Software Design Specification

for

Smart Classifieds – Sell Anything

Version 1.0

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1.0 Introduction

This section provides an overview of the entire design document. This document describes all data, architectural, interface and component-level design for the software.

1.1 Goals and objectives

Smart Classifieds – Sell Anything is a Semantic web application that aims in bringing together the advertisers and their potential audiences across the boundary of the system.

1.2 Statement of scope

The project aims at building a platform to advertise products which may belong to different categories through classifieds. Unlike traditional systems which get the data from its own repository, this platform gets data both from its own repository and from other systems which are been agreed upon a specific data-transfer format. The purpose of this data transfer, the semantic web technologies come into picture so that manipulation of data being transfer becomes easier. The users can post their classifieds and view the potential buyers across different systems.

1.3 Software context

This Smart Classifieds – Sell Anything is a very efficient web application, which maintains the database of sellers, buyers through which the advertisers and potential audience are brought much closer. This mainly concentrates on Semantic Web. For this purpose, two semantic web technologies are used namely- Resource Description Framework and Web Ontology Language(OWL) are used.

1.4 Major constraints

The software is to run on a system, with MySQL. Therefore the systems should be properly connected to the server to access database. Based on a particular ontology which is defined, all the systems must follow this ontology for information exchange and sharing.

2.0 Data design

To understand the data design for the Smart Classifieds – Sell Anything system its important to have a look at the overall design of the application.

As the application is being build in PHP, MySql , and PDO Map the overall application design can be categorized into three parts based on the above mentioned application developing languages.

1. **Front End Graphical User Interface**

Java is being used for the development of the front end GUI. More explanation of the overall GUI and it components is available in the section 4 of the document.

2. **Back End Data**

We are using MySql at the back end for storing the user input.

3. **Internal Functional Procedures**

The internal functional procedures are the logical entities that carry out different tasks of adding, updating, deleting, viewing the database.

2.1 Internal software data structure

The Internal software data structures being used here are the CategoryMaster class and the AdditionalInformationMaster class.

The CategoryMaster class is used to describe each category. It has the following fields-

 Category_name - contains the name of the category

Comments- contains the description of that category.

AdditionalInfoMaster class is used to describe each attribute of a particular category of a classified. It contains the following fields-

InfoName – contains the name of an attribute of the classified of a particular category

Mandatory- This flag indicated if the attribute is mandatory and has to be filled by the user.

Max Occurs- This indicates the number of times this attribute can be used for the classified.

Type- This indicated if the attribute is of type text/file/image

SWName- This field maps the attribute name to its name in the OWL ontology file.

Comments- Contains the description of the attribute.

Search Class contains the fields Search_string which contains the keywords used for searching, and Search_Timestamp which gives the date and time of search.

2.2 Global data structure

The main global data structures used in Smart Classifieds-Sell anything are the User class and the Classified class.

User Class has the following fields –

Name – specifies the unique name of the User/External system

Password – specifies the password for the user and is required for authentication.

ExternalSystem and InternalUser classes inherit from the User class. ExternalSystem class has the additional field URL to identify each external system using the services our system. InternalUser class has additional fields Name, Email, Address, City, State, Country and Phone specific to each user registered to post classifieds.

Classified class has the following fields-

Title – specifies the title of the Classified being posted.

Type – specifies whether the classified is for Selling or Buying and hence can take either of the two values- Sell or Buy

Category – specifies the category of the product for which the classified is being posted.

Min_value and Max_value – specifies the range within which the user wants to sell/buy the product.

Ad_Date – specifies the date on which the classified is being posted.

Expiry date – specifies the date till which the classified will get expired.

Expired- a flag that indicated whether the classified has got expired.

Image- contains the image related to the classified.

The Classified class is related to AdditionalInfo class which contains one field Info value which contains the value for each attribute of each classified of a particular category. AdditionalInfo class is in turn related to AdditionalInfoMaster class.

