Stanford Computer Science Software Faire
Senior Projects for CS194, CS210, CS191, and CS199
June 9, 2014

CS194 Projects

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CS 194
Senior Software Projects

4. PrettyPlease - Clarence Chio, Christina Kao, Keziah Plattner
PrettyPlease is a crowdsourced favor-asking iOS application that aims to achieve higher success rate through more targeted favor-asking. By incorporating relevant context of the users, such as geo-location, and by allowing users to create predefined small groups to issue relevant requests to, PrettyPlease makes favor-asking more effective, effortless and time-efficient.

Cardinal Mammogram Classifier (CMC) has set out to use computer vision and machine learning techniques to aid doctors with breast cancer detection. With a clean and easy to use interface, CMC makes it easy for doctors to get a diagnostic of whether or not a mass is malignant or benign. Computer aided detection in medical disciplines is difficult, but there is a lot to be gained.

8. WindowShopping - Jordan Marcy, Stephen Hudson, Sheta Chatterjee
WindowShopping is a google glass/android application that leverages wearable computing in the shopping space. With WindowShopping, you can take a picture of any item with your google glass and get a list of vendors who sell that item to compare prices and make smart buying choices on the go.

10. DanceSpace - Jake Ayala, Sarah Nader, Rupa Shankar, Changwhan Yea
DanceSpace is a web platform dedicated to creating an organized dance community for studios. Dancers, choreographers, and studio owners can share dance videos, social media feeds, and studio information on the platform.

12. iGraduate - Elmer Le, Quentin Moy, Andrew Mah, Mauricio Gonzalez
iGraduate is a course planning tool that is focused around satisfying course requirements for majors. We want to provide a centralized point for students to access their major information from their respective departments and course information from Stanford's ExploreCourses and make the course planning process as streamlined as possible.

CoursePlanner is the next greatest graduation requirement planning application! We ensure your success in graduation planning using automated requirement-fulfillment verification. We make use of cloud technology such as AppEngine as well as an advanced Javascript framework to deliver you the best experience possible. Take the stress out of course planning!

18. HashLattice - Jessica Taylor, Mario Villaplana, Ashwin Siripurapu
HashLattice is a peer-to-peer distributed network allowing developers to create distributed web applications. After developers upload these applications, users can view them in the browser by visiting a special URL. HashLattice can be used to share files, and it also supports dynamic content such as posts or messages.
on a social network. This gives developers the advantage of being able to develop web applications without relying on a centralized server to store content.

24. **MatchBook** - Kevin Chiu, Abraham Mgowano, Bartholemew Dimodica

MatchBook is a localized to campus web app that aims to provide a fast, easy, and cost-effective way for students to buy and sell textbooks on campus. With MatchBook, you can search by course for books that you are looking to buy or sell. With a database of these buy/sell lists for every user, we can instantly show you who on campus can fill your need, and you can immediately meet them on campus to complete the transaction. By using Matchbook, buyers can avoid paying inflated prices at the bookstore or wasting time waiting for books to ship via Amazon, while sellers no longer have to sell their books for pennies on the dollar. All of this is done in a way that is easy, fast, and cost-effective!

27. **Sigma** - Greg Greiner, Josh Valdez, Luke Knepper, Nick Breitweiser, Dylan Rhodes

Sigma is a beautiful email client designed to help you quickly organize your mailbox. It automatically categorizes emails and has the quickest and most-intuitive interface for sorting email on mobile and desktop.

28. **Surya** - Kunal Datta, Alberto Lalama, Vaibhav Nangia

Surya provides an affordable software solution to the problems faced by solar micro-grid installations in rural parts of developing countries. The hardware is integrated with a GSM-controlled system to regulate the supply and demand of electricity via a method of prepaid payments through the use of SMS. This allows the product a wide reach in terms of its rural consumer base, by taking advantage of the fact that telecommunications network towers can be found even in the most remote parts of India – our initial target market.

