

MYGOVERNMENT

By the people, For the people



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Video: <http://jeremya.com/src/e6998-3/midterm/>

I. Introduction

The United States government was formed by men who rejected an authoritarian, tyrannical leader, and who espoused basic human rights and principles of a free people. Government by representation was essential in this formation. Free people must be governed by a body of leaders which not only share the peoples values and ideals, but also listen to their constituents and aptly represent the will of the people. As the size and reach of the United States government has grown, so has it drifted from these founding principles becoming increasingly more secretive and opaque. As executive power has increased, true representational government has decreased.

In recent months and years steps have been taken to shift the direction of US government toward a more open and transparent government that better serves and represents the American people. The Federal Funding Accountability and Transparency Act of 2006 is a perfect example of this shift. The myGovernment iPhone application gives users a fresh, concise, well-organized and highly available view of how well their government is serving and representing the American people. A government by the people, for the people is the central principle used to create and shape the application. A citizen's elected congressional legislators are their voice in the representational government, and thus should be held accountable for the actions, laws, spending, and general operation of the government. The myGovernment application presents users with an easy to read, quick to navigate database of representatives and senators and then attempts to link those legislators to government actions, such as contract spending and current legislation (bills, resolutions), and provide a quick and efficient means of communication to those legislators so that the voice of the people can not only be clearly heard, but well informed.

The myGovernment application does not solely focus on legislators. It also provides a way for users to interact with each other by sharing ideas, voicing opinions and organizing events. It does this through a blog/twitter based interface where users can read comments and notes from other users and share their own opinions. In short, it aims to be a grass-roots organizational and informational tool.

2. Related Work

There are several applications and websites currently available which perform similar functions to those proposed by the myGovernment application. While the existing applications and websites provide excellent resources, there is no compellingly similar application for the iPhone. The key comparison metrics used to differentiate existing art from the proposed myGovernment application are as follows:

- ✓ price - should be free (libre and gratis) as a public service to US citizens
- ✓ community - should provide an outlet for citizen voice
- ✓ data - at least minimum legislator data with associated bill/spending data
- ✓ presentation - quick/easy legislator contact, elegant design

IPHONE APPLICATIONS

ICONGRESS

The iCongress application is a \$0.99 AppStore purchase which comes with a static database of legislators and their contact information, and allows the user to view basic legislator information and easily contact their local representatives. A recent update does allow local database updates via internet download. There is no provision for community feedback, and there is no attempt to connect legislators with any congressional data. The application also suffers from poor design: custom GUI elements don't fit with standard iPhone usage models, many GUI controls are too small for large fingers, images are stretched without respecting aspect ratio, and overall application flow feels like the authors were too lazy to design an elegant UI and instead opted for a lot of cut-and-paste.

CONGRESS / CONGRESS+ / CONGRESSPRO

This application comes in three varieties for the iPhone, a \$0.99 version which is a slightly more organized and elegant version of iCongress; a \$9.99 version which adds staff information and committee assignments (and a free database update in 2009 and 2010, woohoo!); and a \$99.99 version which apparently only adds a yearly subscription to their live database updates (yearly meaning an additional \$99.99 will be required every year to continue the service).

While the application is over-priced, it is mostly well designed and reasonably responsive. The built-in mini browser (a very thin WebView wrapper) keeps you in the app during website viewing which turns out to be invaluable because instead of

formatting a lot of the information for a mobile device, the authors chose to simply re-direct the user to an existing website. Quick turn, poor marks for elegance and usability. There is no provision for user or community feedback, and a monolithic database means bulky updates and quick obsolescence.

WEBSITES

OPEN CONGRESS

This website was recently launched by the Participatory Politics Foundation. It collects data from myriad sources, presents an easily searchable bill/resolution database, allows users to comment on just about anything on the website, and presents legislator data in easy to understand and use ways. The amount of data in an easily comprehensible, searchable and trackable format is staggering; the interface is friendly, elegant and easy to understand; and the entire website is free, open-source and non-partisan. In short, the PPF and SunlightFoundation have created a website after which myGovernment is, at least partially, being modeled.