2.3 Temporary data structure
Temporary data structure includes files required for data transfer using RDF and OWL.

OWL File:

Class Name : Classified
Attributes : Classified Date, Type, Expired, Image, Max_Value, Min_Value, Title, Valid_Till, Valid_From.

Class Name: Book. This extends Classified Class.
Attributes: Author, Book Name, Book Type, Edition, ISBN, Publisher, Publisher Year.
Class Name: Cars. This extends Classified Class.
Attributes: AC, Brand, Colour, Fuel, KMRan, Model, Model Year.

Class Name: Computer. This extends Classified Class.
Attributes: Brand, Chip Set, Computer Connectivity, Form Factor, Model, Graphics_Card(instance class), RAM(Instance Class), Display(Instance Class), CPU, Hard Disk(Instance Class), Optical_Drive, Processor(Instance Class), Warrenty in Months.

- **Graphics_Card:** This is a class which contains the attributes- Brand, DedicatedMemory in MB, Shared Memory In MB.
- **RAM:** Brand: This is a class which contains the attributes – Brand, Capacity in MB, Speed in MHz, Type.
- **Display:** Brand, Size_In_Inch, Type.
- **Hard Disk(HDD)**: This is a class which contains the attributes – Brand, Size In GB, Speed In MHz, Type.
- **Optical_Drive:** This is a class which contains the attributes – Brand, Type.
- **Processor :** This is a class which contains the attributes – Brand, Model, ClockSpeed In GHz.

Class Name: Mobile. This extends Classified Class.
Attributes: Brand**,** Expandable Memory In GB, Memory in GB, Mobile 3G, Camera(Instance Class), Mobile Connectivity, Form Factor, Model, Screen Dimension(Instance Class), Touch, Weight In Grams.

- **Camera:** This is a class which contains the attributes – Type, Resolution.
- **Screen Dimension:** This is a composite type of Mobile which contains the attributes – Height, Units, Width.

Class Name: Real_Estate. This extends Classified Class.
Attributes: Property_Address (Instance Class), Property Sale Type, Property Type, RealEstate Area(Instance Class).

- Address: This is a class which contains the attributes – Address City, Address Line1, Address Line2, Pincode, State.
- Area : This is a class which contains the attributes - Area Covered, Units.

Class Name: Other. This extends Classified Class.
Attributes: Other Category Name.

2.4 Database description

Table Name: User
Attributes: USER_ID, USERNAME, PASSWORD, TYPE.
Description: The User Details are stored in this table for authentication purpose. Primary key is USER_ID.

Table Name: External System
Attributes: EXT_ID, USER_ID, URL
Description: This table with the help of URL should be able to access the services of our system. This table is inheriting the User table. Primary Key is EXT_ID. Foreign Key USER-ID refers to USER_ID of User table.

Table Name: Internal User
Attributes: INT_ID, USER_ID, NAME, EMAIL, ADDR_LINE1, ADDR_LINE2, ADDR_CITY, ADDR_STATE, ADDR_COUNTRY, PIN, PHONE
Description: It holds all the general information which is necessary for contact purpose. This table will inherit the User table. Primary Key is INT_ID. Foreign Key USER_ID refers USER_ID of User Table.

Table Name: Search
Attributes: SEARCH_ID, INT_ID, CLASS_ID, SEARCH_STRING, SEARCH_TIMESTAMP
Description: It holds all the general information which stores the history details when a particular user searches for a classified. Primary Key is SEARCH_ID. Foreign Keys USER_ID ans CLASS_ID refer USER_ID and CLASS_ID of User and Classified Tables respectively.

Table Name: Classified

Attributes: CLASS_ID, CAT_ID, INT_ID, TITLE, TYPE, MIN_VALUE, MAX_VALUE, AD_DATE, EXP_DATE, EXPIRED, IMAGE.
Description: It holds all the information related to classified which a user can post or search for it wherein any new user can find out all the necessary details about a product. Only one user can post any number of classifieds whereas, any number of users can post any number of classifieds. Primary Key is specified by CLASS_ID. Foreign keys CAT_ID and INT_ID refer to CAT_ID and INT_ID of Category table and Internal User table respectively.

