EGERTON UNIVERSITY

Software Requirement Specification for

E-Extention Web Portal

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1. Introduction

1.1. Purpose

This SRS (Software Requirement Specification) defines the specifications and requirements for the E-Extension web portal that is to be developed to allow agricultural extension officers and farmers both to participate in the provision of peer-to-peer advisory services and virtual extension.

The document is to make sure that all users of the system and stakeholders involved in developing the system understands its purpose, benefits and how it will solve the existing problem in the provision of agricultural extension services.

1.2. Document Conventions

In the writing of this document it was inherited that all requirements have different level of priority. Furthermore, the following conventions have been observed:

- Font size 16 and bold is to specify the major sections of the document.
- Regular font size 12 is used in writing the body of all the sections of the document.
- Bold font 14 is used to specify sub-sections which are under the major sections
- Text style Times New Roman has been used on the body of all section

1.3. Intended Audience and Reading Suggestions

This SRS is intended for the following group of people who are going to interact with the system:

- **System developers**: The system developers will use this document for reference purposes in the course of the system development and ensure that the system developed meets all the highlighted requirements and specifications.
- **System administrator**: The administrator determines who uses the system, what resources are available to them and how the resources are to be modified in the system. The document will enable the system administrator determine the kind of controls to be put in place to ensure that the system integrity is maintained.

- **Farmers and Agricultural Extension Officer** : This group is the target audience of the system and thus this document is very vital, in that they can learn its functionality and the capabilities.
- **Software product testers:** These are those people who will ensure that the software product is free from bugs and meets the documented scope of the product. The various functionalities of the system listed in this section will be tested by the testers and verified. In the event of bugs or functionalities not implemented, the testers will report them in order for an appropriate action to be taken before the product is taken to the users.

2. Overall Description

2.1 Product Perspective

This product is total new system that is intended to aid in the delivery of agricultural extension services by both the extension officers and farmers helping farmers within a web platform. The system also intends to give chance to government extension officers share relevant and needful information to farmers via the platform.

This system will help in the filling of the gap of the provision of extension services to ensure farmers have access of relevant information for their farming activities and help them get appropriate answers to the questions of the challenges they are facing at each given moment.

2.2 Product Features

The main system features include:

- Authentication of different users.
- Validation of all fields inputs and databases to prevent errors.
- Questions Section.
- Blog Section.

2.3. User Problem statement

The admin, agricultural officers and farmers will be the main users of the system.

- **Admin:** The admin should have prior knowledge of the entire system and people to track the various usage of the system from various users. The admin should be able to perform all the create, update, read, and delete on all the contents within the platform. They can delete any

irrelevant information being shared in the platform or even ban a stubborn user from the system. The admin need to have full understanding of all the consequences of the his/her own actions.

- **Agricultural Extension Officers**: The agricultural extension officers will be given privileges to create blogs, update and delete their own individual blogs created. The will be able to disseminate needful information to farmers through the blog section and also approve of correct answers given by fellow farmers on questions besides themselves answering the farmers' questions based on their expertise.
- **Farmers:** Farmers are the key target of the system. They will will be able to ask whatsoever question concerning agricultural activity and also be able to answer their fellow farmers appropriately based on their experiences.

2.4. User Objective.

The different kinds of main users have got different expectations or "wish list" from the use of the system. They include:

- **Admin:** The admin expects that different farmers and agricultural officers will be able to register appropriately into the system based on their own designations. Furthermore,that only relevant, needful and appropriate agricultural contents will be shared over the platform. The admin also expects that the system will be reliable to all the users and be able to meet their different needs.
- **Agricultural Extension Officers**: The agricultural officer expects that the system will be able to give them a platform to easily and quickly disseminate needful information to farmers throughout the country besides allowing them to appropriately answer questions on challenges faced by farmers.
- **Farmers:** Farmers desire that the system will give them a chance to be able ask questions on the agricultural challenges they are facing and be able to receive the appropriate answers that will help them increase their yields and income from their produce in reaching a wider market.