GOVTRACK

The govtrack website is, at its core, a set of automated scripts which troll a few of the more arcane government websites such as THOMAS (<http://thomas.loc.gov/>) and update an XML/JSON database. The database can be accessed in a raw file mode or downloaded for local use. Recently tracking features have been added to allow users to receive updates about particular legislation or legislators, and a simple API has been developed to allow others to use/access the auto-generated database.

The purpose of the site is primarily to function as a clean data source, and not to provide a community portal or feedback mechanism. In fact, OpenCongress and several other websites use the govtrack data because it is easily accessible and parseable.

VOTE SMART

Project Vote Smart is a non-profit organization which operates in a manor similar to the Peace Corp, and whose primary mission is to provide accurate and freely available legislative bio and voting record data. The website is easy to navigate and can quickly access legislative vote history sorted by any number of different categories. The site also provides several other political resources. It functions as an information source similar to govtrack, but with a much friendlier user interface. It does not provide a community feedback feature, but does provide a reasonable API

to access their carefully collected data (unfortunately the restrictions on API usage almost completely prevent reasonable use from mobile devices).

3. Usage model

The myGovernment application is broken into two distinct spheres of operation: government investigation and participation. The central idea being that the user will investigate government data and actions (such as the summary of a particular piece of legislation), then take actions based on the data collected (such as sending the sponsoring legislator an email, or organizing a rally against a piece of legislation). These two spheres of operation are presented in a collection of application “areas” each of which provide a user interface to different facets of each sphere. The five currently planned application areas are: Community, Congress, Spending, Bills, and Recovery. Each area can be accessed via an icon in the tab bar location, and as more application areas are designed and implemented, they will be accessed via the iPhone standard “More” tab bar button which will bring up a list of the different areas. The last area visited when the application exists will be stored, and the next time the application starts the user will be returned to that area.

In order to facilitate quick and easy constituent participation, a design goal of the application is to keep the user within two finger taps of contacting a legislator about any piece of data presented in the application. This means that no matter what area the user chooses to investigate, a legislator can be contacted via email, twitter, phone or web-form using no more than two taps.

COMMUNITY AREA

The community area is designed to be a facebook or twitter-like feed of user comments and event invitations. This area will be primarily focused on the participation sphere of operation. Here users will be able to voice opinions on specific legislation, legislators or government policies. They will be able to organize events (such as rallies or protests) and invite other users (or non users via email and twitter).

Community area navigation is mostly intuitive with feed items grouped into events and “chatter.” The users will be able to sort the feed via navigation bar buttons, and each feed item will open a detailed view of the comment or event. User comments will be associated with either some page or area in the application, or some external website. A link to in-application pages and external websites will be provided for reference, followed by the user comment. Table data on this same page will display a threaded-like comment path (think slashdot) where other users can respond to the comment, and navigation bar buttons will allow the user to add a response.

Events will be managed by an external service, and the event detail page will show location, organizer, date, time, and event summary (brief description). The navigation bar will allow users to indicate that they plan to attend this event (even asking permission to add the event to the iPhone's calendar), and also provide buttons for creating a new event, finding events in your area (via location services), and searching for events with keywords.

CONGRESS AREA

The congress area presents legislator state, district, party and contact information. The initial view is a table of legislators organized by state. The table header will be a search bar allowing the user to change the sorting based on input search criteria. The navigation bar allows the user to switch between House and Senate legislator data, and also allows the user to find their local representatives by pressing an iPhone standard "location" button. When the location button is pressed, the application looks up the users current location (using the CoreLocation API), uses the govtrack.us web-based REST API to convert a location into a state and congressional district. From the state and congressional district the application then displays a table of state senators and district representative associated with the current location. This is a quick way to find and contact a local representative.

All of the data in the congress area is initially downloaded from sunlightlabs.com (with photos from govtrack.us), and the user can re-download and re-load this data using the iPhone standard refresh button also located on the navigation bar. The data is cached locally on the device, but this functionality avoids shipping a database with the application which can quickly become outdated.