Table Name: Category Master
Attributes: CAT_ID, CATEGORY_NAME, COMMENTS
Description: It contains the names of the different categories and their description.. Primary Key is CAT_ID.

Table Name: Additional Info.
Attributes: ADD_INFO_ID, CLASS_ID, ADD_INFO_MASTER_ID, INFO_VALUE
**Description**: This table contains the attribute values of a particular classified. Primary Key is ADD_INFO_ID. Foreign Keys CLASS_ID and ADD_INFO_MASTER_ID refer to CLASS_ID and ADD_INFO_MASTER_ID of Classified Table and Additional Info Master table respectively.

Table Name: Additional Info Master.
Attributes: ADD_INFO_MASTER_ID, CAT_ID, INFO_NAME, MANDATORY, MAXOCCURS, TYPE, SWNAME, COMMENTS
Description: It holds all the details of the pre-defined attributes required for each category as well as those entered by the user. Primary Key is ADD_INFO_MASTER_ID. Foreign key CAT_ID refers to CAT_ID of Category Table.
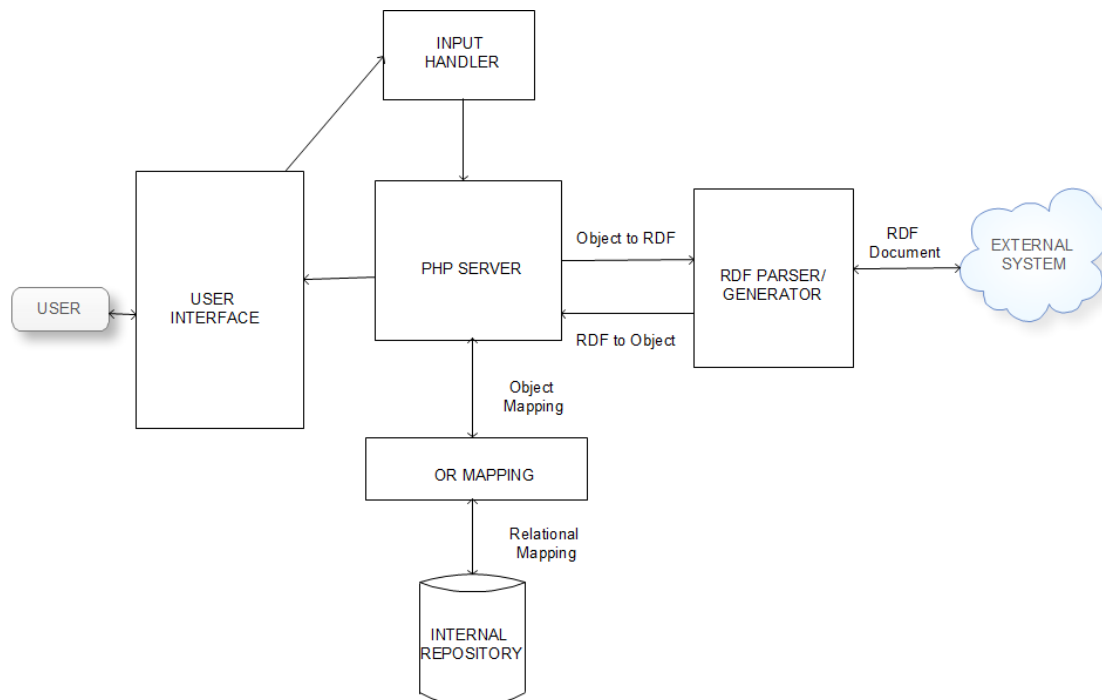
The Class diagram is given below
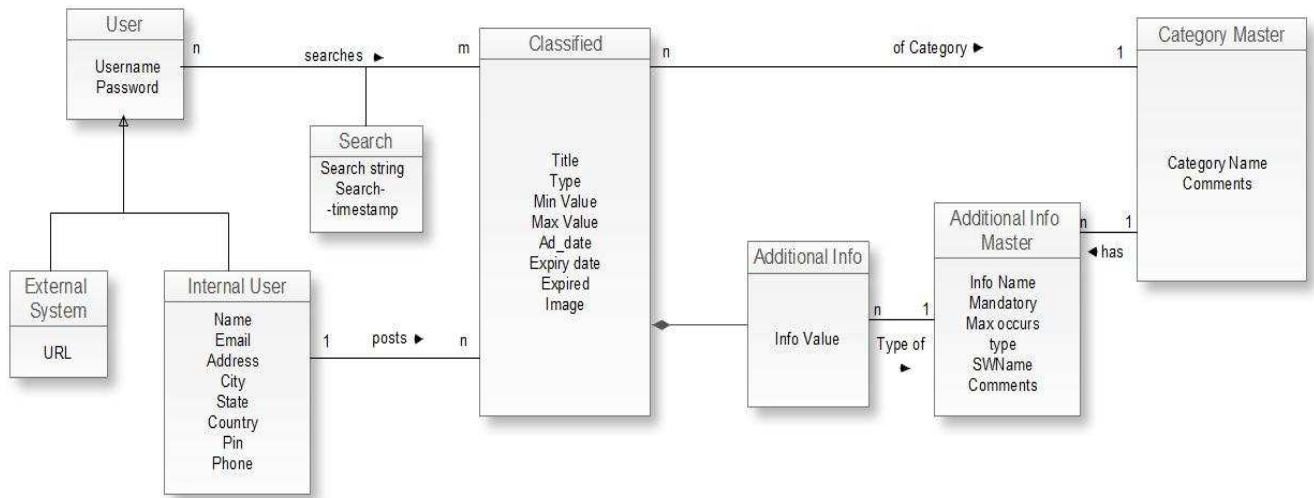
3.0 Architectural and component-level design

