



ENGINEERING SOCIAL JUSTICE:

A DESIGN CHALLENGE

March 16th, 2023

FOSTER CARE CHECK-IN

PONTIS

Team members: Kaitlyn Min (Computer Science), Lizbeth Anaya-Morales (Computer Science), Eric Ly (Computer Science), Cristal Santos (Electrical Engineering)

Faculty Mentor: Yoonsuk Choi

Abstract: Foster care children struggle with trust, depression, and anxiety, largely due to the overall lack of stability in their lives. The only constant adult, their Social Service Agent, is only able to visit each child once a month. Our solution is an app that would provide the daily emotional support these children lack. The app's main function is a daily questionnaire that asks a variety of questions checking on their personal emotions and their surrounding environment. The questions will be automated so if the child continuously shows signs of emotional distress or unease, their agent will be alerted. Additionally, our chat function would enable these children to create a community and connect with others that can relate closely with their personal situations. Our safety functions would confirm that it is indeed the child answering the questions, and not an adult or other child. To ensure that the children would be inclined to fill out this daily questionnaire, there will be incentives provided, such as free subscriptions to streaming or music services or food discounts. Through this app, we will provide the emotional support and security that these children need in order to become the next influential leaders of our society.

Keywords: Daily check-in, Emotional Stability, Foster children



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Connect - Bridging the gap

TEAM PEGASUS

Team members:

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Faculty Mentor: Prof. Sampson Akwafuo

Abstract: Food waste is a global problem that has negative effects on society, the economy, and the environment. In the United States alone, 40% of food produced is wasted, costing almost \$109 billion annually. To address this issue, a web app could be developed to connect restaurants, hotels, and NGOs, enabling food that would be thrown away to be collected and distributed to the less fortunate. This would reduce food waste, lower greenhouse gas emissions, and alleviate hunger. By keeping track of the amount of food provided and collected, the web app can monitor progress made towards reducing food waste. Raising public awareness about food waste is also crucial in encouraging people to participate in the initiative. Overall, a web app that mediates between different organizations could have a significant positive impact on society, the economy, and the environment by reducing food waste.

Keywords: Social Justice, Alleviating Hunger, Food Wastage, UN SDG 2



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TranscendCare: A Comprehensive Engineering Solution to Transgender Healthcare Disparities

Team Unicorn

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Department of Engineering and Computer Science

Faculty Mentors: Dr Jin Lee, Dr. Paul Inventado

Abstract: Transgender individuals are subject to unique health disparities which afflict both physiological and psychological harm. As the visibility of the transgender community has increased in the public consciousness, so too has the demand increased for gender-affirming healthcare products and services. Despite this need, transgender individuals continue to report a lack of accessible transgender medical resources. TranscendCare directly addresses the issue of transgender accessibility to healthcare services by enabling questioning and self-identifying transgender individuals to directly take control of their gender-affirming healthcare experience. This is achieved through the utilization of an integrated PDA device, myEgg, which centralizes transgender medical resources and patient information such as affirming-care provider directories and patient treatment plans. Informed by the real-world experiences of stakeholders in the transgender community, myEgg also serves as a personal companion tool for transgender individuals to connect with their local gender non-conforming community in a safe, moderated environment. The combination of tangible healthcare resources with a community-based approach to individual wellness defines myEgg as a novel solution to transgender healthcare diversity, equity, and inclusion.

Keywords: transgender, gender-affirming healthcare, gender nonconformity, myEgg



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Taypr: Drug Tapering System

Taypr

Team members: Yieun Park (Electrical Engineering), Matthew Cesena (Computer Engineering), Minji Kwon (Computer Science)

Faculty Mentor: Yoonsuk Choi

Abstract: Taypr offers a modern solution to the addiction crisis based on the principle of drug tapering. Among the homeless population, approximately 26% abuse drugs. This is due in large part to the fact that drug care is often inaccessible to the homeless. Our solution comes through three components: a time-based medication lockbox, a bioinformation tracking smartwatch, and a user interface for healthcare providers. The box dispenses the patient's medication and is time locked to only dispense the medication on the appropriate day at the appropriate dose. The watch tracks bioinformation such as skin temperature, heart rate, and acceleration and stores this data in the cloud. A backend server analyzes this data, utilizing AI methodologies to determine if the patient doses on their drug while in treatment. The backend also determines if the patient overdoses and contacts emergency services if necessary. The healthcare provider UI provides a dashboard to view any data collected, including when the patient takes their dose, as well as modify the dosage schedule. Overall, Taypr removes the need for addicts to visit a treatment center daily as well as allows healthcare providers the opportunity to monitor the patient's behavior outside of the clinic, ensuring compliance with the treatment.

