both technical skills, such as proficiency in React.js, SQL, and database design, as well as non-technical skills like teamwork, communication, and project management needed to complete this project.

In addition to my coursework, my co-op experiences have given me real-world insights into the software development process that I will apply directly to our senior design project. As a Software Developer for Carbon Copy Assets, I worked on an app using React.js, Ethereum, and Privy Wallet, gaining valuable experience in app development and blockchain integration. I worked closely with my client, Dr. Jones, to cater to the audience he sought to use the app for. Since I was mostly navigating my own schedule, I required good communication skills to communicate with my client, and also implement my own project management methods. I used an Agile SCRUM project management process to always check in with the client while building the app in order to make sure he's getting the final result he wanted. As a Software Tester and

Developer for Kurist, I conducted thorough testing of a platform connecting international patients with medical experts by helping find bugs in the application, document and report the errors, and document how I changed the code to fix the bug. My work at both companies taught me essential testing practices, manual software editing, and project management skills using tools like Jira and Tuskr. These experiences have prepared me to ensure our smart home project is both functional and efficient.

My motivation for this project comes from my long-standing interest in creating user-friendly applications that bridge technology and human experience. Although I am most seasoned in full-stack web development, I am particularly excited to participate because of the opportunity to incorporate AI and VR, which aligns with my interests in both software development and creative technology. It will add an extra layer of challenge and interest to this senior design project. In terms of approach, I plan to lead the development of the user interface, ensuring it is customizable and adaptable to different user profiles and will use React JS as well as libraries like ANT design and bootstrap to assist in a clean UI design. I also plan to collaborate with the team to integrate the backend logic and device controls using Postgre. My expected results are a polished, fully functional UI smart home interface that is easy to navigate for each user based on their respective profile, and demonstrates its value through a 3D model or VR integration.

To evaluate my contributions, I will regularly seek feedback from my teammates and faculty advisor to ensure that my work aligns with the project's goals. We will thoroughly document our individual contributions and project progress throughout the development process

via our project documentation to help evaluate and accredit each team member's contributions. My expected technical end product is a full-stack developed UI that is hooked up to a 3D model or VR integration to show the demonstration of our app. In addition, I will want a full engineering notebook worth of documentation of research, project management, contributions and all other documentation relevant to the project, and a full-fledged presentation that pitches and describes our idea for the senior design showcase at the end of the year. I will know that I have done a good job when the user interface runs smoothly, all features are accessible, our documentation is comprehensive, organized, and easy to follow and the end product is intuitive and engaging for users. Achieving these outcomes will signify the completion of the project, but I will continuously refine the interface to ensure it meets the highest standards of usability and design.