3.1 Program Structure

3.1.1 Architecture diagram

3.2 Description for Components

The components are

1. User Interface

2. PHP Server
   3. Input Handler
   4. RDF parser
   5. OR Mapping

3.2.1 Description for User Interface

3.2.1.1 Processing narrative (PSPEC)

The user interacts with the user interface. He can input the necessary data, view the search results.

3.2.1.2 Component interface description.

The inputs are mostly data that are necessary to create classified, add new user, login credentials. The outputs are the processed data that is can be the search result, home page etc.

3.2.1.3 Sub-Component processing detail

The user interface is a platform for presenting data or getting data from user and there is no other sub-component.

3.2.2 Description for PHP Server

3.2.1.1 Processing narrative (PSPEC)

The PHP server is the one which does all background processing necessary for generating a response back to the user interface, the parser etc. The PHP Server gets the data from PDO Map.

3.2.1.2 Component interface description.

The PHP server after validating the input it gets from the Input controller, perform the necessary tasks like creating new objects, verifying the user credentials etc. Then it send the required data to the User Interface.

3.2.1.3 Sub-Component processing detail

The PHP Server is primarily for processing data or getting data from user and there is no other sub-component.

3.2.3 Description for Input Controller

3.2.3.1 Processing narrative (PSPEC)

The input controller checks for any errors, validations that can be done in the client side without escalating to server.

3.2.3.2 Component interface description.

The input controller checks for the validation of the data the user enters in the user interface such as the availability of user, constraints on string, numbers etc. These things are usually done so as to minimize the work of the server in case of minor errors.

3.2.3.3 Sub-Component processing detail

There is no sub component for the Input Controller.

3.2.4 Description for RDF Parser

3.2.4.1 Processing narrative (PSPEC)

The RDF parser has the main responsibility of getting the input from the external system and to give responses to it by parsing from and to RDF document respectively

3.2.4.2 Component interface description.

The RDF parser has the responsibility of converting the data the PHP Server gives to the format that is decided and that can be understood by the external system. It also needs to parse the RDF request it gets from the external system to the way the PHP Server can understand.

3.2.4.3 Sub-Component processing detail

There is no sub component for the RDF Parser.

