

**Google Glass**

Virtual Memory App Requirements

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SYSM 6309

Google Glass, Project Phase 1

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Project Phase I: Requirements Elicitation: Initial Understanding

*The hardest single part of building a software system is deciding precisely what to build. No other part of the conceptual work is as difficult as establishing the detailed technical requirements, including all the interfaces to people, to machines, and to other software systems. No part of the work so cripples the resulting system if done wrong. No other part is more difficult to rectify later*. [Brooks, 1987]

# 1. Introduction

## 1.1 Project overview

There are many technologies available today that allow a wide range of people greater accessibility to the world. People benefiting from accessibility technology range from travelers that do not speak the local language to those suffering temporary or permanent auditory or visual impairment, which may include disabled children and adults, and the elderly. The problem is how these individuals can be helped, in a manner as to maximize their abilities towards that of the average individual, yet at the minimum apparent difference from their peers. For example, a person who requires help to hear can be helped via hearing aid technology to allow them to hear almost as well as an individual with no appreciable hearing loss. Yet the hearing aid device is small and subtle so as to make the individual appear no different than anyone else. There is no large device with a battery pack strapped to them, which is easily identifiable. Modern hearing aids allow the affected individual the freedom to “blend into society.” The same is not true for all ailments. Neurological conditions that affect memory and cognition for example, require multiple dimensions of stimuli; more than just auditory.

The technology required to aid with multiple needs is required to be quite more advanced than the above example of a hearing aid. Technology providing real world accessibility is typically triggered by some types of stimuli. Information can be static and/or passive, like a proximity sensor triggering a prerecorded message for the visually impaired letting them know transportation information. Passive information is generally static, meaning it doesn’t change per user. It isn’t custom to that person’s needs. To have interactive information, most existing technology requires the user to provide stimuli input information in some way. This indicates the information desired. This can be as simple as typing words or symbols, to more complex recent solutions using breath or eye movements, but the custom information is triggered in some way.

Our project is to combine a passive stimuli for the user, where the user is not required to do anything at that moment, with customized information. Google Glasses are technology that people wear similar to glasses. The Google Glasses see the world and help interpret it for the wearer. There are many commercial applications for the technology, but our team is focusing on improving real world accessibility for dementia/Alzheimer’s patients. For the wearer, the glasses must be worn, but that is the extent of user stimuli. The glasses interpret the world and provide customized information to the wearer. The customized information is entered by care givers at any time, and can be actively maintained.

The development of this project has involved a detailed development and scoping of the functional and non-functional requirements needed to address the daily needs of individuals with early on-set Alzheimer’s. The users will be those affected by the disease. However their family and caregivers will also be required to learn the use of both the application we are developing as well as Google Glass. This will allow the customization of the application’s functions to meet the changing needs of the affected individual to fit into their “normal route” and social group. As the disease progresses, adjustment may also be required to be made by the family or caregiver, such as reminders for the medication regimen.

The domain of our application is limited to the software and hardware platforms established by Google for their Google Glass project. An android smartphone communicates with Google Glass, and provides real-time connectivity to the cellular data network. Our application is downloaded onto the Android smartphone from the Google Play application store, and services Google Glass with an assistive technology for the wearer. The family or caregiver customizes the app via the Android smartphone to meet the unique needs of the patient. The environment of the patent is all-inclusive of the real-world, ranging from a care-facility on one extreme with limited range of activities, to active individuals still engaged with relative degrees of independence.

The requirements process began with extensive research of the needs of Alzheimer’s patients and their caregivers. Our resources included, the Alzheimer’s foundation www.alzheirmers.org as well as interviews with primary caregivers. The goal being to develop a tool that can not only manage all the necessary data associated with the care of the patient but also to provide several useful applications for the patient’s use via the Google Glass platform such as customized reminders for the patient that will have audio and picture of a familiar trusted person reminding them to take their medicine.

## 1.2 Goals

* Google Glasses will improve real world accessibility for early stage dementia/Alzheimer’s patients.
* Provide a total solution for the family/caregivers of patients to use the application for the joint benefit of their lives and the patient’s
* Integrate successfully of the app with Google Glass platform
* Capture market share in accessible technology market

## 1.3 Project deliverables

* High-level functional and technical requirements for a Google Glass application which would use the Google Glass platform. Would provide a specialized application for the use of people with real world accessibility challenges.
* User interface for caregiver to load customized content for the individual wearer.
* High-level marketing and sales requirements

