Quizzly - In-Class Clicker Software

USC Viterbi School of Engineering

Estimated Team Size: 3-4

Technologies Expected: ReactJS, React Native, NodeJS, EspressJS, MySQL, MongoDB, mobile app development

Background Requested: Current or aspiring full-stack web developers

Description: Quizzly is a web, iOS, and Android application that allows professors to create quizzes and then quiz students in class in real-time. Quizzly has many use cases ranging from simple attendance to full-blown quizzes. In addition to quizzes, Quizzly offers detailed metrics to users. Professors will be able to easily grade students and gain feedback on overall classroom understanding. Students will be able to use past quizzes as study materials for tests and papers.

Ultimately, Quizzly seeks to replace the old-fashioned and outdated clicker polling systems currently on the market through intuitive design, top-notch user experience, and superior technologies. This is a continuation project from previous semesters.
Summer Camp Registration System
USC Viterbi School of Engineering

Estimated Team Size: 4-5

Technologies Expected: Java web development (JSPs, servlets, MVC framework), PHP, MySQL, HTML, JavaScript, WordPress

Background Requested: Web development is a plus

Description: Programming has become a necessary skill for students to learn to be competitive in the world dominated by technology. The age at which students should learn to program has continued to get younger, and elementary school students are learning to program with tools such as MIT’s Scratch. USC runs a number of summer camp programs that teach students about science, technology, engineering, and mathematics. Other types of camps are going to be offered in the future, including robotics and different types of programming.

The current registration system at http://summercamps.usc.edu needs to be improved. There are many features that need to be added, including the ability to add email addresses manually, create different email groups, allow emails to be sent and tracked from the system, social media integration, adding volunteer functionality, automatic picture tagging and emailing to parents, attendance functionality, tracking of person who picks up kids from camps, etc. The entire system needs to be replicated as well for redundancy. Many other features will be discussed in team meetings, so the team can decide which features sound most interesting to implement.

This is a continuation project from previous semesters. There is more work that needs to be done on the previous projects, and many new features to be added.
**Sigma Coding Web Site**

*Sigma Coding, LLC*

**Estimated Team Size:** 3-4

**Technologies Expected:** WordPress, HTML, JavaScript, CSS, responsive web design, API integration with Square or Stripe, and others based on recommendations of group

**Background Requested:** Web development is a plus

**Description:** Sigma Coding is a startup business that teaches kids computer science and robotics from Kindergarten – 12th grade. We teach classes year-round and offer weekend and afterschool courses as well as camps. We are looking to scrap the existing web site, developed with Wix, and create a more modern website using WordPress that can use modern SEO. We need a website that looks great while displaying all of our classes and locations in an easy to use manner. The website needs to be created in a way that an administrator can add classes, times, and other things to the site without knowing HTML or web development (through the administrator portal, with more features described below).

We also want the parents to be able to register their kids for a chosen course using an account-based system. We want the parents to be able to create an account, add students, and register and pay for classes. Lastly, we want to be able to process payment through the site using Square or Stripe without an administrator needing to intervene.

Of course there needs to be an administrator portal so that we are able to see the status of the classes, how many students are registered, how many students have paid, and the specific students with their information.
Appraisal Training Record Tracking
LA County Assessor’s Office

Estimated Team Size: 3-4

Technologies Expected:
- Open Source Tools: PHP, MySQL, JavaScript, HTML, WordPress
- Team collaboration using JIRA
- GIT source code control
- Agile/Scrum project management methodology

Background Requested: Nothing specific

Description: The training section for the LA County Assessor’s Office tracks training courses and hours earned for appraisal staff and issues a Record of Appraisal Training Hours annually in order to assure that appraisers (1) can anticipate how many training hours they will need during the upcoming fiscal year and (2) that they have met their annual training requirements for the preceding fiscal year, as set forth in Section 671 of the Revenue and Taxation Code, Property Tax Rule 284. The California State Board of Equalization (SBE) provides computation guidelines to determine whether an appraiser has met his or her training hour requirements.

Detailed training data is currently being tracked through a combination of spreadsheets and databases that require a significant amount of effort to manage and reconcile. Updated records of training hours are currently mailed via snail mail to appraisal staff.

The student project team will work collaboratively with a technology team from the Assessor’s Office. Our objective for this project is to do the following:

- Build a database to store appraisal training records and create an interface that automatically loads/updates data provided monthly by the California State Board of Equalization.
- Develop a secure single sign-on website that provides appraisal staff with online access to their personal training records. The website should also include functionality that allows staff to self-report corrections to their official training records that can be reviewed and accepted or rejected by an administrator.
- Create reports and notices that will be automatically emailed to appraisal staff, eliminating the need to physically print and mail hardcopy reports. This will include summaries that list how many training hours have been completed and how many additional training hours are required for the next fiscal year.
Adding Self-Awareness to Mobile Remote Presence Robots
USC Viterbi School of Engineering

Estimated Team Size: 3-4

Technologies Expected: Hardware platforms for the project will include commercial and research telepresence robots, plus additional sensors such as RGB and RGB-D cameras. Software for the project will involve a mix of the following: Robot Operating System (ROS), Python, JavaScript, OpenCV, and machine learning.

Background Requested: Ability to program in either Python or JavaScript. Experience with robotics, Robot Operating System (ROS), computer vision, and/or machine learning is a plus but not required.

Description: The Interaction Lab is a research lab at USC dedicated to developing socially assistive robotics; that is, robots that help people achieve some goal through social interaction. This project is part of Interaction Lab efforts to, with the help of Mobile Remote Presence (MRP) robots, improve the learning and social experiences of K-12 students who miss extended amounts of school.