29. **Assassins** - Jessica Kung, Simon Yamawaki Shachter

Almost every freshman at Stanford goes through a rite of passage called Assassins. Everyone is equipped with a watergun and tries to be the last one standing. Our web application makes this games trivially easy to administer and to play. Creating games, reporting kills, badmouthing your enemies, and destroying the competition can all happen in a few clicks. Suited for mobile use, our application fits the freshmen's lifestyles and makes playing assassins the fun and engaging highlight of freshman year it deserves to be.

32. **Dugong** - Aaron Damashek, Isaac Madan, Aojia Zhao, John Burke

Dugong is a data science platform that democratizes the complex tasks of data preparation and analysis and fits into an existing data science workflow. Dugong consumes data in many formats and provides users tools to clean their data, analyze it using SQL and custom/pre-written scripts, visualize it, and integrate it through APIs and database access. In addition to these resources, Dugong also serves as a platform to connect data scientists with data owners: our marketplace enables users to post data cleaning/analysis tasks alongside their data. In this way, Dugong gives everyone with data the power of data science.

36. **Newsfeed:8000** - Marie Feng, Sam McLaughlin, Jake Neighbors

Newsfeed:8000 is a website for serious news readers that aggregates stories from various other news sites and RSS feeds. Readers can gather their favorite news sources into customizable feeds to suit their interests, and then share those feeds with others. Additionally, Newsfeed:8000 allows users to collaboratively curate groups of articles and dynamic summaries of breaking news events to give other
readers a wider view of the big stories of the day. Finally, Newsfeed:8000 places all of this information in a social context by drawing on Facebook and Twitter to provide readers with reactions from their friends and peers to current events and popular articles.

HapApp is an online service that allows users to track their happiness and activities and engage in social niches centered around similar activity interests. HapApp offers intelligent activity suggestions to users based on their logged activities on the website. Our goal is to improve society's overall happiness by providing tools that empower the individual user to structure his or her day-to-day activities; analyze the impact that these activities have on his or her overall happiness; and engage with other HapApp users to share and challenge others to strive for self improvement.

40. Graphene - Hung Tran, Lawrence Xing, Roger Hau
"Drinking from the fire hose"--a common expression oft used to describe the learning process when one is exposed to an ocean of new information, in particular, documents. Part search-engine, part data-analytics tool, our project can ingest large corpora of information and graph relationships between documents, authors, and topics. Using a browser-based UI, users can narrow down subjects of interest to explore relevant papers and authors.

41. Hudson - Ryan Globus, Bryan Offutt, Kelly Ortel, Garren Riechel
Hudson is a website which streamlines the apartment hunting experience. You can create and save multiple queries, receive email and/or text notifications when new posts matching your queries are listed, automatically reply to new matching posts, and keep track of your favorite posts, all with a simple web interface.

42. Chalk Walk - Jonathan Hung, Scott Khamphoune, Joanna Kim
Chalk Walk is a mobile web game that simulates "outdoors pictionary." Draw on a canvas by walking around with your phone's GPS. Your friends can watch your progress update real time on their own phones and guess what you're drawing. Chalk Walk is part of a new genre of mobile gaming where players are encouraged to get up, go outside, and move around!

44. Janus - Mohammad Khalil
Janus is an integrated system for vehicles that replaces a driver's instrument panel with customizable tablets. Multiple in-dash touchscreens allow an easy way to stay productive while in a high traffic zone. This project is specifically designed on the assumption of self-driving vehicles such that a driver can enable a built-in "automatic mode" where the vehicle takes total control over the drive. Connectivity between the tablets is crucial to the driver's comfort and productivity.