Each legislator table entry can be touched to bring up a quick menu allowing the user to send an email, call or tweet the selected legislator. This interface allow a user to be in contact with their local representative with as little as three screen touches! Each legislator table entry also has a detail-disclosure button which reveals more detailed information about the selected legislator. The detail legislator view shows a photo (if available), allows the user to add the legislator to their device's contact database, and organizes detailed legislator info into a sectioned table. Detailed legislator info includes (but is not limited to) phone, fax, email, website, office address, twitter/youtube account, committee membership, and recent news blurbs. Each item in the detailed view will be touch-able and have an appropriate action associated with it such as making a phone call, visiting a website or viewing a map.

SPENDING AREA

The spending area uses the API from usaspending.gov to gather government contract data, and then correlate the spending with a senator or legislator. The navigation bar allows the

user to select a data sorting method. The three basic sorting methods are district, state and contractor. In each method the section titles of a table will either be set by the chosen sort method (states), or an alphabetical listing (contractors). Each table cell will contain a summary of the spending data for a particular district, state or contractor with a detail disclosure button that will lead to another view containing more detailed information about the chosen item.

The detail view contains a toolbar just below the navigation bar which allows the user to change the fiscal year and the level of detail shown in the view. The toolbar also contains an information button which will display the list of legislators associated with the state/district in which the contractor does business and the state/district where the contract was performed. In this way a user can easily connect government spending to a particular legislator. In the future a more sophisticated connection between contract and legislator should be devised that uses the government agency which awarded the contract to better connect legislators to tax-payer dollars.

BILLS AREA

The bills area will collect congressional data from opencongress.org and present a searchable, sortable legislation viewing interface. The navigation bar will allow you to choose a sort method, and the table header will contain a search bar allowing free-form query of bill/resolution/legislation. This area will also directly link legislators to the laws and resolutions they write by presenting sponsor/co-sponsor and committee information associated with each bill or resolution. Each bill or resolution will have a link where a user can add a comment, or jump to an existing comment thread already started on the particular piece of legislation.

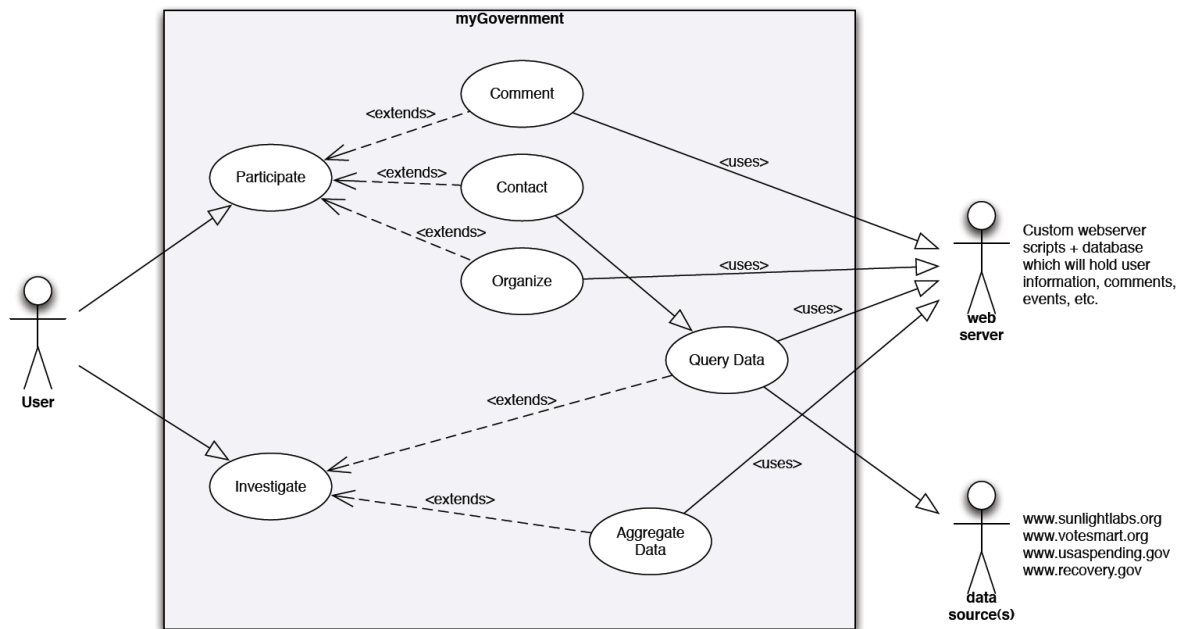
This format will closely follow the OpenCongress website format which presents both a comment/discussion forum as well as a full Wiki interface. The specifics of how this will be accomplished have not been completed.