The students on this project would assist in developing new self-awareness strategies for MRP robot users. Self-awareness challenges in the school and classroom environments include topics like perceiving bullying events from peers, gauging one’s speaking volume, and gaining information about whether your MRP robot is behaving appropriately.

This project team will learn about the state of the art for MRP robots in education, select a specific robot self-awareness problem to address, and work under the guidance of an Interaction Lab researcher to improve sensing and communication technologies in this area. Students on this project team will gain hands-on experience with robots and cutting-edge robotics research areas such as computer vision and machine learning.
Crowdsourcing Socially Assistive Robot Interaction  
*USC Viterbi School of Engineering*

**Estimated Team Size:** 3-4

**Technologies Expected:** JavaScript, Python, Amazon Web Services, chatbot services such as API.ai and Amazon’s Lex, C++, Robotics, Tabletop socially assistive robots

**Background Requested:** Ability to program in JavaScript and Python. Exposure to Amazon’s web services and Mechanical Turk, chatbot services, robotics, C++, and Robot Operating System (ROS) are a plus but not required.

**Description:** The Interaction Lab is a research lab at USC dedicated to developing socially assistive robots (SARs) that help people achieve some goal through social interaction. SARs must be capable of encouraging a diverse group of end-users to complete some tasks beyond their current abilities. Through crowdsourcing, virtual SARs can interact with a large set of diverse users, beyond those who can be brought into the lab. The students on this project will develop software for crowdsourcing SAR interactions to inform the algorithms employed by our robots.

The students will design and implement a virtual SAR as a socially assistive chatbot, using either API.ai or Amazon’s Lex. The students will design one or more game- or activity-based interaction to be deployed with the virtual SAR on a crowdsourcing platform (i.e., Amazon’s Mechanical Turk). Students will learn about machine learning and big data analytics, the process of developing state-of-the-art research code for human-robot interaction, as well as gaining experience in the research process.
In-Home Socially Assistive Robotics  
USC Viterbi School of Engineering

Estimated Team Size: 3-5

Technologies Expected: Robot Operating System (ROS), Python, JavaScript, robotics, tabletop socially assistive robots

Background Requested: Ability to program in either JavaScript or Python. Exposure to robotics, networking, and the Robot Operating System (ROS) is a plus but not required.

Description: The Interaction Lab is a research lab at USC dedicated to developing socially assistive robotics; that is, robots that help people achieve some goal through social interaction. The students on this project would assist in developing software and infrastructure for in-home deployment of a socially assistive robot, capable of interacting with inter-generational groups of people, from young children to older adults.

The students will design one or more game- or activity-based interactions, using a tablet interface and tabletop socially assistive robot. The students will be invited to attend project meetings, and will collect requirements and design guidelines based on those meetings and the results of existing focus groups. Students will learn about in-home deployment of research technologies and the process of developing state-of-the-art research code for human-robot interaction, as well as gaining experience in the research process.
Autonomous Drone Control

Raytheon

Estimated Team Size: 3

Technologies Expected: OpenWRT, Ozone Widget Framework (OWF), WiFi, iOS, Android

Description: A drone engineered to autonomously seek out, hack, and wirelessly take full control over other drones within wireless distance.

This method to autonomously seek out and take control of other drones via RF interface within the RF range of the quadcopter allows for greater flexibility in tracking the target drone, allows for maintaining a greater range from the target, to avoid detection, and allows the operator to maintain a safer distance. The key is to develop methods and processes to scale up results to other platforms

Tasks:
Task 1 – Vulnerability Research - The quadcopter is controlled using a 5.8GHz remote. Telemetry and live video preview is available through the DJI Vision app (iOS/Android), which connects to the Phantom through a WiFi-network provided by a device called the Range Extender. Range Extender is a small Linux system based on OpenWRT. Document findings.

Task 2 – Exploit Development - Use OpenWRT application to reveal vulnerabilities and develop exploits for those vulnerabilities. Document findings

Task 3 – Deliver Exploit - Use Wifi Pineapple to exploit OpenWRT and provide Situational Awareness (SA) to the Ozone Widget Framework (OWF). Drone detects the wireless signal sent out by a target drone, injects WiFi packets into the target’s connection, de-authenticates it from its real controller and then authenticates it to the master drone. Document vulnerability and payload delivery system.
iLegalSelfHelp

iLegal

Estimated Team Size: 3

Technologies Expected: iOS, Android

Background Requested: iOS or Android development

Description: Continuing the development of the first non-profit self-help app for both Android and iOS, this app will allow millions of Angelinos to search, fill, and file court documents within the Los Angeles County. This project is a continuation of a previous 401 project. The app is already built with the ability to upload and generate fillable PDFs.

I am looking to incorporate a few features, such as, but not limited to:

- “live-chat” via instant messages.
- notifications
- email connection
- payment method
- updating PDF submission

This app is geared toward assisting the underrepresented communities in Los Angeles County and offers, each who downloads, the opportunity for legal learning.
Social Media Consumer Logo Detection
USC Keck School of Medicine

Estimated Team Size: 3-4

Technologies Expected: Smartphone development

Background Requested: Smartphone development experience a plus but not required, at least 1-2 CSBA students requested

Description: Because social networks gather larger amounts of user information, social media advertising is able to target audiences in a wider variety of ways than other online traditional platforms such as ad banners. Stretching beyond general demographic and geographic data, social media advertising has opened the door to deeper interest, including behavioral and connection-based targeting methods. These advanced targeting options increase the ad’s relevance to users and provide a level of personalization that is not achievable on other advertising channels and helps businesses find new potential clients by using users’ own shared information to identify interest.