46. Planit - Anh Truong, Peter Phan, John Wu
Planit is a trip planning and itinerary application which helps travelers organize all of their travel information in one centralized location.
SUTalk - Sameer Arya, Matthew Taylor, Micah Arvey, Krista Fryauff

SUTalk is a web application designed to help Stanford students connect with each other, primarily via open and candid conversation. The app includes a unified, public newsfeed to which students can post about anything they wish to talk about (academic, personal, etc.). Students can participate in deeper discussion of existing posts, or engage in private chats with post authors. If a post refers to some public event (e.g. study party, pick up soccer game), users may optionally tag it with location and timing info, in which case it will appear on a centralized campus map featuring all user-generated events in real time. Most importantly, all actions (with the exception of posting events to the map) may be performed anonymously at the user's discretion.

CS210

Corporate Collaboration Software Projects

0. BMW Journeys - Adam Goldberg, Yeskendir Kassenov, Aaron Nagao, Alex Popof, Bharad Raghavan

The impetus for our project is that we believe the number of sensors in the world—such as cameras and microphones—is rapidly growing via wearables, autonomous cars, and other emerging technologies. Our long term vision is to build a software system that intelligently leverages ubiquitous sensors and triggers them automatically to reduce user friction.

Working with BMW, our first form factor focuses on car cameras, and our current prototype enables a driver to frictionlessly and passively capture high-quality photos while driving. All cars are required to have rear view cameras by 2018, and the emergence of autonomous cars will greatly increase the number of available sensors. Our prototype currently utilizes a Sony QX10 WiFi enabled camera to simulate a car’s built-in camera. We have built an Android application, which integrates with the BMW car console. In addition, we have made a photo sharing website that performs content curation and journey visualization, allowing users to relive their memories.

1. Storylytics - Roger Chen, Truman Cranor, Tiffany Dharma, Eri Gamo

For any inquisitive professional who wants to collaboratively explore data, our intuitive platform is a fast solution that allows the parsing of data sets and creation of visualizations in real time.

2. FocusIN - Harley Sugarman, Peter Lipay, Ellora Israni, Eric Feldman

FocusIn is tackling the multi-billion dollar market of enterprise software collaboration.

It is particularly challenging to collate, prioritize, and develop product features in the enterprise software space, where companies with thousands of employees often work in hundreds of markets. FocusIn solves this problem by unifying the platform for communication between engineers, product managers, salespeople, and customers.

11. Mapick - Dennis Won

Mapick lets travelers to have tours and fun events with local insiders.
15. Wikimedia Education Program - JJ Liu, Jeff Lloyd
The Wikimedia Education Program Extension is an open-source project developed in-house for websites such as Wikipedia. It enables instructors to create classes and assign wiki articles to enrolled students as part of coursework, in turn building the quality and breadth of the entire wiki. JJ and Jeff, as part of the open-source team, developed code and designed new features for this extension. In particular, they worked on fixing bugs, adding notification functionality, and doing user testing and need-finding for a new Activity Feed.

Soundtrip, in cooperation with Audi, is an iOS application that allows everyone to have a say in what music you listen to in the car. Soundtrip allows on the spot collaborative playlist creation. Simply pick music from your local iTunes, Spotify, or Soundcloud and sit back and enjoy the music with your friends.

Leveraging the power of twitch crowdsourcing, The Seoul Sistas would like to present Thermal Runaway, a hot-or-not for companies empowering students to identify for which companies they might want to work, investors to identify interesting deals, and companies to begin to understand their public perception.

20. Fluxy - Amrit Saxena, Ayush Sood, Arushi Raghuvanshi, Rahul Gupta-Iwasaki, Christopher Guthrie
Fluxy is a dynamic pricing application that serves two key business goals:
1. It seeks to help businesses deal with ever-changing supply and demand curves in an economically-efficient manner.
2. It presents consumers with an intuitive discovery platform with variably priced deals to allow them to secure deals at optimal price points for them.
In its first incarnation, Fluxy seeks to solve this problem in industries with traditionally high sunk costs. As such, the initial consideration set of target industries for Fluxy are restaurants, services, and events.
Fluxy is currently rolling out its consumer-facing iOS application and vendor-facing web application to the restaurant industry in the Palo Alto area as a proof-of-concept, and it seeks to expand across verticals and geographies in the months to come.