2.5 Operating Environment

The following operating environment will be observed for the operation of the system in both the development mode and the production mode:

Development mode:

- **Operating system:** Windows, Mac OS and Linux
- **Processor:** Core i3 and above
- **Processor speed:** 2.5 GHz
- **RAM:** 4GB and above.
- **Hard disk drive:** 256GB and above.
- **Database:** The system shall use the SQL Database as the back-end, which is open source and free.

Production mode:

The system will be a web system and in production is expected to run in any of the cloud providers server. For our case, it will be deployed on the Heroku free tier cloud platform.

The system should be accessed by different users over the internet via any smart phone device, tablet or laptop through a modern web browser like google chrome from any place at any time.

2.6 Design and Implementation Constraints

The E-Extension web portal is a web application system that is to developed using the Python Programming Language and its Django web framework, JavaScript language and CSS in the front-end and the SQL database in its back-end. Any operating system such as Linus, Windows and Mac OS can be used at both its development and production.

The system will need access to a stable internet in order to used by any of its user in production.

Digital literacy will be needful for all users of the system in order to fully utilize it and benefit from it without much challenge. Though user centered design will be observed to ensure that the system get easily used by any user even with a small amount digital literacy.

2.7 User Documentation

- A HTML Help file with a tutorial and full help on all features provided.
- Screen shots shall be available in the help pages.
- The user can conduct the administrator if he/she has more queries regarding this website. This could be done through the “contact us“ page.

2.8 Assumptions and Dependencies

- The code shall be accurate without compilation errors or syntax errors.
- It is assumed that the users of the system are computer literate.
- It is assumed that the users understand English language as the system will be deployed using English.
- The user will have a smart device with a web browser to use the system.
- The user will always have access to the internet to use the system.

2.9 User Constraints

- The system is expected to be developed following the IEEE standard.
- The system is expected to be access by the user 24/7.

3. System Features

3.1 Home Page

3.1.1 Description and Priority

This section of the system will be available for users in the public domain. Its the first section of the system that both new and registered users encounter while using the system.

It's a "read only" page with links to other sections of the system.

Priority: High.

3.1.2 Stimulus/Response Sequences

Stimulus: The user search for the e-extension portal in the web browser.

Response: The URL link with the homepage of the e-extension portal get returned in the web browser.

Stimulus:The user clicks the URL to the homepage of the e-extension portal.

Response: The web browser returns the user in the homepage of the e-extension portal.

3.1.3 Functional Requirements

The page shall be accessible to any visiting user in the public domain not necessarily a registered user. This page is a “read only” page with links to other key sections of the system.

3.1.4 Technical Issues

The user should be in a web browser with internet access within a smart phone device, tablet or laptop.

3.1.5 Dependencies with other requirements

No dependencies with the other requirements.

3.2. User Registration

3.2.1 Description and Priority

All visiting users who are new to the system will required to register before participating in the asking or answering of questions in the system.

Priority: High.

3.2.2 Stimulus/Response Sequences

Stimulus: The User clicks on the Register Button on the Home page.

Response: The system directs the user to the Registration page, where the user is given a chance to either choose to register as an expert agricultural extension officer or as farmer while providing relevant details.

Stimulus: The user enters relevant details based on his/her own expertise with details such as first name, last name, email, password and password confirmation then clicks the Register button.

Response: A link will be sent to the user’s email for a 2 way authentication to allow him/her login into the system as a registered user.

3.2.3 Functional Requirements

This page is accessible to the user who is on the home page of the e-extension portal system.

3.2.4 Technical Issues

A stable internet access will be required in the process of registration.

3.2.5 Dependencies with other requirements

The new user is expected to have an active email address in which he/she can be authenticated with in the registration process.

3.3. User Login

3.3.1 Description and Priority

This module allows different registered user of the system to login into the system in order to ask questions, answer questions or even perform other relevant tasks according to the privileges that's assigned to them.

3.3.2 Stimulus/Response Sequences

Stimulus: The user clicks the login button in the home page.

Response: The system directs the user to the login page where he/she is requested to enter his/her login details such as email address and password.

Stimulus: The user enters his/her rightful details in the login page and clicks login in button.

Response: The system validates the user's details and when correct directs him/her into the system with the appropriate read and write privileges.