Photographs shared on social media are full of untapped information, especially consumer products. We would like to build an engine which is able to analyze photos posted on social media and detect product logos. This would allow us to create more targeted advertisements relevant to the user and to maximize the return on advertising expenditure. This type of engine will be able to personalize marketing offers for specific relevant products to the user and deliver them through the right channel (ex: email, SMS, direct mail, mobile app) at the right time. This type of engine will therefore allow us to proactively target relevant users before they even begin their search, making a powerful online advertising tool.
Family Picture Connection  
USC Keck School of Medicine

Estimated Team Size: 2-3

Technologies Expected: Social media integration, image processing, smartphone development, web development, OS integration

Background Requested: None required, at least one CSBA student requested

Description: The growth and popularity of social media platforms like Facebook has led to rapid advancement of the features and settings on these sites, creating an obvious barrier for the elderly population to get online and have meaningful interactions with their families and friends, especially when it comes to viewing photos.

One method to help the elderly overcome this barrier would be to build a separate simpler platform which extracts family photos from the social media pages and displays them in a larger, more user-friendly format on phones/tablets/computers. In order to do this, the ideal platform would use facial recognition to identify individuals in posted photos that are relevant to the user and then re-display only those photos in the new platform, making the process user-friendly while helping the elderly stay connected with family and friends.
Prototyping a Virtual Reality Multi-User Environment for Product Engineers

*Siemens*

**Estimated Team Size:** 3-4

**Technologies Expected:** Unity 3D, Google Daydream, Google Pixel Phone, AWS, VoIP, other web technologies, other VR technologies

**Background Requested:** AWS, web programming, real-time multiuser web technologies, multiplayer gaming architectures, VoIP, VR, Unity 3D

**Description:** Virtual Reality (VR) typically refers to computer technologies that use software to generate realistic images, sounds and other sensations that replicate a real environment (or create an imaginary setting), and simulate a user's physical presence in this environment. The use of 3D computer-aided design (CAD) data in expensive VR environments (C.A.V.E.) in automotive, aerospace, and ground transportation original equipment manufacturers (OEMs) in their product engineering and manufacturing engineering has a long tradition. Virtual reality adds more dimensions to virtual prototyping, product building, assembly, service, performance use-cases.

One of the main advantages VR brings to CAD is the ability to show a design that exists solely inside of your computer’s design software, in an immersive, realistic environment. This enables engineers from different disciplines to view their design as its final product. Imagine a team of car designer’s reviewing the latest design of their next generation automobile.

At Siemens Solid Edge we are exploring how VR could be used in our design environment to help designers, simulation experts and operators build better products. In this project you will explore how to design a real-time, cloud based environment (like a multiplayer game platform) that enables remote users to share the same VR experience as if they were together in the same room. The goal is to enable teams of engineers that are located in different parts of the world to collaborate more efficiently.
**Trojan Motors: A car manufacturing game to reinforce dependencies between different groups**  
*USC Marshall School of Business Experiential Learning Center (ELC)*

**Estimated Team Size:** 3-5

**Technologies Expected:** To be determined by the group

**Background Requested:** None required. Familiarity with ELC would be helpful.

**Description:** Players will be assigned to one of 7 different positions at 6 different production sites. Each site will manufacture one of 3 types of cars. There are also 5 different executive positions overseeing all production. The game lasts 4 quarters, but there is a practice round with a review of the previous financial results.

One of the key requirements of the game design is collecting the financial data from all sites and providing it to the Chief Operating Officer as soon as the quarter ends. Then, based on specific performance indicators, messages are sent to the individual positions at the individual production sites. For instance, if a site’s investment goes below a set amount, their cars will begin to have safety failures and the Dealership Liaison would be notified initially. So performance at each production site will be monitored against criteria set for the cars that are being manufacturer there.

Also, at various points during gameplay, either an audio or video clip will be played to all sites.

Requirements include: user authentication login per production site and executive group, algorithm development for automated scoring and generation of messages based on performance indicators. Performance messages/alerts will need to be sent to the relevant position’s personal cell phone. No specific coding language required. Complete content for the game will be provided before the start of the project.
**Autism Society Inland Empire Resource Guide App**  
*Inland Empire Autism Society*

**Estimated Team Size:** 3

**Technologies Expected:** iOS, Android

**Background Requested:** App development

**Description:** The Autism Society Inland Empire (ASIE) is a non-profit organization dedicated to provide various services and support to people on the Autism Spectrum. Over the years, they have created an online resource guide for everything from dentists who are sensitive to individuals with ASD to equestrian lessons. Unfortunately, most people prefer to access information via apps on their cell phones, so potential users ignore this valuable resource.

ASIE would like an app created that would access the resource guide. Here is a link to their web page, which contains a link to the resource guide: [http://www.ieautism.org/](http://www.ieautism.org/).

Work was done by a project team last semester using React Native, but the technology was difficult to use. The team recommends reworking the resource guide app by native iOS and native Android developers.
**Autism Society Inland Empire Employment Database**

*Inland Empire Autism Society*

**Estimated Team Size:** 3

**Technologies Expected:** Open to recommendation of team

**Background Requested:** Database, web development

**Description:** The Autism Society Inland Empire (ASIE) is a non-profit organization dedicated to providing various services and support to people on the Autism Spectrum. One of the issues that's coming up is that they are contacted by an employer who may be looking for somebody in San Bernardino interested in the construction business. Currently, they have no mechanism to identify who may be a match. They need a database to collect that data and when job openings come up around a certain area they could search for a match.

Being able to identify potential candidates for employers willing to give young people with autism a chance at a job would be a tremendous benefit to both willing employers and interested candidates.