## 1.4 Evolution of this document

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Version** | **Editor** | **Change** |
| 7/5/2013 | 1.0 | Nik | Initial version of document |
| 7/7/2013 | 1.1 | Nik | Second version with additional sections |
| 7/8/2013 | 1.2 | Randi | Third version with additional edits, content, and format changes |
| 7/11/2013 | 1.3 | Nik | Evolution from outline to formal document |
| 7/12/2013 | 1.4 | Nik, Ben, Dylan | Edits for Part 2 class submission |

## 1.5 Definitions, acronyms, and abbreviations

Not applicable at this time

## 1.6 Web Link

Location of project website: <http://bit.ly/13iyKMR> (Shortcut)

Ergonomic link address: <http://nxw111230.wix.com/semgoogleglass>

# 2. Project Organization

## Process model

Our group has implemented the Agile approach to development of our requirements. The Agile approach is based on iterative and incremental development, where requirements and solutions evolve through collaboration between self-organizing and, cross-functional individuals. We chose this approach because it promotes adaptive planning, evolutionary development and delivery, a time-boxed iterative approach, and encourages rapid and flexible response to change. It is a conceptual framework that promotes foreseen interactions throughout the development cycle.

## 2.2 Organizational structure

* Stakeholders: Early onset Alzheimer’s patients and their primary caregivers
* Engineering Requirements Development Dylan Brandt & Ben Smiley
* Software Development – Ben Smiley Dylan Brandt
* Test- Ben Smiley Dylan Brandt
* Support – Randi Craig
* Maintenance – Randi Craig
* Marking requirements – Nikolaus Walch
* Sales requirements – Nikolaus Walch

## 2.3 Organizational boundaries and interfaces

This project will not have additional resources, so we are limited to current resources. The abilities of each individual, as well as the research material available online regarding Google Glass development are the extent of the resources utilized.

## 2.4 Project responsibilities

Each resource is required to take meeting notes at least once.

Each resource is required to participate in presentations.

Each resource is required to provide content in a timely manner.

# 3. Managerial Process

## 3.1 Management objectives and priorities

Our group is developing the requirements for a Google Glass application from the perspective of UTD graduate students. We have an interest in the varying applications Google Glass has the ability to service. One we have chosen at this time is to focus on dementia and Alzheimer’s patients. Our project scope is therefore limited to this one application, with few resources and time devoted to this project since each member of the team is a employed during the day and have other academic commitments.

Varying business needs are addressed by our application. For the doctor the application provides a treatment option which is of tangible value to their patients. The doctor is able to offer a treatment option to retain the patient as a client. The hospital or clinic/practice associated with the doctor is distinguished in its market by providing the latest technology in difficult to treat neurological condition.

## 3.2 Assumptions, dependencies, and constraint

Once developed, the real world application will reside on the Google Glass platform. Basic functionality already covered by Google Glass platform will not be addressed. Google Glass hardware and software platform requirements are also a constraint. We assume the technology described in Google’s requirements exists, or will be in place before needed in production.

## 3.3 Risk management

Timeline and scope creep are always project risks. A competitor app may come to market first. A competitor app may come to market with a richer set of features more appealing to either the doctor or the patient. Google Glass hardware and/or software requirements may change, requiring extensive rework of our designs.

Additionally our team my suffer the loss of team members and/or wasted resources on requirements which do not ultimately benefit the project.

## 3.4 Monitoring and controlling mechanisms

We will address timeline and scope creep with a strict timeline of team defined deliverables and regular weekly meetings; or as needed.

## 3.5 Division of work

* Who is the end user – individuals with early onset of dementia and alz., still in their personal home. Family members help to integrate them into the capabilities of GG.
* Engineering requirements
  + Hardware – Dylan/Ben
    - Functional – uses the phone (android?) to serve up data/net
    - Non-functional
  + Software – Ben/Dylan
    - Functional – apps to help you find common objects
    - Non-functional
  + Support - Randi
  + Maintenance - Randi
* Marking requirements - Nik
* Sales requirements - Nik

# 4. Technical process

## 4.1 Methods, tools, and techniques

* MS Office Suite, including Word, PowerPoint, Visio, Excel
* Communications we are using Facebook, email, Dropbox
* PMI project management methodology including all phases of SDLC
* RE-Tools requirements modeling toolkit
* Wix.com webpage design and hosting

## 4.2 Software documentation

To be done in MS Word, and Adobe PDF.

## 4.3 Project support functions

We will consult the [Alzheimer's Foundation - alzfdn.org‎](http://www.alzfdn.org/) to get their requirements and endorsement.