Keywords: Addiction, Healthcare, Homelessness



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Vending Magick

Women In Stem

Team members: Sama Ahmed (Computer Science), Boushra Bettir (Computer Science), Kylie Ebrahimi (Computer Science), Skye Kressin (Mechanical Engineering).

Faculty Mentor: Kanika Sood

Abstract:

Vending Magick Machines offers a variety of nutritious and healthy canned food options at any time for the full 24 hours, making it accessible for low-income families and individuals. Our vending machines use state-of-the-art technology that ensures the freshness and quality of the food. Moreover, we hope to partner with local schools and suppliers to support the community and offer the best nutrition. In addition, Vending Magick Machines are placed strategically in areas where there is a high demand for food, such as Orange County. Once we start in Orange County, we will be able to flourish and expand our product throughout other counties. We believe that access to healthy food should not be limited to certain areas, and our goal is to bring food to those who need it the most. Our mission is to create a sustainable and inclusive community where everyone has access to healthy food options. Additionally, we hope that these accessible vending machines allow many families and individuals to pick up food at a convenient time. This truly sets us apart from others. With Vending Magick, we hope to make a difference in the lives of low-income families and individuals, one vending machine at a time.

Keywords: machine, hunger, low-income, technology



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Automated Fridge Door

Food Pantry Accessibility

Team members: Roman Grossi (Mechanical Engineering), Nicholas Thomas (Mechanical Engineering), Abdulgader Aburawi (Mechanical Engineering), Brandon Gonzalez (Mechanical Engineering), Irving Falcon (Mechanical Engineering)

Faculty Mentor: Dr. Jin Woo Lee

Abstract:

In recent years, there has been an increasing focus on accessibility, inclusivity, and disabilities awareness in the United States. In the United States alone, one in four people have a disability which encourages businesses nationwide to develop accommodations. The American with Disabilities Act (ADA), enacted in 1990, served to prohibit discrimination against people with disabilities by requiring reasonable accommodations be available by employers, businesses, and public spaces alike. These factors have played a significant role in the technological advances for individuals with disabilities seen today. The proposed design promotes a sense of independence and inclusion in public spaces while still allowing and encouraging users to request assistance. An automatic fridge door would provide wheelchair users with the reasonable accommodations that are outlined in the ADA guidelines. CSUF's Food Pantry is an essential resource for students who are facing food insecurity and in order to achieve an environment that is inclusive for all students, creative ideas are necessary to improve overall accessibility. Thus, the goal of the Food Pantry Accessibility team is to assist in creating a safe, inclusive environment for all students. Overall, the design aims to create social impact by removing barriers to independence and inclusion for disabled students.

Keywords: Accessibility, Independence, Inclusivity, Disability, Wheelchair



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Carpool Tunnel

META CARPOOL

Team members: Brisa Bernal, Olvin Bolanos, Fabiola Estrada, and Oscar Sosa Cordova

Faculty Mentor: Dr. Sudarshan Kurwadkar

Abstract:

Despite steady improvement in the mass transit system and evolving corporate work culture, the challenges faced by school/college commuters remain to be addressed. Large commuter schools, such as California State University, Fullerton (CSUF), offer few avenues to overcome the challenges faced by students while commuting to school. Proposed here is a project that seeks to solve the issue of daily long-distance commuters with the help of a Ride Sharing Program - "Carpool Tunnel." Students who commute from near and far, particularly those in low-income communities, are encouraged to ride with duly vetted and authenticated students to school. Currently enrolled CSUF students can voluntarily register on the app through the campus portal. Once registered, they can access the app and match with those in their immediate proximity and who ideally may share similar schedules. Both voluntary participants can either "Confirm" or "Deny" the requests. Once both parties agree (matched) can carpool together. The proposed initiative will be tied with the sustainability drive on campus that promotes active biking and offers similar monetary incentives, including priority parking at designated places in CSUF parking lots. The program's benefits are multifaceted, aimed at reducing gas emissions, increasing student accessibility, reducing the influx of cars on campus, and increasing students' academic success.