Here is a link to their web page: [http://www.ieautism.org/](http://www.ieautism.org/).
Kabom – Unify to Solve!
USC Viterbi School of Engineering

Estimated Team Size: 3-4

Technologies Expected: Full stack development, language to be determined by team

Background Requested: Web development would be useful but not required

Description: This project attempts to solve what I consider a problem with all people who attempt to learn programming, whether that is in an academic setting, or a personal setting. Namely, besides internship experience, what is another valuable way for people to learn and apply specific technologies that are being used in the industry right now?

What this project entails of is creating an app to help people of all backgrounds in programming network and form small groups so they can tackle some real-life projects that someone or some company needs. Specifically, companies or individuals can browse the website, and seek out these programming groups that fit the needs of the project that needs to be done, and contact the group for further details. On the other side of the coin, this app will also help companies or individuals outsource their work to people who really need the experience.

List of full requirements will be provided to the students upon selection of the group.
Data Analysis, AI, and Machine Learning for Marketing Technology Platform

PureFocus

Estimated Team Size: 3-4

Technologies Expected: Java, MySQL, Python, AWS RDS, AWS Datapipe, AWS S3, AWS Machine Learning

Background Requested: The ideal candidate(s) should possess a fundamental understanding of data science, business intelligence, algorithmic models, and machine learning methodology. Experience with or a desire to learn Amazon Web Services (RDS, Datapipe, S3, ML, AI) preferred but not required.

Description: The goal of this project is to design, build, test, and deploy a self-learning business intelligence system that analyzes data collected from Website Analytics, Facebook, Twitter, LinkedIn, Google, and YouTube to predict the time, place, message, and medium that has the highest probability of generating the desired business objective.

This project involves collecting digital data, preparing (tagging/classifying) it for machine learning, and designing ML data models (regression, binary, and multi-class) that identify, predict, and recommend actions to users of our marketing technology platform.

The result expected is business intelligence module that includes four functions:

Phase 1 – Data Ingestion

Automatically ingest, tag, classify, and store multiple data-points - Website Analytics, Facebook, Twitter, LinkedIn, Google Search – in a data warehouse (AWS S3 container).

Phase 2 – Machine Analysis

Move data from the data warehouse via AWS Datapipe into AWS Machine Learning to identify patterns that lead to successful events and correlations unseen by manual analysis.

Phase 3 – Recommendations

Output recommendations into second data warehouse container (via AWS Datapipe) where the Platform can extract the results and programmatically deliver the recommendations to the users via the user interface module.

Phase 4 – Self-Improvement

Data from recommendations that were implemented (the results) would then be compared against the ML Model to continuously improve the quality/probability of each recommendation.
Portable English: Pocket Professional Development
USC Center for Excellence in Teaching (CET)

Estimated Team Size: 3

Technologies Expected: mobile app development using BiNu (though team can suggest other technologies)

Background Requested: Interest in mobile app development or interest in language teaching/learning

Description: Just as Duolingo serves language learners worldwide, the Portable English app would serve teachers of English worldwide, starting with teachers of English in developing countries. Instead of learning a language as with Duolingo, users learn how to teach a language—English. Portable English therefore aims to democratize access to teacher professional development for teachers of English in developing countries so that they can have access to the same training their colleagues do in the developed world. The target audience lives where mobile phones are ubiquitous, but not necessarily connected to the Internet. Thus, creating the first version of the Portable English app as a BiNu app would turn these teachers’ “dumb phones” or feature phones into smart phone-like devices so that they and their students don’t have to wait a decade for Internet to reach them. The project stakeholder will provide all lesson/app content. The Portable English BiNu app has potential to be adopted by the U.S. Peace Corps and U.S. State Department English Language Fellows Program. There can also be a traditional app version for teacher-users with smart phones.


Building a Computational Modeling Tool to Analyze the Stability and Evolution of Norms

USC Gould School of Law

Estimated Team Size: 3-4

Technologies Expected: JavaScript, Python, other web programming languages

Background Requested: Some exposure to inverse reinforcement learning and POMDPs would be helpful. Interest or background in cultural evolution a plus. Familiarity with economic modeling in the form of agents that maximize their utility by choosing actions under uncertainty.

Description: How do norms—which classify behaviors as either ‘okay’ or ‘not okay’—emerge? What causes classifications to change or resist change? How does a society react to norm violations by some agents? Understanding the answers to these questions is important for a wide range of research projects, ranging from efforts to explain the evolution of culture in human societies, to the success (or not) of efforts to change norms, and the development of artificially intelligent agents that are competent at interacting with human norms (self-driving cars following rules of behavior at a traffic intersection, for example.)

In this project, students will work to develop a tool to help researchers study the variables that affect the stability and evolution of norms in a multi-agent setting. The goal is to produce a tool that is user-friendly, one that people with minimal programming ability can use to test their theories. Developing the tool will involve integrating the functionality of two existing tools that have these features: WebPPL, based on JavaScript, which allows researchers to model the optimal policies for an agent making decisions about actions in an uncertain environment, and a multi-intelligent-agent platform like NetLogo that allows researchers to explore emergent behavior in populations. The first use case will be exploring how classification of a novel behavior emerges from the decisions agents make to either criticize the behavior or not, in light of their own private preferences for allowing the behavior, the expressions others before them have made, and their expectations about which group (those who criticize, those who don’t) will ultimately hold the majority.