RECOVERY AREA

The recovery area is currently unimplemented, and serves as a place-holder for an application area which will be developed around data provided from both the feed.gov and the recovery.gov websites. This application area will present a mobile version of the American Recovery and Reinvestment Act data. The goal will be to connect recovery spending with legislators and provide a feedback mechanism for the user to voice their opinion.

USE CASE DIAGRAM

The following diagram summarizes application functionality in the form of a use-case diagram. The use case actions do not necessarily correlate directly to application areas, but instead each application area is intended to present a different facet and interface to several use case actions.



myGovernment Use Case Diagram

4. Architecture Design

myGovernment application code has been divided into areas which match in name and function to the usage model areas discussed above. Each application area is completely responsible for its own UI flow, data caching and data retrieval, but also provides a shared data management interface so that other application area can use data from one or more non-local areas. The logical division of code provides a natural mechanism by which to divide workload, partition application development and localize test / verification methods.

A key design decision made in the development of myGovernment was to leverage the massive store of congressional and legislative data freely accessible via myriad web APIs. The benefits of this architecture are that application data can be updated in a continuous manor, the application's lifetime is extended by avoiding cumbersome and quickly obsolete local databases, and the programmers are not required to generate or capture data - only to

parse it. The downside to this design decision is that the application user will generally need to be connected to a WiFi/Edge/3G network, and network connectivity problems could directly affect the user experience.

The negative aspects of network-stored data have been mitigated by three additional design decisions. First, a local data caching scheme has been designed to store less frequently updated data such as basic legislator info and contact information. After an initial database download, basic legislative data is stored locally for future retrieval and a user interface button is provided for manual update of this cached data.

Second, network access to application data has been partitioned as much as possible into small chunks which are downloaded in an on-demand fashion. An example of this is legislator photos. The entire database of legislator photographs would present an unreasonably large network burden on Edge connected devices. To alleviate this burden legislative data is downloaded in smaller chunks. The initial database download only fetches basic information in XML format which is small and easily compressible by network providers. As a user selects a particular legislator for more detailed review, if certain data is missing (such as a the legislator's photo) it is downloaded in a background thread as the user needs it. The user is kept in the loop by presenting an activity wheel overlay on data areas currently being processed.

Third, because much of the data used in the application is stored remotely, careful attention has been paid to an interface design which is tolerant of network faults. This means that data being downloaded must run in a background thread and use one of the many callback or notification services present in the iPhone SDK. Several common objective C resources have been developed to minimize code duplication and thread programming errors. Examples of this design are the XMLParserOperation interface which is initialized with a URL and a callback object. The XMLParserOperation spawns a background thread from which it retrieves an XML document from the URL provided at initialization, and then parses the document using callback messages sent to the callback object provided at initialization. This interface class allows an area's data manager to download remote data, by simply implementing a handful of XML callback methods, while maintaining an interactive user experience.

The myGovernment UI strives to comply with Apple's guidelines, and careful attention has been paid to details such as font readability, color coordination and general application graphical continuity.