22. Attune - Eric Kofman, Emily Cheng, Jujhaar Singh
Attune is an app that syncs your phone to your life. Attune seamlessly quiets your phone’s ringer settings while you are driving, in a meeting or sleeping. In addition, Attune gives you the option of responding to calls and SMS messages from certain contacts with a customize-able away message.

26. Team Leonine - Daniel Chiu, Rafael Cosman, Derrick Liu, Eric Thong
Team Leonine present Cosmos, a real-time massively multiplayer online space game where players can build a space empire entirely in their browsers. Players will be able to explore, fight, craft, build, and trade with their friends in an infinite online universe.

In Cosmos, everything is made out of blocks. This includes your ship, massive space stations and even planets.

Experimentation is key in Cosmos. Players can add engines and other components to their ships in any way that they like. When crafting, players can discover new and unique recipes for awesome blocks. It pays
to explore in Cosmos: there are undiscovered treasures to be found in the far reaches of space like abandoned space stations and rare resources.

Players can automate their ships using a simple and intuitive block-based programming interface to make ships mine, defend, and explore. Players can run their galactic empire even when they are away from their computers!

30. Tutti - Jay Thomason, Harrison Wray, Audrey Proulx
Tutti is a native Android application developed in conjunction with Audi and the VW ERL to make it easy to share music with your friends. Tutti solves the problem of deciding who gets to play their music through the stereo when riding in the car or playing music with friends outside. One user hosts a 'jam session' and other users that are on the same wifi network may discover and join that session. Tutti presents to the users a shared, synced music library that contains all of the local music on everyone's phone. Each user may add music from this shared library to a playlist. Users may play, pause, skip, delete, and reorder songs and the playlist remains synced between all devices. Tutti was intended to be used in wifi-enabled cars but it is great for listening to music with your friends anywhere that you have wifi. It does not require data usage or access to the internet.

34. Dewey - William Chidyausiku, Veni Johanna, John Pulvera, Stephen Quiñónez, Brett Solow
Dewey Travels (deweytravels.com) is a web application that allows users to interactively fill out and explore where they and their friends have traveled. Use Dewey to get destination ideas, ask for recommendations from your friends and plan your trips better!

50. Audible - Justin Lee, Amanda Lin, Sanjana Rajan
Audible is a new mobile that transforms social music listening in cars into a seamless, wireless experience that gives everyone a say. By connecting a single phone via Bluetooth to the car’s media system, all passengers can browse through everyone’s music collections and have instant control over what songs will play. If there is no specific song in mind, users can simply select a keyword for a type of music they are in the mood for and Audible will automatically generate a playlist based on the shared music collection of everyone in the car. No more AUX cables, annoying songs on the radio, or the domineering kid in the passenger’s seat who refuses to play anything other than Taylor Swift. Music should be a shared and personal experience; Audible helps to make that possible.

52. Aesop - Grace Kwan, Simon Zheng, James Tran
Aesop Academy helps programmers hone their coding skills with a unique visualization engine. Whether you're a first-time student of computer science or an industry veteran, our challenges help you learn to code in a new visual way.
CS191 / CS199
Independent Study Projects

3. CVXPY - Steven Diamond
CVXPY is a Python-embedded modeling language for convex optimization. It allows you to express your problem in a natural way that follows the math, rather than in the restrictive standard form required by solvers.

5. Musicasa - Cindy Chang
Musicasa is an iPhone/iPad application that engages children ages 4-8 and their parents in the experience of short, curated selections of classical music to help them develop a deeper and more personal understanding of the music. Designed for families to use in their homes during down time, Musicasa’s interactive activities guide children through the music and facilitate imaginative conversations between children and parents about what the music sounds like and what is happening in the piece. The application also encourages kids and parents alike to creatively respond to the music with movement and art. With Musicasa, classical music becomes more personal, understandable, connecting, and fun.