# 5. Work elements, schedule, and budget

## 5.1 The domain

The domain of our application is limited to the software and hardware platforms established by Google for their Google Glass project. An android smartphone communicates with Google Glass, and provides real-time connectivity to the cellular data network. Our application is downloaded onto the Android smartphone from the Google Play application store, and services Google Glass with an assistive technology for the wearer. The family or caregiver customizes the app via the Android smartphone to meet the unique needs of the patient. The environment of the patent is all-inclusive of the real-world, ranging from a care-facility on one extreme with limited range of activities, to active individuals still engaged with relative degrees of independence.

## 5.2. Stakeholders

The stakeholders for the Virtual Memory app are presenter below.

|  |  |  |
| --- | --- | --- |
| Who | Expected Skill Level | Why Virtual Memory App? |
| Patient suffering from early on-set Alzheimer’s | Familiarity with smartphones. Concept of virtual/augmented reality a plus. | Provide a supplement to daily life to minimize effects of disease. |
| Spouse, Partner of patient | Familiarity with smartphones. | Experience benefits of patient’s ability to be more self-sufficient and consistent to traditional behavior. Provide input to application to customize it to the patient’s needs. |
| Professional caregiver | Familiarity with care for those affected by neurological degenerative diseases. | Monitor patient for the management of symptoms, calibration of application. |
| Doctor | Familiarity with neurological degenerative diseases, and various forms of treatment and care management. | Monitor patient for the management of symptoms, calibration of application. |
| Insurance | Familiarity with benefits of technological aided disease management | Few other treatment options exist for the management of Alzheimer’s. |

## 5.3 Non-functional objectives

The non-functional objectives are to provide a stable usable and secure application that can interface to Google Glass. Another important non-functional objective is to make the application easy to use for older less tech savvy users.

## 5.4 Functional objectives

The functional objectives would be broken down into two general areas:

Patient care management

Medical History and medication information repositories

Insurance and provider information repositories

Family and close friends & caregiver bios including photos and voice recordings

Patient assist

Personalized reminders for appointments and medication etc.

## 5.5 Schedule

**Phase 1 Purpose: Develop Prototype for UAT**

| **Week** | **Phase Name** | **Comment** |
| --- | --- | --- |
| 1 | Planning and Discovery | Initial project planning, project scope and charter |
| 2-4 | Detailed Design | Requirements design, WRS |
| 5-6 | Build and Unit Testing | Software development of basic functionality for proof of concept |
| 7 | Business and User Acceptance Testing (UAT) | Limited UAT to 20 participants and their care givers. Participants required to be at very early stages of diminished capacity, able to provide feedback. |
| 8-12 | Interviews/Feedback Sessions | One on one interviews conducted with each participant and with each care giver. Feedback categorized into expectations, requirements, nice to have, ease of use, functionality |

**Phase 2 Deliverable: Version 1**

| **Week** | **Phase Name** | **Comment** |
| --- | --- | --- |
| 13-14 | Planning and Discovery | Following interview session, that information is used to develop more detailed requirements. |
| 15-16 | Detailed Design 1 |  |
| 17-18 | Build and Unit Testing 1 |  |
| 20 | Business and User Acceptance Testing 1 (UAT) | Identification of low risk/high value updates to increase usability of existing functionality. |
| 21 | Detailed Design 2 |  |
| 22 | Build and Unit Testing 2 |  |
| 23 | Business and User Acceptance Testing 2 (UAT) |  |
| 24 | Detailed Design 3 | Bug Fixes Only – No New Functionality |
| 25 | Build and Unit Testing 3 | Testing, Any issues identified will categorized as critical to stop go-live or for the next release |
| 26 | Business and User Acceptance Testing 3 (UAT) | Testing, Any issues identified will categorized as critical to stop go-live or for the next release.  Focus on user and training modules |
| 27 | Cut-over and Training | Training for sales and medical professionals |
| 28 | Post Cut-over Support | Cut-over delivery to sales and medical professional |

## 5.6 Budget

There is no budget for the requirements project. We are poor grad students.

If we approach Google, they may choose to invest significantly in our project

We need to identify at least 3 issues we encountered with our overarching design requirements. We wanted to do X, BUT, and then list the issues encountered and how addressed.

Show criteria, pluses/minuses, how we reached our final decision to handle this requirement issue.