Stimulus: In validating the users details, they are found to be incorrect.

Response: The system returns the user back to the login page with the appropriate error message.

3.3.3 Functional Requirements

This page gets accessible on clicking the login button in the homepage.

3.3.4 Technical Issues

A stable internet access will be required in the process of registration.

3.3.5 Dependencies with other requirements

The user is expected to remember the right email address used during registration and also the password.

3.4. Ask Question

3.4.1 Description and Priority

This section will give a chance to the farmers to be able to ask questions based on the agricultural challenge that they could be facing as per the moment.

Priority: High.

3.4.2 Stimulus/Response Sequences

Stimulus: The farmer clicks on the Ask Question button in the homepage.

Response: If the farmer is not login into the system he/she will be directed to the login page to either login if he/she has an account or register for an account in order to login and ask the agricultural question.

If the farmer is already login into the system, he/she will be directed into the systems ask question page with the rich text editor in order to ask his/her own agricultural question.

Stimulus: The farmer ask the question he/she being guided by the system on filling details such as the title of the question, the description and the relevant tags he/she would like the question to have. Upon finishing, he/she clicks the save changes button.

Response: The question get saved and posted into the platform for any login user of the system to answer.

3.4.3 Functional Requirements

This page is accessible upon clicking the ask question button in the homepage.

3.4.4 Technical Issues

A stable internet access will be required in the process of asking the question and posting of the question.

3.4.5 Dependencies with other requirements

The user is expected to be login into the system in order to ask the question.

3.5. Answer Question

3.5.1 Description and Priority

This module allows the login user to be able to post their answer in an already asked question.

Priority:High.

3.5.2 Stimulus/Response Sequences

Stimulus: The user clicks on the already asked question to view it.

Response: The system directs the user to the clicked question page with available

answers if there has been previous attempt to answer. In the bottom part of the question, the user will be provided with a rich text editor to be able to post his/her own answer concerning the question asked.

Stimulus: The user fills his appropriate answer in the rich test editor provided at the most bottom part of the question just beneath all answers previously supplied in case they exist. The user then clicks the post **your answer button.**

Response: The system post the answer of the user posted and the answer will be visible as the most recent answer towards that question asked.

3.5.3 Functional Requirements

This section will be available to a login user upon viewing a question asked.

3.5.4 Technical Issues

A stable internet access will be required in the process of answering the question and posting of the answer.

3.4.5 Dependencies with other requirements

The user is expected to be login into the system in order to answer the question.

3.6. Search Question

3.6.1 Description and Priority

This section allows users of the system to search any question with the tag they have searched.

Priority: High.

3.6.2 Stimulus/Response Sequences

Stimulus: The user enters the text of the tag of the question he/she would like to search for and clicks the search button.

Response: The system returns the questions available in the system having the tag entered in the search.

3.6.3 Functional Requirements

The section will be available to all users who gets to visit or log into the system.

3.6.4 Technical Issues

A stable internet access will be required in the process of searching the questions with the tag entered in the search field.

3.6.5 Dependencies with other requirements

The user is expected to be in any part of the system to search the questions with the desired tags.

3.7. View Blog

3.7.1 Description and Priority

This section will contain all the blogs with the needful information from the extension officers in the platform both from the government and the private sector.

Priority: High.

3.7.2 Stimulus/Response Sequences

Stimulus: The user clicks the blogs section.

Response: The system returns the Blogs page with various blogs written by different extension officers ordered from the most recent one.

Stimulus: The user selects the blog he/she would like to get information about.

Response: The system takes the user to the actual blog with all the details as authored by the extension officer.

3.7.3 Functional Requirements

The section will be available to all users who gets to visit or log into the system.

3.7.4 Technical Issues

A stable internet access will be required in viewing the blog details.

3.7.5 Dependencies with other requirements

The user is expected to be in any part of the system to view the blogs written by different extension officer.

3.8. Create Blog

3.8.1 Description and Priority

This module will allow the extension officers to create blog posts that disseminate

needful information to farmers as the time and season.

Priority: High.