In this project, we explore an algorithm for solving planning problems through the progressive satisfaction of a sequence of subgoals. By exploiting various forms of independence between subgoals, we’re able to achieve exponential speed up over naive approaches. As case studies, we focus on the problems of 8-puzzle, Blocks World, and Sokoban. We’re able to efficiently achieve solutions to these problems, suggesting broader applicability within the domain of planning.

Feedback is a network for surveys and other human intelligence tasks. Much like an ad network, developers use our framework to dynamically load surveys from our server and render them in their applications, which can then be completed by users in exchange for digital currency or unlocked content. Survey makers use our web application to design surveys, target audiences, and set payout prices which are given to developers in exchange for completed surveys.

13. First Order Logic Blocks World - Professor David Dill (Advisor), Lao Thao, With assistance from Karen Wang
Students learn better if they can actively apply and exercise the concepts learned in class. However, even with the combined time in lecture and office hours, there simply isn’t enough time to check students’ understanding of a concept and provide students with feedback about which resources they should access to improve it. We want to provide students with small, immediate exercises that can test a student’s understanding. For example, in learning subjects such as first order logic, students can create a formula about an interactive world and receive live feedback on the validity of that formula. This is part of a larger plan to further develop online learning platforms.
17. **Farsi vowels** - Hanzhi Zhu (advised by Dan Jurafsky)

The Farsi language is written without all of its vowels, making it difficult to read for human learners as well as TTS systems. However, the closely-related Tajik language is written with vowels. In this project, I explore how we can tackle the Farsi vowel insertion problem by using information from a Tajik corpus.

21. **etcML** - Bryan McCann, Advisors: Richard Socher, Andrew Ng

Do you want to know if your favorite sports team is popular on Twitter? Or if your kickstarter proposal is written for success? With a few simple clicks, etcML can make these kinds of classifications and many others. You can train our machine learning algorithms for your own tasks and share your classifier with others!

/etcML (easy text classification with machine learning) is a web application designed to make complicated machine learning techniques easily accessible to researchers in other fields.

23. **Attribute-Based Encryption for Arithmetic Circuits** - Jack Chen

This project implements a cryptosystem for Attribute-Based Encryption (ABE), which provides complex, fine-grained access control of encrypted data. This construction, based on a mechanism called Fully Key-Homomorphic Encryption, features short secret keys and access control policies expressed as arithmetic circuits, which allows for more efficient and general ABE than previous systems.

25. **Brainstorm, Prototype, Define** - Elaine Zhou, Andy Elder

We present results of a human creativity experiment that varied the timing of narrowed constraints within the ideation process. Groups introduced to narrow constraints after the prototype stage yielded both more novel and more appropriate results. Our results suggest that (i) effective timing of design constraints may further optimize ideation and (ii) the underlying mechanism for this may be the Sunk-Cost Fallacy.

33. **GeoDecameron** - Chiara Hordatt Brosco

GeoDecameron is a website that allows academics to visualize the geographical movement of the characters in Boccaccio’s Decameron. Professor David Lummus of the Italian Department requested this site and will use the admin interface to enter the location information for all stories of the Decameron. He, other scholars, and literature teachers can then use the various search methods to see how far the geographical reach is of this 14th century Italian masterpiece.

35. **Align** - David Khavari

A web application focused on helping people reach their goals and become the people they want to be.

37. **Malbehave** - Connor Gilbert

What behaviors make a program malicious? We set out to find out. Malbehave uses program execution traces and an inference process to generate recognizers for various classes of Android malware, and employs permissions and data-flow annotations for increased robustness against code obfuscation. This automatic process is an improvement over current labor-intensive processes for malware detection and characterization, and produces behavioral specifications that can be understood and improved upon by human analysts.
39. Dandelion Express: Game-based Biofeedback System for Respiratory Motion Management in Cancer Radiotherapy - Faye Villaroman
Cancerous cells in the lungs pose a unique problem in radiation therapy because these cancerous cells are moving targets. This game-based software application was developed for the Department of Radiation Oncology at the Stanford Medical Center to improve breathing accuracy, responsiveness, patient control, and total treatment finish time in lung radiotherapy. In the game, the patient controls, using his or her breathing, a gliding ladybug on a dandelion seed as she collects seeds. This software was carefully designed for the radiation treatment process.

