# Software Requirements Specification

# For

# Group 58

Version 1.0

Makerere University Kampala

July 7, 2016

Contents

[1. Introduction 1](#_Toc456257641)

[1.1 Purpose 1](#_Toc456257642)

[1.2 Intended Audience and Reading Suggestions 1](#_Toc456257643)

[1.3 Product Scope 2](#_Toc456257644)

[1.4 References 2](#_Toc456257645)

[2. Overall Description 2](#_Toc456257646)

[2.1 Product Perspective 2](#_Toc456257647)

[2.2 Product Functions 2](#_Toc456257648)

[2.3 User Classes and Characteristics 2](#_Toc456257649)

[2.4 Operating Environment 3](#_Toc456257650)

[2.5 Design and Implementation Constraints 3](#_Toc456257651)

[2.5.1 Signup and Login requirements: 3](#_Toc456257652)

[2.5.2 Language Requirements: 3](#_Toc456257653)

[2.5.3 Specific Technologies used: 3](#_Toc456257654)

[2.6 User Documentation 3](#_Toc456257655)

[2.7 Assumptions and Dependencies 3](#_Toc456257656)

[3. External Interface Requirements 4](#_Toc456257657)

[3.1 User Interfaces 4](#_Toc456257658)

[3.2 Hardware Interfaces 4](#_Toc456257659)

[3.3 Software Interfaces 4](#_Toc456257660)

[3.4 Communications Interfaces 4](#_Toc456257661)

[4. System Features 4](#_Toc456257662)

[4.1 User Authentication 4](#_Toc456257663)

[4.1.1 Description and Priority 5](#_Toc456257664)

[4.2 Visualization 5](#_Toc456257665)

[4.2.1 Description 5](#_Toc456257666)

[4.3 Analysis 5](#_Toc456257667)

[4.3.1 Description 5](#_Toc456257668)

[4.4 Saving and Downloading 5](#_Toc456257669)

[4.4.1 Description 5](#_Toc456257670)

[4.5 Help 6](#_Toc456257671)

[4.5.1 Description 6](#_Toc456257672)

[4.6 Searching 6](#_Toc456257673)

[4.6.1 Description and priority 6](#_Toc456257674)

[4.7 Blog 6](#_Toc456257675)

[4.7.1 Description and priority 6](#_Toc456257676)

[5. Functional requirements 6](#_Toc456257677)

[6. Other Nonfunctional Requirements 7](#_Toc456257678)

[6.1 Safety Requirements 7](#_Toc456257679)

[6.2 Security Requirements 7](#_Toc456257680)

[6.2.1 Data Transfer 7](#_Toc456257681)

[6.2.2 Data Storage 7](#_Toc456257682)

[6.3 Software Quality Attributes 7](#_Toc456257683)

[7. Appendix A: Glossary. 8](#_Toc456257684)

Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Date** | **Reason For Changes** | **Version** |
| **Draft 1** | Monday July 11, 2016 |  | 1.0 |
| **Draft 2** | Wednesday July 13, 2016 | Correction of errors | 1.1 |
|  |  |  |  |
|  |  |  |  |

# Introduction

## Purpose

The aim of this document is to specify all the necessary tools and levels of operation needed to build the Political Data Analytics software solution that will be used to analyze and visualize data from ACLED.

The target solution is described in the concept paper. This document covers all requirements for the development of the software.

The purpose of the document is to collect and analyze all assorted ideas that have come up to define the system, its requirements with respect to consumers. In addition, we shall predict and sort out how we hope this product will be used in order to gain a better understanding of the project, outline concepts that may be developed later, and document ideas that are being considered, but may be discarded as the product develops.

This SRS document is to provide a detailed overview of our software product, its parameters and goals. This document describes the project's target audience and its user interface, hardware and software requirements. It defines how our client, team and audience see the product and its functionality. Nonetheless, it helps any designer and developer to assist in software delivery lifecycle (SDLC) processes.

## Intended Audience and Reading Suggestions

This document is intended primarily for developers of the group 58 recess project.

However, project managers and supervisors may read the

It is preferred for the readers of this document to take a careful look through each of the specifications and keywords given in this document. Careful reading and comprehension of this document is required to be able to build and use the software.

This document contains the following content related to only this software:

* Scope of the software
* References used with this software
* Product Perspective
* Product Functions
* User Classes and Characteristics
* Operating Environment
* Design and Implementation Constraints
* User Documentation
* Assumptions and Dependencies
* External Interface Requirements
* User Interfaces
* Hardware Interfaces
* Software Interfaces
* Communications Interfaces
* System Features
* Performance Requirements
* Safety Requirements
* Security Requirements
* Software Quality Attributes
* Business Rules

## Product Scope

The scope pertains to ACLED data analytics solution. It focuses on the use of analytical tools in R programming language to visualize and analyze the data adopted from ACLED. The data contains violent incidents and that have happened in Uganda between the years 1997 and 2014.