Additional Description: We need to assess what is the optimal policy (decision rule mapping states into actions) for agents who are deciding to say “okay” or “not okay” after having observed a previously unclassified behavior by another agent. Some of the agents will have a preference for okay, others for not okay, others will be indifferent; but preferences and the number in each group is unknown. Agents express their classification in sequence (randomized) and attach a cost to ending up in the minority once all have voted. They observe how others before them have voted. I believe the optimal policy can be modeled using POMDP and running large numbers of samples—effectively I think we’re figuring out how long those with a private interest should persist voting their interest in the face of an emerging majority on the other side). We’re interested in the emergence of a stable common classification without an institution to declare the public classification. We’re hoping to develop a tool that allows us to play easily with the parameters (numbers of those with and without interest, the intensity of the interest, the randomization of how they meet/vote/observe, the cost of landing in the minority, what other information agents might get (e.g. about public benefits from the behavior—think an innovative way of doing a task that upsets traditions)).
Health Pro Caddy
Dentistry by Dr. Doshi

Estimated Team Size: 3-4

Technologies Expected: iOS, Android

Background Requested: iOS and Android experience a plus but not required, Interest in health apps

Description: The app, as it says in its name, is designed for health care professionals and professionals who would like to take care of their health. This app, along with its web portal, has a front end dashboard for users to organize their lifestyles around healthy living disciplines and on the back end, it is supporting multiple tasks intuitively-based on preferences and special circumstances. This app will help the user find the right provider, create an archive of communication, and seamlessly interact with pharmacy, labs, specialists, third party payers, billers, etc.

The app will build an intuitive protocol that helps predict potential challenges in future health care based on current life style habits. (For example: A habitual coffee drinker will be prompted to seek frequent dental care visits, a user with neck pain will be prompted to see a chiropractor and perhaps even suggest the closest location of a massage therapist using his current location.)

What makes HC unique is that it will use filters to short list the search based on price point, online reviews, and eligibility and availability of providers. In other words, it will search for a doctor who is on the HC platform with highly-rated Yelp reviews and affordable price points who is already in-network with the user’s insurance carrier and is available to see the user in the preferred window of time set by user. Not only that, but it will facilitate Facetime, Skype calls, live chat to integrate the doctor/patient introduction via approved HIPAA standards. Here are some of the features for different user types:

For log in as a Client
1. My search for MD, DDS, DVM, DC, DO,
2. My Chat with a provider or providers or affiliates.(archives automatically)
3. My data uploads/downloads (x rays, photos, scans, pdfs, etc)
4. My Calendar Synchronizes with central HC portal.
5. My Panel of doctor/s (linked or stand alone as per the collaborative value)
6. My Pharmacy of choice. (that accepts fax or email)
7. My Nutritional tips (tips from attending MD, DDS, Nutritionist,)
8. My Fitness Coach (Trainer, Therapist, massage therapist, podiatrist)
9. My Crisis button (activates 911, video camera, gps tracking, live monitoring $)

For log in as a Provider
- My Profile visible details to client, or special message (out of town, range, etc)
- My Chat with Client or affiliates or collaborating provider/s
- My Data uploads/downloads (x rays, photos, scans, lab results, Rx orders,)
- My Calendar Synchronizes with central HC portal and shows client requests.
- My Panel of specialists, techs, billiers, tx plan coordinators, etc
- My Prescription to Imaging, labs, affiliates, pharmacy
• My Alerts to monitoring agency in case of emergency. (non responsive client)
• My location gps tracking (enable or disable as per choice.)
• My Forms for clients or referring doctors or referral to specialists or employers

For central HC portal
1. Database of Registered providers, affiliates, & their subscription levels
2. Database of Registered users, active or inactive. (not visible to public)
3. Central archives of all chats, all files, all transactions. (not visible to public)
4. Database of Registered facilities,
5. Search listing and sponsored listing on desktop and mobile device.
**App Development for Lego Mindstorms NXT Programming**  
*Los Angeles Unified School District*

**Estimated Team Size:** 3-5

**Technologies Expected:** iOS

**Background Requested:** None required

**Description:** The mission of LA’s BEST (Better Educated Students for Tomorrow) After School Enrichment Program is to provide a safe and supervised after school education, enrichment and recreation program for children ages five to 12 in the City of Los Angeles. Mayor Tom Bradley created LA’s BEST in 1988 in response to challenges arising from increasing numbers of unsupervised children throughout the City during out-of-school-time—especially within under-resourced Los Angeles neighborhoods that are disproportionately impacted by high rates of poverty and crime. LA’s BEST has grown from operating at 10 Los Angeles Unified School District (LAUSD) elementary school sites to 197, and currently serves 25,000 children each day during the after school hours, and 6,500 to 8,000 in the LA’s BEST Summer Program each year.

LA’s BEST provides an array of programs designed to cultivate social, emotional, and academic growth among children in need at no cost to families. Children participate in a wide range of club-based enrichment activities, including sports, visual and performing arts, digital learning, science, and much more. As part of the organization’s efforts to give children in need the best chances at success in both school and in life, the LA’s BEST Digital Learning Department offers a wide array of programs that help children learn to type, develop basic computer skills, and apply science, technology, engineering, art and math principals though coding, robotics, and digital media arts projects. Each year, nearly 1,400 students participate in digital learning programs at LA’s BEST.

LA’s BEST recently received a much-needed donation of Apple iPad2s 16 GB tablets that it would like to be able to utilize for robotics engagement with LEGO Mindstorms NXT equipment it owns. There is an existing LEGO Mindstorms app available for use with the LEGO Mindstorms EV3 robotics kit, its later generation, but not for the older NXT equipment. LA’s BEST seeks app development for an app that would simulate the LEGO Mindstorms software and its Robot Educator tool for programming. Essentially the app would provide programming tools to command the robotics kit’s medium motor, large motor, tank, display and sound. The app uses programming blocks with which students create a sequence and adjust for rotations, degrees and other variables based on function. The existing LEGO Education app is available for reference. LA’s BEST would provide the project team with the iPads, LEGO software, and robotics kits it would need for the project.