3.2.5 Description for OR Mapping

3.2.5.1 Processing narrative (PSPEC)

The OR mapping is done using PDO Map. The main responsibility is to map between the object schema to the relation schema.

3.2.5.2 Component interface description.

The PHP Server will have the data in the form of objects and the RDBMS will have data in relational schema. To make communication possible a

static mapping and dynamic mapping is to be provided. This is done by OR Mapping. The project uses PDO Map for OR mapping.

3.2.5.3 Sub-Component processing detail

There is no sub component for the OR Mapping.

3.3 Software Interface Description

The software's interface(s) to the outside world are described.

3.3.1 External machine interfaces

NA

3.3.2 External system interfaces

The Input Handler will retrieve files from the system, and the UI will display the output as a file for later use**.**

3.3.3 Human interface

An overview of any human interfaces to be designed for the software is presented. See Section 4.0 for additional detail.

4.0 User interface design

4.1 Description of the user interface

4.1.1 Screen images

Login in Home Page

Logged in User's Home Page

Welcome User,

My Account   Logout

Search :   [   ] [All Categories ▼] 🔍

Home   About   Contact Us

Add New Classified1

Title : [   ]

Type : ○ Sell   ○ Buy

Upload Image : [Choose File] No file chosen

Category : [Select a Category ▼]

Minimum Value : [   ]

Maximum Value : [   ]

                                        All values are in Indian Rupees

Valid From : [   ]

Valid To : [   ]

[Register]

Add new classified

Welcome gakk,

My Account   Logout

Search :   [   ] [All Categories ▼] 🔍

Home   About   Contact Us

Motorola v3i for sale -Sell

Brand : Motorola
Form Factor : Flip
Model : v3i
Height : 5
Units : Inches
Width : 3.5
Weight (In Grams) : 20
Minimum Value : 5000
Maximum Value : 6000
Valid From : 2010-04-14
Valid To : 2010-05-22

View Classified

New User Registeration

Username : _____

Password : _____

Confirm Password : _____

Email Id : _____

Confirm Email Id : _____

Name : _____

Address :

Line 1: _____

Line 2 : _____

City : _____

State : _____

Country : [Select a Country ▾]

Pin/Zip Code : _____

Phone Number : _____

☐ I agree to the terms & Conditions of the site

[Register]

User Register

4.1.2 Objects and actions

1. Login :

The Users can successfully enter the system if the Username and Password match.

2. Register :

The new Users can register themselves by providing the necessary information (emailId, address,etc.) required for registration. The data is sent to the server after the user agrees to the terms and conditions and subsequently presses the register button.

3. Post a Classified :

The registered users can post their classifieds categorized as Buy or Sell (chosen by selecting the appropriate box). They have to provide information like selecting the category and entering minimum value and maximum value of the product.

4. Search for a Classified using keywords:

The search option allows users (all including unregistered users) to search for an item they are interested in. They can also specify the category.

5. View Classifieds:

This option displays the classified along with the related information about the classified (for example the picture of the product).

6. Search for Matches:

This provides a list of all potential buyers and sellers as according to a particular classified.

4.2 Interface design rules

The user interface uses the web 2.0 standards.

4.3 Components available

The GUI uses HTML components.

4.4 UIDS description

Macromedia DreamWeaver 8 is being used along with PDO Map. RAP (RDF API for PHP) is also being used for parsing of RDF files.

5.0 Restrictions, limitations, and constraints

a. Only the Registered Users can update or delete the information
b. Every User should have ID and password to login.
c. The software is to run on a system, with SQL Therefore the systems should be properly connected to the server to access database.
d. The Application should be designed in such a way that the processing speed of the operations should be high
e. The external systems should be up in order to provide the data requested
f. The whole project depends on semantic web technology. But it's just in the stage of concept and not yet fully implemented. This can create some hurdle in the project implementation.
g. No login is required to use the search functionality.