5. Implementation

Because the application relies heavily on remote data sources, extensive testing and design have been done to ensure that application performance and usability suffers as little as possible when network outages or hiccups occur. Some examples of the design framework used to accomplish these goals are the use of Apple's 'NSOperation' class which creates a background worker thread using a given instance method as the thread's main function, and the development of GUI notification elements such as progress overlays.

All areas of the application are currently functional, however, certain functions in the community and congress areas have been disabled in the initial release and are slated for future upgraded versions of the application.

6. Evaluation

The success of myGovernment will be judged primarily by its usefulness to concerned and involved citizens. As such, the UI should be responsive and easy to navigate and understand. Legislative contact and community organization should be primary application benchmarks for usability. Basic testing occurred using both iPhone and iPod Touch devices as well as the iPhone simulator. Different geographic locations were also factored into the testing as different members of the development team tested the application in Denver, CO, New York City, Grand Rapids, MI and Zeeland, MI.

7. Limitations

Due to time constraints some information in the legislator detail views has been reduced, and an upgrade plan has been put into place to add this information back into the application. Specifically there is currently no way to view all the legislation sponsored by a particular legislator, and there is also no data on the legislator's voting record.

The community area functionality has also been pared-down in order to move more quickly to market. All event related functions are currently planned for an incremental upgrade release, and all searching / sorting functionality is currently disabled. The community back-end is running on the Google App Engine service, but not all of the planned functions could be put into place before the target AppStore release date.

8. Member Contributions

The myGovernment team currently consists of three members (the third member was added a couple weeks before the final in-class demo):

Jeremy Andrus (Zeeland, MI)

Wesley Morgan (Denver, CO)

Christian Bell (Grand Rapids, MI)

Jeremy was born in Pennsylvania and moved to Michigan with his parents in middle school. He attended Calvin College and is currently pursuing a masters degree from Columbia University. At Calvin he majored in Engineering with a concentration in Electrical and Computer Engineering, and is currently employed as a Senior Research Engineer at Gentex Corporation (<http://www.gentex.com/>) in Zeeland, MI.

Jeremy is the principle architect of myGovernment. He developed the entire client UI and layout. He also developed the application framework and acts as the project manager.

Wesley was born in Oklahoma City, OK. He moved to Michigan to attend Calvin College where he majored in Computer Science and Spanish. He is currently employed as an Internet Organizer in Denver, CO by US PIRG (<http://www.uspirg.org/>).

Wesley is responsible for the web backend community aspects of myGovernment. The Google App Engine data store and RESTful web interface was designed and implemented by Wesley. He is also responsible for integration of external libraries such as Matt Gemmell's MGTwitter engine (<http://mattgemmell.com/source/>) and maintains the application's version control repository.

Christian Bell grew up in the Denver Colorado area. He moved to Michigan to attend Calvin College where he majored in religion. He is currently employed by Holland Home (<http://hollandhome.org/>) in their IT / web development department.

A brief subversion log has been included at the end of this report to highlight the iPhone client code development process and underscore individual member contributions.

9. Lessons Learned

During the course of this application development I learned a great deal about the wealth of data freely available to those who look for it. I also learned that there is a growing trend of websites (opencongress.org is an excellent example) which are attempting to use this wealth of data to empower citizens. Hopefully the myGovernment application will productively add to this movement, and provide its users with a useful tool to become more involved citizens.

10. Conclusions and Future Work

Development of the myGovernment application will not stop after this class is finished. The application will be released under the terms of the GNU GPL v3.0, and a call will be made for any developers interested in participating. An official feature list is being created which will guide the development process and provide a blueprint for future application features. New versions of the application will continue to focus on improving the user experience, and new features will center around providing access to more government data while simultaneously striving for an easy-to-interpret format and quickly accessible communication outlet.

11. Acknowledgements

Matt Gemmell's Obj-C twitter engine has been incorporated into myGovernment as both a legislator contact mechanism, and as community involvement tool. In most areas of the app it is possible to "Tweet" about the piece of data currently under investigation.

All of the government data used in the application comes from free and open sources such as GovTrack, OpenCongress, USASpending, Bioguide and SunlightLabs.

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