We have contacted LEGO Education about developing an app for the older generation robotics kit and LEGO has clarified that we are able to develop something which uses LEGO products, however it cannot be marketed (or implied) that it is a LEGO product (e.g. the name can’t say “LEGO® MINDSTORMS® Education NXT App”).

This app solution would allow LA’s BEST to maximize the iPad donation it received and bring robotics engagement to Los Angeles students with considerable cost-savings and thoughtful re-purposing of existing tablets.
Online Catalogue Conversion to Print-Friendly PDF

USC Catalogue/Schedule of Classes

Estimated Team Size: 2

Technologies Expected: Team can decide

Background Requested: None required

Description: The online USC catalogue contains a massive amount of text. Each year we need to create a printable PDF version for the Veterans Administration so the university can maintain its certification status. The software offers an export-to-Word or export-to-HTML capability but it is very cumbersome and tedious. We are looking for an easier way to extract the text via API or alternate method to InDesign or other desktop publishing method to more easily create our PDF.
**Virtual Farmers Market**


**Estimated Team Size:** 4

**Technologies Expected:** Python/Django, React and React Native, Using tools for Agile-like development (Git repository in particular Gitflow, Jenkins for continuous integration)

**Background Requested:** Professional industry internship experience preferred

**Description:** Today, about half the population living in poverty consists of rural smallholder farmers. Most farmers are unable to access markets where they can sell their crops for a fair price. Through numerous studies laying the foundation for Purchase for Progress (P4P) and World Food Programme (WFP)’s pro-smallholder efforts, farmers testify that market access is a key challenge. Indeed, this is a universal problem for smallholder farmers and it is preventing hundreds of millions of them to break the cycle of poverty to create a better life for themselves and their families. While WFP have made some great strides in addressing this challenge by connecting farmers to its own demand and other markets, offline solutions are limiting by nature.

The Virtual Farmers Market (VFM) is a new mobile application which aims to connect farmers to digital sustainable markets. You can think about it as a stripped down version of Ebay adapted to the needs of rural smallholder farmers and the traders who want to buy from them. It aims to connect rural smallholder farmers to potential buyers by:

- making information on smallholders supply and buyers’ demand, identity and location visible to the other party
- facilitating Farmer-Buyer discussions and price negotiation
- facilitating sale of farmers’ produce through an escrow payment system where WFP provides the escrow service

The Virtual Farmers Market is currently being piloted in Zambia, where the app is known as ‘Maano’ which means ‘intelligence in the local language. Within the next year, expansion to at least two new countries is planned. So far, VFM has shown that it is possible to connect farmers and buyers, and enable them to negotiate prices and make transactions through digital market places. By connecting poor farmers to a market where they can sell their crops at an increased profit, we are not only helping them improve their own lives, we are also strengthening the interlocking networks of actors and structures that allow food to more efficiently reach the people that need it.

More information about the Virtual Farmers Market and how it works is available on the project website ([http://innovation.wfp.org/project/virtual-farmers-market](http://innovation.wfp.org/project/virtual-farmers-market)), in the factsheet ([https://docs.wfp.org/api/documents/fed6d403b3ab4827be52885d33fa0e6c/download/](https://docs.wfp.org/api/documents/fed6d403b3ab4827be52885d33fa0e6c/download/)), and by exploring the app directly. (The Maano app is available on Google play.)
App development
Phase I of the app development has just been completed and so far about 50 transactions have taken place. The app currently consists of the following features:

a. Farmer profile
b. Buyer profile
c. Advertise produce
d. Place bid
e. Buy produce
f. Manage biddings
g. Django admin to approve transactions

WFP is inviting students to develop Phase II of the Maano app, which consists of the following features:

a. Chat feature (Some similarities with WhatsApp)
b. Develop feature to identify/contact a Transporter to support delivery of purchased goods
c. Map feature to locate producers (so that buyer can visualize and plan their purchases and logistics)
d. Payment system integration & Bulk SMS integration
e. Mobile Wallet
f. Register follower farmers (each ‘Maano Ambassador’ advertises on behalf of 50-100 ‘follower farmers’)
g. Some modifications to the existing app

Technical mentorship will be provided by an expert within the WFP in addition to USC faculty.
Machine learning with accelerometer and GPS data

Mobilized Construction, www.mobilizedconstruction.com

Estimated Team Size: 2

Technologies Expected: Python programming language. Experience with machine/deep learning frameworks like Theano, Tensorflow or Keras is recommended, but not required.

Background Requested: The project entails a large amount of data science work. The project group should have a strong foundation in mathematics and machine learning

Description: The vision of Mobilized Construction is to create economic opportunities and accessibility for the world’s absolute poor by facilitating better infrastructure through software and data science. Globally, 3 billion people live without all-season accessible roads. Seasonal rains compounded with years of neglect deplete roads and severely impede movement. Daily activities like going to the hospital, school, or market take hours per day and can become life and death situations. A similar experience would be taking Uber with a 5x surge every day and a commute that should take 30 minutes taking 2 hours. Mobilized Construction has taken the first steps to create a platform that democratizes and distributes improved infrastructure around the world and need your help to take accelerate our impact. This is a unique opportunity to build software that has a tangible real-life to communities around the world.

Apart from IRI calculations, raw geospatial data from an accelerometer to GPS coordinates can be used to measure road bumps and other hazards. Examples are large potholes, speed bumps, mudslides, vegetation, etc. By looking at the GPS data we can bucket and identify small, sudden turns or irregularities and attempt to correlate them with road impediments. Identifying obstacles will improve the understanding and context of road infrastructure and help restore roads to a level where bigger vehicles or fast moving cars like ambulances can drive safely.

