CMSC 436 Semester Project Ideas
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We have created the following list of ideas as starting points for your semester projects. These ideas tend towards projects for which 1) there is a known or likely customer who would like to have such an app, 2) the app has some "wow" factor because it could have some impact on civic or social issues, or university life, and where appropriate, 3) the app creates and/or uses large publicly-available data sets, such as that found at data.gov, that are stored/retrieved from off the network.

Remember that these project ideas are only starting points. You will need to flesh out many details in order to come up with your actual project. Feel free to suggest other ideas to us, but do so by Tuesday, Oct. 10 at 11:59pm, because we need to get teams assigned and get the projects underway.

Note that some ideas may require the use of an actual Android device. Others can be done with an emulator. Many of these apps will require you to build some kind of back end server. **In cases where specific topics are not covered in depth in this course, you will need to learn them on your own. Get started early.**

Please read over the following list of ideas. We may add some additional choices early next week. Then choose your top 3 choices and email them to Heba Aly <heba@cs.umd.edu> by Oct. 14th at 11:59pm. In your submission clearly indicate 1) **your name**, 2) the **name** of your first choice, 3) the **name** of your second choice, and 4) the **name** of your third choice.

1. Ultrasonic connectivity.

   Chirp.io offers an SDK for building applications that emit and process ultrasound signals. Ultrasound is interesting because it can be distinguished for other noises in a given environment. One application of this technology is to estimate the number of people in a given space. Another is to identify when two or more users are in close proximity, facing each other. For instance, I'm working on a project that is trying to track people with the flu to understand how flu is transmitted between people. A new startup in India is using ultrasound to transfer money between two users.

2. Planet.com

   Planet.com provides access to detailed map images around the world. Unlike other services, these images are updated relatively frequently. Therefore, the images may be useful in business intelligence applications, such as identifying the number of cars in a store's parking lot to see how popular that business really is. Another application might be to compute biomass in a given area, to determine how much fertilizer a farmer should use on their farm. Given the recent occurences of hurricanes in the US, can you think up an interesting app aimed at disaster recovery?

3. Location-Based Tour Guide.

   Build a system and framework where an author can create tours for a set of locations. The system allows users to link audio and video content to each stop on a tour. Users use the app to follow the tour and to automatically view linked content when they are arrive at a particular location on the tour.

   For example, UMD could create information content for interesting sites of campus, a history professor could create a tour of important sites at the Antietam battlefield, etc. App users could then go to these places and see the information.

4. PhotoJigsawPuzzle.

   Take a photo (or image such as a satellite map). Cut it into jigsaw puzzle pieces and allow users to reassemble the jigsaw puzzle on their device.

   One example of this might be to have people on campus for an event such as Maryland Day collaboratively assemble a satellite map of the UM campus. Users could be asked to work on the part of the puzzle near where they are actually standing.

5. Poor Man's Thermal Imaging Camera.

   Using the Open Accessory API, connect an infrared thermometer to a device.

While using the thermometer to evaluate a house for areas of excessive heat loss, snap a photo, take video, or otherwise indicate areas of excessive heat loss visually.

The idea is to have a visual record of the heat loss analysis. You'll need to do some research to figure what what kind of thermometer you will need and whether they are available.

6. Feelings Diary.

   Your app will allow high-school to college age users record and respond to negative personal feelings. See `http://psychcentral.com/lib/an-overview-of-dialectical-behavior-therapy/` for more information.

7. Parent Screen Controller.

   Create a calendar that specifies times when your apps can be used. The use case is for parents with kids that have tablet computers for school use. Could also include a reporting feature. The system should also terminate apps if they are already running, but later move into a blackout period. Most importantly, you must ensure that this system can't be defeated by just uninstalling the controller app. This will probably involve rewriting the Android system code.

8. Collaborative Art.

   Create an app that lets users collaboratively create art? For instance, let users virtually "tag" visible images on their phones (e..g, buildings) with hand drawn grafitti. The tags would be visible to others viewing the same buildings/structures through the app. Another possibility, would be an app that allows people to create and share "Six-Word Memoirs" that are organized around geographic locations. See: `http://www.npr.org/2008/02/07/18768430/six-word-memoirs-life-stories-distilled`.

9. Call Your Mother.

   We communicate with many different people. Often urgent, day-to-day communications crowd out other important communications, such as reaching out to extended family members. Design and create an application that tracks who the users calls to a circle of people, and then presents the user with information or reminders that some contacts are being neglected. Some issues to consider are defining which contacts are part of the calling circle, what normal or acceptable calling patterns are, what happens when certain contacts haven't been called recently?