3.8.2 Stimulus/Response Sequences

Stimulus: The extension officer clicks on the Blog section.

Response: The system returns him/her with the different blogs written by various extension officers including him/her own self. The system also provides him with a button to **create blog.**

Stimulus: The extension officer clicks the **create blog** button.

Response: The system takes the extension officer to a create blog page with a rich editor text with ability to create the blog post with the information he/she would like to share with the customers.

3.8.3 Functional Requirements

This section will be available to the extension officers only.

3.8.4 Technical Issues

A stable internet access will be required in the process of creating the blog.

3.8.5 Dependencies with other requirements

The user needs to have login into the system as an extension officer in order to use this module.

4. External Interface Requirements

4.1 User Interfaces

The user interface shall be compatible with various browsers including Chrome, Firefox, Opera, Safari, Internet Explorer and mobile phone browsers through which the users will gain access to the system.

4.2 Hardware Interfaces

The system will run over the internet. Therefore computing equipment will have to be in place:

- A Smartphone device, laptop or a tablet.

- Internet connection through LAN or WAN.

4.3 Software Interfaces

The system will use a web portal for the front-end and the back-end too.

To organize the front and the back-end, Django will be used.

The system will use PostgreSQL for the database

Programming language will be python.

4.4 Software Interfaces

The system shall use the HTTP protocol for communication over the internet and for the intranet communication will be through TCP/IP protocol suite.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

- The system is expected to handle as as many as 10,000 simultaneous connections and above. The system in the production mode will be deployed on the cloud and therefore the resources are expected to grow and shrink in proportion to the traction from the users' side. At no point is it expected to crash regardless of the number of the simultaneous connections.
- The system in will be developed using the MVC pattern and its server resources will be an instance of the cloud resources provided by the cloud provider. On our case, the Heroku cloud provider.
- The system will be expected to respond to users' query as quick as possible in no longer than 5 seconds.

5.2 Safety Requirements

- The "forgot password" functionality gives the user an option to reset hi/her password.
- Backups must be done regularly to avoid future loss of data.

- Caps-lock" on must be notified to the user when typing the username and password.

5.3 Security Requirements

- Only registered users who have login into the system will be able to perform the Write operations.
- The systems data will be backed up frequently to ensure no data loss in case unavoidable system failures or damages.
- Proper security mechanisms will be put in place during the development of the system to prevent it from attacks such as SQL injections.

5.4 Software Quality Attributes

Reliability: The system to be built is expected to perform correctly as designed in the production with negligible mean time between failures.

Interoperability: The system will be expected to integrate well with other applications in the internet such as Google Mail.

Usability: The system will be designed and developed in such a way its features will easily accommodates different users' needs and contexts. Each feature will be built in such a way the user can achieve a desired defined goal effectively, efficiently and satisfactorily.

Availability: The system will be expected to work as required when required always during the year. The system will be expected to runs on availability of 99.9% throughout the year.

Maintainability: The system will be expected to operate on a maintainability of 90% for one hour in case of failure. Meaning, in case of failure during operation, the system is expected to be restored back to operation within one hour.

Testability: The systems modules are expected to built with ease of being tested effectively and efficiently.

Robustness: The system will be expected to cope well with errors during execution and with erroneous in input while on normal use by users.

5.5 Other requirements Attributes

Scalability: The system to be built will be expected to handle growing and decreasing amount of data being exchanged over the platform. It'll be expected to easily expand and contract its resources to allow heavier and lighter loads of inputs.