This project will employ exploratory machine learning to build a model from either supervised, semi-supervised, or unsupervised learning that will be trained to recognize road impediments and plot them on a map. Specifically, the goal is to construct and train a model to identify patterns in road quality measurements that corresponds to road impairments. The project is explanatory in nature and will focus on achieving as high an accuracy as possible, given the accessible training data.

Why this is critical: A large part of the road impediments will be unable to measure from IRI values alone. By applying some form of machine learning on the measurements, we hope to help identify urgent repairs and prioritize infrastructure investments in countries with limited budgets. (Technical mentorship will be provided from within Mobilized Construction in addition to USC faculty.)
Data Collection Surveying Application
Mobilized Construction, www.mobilizedconstruction.com

Estimated Team Size: 2

Technologies Expected: Android app development, Java, Kotlin

Background Requested: Android app development and familiarity with UX. Java experience is necessary and some experience with Kotlin is recommended. Interest in social impact and international development is likewise recommended, but not required.

Description: The vision of Mobilized Construction is to create economic opportunities and accessibility for the world’s absolute poor by facilitating better infrastructure through software and data science. Globally, 3 billion people live without all-season accessible roads. Seasonal rains compounded with years of neglect deplete roads and severely impede movement. Daily activities like going to the hospital, school, or market take hours per day and can become life and death situations. A similar experience would be taking Uber with a 5x surge every day and a commute that should take 30 minutes taking 2 hours. Mobilized Construction has taken the first steps to create a platform that democratizes and distributes improved infrastructure around the world and need your help to take accelerate our impact. This is a unique opportunity to build software that has a tangible real-life to communities around the world.

This project aims to collect other metrics of road quality outside of IRI that require more manual collection in person from data collectors. Data such as signage, availability of drainage/culverts alongside roads, or SMS/Whatsapp reports are not easily collected and creating a new data collection survey application will help streamline in-person data collection. Currently much of this data is collected on paper notes when patrolling roads. This takes additional time while creating concerns about data accuracy and reliability. Automating this process through a new mobile application can add an additional layer of local context to support transportation planning and maintenance.

This project will analyze and the manual data collection process and attempt to automate as much as possible. The work will consist of offline process analysis to identify ways to optimize the workflow followed by the development of an Android app that will be brought to the field and used by target stakeholders: government officials and/or community members.

Why this is critical: Road conditions cannot always be uniformly measured and ad-hoc tools are needed to collect other types of data and to give additional methods for the community to participate in road monitoring. Software is needed for data consistency, ease of use, and scalability.

Project skills: This project focuses on understanding metric collection in developing countries, and creating Android apps to improve that data collection. Teams will work with prototype development to be tested and deployed with users in the field, so some familiarity with UX is required. The project group should also be familiar with the programming language Java and some experience with Kotlin is recommended. (Technical mentorship will be provided from within Mobilized Construction in addition to USC faculty.)
**SnooCode: A Digital Addressing System**

*tinyDAVID*

**Estimated Team Size:** 2

**Technologies Expected:** None specific

**Background Requested:** Experience working in start-up environment and working in developing countries is desirable

**Description:**

*Company/Product Description*

SnooCODE, the flagship product from tinyDAVID, is an award-winning fit for purpose solution for economic and social development in the developing world. SnooCODE is a digital addressing system that provides a private and unique location code for individuals and businesses across the emerging world. Different from other addressing systems, SnooCODE does not require the internet, a cellular signal or a sim. It can be used by a wide range of literacy levels and demographics whilst maintaining the privacy of customer data at all times.

**The Problem**

The lack of addressing system in the developing world is an overlooked factor for difficult access to essential goods and services. If simple undertakings such as deliveries or advertising your business become a challenge because location is complicated, it is worrying to think about the impact it has on emergency services. The decreased efficiency created by the lack of a robust addressing also leads to a huge waste of time and high costs of transport. Ultimately this translates into low economic empowerment especially for the people at the bottom of the pyramid and adds to the high cost of doing business in developing economies.

**The Solution**

SnooCODE - a 6 or 7-digit alphanumeric geolocation code that acts like a UK post code or a US Zip Code except over 200 x more precise. It can be used to provide directions to any location and is accurate to within less than 7 metres. SnooCODEs are simple, easy to remember for nations operating in different languages. The application can work offline, without credit or connection to a network, allowing it to be robust even when the infrastructure is not.

The problem that SnooCODE solves is bigger than not knowing where people are located. We provide a technology to support poor countries in leapfrogging traditional systems, on which we can build to answer their specific needs and help them charge towards world-class standards.

**U.N. Sustainable Development Goals (SDGs)**

Through its partnership with the ambulance services in Accra and Kumasi, tinyDAVID is supporting the SDG no. 3. The ambulances services in the two cities are using SnooCODE to diminish response time and save lives. Through its use as an innovative solution to the lack of proper infrastructure, SnooCODE is a natural fit with the SDG no. 9. As part of the social impact generated by a properly functioning addressing system is job creation. These jobs will be in postal services, logistics, delivery, e-commerce, etc. Improved efficiency will lead to more business, which will lead to a higher number of decent jobs created. This supports the SDG no. 8.
When you live in a beautiful neighborhood in Africa, chances are that you have an address. Even if you do not have one, the roads are probably “good”, you have landmarks close to you, etc. Therefore, you can easily be found and have a better access to goods and services than someone in a slum or in a rural area. Equally, a business that has the means to be on a main road will have a lot more clients, not only because of its visibility but because it might be virtually impossible to find competitors that are smaller and located in obscure corners of the city. Being able to easily and accurately locate all houses or businesses in a country will provide everyone, no matter their socio-economic status, equal economic opportunities through this new ability to find and be found. This supports the SDG no. 10.