## 5.7 Creeping Requirements

Nutrition information presented to the patient. Alzheimer’s as with any disease, including neurological conditions, is affected by the health of the dependent range of nutrition the affected organ (the brain) receives. A diet high in saturated fat is detrimental to the blood supply of the brain received from the cranial arteries. Our team decided an additional benefit of our application will be to allow the caregiver of the patient to input foods the patient shall be encouraged to eat by the application, and those which should be reduced or avoided entirely. The addition of this requirement to the application in a future version will provide benefit to

* Show Justification why our requirements are better. Can we make the change requested and why yes/no
* The ability to delete appointments

# 6. Requirements Specification

## 6.1 Non-functional Requirements Specifications

The Non Functional Requirements for Visual Memory application are divided into the following categories:

1. Compatibility
   1. The software shall be compatible with the Android version 4.03 and above
   2. The software shall be compatible with the Google MyGlass app.
   3. The web portions of the software shall be compatible with Google Chrome (version 27 or higher), MS Internet Explorer (version 9 or higher), and Firefox (version 22 or higher).
2. Availability
   1. The software shall be available for download from GooglePlay store.
3. Usability
   1. The software shall be easily operated by those with minimal computer skills.
   2. The software functions shall be accessible through both the smart phone app, tablet app, and the web portal.
   3. The GUI application interface shall be easily navigable for inexperienced users.
   4. The GUI application interface shall be configurable with a zoom magnification of not less than 200%.
4. Performance
   1. The software error handling shall notify the user of an error once it is identified.
   2. The software shall have an error rate of less than 5%.
   3. The software shall respond near instantaneous to the user’s inputs.
   4. The software shall respond to 100% of its notifications.
   5. The software shall not drop or miss notifications when battery life is available.
   6. The software shall request ratings from the end user to collect APMs.
5. Integrity

5.1 The master database shall be kept on the website but shall be fully accessible from the smart phone.

* 1. All updates shall be controlled by the website. The smart phone shall request an update but the confirmation and control of updates shall remain with the website.

1. Security
   1. The smart phone software shall not allow any unsolicited update requests.
   2. Access to website will require a unique userid/password combination.
2. Maintainability
   1. The software shall be well documented and follow good design practices to facilitate ease of maintainability.
   2. The software code shall follow standard good programming practices for code comments
   3. The software shall be written in a commonly used programming language that is suitable for the Android platform.

## 6.2. Software System: Functional Requirements

The Functional Requirements for Visual Memory are divided into the following seven functional categories:

1. Visual Memory Application
   1. Upon initialization, the application will require the user to create a username and password and supply an email address.
   2. The application shall require authentication through the activation link sent to the user’s email.
   3. The application shall notify the user of the Visual Memory website and the personal fact sheet.
   4. The home screen of the application will have icons to access the Schedule, Family, Recordings, Provider, Medication, History, and Insurance.
   5. The application shall allow for the user to quickly return to the home page.
   6. The application shall allow for uploading photos from the user’s Android phone or tablet.
2. Schedule
   1. The schedule menu shall be accessible as its own icon from the main menu via a picture icon and text indicating schedule.
   2. The schedule shall allow for synchronization between the schedule app, the medication app, the recordings app, the family app, and the Visual Memory website calendar.
   3. The schedule shall display all of the user’s appointments.
   4. The schedule shall allow the user to select what format to display the appointments.
   5. The schedule shall provide a warning if a scheduling conflict exists.
   6. The schedule shall allow the user to create appointments.
   7. The appointment shall allow the user to specify the subject of the appointment.
   8. The appointment shall allow the user to specify the location of the appointment.
   9. The appointment shall allow the user to specify the start date of the appointment.
   10. The appointment shall allow the user to specify the end date of the appointment.
   11. The appointment shall allow the user to specify the start time of the appointment in hours and minutes (increments of 5) and AM or PM.
   12. The appointment shall allow the user to specify the end time of the appointment in hours and minutes (increments of 5) and AM or PM.
   13. The appointment shall allow the user to place notes in the appointment.
   14. The appointment shall allow the user to set a reminder alarm.
   15. The appointment shall allow the user to select a notification time for the reminder, subject to the following options: At time of event, 5 minutes before, 15 minutes before, 30 minutes before, 1 hour before, 2 hours before, 1 day before, 2 days before.
   16. The appointment shall allow the user to customize the reminder alarm.
   17. The reminder alarm shall allow the user to attach a photo from the family bio storage and retrieval app.
   18. The reminder alarm shall allow the user to attach a recording from the audio capture app.
   19. The reminder alarm shall allow the user to select the display interface for Google Glass: text only, text and audio, text and custom audio, text and photo, text audio and photo, text custom audio and photo.
   20. The appointment shall allow the user to set future reoccurrences.
   21. Future reoccurrences shall provide the following sections: every day, every week, every 2 weeks, every month, or every year.
   22. The user shall be able to select the calendar display for all appointments as a List, Daily, Weekly, or Monthly view.
   23. The schedule shall allow users to interface with it on an Android phone or tablet, or via the Visual Memory website.
   24. The schedule shall allow users to modify or edit the fields of an existing appointment.
   25. The schedule shall allow users to delete appointments.
   26. The software shall be updateable.
   27. The calendar shall allow registration online from nxw111230.wix.com/semgoogleglass
   28. The software shall expose data to standard RESTful API calls.
3. Family(Ben)
   1. The family app shall be accessible from the main menu as its own icon and text indicating family.
   2. The software shall provide the ability for the user to input the following information:

Name of person

Photo of person

Familial relation (or friendship context)

Audio recording of person’s voice

* 1. The software shall expose data to standard RESTful API calls.
  2. The software shall respond to queries based on a person’s name to retrieve selected information.
  3. The software shall allow for retrieval of any part or all of the biographical data
  4. The software shall provide an interface that shall allow the user to browse through the database for purposes of familiarizing the user with the people in the database.

1. Recordings
   1. The recordings menu shall be accessible the main menu as its own icon and text indicating recording.
   2. The software shall provide an interface for the user to record audio input to a maximum length of 10 seconds per recording.
   3. The software shall require an id tag for the person whose audio is recorded for purposes of tracking the recording in the system.
   4. The software shall provide a mechanism to delete or modify existing recordings
   5. The software shall provide a mechanism for retrieval and playback of recordings based on the key of the unique personal id of the person whose voice is recorded.
2. Provider
   1. The provider menu shall be accessible from the main menu via a picture icon and text indicating Provider.
   2. The software shall provide the ability for the user to input the following information:

Provider name

Office address

Office hours

Office phone#

Emergency phone#

Specialty

* 1. The software shall provide the ability for the user to enter appointment dates and times for any provider in the provider list.
  2. All data in the provider software shall be exposed to the calendar software.
  3. All data in the provider software shall be exposed using standard RESTful API calls.

1. Medication
   1. The medication menu shall be accessible from the main menu via a picture icon and text indicating medication.
   2. The interface shall provide the ability for the user to input the following information:

Medication name

Dosage

Frequency taken

Preferred time(s) of day to take

Pill count per prescription

# refills

Prescribing doctor

Cost

* 1. The software shall calculate the number of pills left in the prescription based on the pill count, frequency taken and number of prescriptions left and shall communicate with calendar software to issue an alert to get prescription refilled two weeks prior to the calculated date that prescription would be fully consumed.
  2. The software shall communicate with calendar software to issue reminders to take medication based on the preferred time of day entry for each medication in the database.
  3. All prescription data shall be exposed via standard RESTful API calls.

1. History
   1. The history menu shall be accessible from the main menu via a picture icon and text indicating history.
   2. The interface shall provide the ability for the user to input the following information:

Diagnosed diseases

Recorded surgeries

Medication allergies

Food or other allergies

Immunization records

* 1. All medical history data shall be exposed to standard RESTful API calls.

1. Insurance
   1. The insurance menu shall be accessible from the main menu via a picture icon and text indicating insurance.
   2. The software shall provide the ability for the user to input the following information

Insurance carrier name

Type of insurance (medical/dental/vision etc)

Group #

Member #

Phone # for providers

Phone # for members

Claims processing address

* 1. All insurance carrier data shall be exposed to standard RESTful API calls.

1. Interface Requirements (Glassware to smart phone APP) (Dylan)
   1. Glassware will allow wireless tethering to the user’s Android phone or tablet via WIFI or Blue Tooth 4.0+
   2. Glassware shall utilize the Google Mirror API and appropriate RESTful calls as the access to the Glass operating system.
   3. The calendar Glassware shall display reminder alarms and notifications from the Visual Memory application.
   4. The calendar Glassware shall allow for text reminders/notifications.
   5. The calendar Glassware shall allow for audio reminders/notifications.
   6. The calendar Glassware shall allow for photo reminders/notifications.
   7. The calendar Glassware shall display the subject, time, and location as default for reminders/notifications from the Visual Memory application scheduled appointment.
   8. The calendar Glassware shall display reminder alarms per the user’s interface selection: text only, text and audio, text and custom audio, text and photo, text audio and photo, text custom audio and photo.
2. Website (Dylan)
   1. The website shall allow for synchronization between the Visual Memory application
   2. The website shall allow for inputting calendar appointments, family biographical information, and medical records including provider information, medication, medical history, and insurance information.
   3. The website shall provide links to Alzheimer’s support and information for caregivers.
   4. The website shall provide a personal fact sheet.