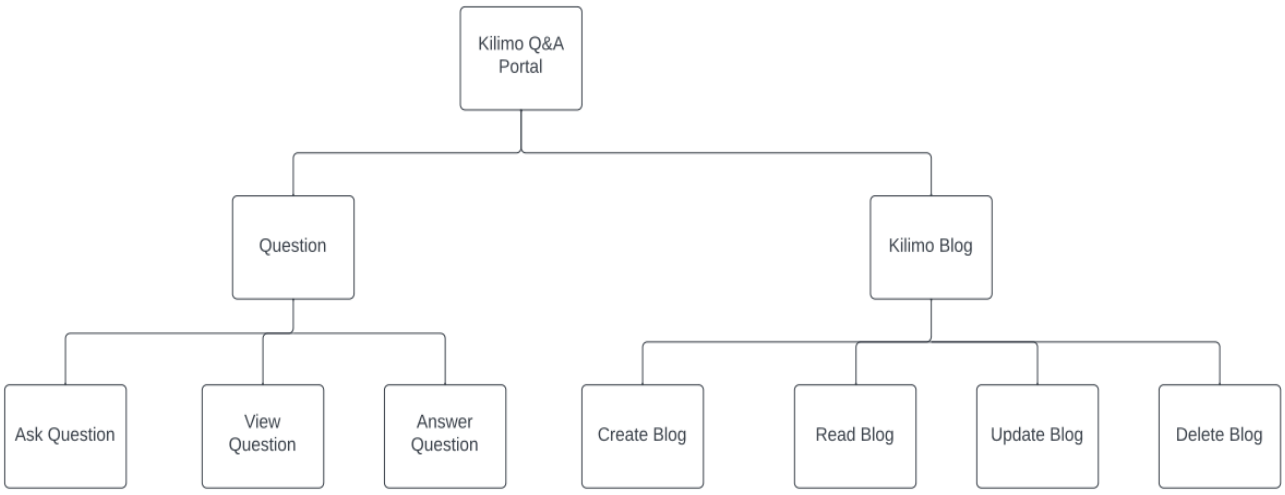
Portability: The system will be expected to be able to operate in any operating system and accessed through any web browser in any smart phone device, laptop or tablet.

Extensibility: There will be a room for further development of the system to meet the growing needs of users even after its initial deployment.

Serviceability: The system will be built with ease of maintenance in performing tasks such system monitoring, system repairement to arising problems, addition and removal of users from the system and in upgrading hardware and software components.

6. Preliminary Object-Oriented Domain Analysis

6.1 Inheritance relationships



6.2 User Classes and Characteristics

6.2.1 Abstract or Concrete

a) Kilimo QA Portal

6.2.2 List of Super classes

a) Question

b) Kilimo Blog

c) Farmer

d) Extension Officer

e) Administrator

6.2.3 List all subclass

a) Registration

b) Login

c) Edit Profile

d) Change Password

e) Ask Question

f) View Question

g) Answer Question

h) Create Blog

i) Read Blog

j) Update Blog

k) Delete Blog

6.2.4 Purpose

The key super classes and sub classes are described as follows bellow:

Kilimo QA Portal: This class contains the key attributes and properties that will be inherited in all the sub classes in the system.

Question: This super class contains the methods and attributes that each question sub class in the system should have.

Kilimo Blog: This is a super class about the Blog section which acts as means for the extension officers to disseminate information to farmers.

Extension Officer: This module illustrates what can be done by the extension officers.

Administrator: This class defines the major properties and attributes of the administrator of the system and his/her functions within the system.

Registration: This class describes how each category of the user gets registered for the use of the system.

Login: This class describes how each category of the user gets to login into the use of the system.

Edit Profile: This class allows each category of user to be able to update his/her user details from what he/she registered with.

Change Password: This class allows the users to be able to change their password in case they happens to have forgotten it.

Ask Question: This class allows the farmers to be able to ask questions on the challenges they are facing in their agricultural activities.

Answer Question: This module allows both extension officers and farmers to answer the question asked by farmers in the system.

Create Blog: This section allows the extension officers to create blogging information in which they can communicate to farmers about needful information as per the season.

Read Blog: This class allows the farmers and the extension officers to read blogs created by other extension officers.

Update Blog: This class allows the extension officers to update their own created blogs.

Delete Blog: This class allows the extension officers to delete their outdated blogs from the system.

6.2.5 Collaborations

6.2.6 Attributes

a. Security

b. Reliability

c. Portability

d. Usability.

6.2.7 Operations

Add Question: This operation allows the farmers to ask any other question they might be having other than what they have already asked.

Update Question Details: This operation allows the farmers to update the question asked so as to be easily understood by the other system users so as to be answered appropriately.

View Question Details: This operation allows the users of the system to view the question asked and see if they can help with answering it.