Project Description
SnooCODE is a product that was built with the bottom of the pyramid (BoP) in mind. It is simple and easy to use, patronizing a letter and number system that is common in everyday lives through mobile and mobile wallet interactions. There are however some barriers we are facing to further adapt our product to the needs of the BoP. We think these could be solved through the following deliverables:

- Finding an alternative way to provide high accuracy addresses to people with low quality smartphones or feature phones.
- Creating a simple, accurate, constantly evolving mapping system for the developing world
- Creating a gaming system that would educate how to use SnooCODE and its many potential uses in real life

Necessary Skills and Experience:
- Willingness to learn and adapt
- An understanding of the start-up environment, which includes constant change in priorities and deliverables
- Experience working in developing countries
- Proactivity
- Able to work autonomously
- Not afraid to ask for help when needed

Commitment for technical mentorship:
The Founder and CTO of tinyDAVID will provide guidance as required for the student to be able to learn, perform and deliver. (This mentoring will be provided in addition to USC faculty supervision.)
ShowPads.com Mobile Web App
ShowPads.com

Estimated Team Size: 2-3

Technologies Expected: Front end web design and web development for use on desktop and mobile browsers, including PHP, MySQL, Java, HTML, WordPress

Background Requested: Mobile-Optimized web design experience

Description: Imagine Zillow-meets-Lyft, where, using our web app on their mobile device, apartment hunters can geolocate rentals (like Zillow), identify nearby Showpads Associates (like Lyft) and book a rental tour in as little at 30 minutes. That is the promise of SHOWPADS: Vacancy Showings On Demand. Through our basic website www.showpads.com we have proven the demand (both from owners and renters) for an On-Demand rental showing service. Now we must automate and optimize our core business functions for mobile, making SHOWPADS more efficient to manage and scale and more elegant and user-friendly for Owners, Renters, and Showing Associates.

Desired automated functions for the site:

- Ease of account creation for main paying stakeholders: Owners and Management Companies
  - Input and updating of their listings
  - Tracking showings scheduled and completed
  - Receipt of feedback from showings
  - Receipt of applications and supporting docs from interested renters
  - Ease of making listing payments
  - Ease of receiving initial deposits and rent payments

- Ease of account creation for Renters
  - Signing up
  - Geolocating Listings and sorting by price, size, and other criteria
  - Saving favorites
  - Viewing open house schedules
  - Booking On Demand Showings and paying our convenience fee
  - Submitting applications and supporting docs. Getting response from owners
  - Paying for and Ordering credit checks
  - Paying move-in deposits and fees

- Ease of Use for Showing Associates
  - Creating Accounts
  - Receiving and responding to appointments for Open Houses or On Demand showings.
  - Inputting feedback from showings
  - Tracking showings completed and receiving payments

- Ease of Use for Admin
  - Creating and updating Listings
  - Assigning and tracking showings and agents
  - Tracking number of showings per property
  - Syndication of Listings to various listing sites, popular with renters
  - Payment of showing agents for showings completed
  - Integration with Social media
Teach-Bot, Slack Tools for the Classroom

USC Iovine and Young Academy

Estimated Team Size: 2-3

Technologies Expected: Backend technologies (Golang, PostgreSQL), Infra technologies (Docker, Ansible), Cloud technologies (Amazon AWS Cloud Services), Front end (HTML, CSS)

Background Requested: Backend programmers with some knowledge of front-end (HTML, CSS). Startup experience recommended but not required. Hopefully some skills in rapid prototyping, design thinking, and user testing.

Description:
Teach-Bot is a Slack App for teachers and students who use Slack in the classroom. It elegantly solves the frustrations of teachers who use Slack, with Assignments (distribution, collection, reminders and help), Announcements (acknowledgment, reminders, and polls), and Grading (dashboard, report, and exporting).

There are no other solutions for Slack classroom applications in the Slack App Directory. What people have done instead is try to leverage features of Slack in a way that allows them to teach most effectively. In fact, there's even a book written about this: https://www.amazon.com/SlackEduRooms-Learning-Design-Myra-Travin-ebook/dp/B01M343O6K, and many of the people in the SlackEDU team discuss similar methods. Teach-Bot can automate these methods, and make them default, so that teams collaborate well from the start.

The Iovine Young Academy for Arts, Technology and the Business of Innovation is a USC undergraduate program that, as the name suggests, combines design, engineering, and business. Our capstone is called “The Garage Experience” and it’s set up like an accelerator or other co-working space with up to 25 different projects going on in the same room (not unlike CSCI 401, I imagine). Over the years we have tried different collaboration tools and this year we are giving Slack a go. It has some desirable features – most notably a good number of students are already familiar with it and it comes without a lot of bells and whistles which means it’s not pre-customized to organizational practices that are different from the ones we are evolving.

But that’s the rub: it’s also not particularly oriented toward the hybrid educational/startup environment that we are trying to foster in this course. We have an ideal environment for developing really great tools so solve this problem: we have a group of 30 tech savvy students and 7 tech savvy instructors collaborating using Slack. We will be generating both needs and ideas in real time. I worked briefly with Irfan Faizullahbroy (CS student) last spring to think through the sorts of extensions to Slack that would be useful in educational operations like the one at the Academy and already saw lots of promise in the tools already developed. More generally, I’m interested in a problem almost no one in EdTech is thinking about – how do professors and instructors really work and how could technology deeply support good instructors so that they could, in the words of my mantra, teach twice as many twice as well twice as easily. This situation offers a great context for rapid development: a smart and engaged set of users ready to think with you as developers to help you create tools that are high on desirability and impact.