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Bag/Get

Open-Source Pantry Solutions (Social Justice WL)

Team members: Rohan Kunchala (Computer Science), Ashley Rus (Computer Science), Cesar Rojas Rojas (Computer Engineering), Alan Cortez (Computer Science)

Faculty Mentor: Ph.D. Kanika Sood

Bag/Get will be a free, open-source alternative to paid food pantry management systems. It aims to benefit food equity and accessibility for disadvantaged groups by challenging the existing oligopoly and introducing additional key features. The application will feature an extensive inventory management system with custom or template storage categories to improve productivity for understaffed pantries. The Wish List system allows coordinators to set up flexible donation goals manually or via custom item capacity parameters. Each pantry will possess a Homepage featuring contact information, accessibility tags, and a calendar module for appointment scheduling. The Pantry Finder page will enable users to discover Homepages and apply filters, including item availability, food needs, and language preferences. Users can Follow a Homepage, populating their Community Feed with announcements, opportunities, and donation requests. Overall, Bag/Get streamlines pantry management and promotes social equity by providing free, accessible food pantry services to those in need.



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OpenDoors

Access Squad

Team members: Katherine Chen (Computer Science), Stephanie Pocci (Computer Science), Alejandro Ramos (Computer Science), Nolan Delligatta (Computer Science), Cesar Gutierrez (Computer Science)

Faculty Mentors: Jin Woo Lee, Paul Salvador Inventado

Abstract:

More than 86.3 million Americans are disabled (CDC 2022). Even with the implementation of the Americans with Disabilities Act (ADA) in 1990, approximately 30% of American businesses and public spaces remain non-accommodating to those with disabilities (IAMV 2020). Additionally, our research survey of 11 local disabled folks indicated in their interviews that they all experienced difficulty navigating public spaces independently. OpenDoors aims to create a nationwide disabled-led review site for ADA compliance of local businesses. By crowdsourcing reviews from disabled individuals, we will create a thorough ADA access guide for the disabled. OpenDoors also accommodates both visible and invisible disabilities with its reviews. OpenDoors' reviews will also ensure businesses are held accountable for being accessible for our entire disabled community, as is mandated by law. OpenDoors aims to empower disabled voices, encourage public spaces and businesses to improve accessibility, and foster a more inclusive society.

Keywords: ADA Compliance, Disabilities, Buildings, Public spaces, Accountability



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CharityToday

Team Wowmen

Team members: Adam Kaci, Brian Milian, Joann Sum, Emily Krohn, Oyinkansola Olayinka, Katherine Sutandar, and Jason Wong

Faculty Mentor: Sampson Akwafuo

Currently, there exists a large number of different charity websites and organizations that specialize in a variety of different issues. Despite that, research has shown that people still need to be incentivized to donate to these causes. A common reason why people don't donate is that they don't believe they have the money to spare. Charity apps help donors find more societal issues to remedy, while budgeting apps convince people to spend their income wisely. Creating an application that bridges charity and budgeting will create a potential solution to the problem at hand. Existing donors could also contribute more by visualizing how philanthropy fits their budgets. We aim to tackle the social issue of funding unavailability for charity and nonprofit organizations.

To realize this project, we have a team of programmers that would use React Native, Firebase, and other software to build our platform. Our charity budgeting application will challenge the landscape of modern philanthropy and create a platform of trust, driving more people to donate. We will ensure that every penny spared makes a difference.

