Distributed Intelligence as a GIS Software Requirement Specification

Version 1.1

Revision History

Date	Version	Description	Author
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Contents

1. Introduction

1.1 Purpose

This SRS document will fully describe the external behaviors of the Distributed Intelligence as a GIS application, and its basic required functionalities. The nonfunctional requirements for the system will also be focused upon. Design constraints, other factors that will affect the development and the end product will also be discussed with detail.

1.2 Scope

The Scope of this SRS document is the Mobile (Android™) application and online portal that will enable users to use the Distributed Intelligence System on Geographic Information Queries. The administrative concepts as well as technical internals will also be addressed.

1.3 Definitions, Acronyms, and Abbreviations

ACL -Agent Communication Language
API - Application Programming Interface
CMC - Computer Mediate Communication
DF - Directory Facilitator
DS - Dempster Shafer
DSSN - Distributed Semantic Social Network
FIPA - Foundation For Intelligent Physical agents
FQL - Facebook Query Language
HTML - Hyper Text Markup Language
GATE - General Architecture for Text Engineering
GIS - Geographic Information System
JADE - Java Agent Development (Framework)
KIF - Knowledge Interchange Format
KQML - Knowledge Query and Manipulation Language
MTP - Message Transfer Protocol
NLP - Natural Language Processing
PCFG - Probabilistic Context Free Grammar

1.4 References

Web site address here

1.5 Overview

The SRS document is organized in to 3 subsections, namely:

- Overall Description
- Specific Requirements
- Supporting Information

2. Overall Description

2.1 Product perspective

The Product will be viewed as an Answering engine for Geographic Queries. Users can register for the service through the Android application portal. The application can be used to direct Geographic queries and Users will be given the answer within an acceptable time.

The users from the servicing perspective from the social network view the product as another user which directs questions to them. Social network users, who are subscribed to the application user interface through the social network, will have the ability to answer questions considering the relevancy and the knowledge to service questions.

2.2 Product Functions

Through the android application new Users have the ability to register for the Answering service. Registered Users can submit Geographic related queries to the application. Some possible geographic queries are detailed below:

- Directions from one place to another
- Easiest path to take
- Voting questions

After collecting information for the given query, the system will give a single relevant answer to the question. Users then can give feedback of how satisfied are they of the answer.

From the social network end, users will have the ability to view User questions which will be directed to the social network through the system. Users who can answer the questions can post their expert opinions according to their knowledge relevant to the question..The format would be irrelevant.

2.3 Constraints

The user interface application will be only developed for the Android platform. The system would only be able to efficiently answer geographically related queries. Questions on other areas will not be serviced in this implementation. Also irrelevant questions spam and abusing queries will have to be detected and discarded.

The time period between the postings the question and the retrieval of the answer will be dependent on the network delays and the delays from the social network knowledge gathering. The time to service a given query will have a lower limit.

The efficiency of information collection from the social network users will be constrained by the available users who are online at the moment and who has the ability to answer the question. The expert users enthusiasm of answering a given query will be relevant also. After answers have been gathered Spam, relevancy of information and Abusive content will constrain the efficiency of servicing the query.

Single answer generation will have additional overhead if the retrieved answers correlation is low. It will also depend on the number of answers received and the scope of the question.

2.4 Assumptions and dependencies

General assumption is that Users will be familiar with basic Android functions and will be able to give proper Internet access for the application. A continuous Internet access will be required for the operation of the application. For the application to operate the server would have to be running at all times.

It will always be assumed that the questions will be directed in English Language. Questions directed in other languages will be discarded and the users would be notified of the language dependency.

Proper identification of the type of query and the semantic analysis would depend on a set of identified question criteria. Other question criteria will be considered as irrelevant.

The questions will be directed to the Social Network interface under the assumption that the social network will be accessible at all times. Also it will be assumed that if the social network is accessible, then within a given time period it will be possible to gather answers from the social network always.

For efficient answer gathering, an important assumption is based that there will always be users that can answer the given query correctly. Also it will be assumed that the majority of users are non-malicious, that they behave according to the given acceptable criteria.

The Answer formulation is always assuming that the majority of answers governs the correctness of the answers. The Knowledge base used in the system will be used as an additional measure of correctness, based on the assumption that the knowledge base is always reliable.