6.2.8 Constraints

There are some operations in the system which are constrain to certain user category only. For example, only the extension officers have been authorized to create, update and delete their respective blog posts for sharing needful information, farmers can only view the blog posts, ask questions and also answer the possible ones.

7. Preliminary Budget and Schedule

Project Budget

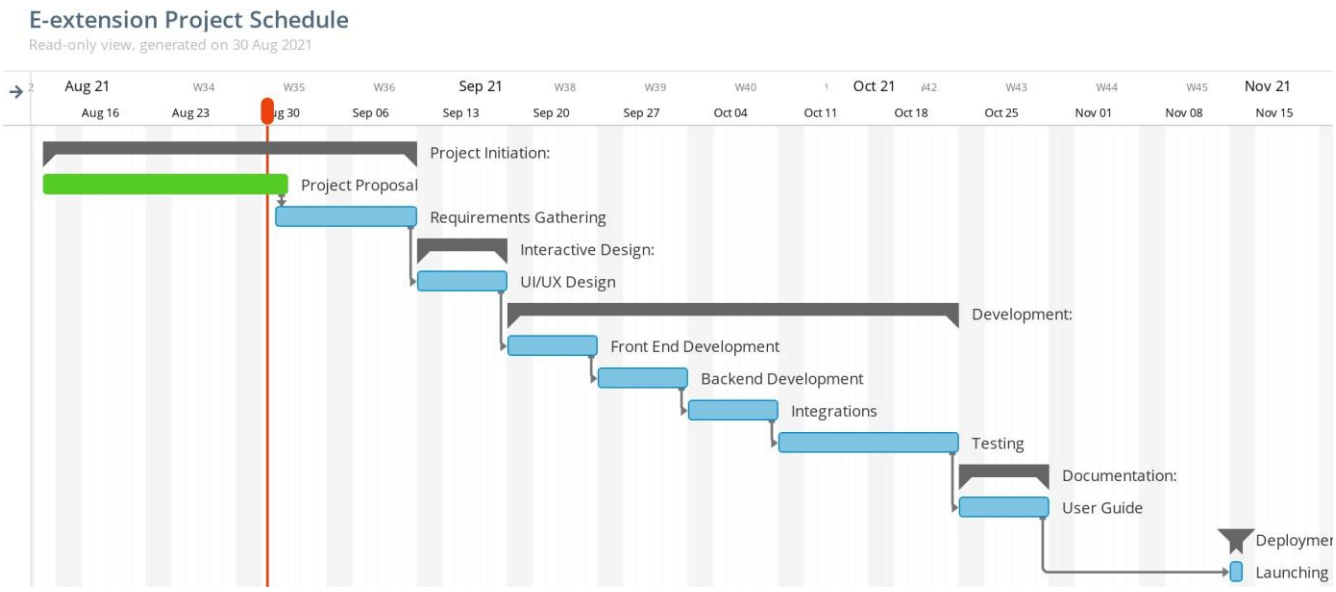
The development of this first release e-extension portal is estimated to take a

total Sh 25000.Research and traveling expenses – Sh 5000

Internet Bundles – Sh 5000

Upkeep – Sh 15000:

Project Schedule



Change Management Process

This SRS is subject to change in order to meet all the requirements needed. Changes made may affect the system development and requirements may need to change and reviewed thereof.

8. Other Requirements

8.1 References

1) Ian Somerville 2011.Software engineering ninth edition, PEARSON publishers, Manufactured in the United States of America, 2011.

2) IEEE Recommended Practice for Software Requirements Specifications - IEEE STD 830-1998

8.2 Appendix A: Glossary of definitions, Acronymes and abbreviations

i. E-Extension – Electronic Extension.

ii. SRS – Software Requirement Specification.

iii. OS – Operating System.

iv. SQL – Structured Query Language.

v. CSS – Cascading Style Sheet.

vi. HTML – HyperText Markup Language.

vii. URL – Uniform Resource Locator.

viii. MVC – Model View Controller.

ix. HTTP – HyperText Transfer Protocol.

x. TCP/IP – Transmission Control Protocol/Internet Protocol.