Keywords: Charity Donation, Budgeting, Philanthropy, Social Justice Apps



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Smart Drone Technology for Solving Social Justice Issues

Titan Drone

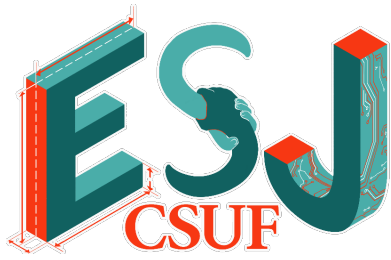
Team members: Levant Ho, Valeria Meza, Chris Santana, Aaron Santana, David Garcia, Giovanni Sanchez

Faculty Mentor: Dr. Sagil James

Abstract: In search and rescue operations, time is of the essence and can mean the difference between saving a life and not. First responders face significant challenges in disasters such as earthquakes or building fires, where the structures or pathways are compromised, making it difficult to navigate and locate victims. To overcome these challenges, it is crucial to provide first responders with all available tools to shorten the time to first contact. One promising approach is to leverage non-human navigation methods to enhance their senses and mobility.

Several non-human navigation methods have been used in the past, with dogs being one of the most successful ones. Their powerful sense of smell has been instrumental in locating trapped victims after avalanches or building collapses. However, there is a need to explore other non-human navigation methods that can complement or enhance the existing ones.

In this context, our research argues that the most effective way to increase first responders' ability to rescue is to leverage non-human navigation methods that can provide them with enhanced senses and mobility. This can significantly reduce the time to first contact, increase the efficiency of search and rescue operations, and save more lives. Our research provides an overview of the current state of non-human navigation research, highlighting its potential to transform search and rescue operations in the future.



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Unlocking Access To EVs In Underserved Communities

KAD Tech

Team members: Kemafor Azodoh, Andrea Andrade, Danah Mohammad

Faculty Mentors: Jaya Dofe and Rakeshkumar Mahto

Abstract: Electric vehicle (EV) adoption is growing due to lower emissions and operating costs than traditional gasoline vehicles. However, a lack of accessible and convenient EV charging infrastructure, particularly for those living in multi-unit buildings, hinders widespread adoption. This disproportionately affects economically disadvantaged communities. We propose a pluggable EV charging port design that utilizes a phase shift circuit for faster charging from standard household outlets to address this issue. Our cost-effective and scalable solution offers convenient and flexible EV charging without modifying existing electrical systems, promoting social justice by improving accessibility for apartment dwellers in economically disadvantaged communities.

Keywords: Electric Vehicles (EVs), Charging, Power Outlet, Social Justice



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Connect For College

Pixels

Team members: Kayla Gutierrez, Kent Tran, Khushi Kaushik, Riya Jain, Ashley Chan
(Computer Science)

Faculty Mentor: Jaya Dofe

Abstract: Many studies have demonstrated that the pandemic has disproportionately impacted marginalized students. Community building can significantly impact college campuses, especially in helping marginalized student populations cope with the aftermath of the pandemic. For the design challenge, we introduce the Connect for College app, exclusively designed for university students based on our experiences in the first year at CSUF. Our app aims to support first-year, transfer, international, first-generation, and historically marginalized students to create meaningful friendships. Connect for College is more than just another socializing app; it's an essential tool for enriching the university experience inclusively to impact the quality of life and well-being. Our app provides multiple features, including academic interests, major, and passions, to help students find like-minded individuals and build authentic relationships. Whether you're a freshman looking to make new friends or a senior wanting to stay connected with the campus community, Connect for College got you covered.



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M1 M.A.D.O.

Modular Actuated Door Opener

Project DARE

Team members: Erica Jiang & Arsalan Ahmed (Mechanical Engineering)

Faculty Mentor: James Sagil

Abstract: The goal of Project DARE (Disability and Rehabilitative Engineering) is to address the current and future challenges related to disability and rehabilitation through Universal Design (UD) principles. Currently, the disability engineering and manufacturing sector is limited with specific requirements and differences in disabilities for each patient. To start, DARE has focused on Accessibility by partnering and meeting with individuals who have faced accessibility challenges to listen to their viewpoints and develop new UD solutions. As a result of these meetings and collaborations, DARE has come up with the creation of M.A.D.O, (“Modular Actuated Door Opener”), a robotic door latch assembly equipped with a universal grip. M.A.D.O has gone through stages of literature review, analysis with Finite Element Analysis, Cost Analysis, and Manufacturing Analysis after being modeled with Computer-Aided Design. M.A.D.O. is currently undergoing manufacturing, with hopes for the first prototype to be completed by early May.