3. Specific Requirements

3.1 Functionality

3.1.1. Install Application and Register for the Service

Users who are having Android enabled mobile devices will be given that chance to download the DiGIS application and install it in their devices from the Android Play portal. After installing the application users are required to access the Internet through the device and register as a user for the service from the application itself.

3.1.2 Ask geographically related question from the Android application

After successfully registering for the service, users can ask questions from the application. After asking the question, if the question cannot be serviced, then the user will be notified about it. If the question can be serviced after an inevitable time delay, the answer will be received on the device. A notification will be made on the retrieval of the answer.

3.1.3 Give Feedback of the answers.

After receiving the answer, the user will be prompted to give feedback on the answer. Options will be given to point the satisfaction of the answers. Rating out of 5 stars will also able to be given. The users also can view the question and the answers received at a later time and give feedback at their convenience. These data will be redirected to the server.

3.1.4. Post answers to questions

Answering users from the social network interface(s) will have the ability of looking at currently available questions and give answers according to the question. The answer will just be posted as post under the question, (the terminology differs from one social network platform to another). Answered questions will be indicated by the system user within the social network.

3.2 Usability

Any User who is familiar with Android applications should be able to use the application with ease and without much confusion. After asking a question the maximum delay for the retrieval of the answer should be less than 15 minutes.

3.3 Reliability

3.3.1 Availability

The service should be available 95% of the time. The Remainder time could be allocated for maintenance tasks for the server.

3.3.2 Failures and repair

Acceptable Mean time between failures should be 72 hours.. Mean time to repair the failure should be approximately 1 hour.

3.3.3 Accuracy

The Given answers by the system should be always relevant to the User question and acceptable by the User. The answers should not be misleading in any circumstances.

3.3.4 Bugs and Issues

Acceptable maximum Bugs per function-point should be a margin of 5 bugs. The average bugs per function point should be 2 bugs. Bugs which will obstruct the answering process and delay it indefinitely should be considered as a critical bug and should be remedied immediately.

3.4 Performance

3.4.1 Responsiveness

The average delay between the asking of the question and the retrieval of answers should be 6 mins. The maximum acceptable delay is 15 mins.

3.4.2. Throughput

The system should be able to handle 30 transactions concurrently. In other words 30 users should be able to efficiently retrieve answers for a query at the same time. From the Social network interface, 50 users should have the ability to answer questions concurrently.

3.4.3 Utilization

The android Application should have only 1.5MB of non volatile memory allocated for its operations, for storing of past questions and answers. The Application itself should only consume maximum 2 MB of memory since the simplicity of the application. Processing power consumed by the mobile application should also be minimal since, majority of the processing should be handled through the server. Internet access is required for the application to operate. Use of bandwidth for the application should be only 3 KBps maximum.

3.5 Supportability

3.5.1 Code base

The Project is an open source project. Hence the code of the project should be available through sourceforge.net A project page should be included in the Sourceforge web site. Where developers of interest can access the code base and give feedback on the code and the system.

3.6 On-line User Documentation and Help System Requirements

The Project Web site shall be hosted at a later given URL. Where users can refer about the overall system and refer documentation about the usage the product. Also through the web site Users also be able to post Issues and give feedback on the system. The Android Play portal enables these functions also.

3.7 Interfaces

3.7.1 User Interfaces

The Main user interface is the Android Application User interface. It should provide the users with the basic Functions described in previous sections. The answer providers will be presented with whatever the user interface which is used in the social network that they are logged in.

3.7.2. Hardware Interfaces

The server components of the application need a server to properly service multiple concurrency transactions. The client application must have Android enabled device to function.

3.7.3 Software Interfaces

The server should have an interface which should have flexibility to connect with any other question asking system. But the interface should primarily be designed for the Android application. For collection of answers the system must have a software interface which alternative social network platforms can be plugged in.

The Single Answer Fusion engine should be plug-able, the system should have the ability to plug in other information fusion algorithms which best suite the system.

3.7.4 Communications Interfaces

The main communication interface should be based on Agent Communication language. ACL shall be used within the system for message passing and passing of results so social network and the client application.

4. Supporting Information

4.1 Appendix

4.1.1 Use Case View