6.0 Testing Issues

Test strategy and preliminary test case specification are presented in this section. The various tests to be conducted to validate the software developed are login test, External System test, User test, Add New Classified test, Add potential buyers/sellers test.

There are two types of testing techniques. Black Box and White (Clear Box). In Black Box we consider the domain of inputs to the system and without considering details in the software i.e., User Interface details are considered. In white box, we consider each and every path, branch for the testing. J-Unit will be used for the same.

6.1.1 Classes of tests

Login test: This test class is defined to validate whether the user/external system is able to login with his ID and password.

6.1.2 Expected software response

The user/external system will be able to login when he enters the ID and password

6.1.3 Performance bounds

The user/external system should not login if enters a wrong ID or password. The user must be able login within 1-2 seconds if correct user name and password are provided.

6.2.1 Classes of tests

External System Test: This test class is defined to validate whether the external system is able to access the services of our system. All the functions related to External System are called here.

6.2.2 Expected software response

The External System should be able to view, search the classified and identify the potential buyers/sellers.

6.2.3 Performance bounds:

The External system must be able to get responses from our system within 4-6 seconds.

6.3.1 Classes of tests

User test: This test class is defined to validate whether the user is able to access the services of our system. All the functions related to User are called here.

6.3.2 Expected software response

The User should be able to view, search the classified and able to identify the potential buyers/sellers.

6.3.3 Performance bounds:

The User should be able to view, search the classified and able to identify the potential buyers/sellers within 2-3 seconds.

6.4.1 Classes of tests

Add New Classified Test: This test class is defined to validate all the fields of a particular classified. All the functions related to Classified are called here.

6.4.2 Expected software response

The user must be able to enter any number of classifieds successfully. The User shouldn't be able to enter a classified if any mandatory field is not entered properly.

6.4.3 Performance bounds:

The user must be able to post the classified after entering the fields within 1-2 seconds.

6.5.1 Classes of tests

Identify Potential buyers/sellers Test: This test class is defined to validate all the potential buyers/sellers who match to a particular classified. All the functions related to Additional Information are called here.

6.5.2 Expected software response

The potential buyers/sellers should be displayed.

6.5.3 Performance bounds:

The user must be able to identify the potential buyers/sellers within 4-6 seconds.

6.6 Identification of critical components

Critical components in Smart Classifieds Sell anything are the Classifieds component and the External Systems component and hence need to be tested thoroughly.

7.0 Appendices

7.1 Requirements traceability matrix

Actor	Use Case	Design Component	Sub Component
user	Register	1. User Interface	3.2.1.3.1
	Enter Search string	1. User Interface	3.2.1.3.2
	View Search results	1. PHP Server 2. RDF parser/generator 3. OR Mapping	a. 3.2.2.3.1 b. 3.2.4.3.1 c. 3.2.5.3.1
Registered User	Login	1. User Interface	a. 3.2.1.3.3
	Search	1. User Interface 2. PHP Server 3. OR Mapping	a. 3.2.1.3.4 b. 3.2.2.3.2 c. 3.2.5.3.2
	View a specified classified	1. PHP Server 2. RDF parser/generator 3. OR Mapping	a. 3.2.2.3.3 b. 3.2.4.3.2 c. 3.2.5.3.3
	Add New Classified	1. Input Handler 2. PHP Server 3. OR Mapping	a. 3.2.3.3.1 b. 3.2.2.3.4 c. 3.2.5.3.4
	Search for matches	1. PHP Server 2. RDF Parser/generator 3. OR Mapping	a. 3.2.2.3.5 b. 3.2.4.3.3 c. 3.2.5.3.5
External System	Request list of Classified matching a keyword	1. PHP Server 2. RDF Parser/generator	a. 3.2.3.3.9 b. 3.2.4.3.5
	Request for matches for a particular classified	1. PHP Server 2. RDF Parser/generator	a. 3.2.3.3.10 b. 3.2.4.3.6
	Request details of a specific classified	1. PHP Server 2. RDF Parser/generator	a. 3.2.3.3.11 b. 3.2.4.3.7