43. Digital Identity - Yiju Hou, Michael Wintermeyer
Our project researched how personal identities affect the development of technology as well as the digital identities stored within the technology. We addressed identity issues such as identity theft, privacy concerns, and social problems caused by the lack of diversity in tech fields.

45. Ruitang Chen - Ruitang Chen
Genomewide association studies (GWAS), have associate >1000 genetic loci with specific traits and diseases. By sequencing whole genomes, vast majority of common single nucleotide polymorphism (SNP) have been characterized. However, many low-frequency variants remained poorly characterized. Low-frequency variants are enriched for potentially functional mutations, and thus characterizing such variants is crucial for interpreting individual genome sequences. While detailed analysis of a single individual requires deep sequencing, it is time and cost consuming. An alternative is to combine shallow sequence data across individuals. However, for very rare SNPs (< 0.1%), the sequencing error rate is higher (~0.5%), and it is hard to tell real SNP from sequencing error. Standard genotype-calling algorithms rely on redundant sequencing of each base to distinguish sequencing errors from true polymorphisms. For example, 30× read depth (where each position is covered by an average of 30 reads) typically results in >99% genotyping accuracy. While deep sequencing approaches have proven successful, their application to complex trait studies—which may require sequencing hundreds or thousands of individuals—remains challenging due to high sequencing costs and limits of existing sequencing capacity. We come up with a solution that by combining Linkage Disequilibrium (LD) information, we can tell the real SNP from the false positive ones.

47. Ringo - Rohan Puttagunta
Ringo is an In-Memory Graph Exploration Tool. It supports fast computation and conversions on Graphs and Tables while having a Python interface. My work primarily involved tracking the metadata of the user’s operations, allowing Ringo to trace the history of each data object. Ringo uses this information to construct runnable scripts to recreate any such data object.

49. Wi-Fi Range Extender - Greg Kehoe
This project delivers an 802.11bg wireless range extender that increases the range of Wi-Fi coverage in residential environments. The range extender is built using a low-power ALIX board with AMD Geode processor targeted for embedded systems. A customized Linux build is used to provide hardware support and run user programs that support network operation.

53. K Data Compression - Kai Kuspa
The increasing prevalence and diversity of sensors in mobile technology has spurred new applications for consumers. Many of these applications involve long-term data collection, but are limited by size and power
constraints. Even for BlueTooth Low Energy (BLE) devices designed to consume as little power as possible, switching the state of the radio to broadcast consumes roughly 50,000x more power than sleep mode (with some variance between chipsets). This rate of consumption places a lower bound on how small these devices can be since they must accommodate batteries with the capacity to run the application for the desired length of time. However, if the data that is sent over wireless is compressed, less data needs to be sent, requiring the wireless radio to remain in Rx/Tx mode for a shorter amount of time. This project includes a novel lossless data compression algorithm that is computationally simple enough to run on less powerful 8/16 bit systems. This algorithm could be used to increase the lifespan of networked sensors in applications such as medical devices, consumer technology, and the Internet of Things.

54. Felipe Munera - Felipe Munera
The large-scale data centers used by companies like Facebook and Google are power limited. Hence, there is a lot of interest to use power efficient technologies for processors, memories, networks, and storage. The ARM architecture has traditionally been behind energy efficient chips for mobile systems. Now there is an effort to build ARM-based systems for servers and data centers. The focus of this work is to evaluate and optimize one of the first such systems.

55. Homegrown - Meseker Yohannes
Homegrown is an online marketplace for buying and selling organic produce. Users can market their locally grown produce, manage their sales and purchases, and communicate on community forums - trading tips, posting articles, and asking questions.