Our goal will be

* + - To enable security forces know how to balance their efforts in case of violent incidents happening.
    - To show how much impact different forms of violent incidents have caused.
    - To predict places that are likely to have violent incidents

This SRS is also aimed at specifying requirements of software to be developed but it can also be applied to assist in the selection of in-house and commercial software products. The standard can be used to create software requirements specifications directly or can be used as a model for defining an organization or project specific standard. It does not identify any specific method, nomenclature or tool for preparing an SRS.

## References

1. J H Maindonald, Using R for Data Analysis and Graphics, Centre for Mathematics and Its Applications, Australian National University.
2. Eric Mayor, Learning Predictive Analytics with R.
3. Julian J. Faraway, Practical Regression and Anova using R.
4. Roger D. Peng, R Programming for Data Science, 2015.

# Overall Description

## Product Perspective

This software is dependent on R packages. Most especially the shiny package. Shiny package enables presentation of R scripts and content as a web application.

## Product Functions

The software will allow users to visualize the ACLED data on maps, bar graphs, pie charts, scatter diagrams.

The software will enable users to predict events based on the data given.

The software will help in making conclusions based on the analysis of the data.

The software will allow users compare one or more locations on the map based on the incidents.

## User Classes and Characteristics

* **Advanced end users:** users that are familiar with programming and can personalize the system by using command line options or can add more functionality.
* **End users/Desktop:** users with no particular knowledge on computer programming. They just use the system for data analysis
* **System administrators:** administrators working on computers that support a lot of accounts and personal data for other users. The administrator can save all data with no risk of leak to third persons.
* **Science/Research Telecommunications:** for organizing data that have to do with lots of people and applications.

## Operating Environment

The software should run on all Operating Systems that support R programming language:

All 32-bit MS Windows (XP/Vista/7/8/8.1/10/10.1).

Android 4.0 and above.

All **AMD** and **i386** versions on Linux (Debian, Fedora, Ubuntu, Suse, Red hat).

Mac OSX.

The user must have installed R programming language and MySQL Server.

User interfaces will be web browsers. Alternatively, similar software.

## Design and Implementation Constraints

### Signup and Login requirements:

Users are required to have signed up and login to have full features of the system, also as a security measure to the system.

### Language Requirements:

No translations of system files or help files are available. The system is entirely written and run using English locale for the United States (En-US).

### Specific Technologies used:

* **MD5** and **SHA1** encryption algorithms may be used to store user credentials in the database. To avoid security concerns of user data misuse.
* **R** scripting backend for visualization and analysis of the data.
* **PHP** for server side scripting.
* **HTML5, CSS3** and **JavaScript** for user interface construction.
* **JSON** for data parsing between **PHP** and **R**

## User Documentation

The system will have a help page that will guide users on how to use. Programmers will have to use the reference books to get familiar with concepts of the R programming language.

## Assumptions and Dependencies

* Users are computer literate.
* Users have internet connection.

# External Interface Requirements

## User Interfaces

The user interface for the software shall be compatible with any web browser such as Internet Explorer, Mozilla Firefox, google chrome, opera, safari and any java script enabled web browser that a user can access to the system. The user interface shall be implemented using any of these tools or software packages: - Java Applet, java servlets, PHP scripts, ASP.NET, JSP, Ruby on rails, R shiny, python, or any other tool that can be used to create CGI Scripts.

## Hardware Interfaces

In order to use the system, users should be connected to the internet. This connection can be via the use of modems, wireless connections or Ethernet.

Users may use Laptops, phones, tablets, kindle or other devices capable of browsing the internet.

## Software Interfaces

* The system shall communicate with an external maps API to visualize locations.
* The system shall communicate with search engines to find video, audio, web sites and other content related to the data.
* The system will work with a back-end database to store required information and improve performance.

## Communications Interfaces

Internet connection and a browser are required in order for several functions to be executed such as downloading plugins.

# System Features

The System provides the user with the following functions:

* User authentication.
* Visualization.
* Analysis.
* Save and retrieve.
* Help.
* Search.
* Blog.

## User Authentication

The system will provide this as an optional feature for any user who may want to used server resources or unique features like save, edit, print.

The feature involves three steps:

#### Signup

The user will provide a name and email for identification purposes.

The user will also set a minimum of six characters as his/her password

#### Login

The system will require that the user input his/her username and password to identify with the system resources.

System will reject Wrong username and passwords and the user will have an option of signup

#### Logout.

This feature will be set for the user to close his interaction with the system and return to the guest mode.

### Description and Priority

The user will provide his registered name and password to the system to login.

Upon login, the user will have access to all unique features in the system including:

* Saving of analytical user data
* Editing of his saved user data
* Deleting saved user data
* Downloading any data analyzed by the system

## Visualization

This feature will have all required views of graphs, video, images and audio related to the data.