10. System for Locating People Using Electricity Dependent Medical Equipment During Public Health Emergencies.

    From the web site: "Many in-home patients require the daily use of a piece of electrically powered durable medical equipment (DME). During a disaster or other event that leads to a prolonged power outage, these patients often end up at shelters or emergency rooms looking for sources of power or alternate ways to manage their medical needs. We need a reliable system available to identify, locate, and assist these individuals in a timely fashion."

    See `https://www.innocentive.com/ar/challenge/9933433` for more information.

11. Feed the Kitty.

    With this app a circle of people can fund an event. Suppose that you and your friends want to get together to watch the super bowl. Such an event require snacks, so the host for the event would create an event and make it available to a circle of people along with information about the event. People in the circle would use a payment service, such as Venmo or PayPal to fund the event and would receive some "receipt" for their contribution to it.

    Users could leverage existing social networking systems such as Facebook, Twitter, or Google+, controlling the distribution of the event. Event creators can post the event as a status to Facebook, Twitter, or Google+ to get the word out about the event. Any member who has visibility of a fund, can also share it to their social media circle. When a fund creator creates a fund, they can attach a hashtag to their fund. This will allow a fund page to have a stream of statuses about their fund.

12. Read Aloud with Stuffed Animal.

    This app will allow a small child to create a simple text story, laid out over several book pages. Your app might allow the child to illustrate the story's text. This story can then be sent to an

electronic stuffed animal that can read the story back to the child, automatically turning the pages of the story as the story is read.

13. Audio Dictionary.

Students learning languages often find it difficult to learn how to pronounce words correctly. This app will allow native speakers of a particular language to record themselves pronouncing a word by itself and a word in a sentence. These audio snippets are then attached to the dictionary entry. In addition, native speakers have the ability to rate individual audio snippets to ensure that they are pronounced correctly.

14. Whos There?

This app allows people to meet up with friends. For instance, if the user is in the same building as a friend both would each receive a notification informing them that the other friend is in the building.

This app should be configurable so that it only notifies people when meeting up would be unusual to some degree. For example, family members shouldn't be notified each time they enter their common home. In addition, this add should be configurable so that the distance at which two people are considered to be in the same place changes. This might interact with meeting frequency as well. If a friend I haven't seen in a year is 50 miles away, I might want to be notfied. In addition, this app could be expanded to consider a user's likely location in the future (ny examining the user's calendar).

15. Context-aware Ringer

This app allows users to define different ring volumes and settings for different contexts, such as when they enter a certain location or place. For example, your app would allow users to configure their phone to go into 'Do Not Disturb' mode every time they enter a library, movie theater, or A.V. Williams or lower the phone's volume if they are using headphones. Ideally, your users could control and define a number of different contexts and enable and disable them easily. You might get even more creative and create an app that learns from its user how to respond to particular events when in different contexts. If you're interested in this idea, you may want to look into Google's new Awareness API: `https://developers.google.com/awareness/overview`

16. Blockchain

Blockchain is a hot technology that allows people and businesses to exchange value in a trusted way. For example, blockchain underlies the virtual currency, BitCoin. I don't have a concrete app in mind here, but if you're interested in exploring this new technology let Dr. Porter know.

17. uCurate

This app meant will encourage art enthusiasts to explore their local communities and discover its art. Piloted on the UMD campus, art pieces (as defined by the user) can be tracked by location and by image. Users can organize subsets of these art pieces into collections. The app will then create walking tours allowing other users to visit this collection. Additional features may include public artworks tagged by users, supplementary information designated by gallery/museum curators, etc.

18. Geek-Out

Adapt the tabletop trivia game Geek-Out for use on a mobile platform. Geek-Out asks open-ended questions that can have multiple answers, such as "Named Fictional Dragons" or "Coen Brothers' Films". Advantage is given to players who know more rather than players who say answers faster. This app should allow multiple players to play at the same time (possibly remotely).

19. Offline News Aggregator This app will aggregate multiple different online content sources (e.g., NYT, WSJ, or WashingtonPost) when the user has WiFi connectivity for reading at a later time when the user is offline. This might be useful when the user is traveling or if the user has their data usage capped. The app will allow users to identify specific content sources and will develop a predictive model of content that the user might want to download in the future.