### Description

A user will select the visualization option from a menu. User will choose to get a view he would want for example map, bar plot, box plot, scatter plot, or histogram. The system will provide these visualizations upon selection.

## Analysis

This feature will enable users to get the analysis conclusions or predictions about the data.

### Description

This feature will enable users get analytical information about the data. Like mean values, regression analysis, predictions and totals.

## Saving and Downloading

Registered users wanting to save and retrieve their findings to and from the database will use this feature.

### Description

A user will select a visualization or analysis, he/she will be given a save option. The user will then click the save button to save the data.

## Help

This feature will be included to aid users on how to use the system.

### Description

A user will select the help option from the system then a help page will be shown. The users could also search for a feature they want to use.

## Searching

This feature will be included to help users search the site for content they need.

### Description and priority

A user will have to input text into the search input-field, then he/she can press Return key or click the search button.

## Blog

This feature will be included to aid users to comment on the software and its features. It will to present advancements and updates on the system so that users can view.

### Description and priority

Users will select blog option to view published blogs. The user can also comment or reply to other user’s comments on the system via the same blog page.

# Functional requirements

|  |  |
| --- | --- |
| **Requirement number** | **Requirement** |
| RQ-1 | The username or email is required for signup and login. |
| RQ-2 | The password is required for signup and login. |
| RQ-3 | Email address is required for signup. |
| RQ-4 | Users must select the visualization option. |
| RQ-5 | Users must have unique emails and usernames. For account creation. |
| RQ-6 | Users must have saved one or more data items before to download. |
| RQ-7 | Users must select the download option to view and download content. |
| RQ-8 | Users must click the save button to save data. |
| RQ-9 | Users must login to access all features. |
| RQ-10 | Users must registered before login. |
| RQ-11 | Users must select the blog option to view blogs. |
| RQ-12 | Users must select the help option to view help. |
| RQ-13 | The user must press Return key or click the search button to search. |
| RQ-14 | Only registered users can post and reply comments. |
| RQ-15 | Users must select analysis option to view the analytics |

# Other Nonfunctional Requirements

## Safety Requirements

All users must login to the system to be able to save any of their history or generated plots.

To save server space and memory non-logged in users will only have limited permissions on the system. Regular Database backups to avoid loss of user data.

## Security Requirements

### Data Transfer

* The system shall use secure sockets in all transactions that include any confidential information.
* The system shall automatically connect to the internet to obtain images and audio or videos clips.
* The system shall confirm all transactions with the customer’s web browser.
* The system shall not leave any cookies on the customer’s computer containing the user’s password.
* The system shall not leave any cookies on the customer’s computer containing any of the user’s confidential information.

### Data Storage

* The user’s web browser shall never display a customer’s password. Password echoed with special characters representing typed characters.
* The system back-end servers shall not track the user’s location.
* The system’s back-end servers shall never display a customer’s password. The users may reset their own password.
* The system’s back-end servers shall only be accessible to authenticated administrators.
* Encrypted back-end databases for the system.

## Software Quality Attributes

* The system is a small and light project so it does not need installation. All it takes is unpacking from the Zip package. One can transferred the system also in a USB stick with additional configuration needed for the database only.
* The system is a project that once carefully uninstalled from a computer, leaves no trace behind. Therefore, there is no way passwords and other data in the database can leak.
* This system is developed under GNU General Public License version 2 or later

(Copy from <http://www.gnu.org/licenses/gpl.html>) and can be distributed under those terms.

* The system can be found and downloaded from GitHub on <http://github.com/kisya-moses/RecessY2>

# Appendix A: Glossary.

|  |  |
| --- | --- |
| **Word** | **Description** |
| **Computer Literate** | Some one that can use a computer system. |
| **Internet** | A collection of computers, and software networked |
| **Programming Language** | A set of rules and tools required to make computer programs |
| **CSS3** | cascading style sheet 3 |
| **Md5** | A widely used hash function that produces a 128-bit hash value |
| **SHA1** | Secure Hashing Algorithm 1. A cryptographic hash function |
| **HTHL 5** | Hyper Text Markup Language 5 |
| **JavaScript** | A programming language for client side scripting |
| **JSON** | JavaScript object notation |
| **MySQL** | An open sourced database management system |
| **Browser** | A computer program that can interface a user with the internet |
| **Amd** | 64 bit architecture series of computer processors |
| **Windows** | operating system by Microsoft corporation |
| **R Package** | Helper program written to extend functionality of R programming language. |
| **R Script** | Document that contains R code or instructions. Interpretable by the R engine. |
| **SRS** | Software Requirements Specification |
| **SDLC** | software Development Life Cycle |
| **RQ –x** | Requirement -x. where x is a number greater than 0 |
| **GNU** | A Unix like operating system. That is free software |
| **USB** | Universal Serial Bus. |