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ROLA: Robust Optimized Lab for Apps: Dashboard for Systems Biologists and Bioinformaticians workbench

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Abstract: ROLA (Robust optimized lab for apps) is an approach to model a centralized toolkit for Systems Biologists and bioinformaticians. A scientists workflow management system with customization facility has been developed using codeigniter 2.1.0 framework. A beta version of ROLA software is being released. The software is publically available at URL : http://dev.ejuicysolutions.com/ROLA_application.

Keywords: Supra-MVC, Bioinformatics applications, workflow systems.

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1. INTRODUCTION

ROLA is an insilico laboratory that provides a platform for customized tools as per requirement of the scientists in general and Systems Biologists and bioinformaticians in particular. There has always been a requirement for a home-grown personalized portal system that can be considered a station for innovation. [1] Details regarding the previous efforts are well documented [2]. However, the ideology behind ROLA is to make a generalized application system with a usage spectrum that befits needs of the scientific community. ROLA presents a user-friendly interface that depends on the activity of the user packaged with customized apps. The Apps can be built personally as well and can be integrated. The customized tools can be synchronized with the software by baking the tools in Supra-MVC format in codeigniter framework pattern scheme for carrying out research methodologies. The basic idea is to put requirements at the heart of ingenuity so that technology support can maximize scientists output and reduce time and cost of research.

2. METHODOLOGY

The application has been developed using Supra-MVC developed by Khan et al using Object Oriented programming approach[3].

2.1 Interface Design

A user friendly interface is designed for scientists. The functionality features are discussed in the following section.

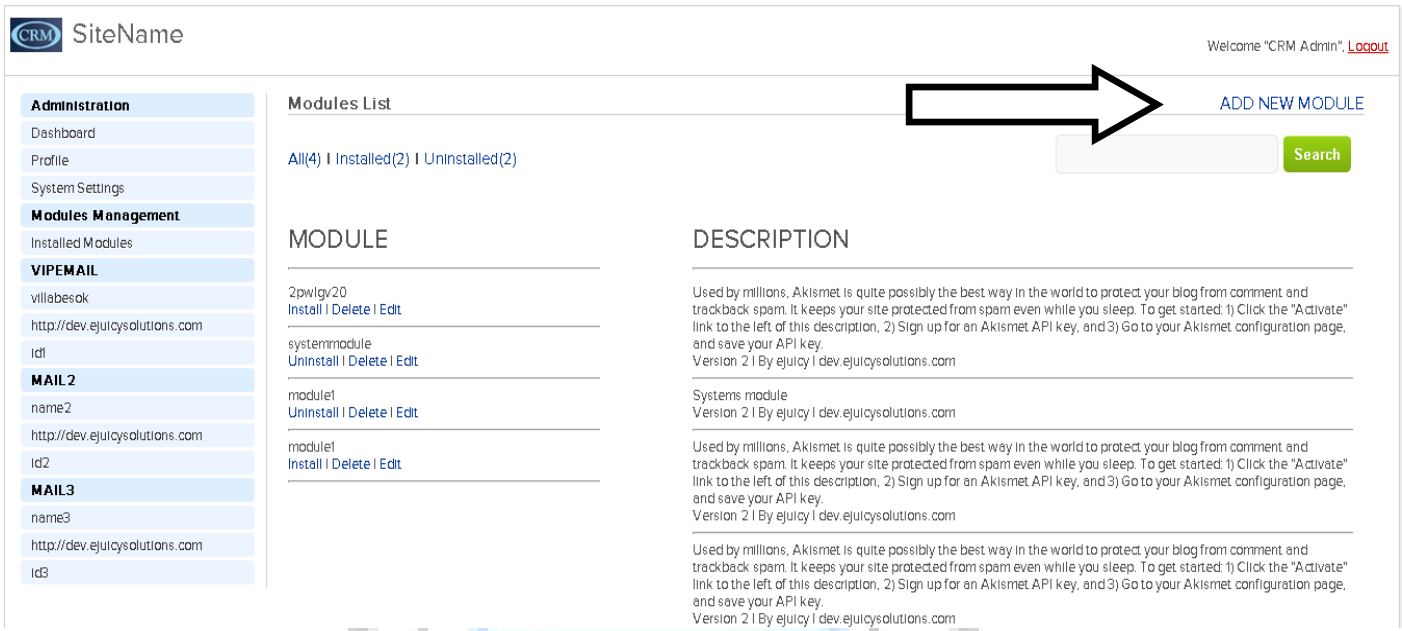

Fig. 1: The interface design is shown

3. FEATURES

3.1. User authentication

User authentication has been ensured for security purposes. The application is MD5 password protected which is considered a strong shield and is a regular practice for impregnable gateways for various applications that demand high security.

3.2. Administrator settings

The left menu provides the user with profile settings option. The user can insert his/her personal information. System settings can also be edited in this section.

3.3. Module Management Section

The modules list is displayed in on the screen with module name on the left side and module description on the right side. Various module management options are also provided. Modules can be installed and uninstalled, edited and deleted.If the user clicks on "install" option then the module add-ons become visible in the side menu as well. Uninstalled module items can be viewed separately as well. Module Search facility is also provided to the user.

4. CONFIGURATION OF AN APPLICATION

Steps mentioned in this section are required to implement the ROLA application. (see supplementary material) :

- Download ROLA application form the above mentioned availability link
- Download a stable version of codeigniter. public access is available on the internet as well. [4]
- Configure ROLA application
- Run crm.sql file in mysql

5. METHODOLOGY TO ADD NEW MODULES

In order to add new module in the application the user has to click on the "ADD NEW MODULE" on the top right corner of the interface. The user will be directed to select file. The file selected is a compressed folder which contains the following files.

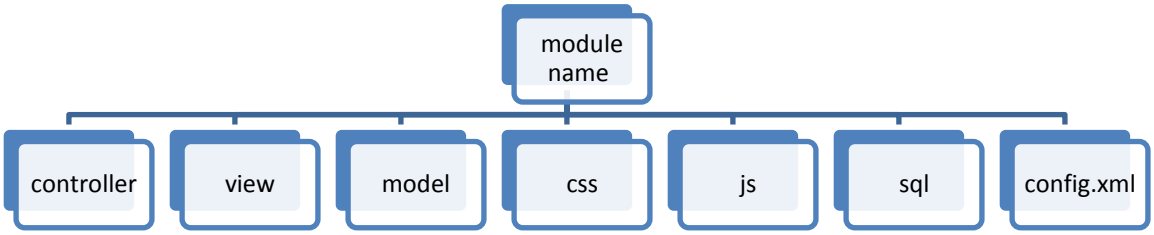

Fig. 2: The File hierarchy is displayed

The application capacity is database driven and it can be augmented by following the following methodology. A compressed folder should contain the following files whereas the config.xml is the file that contains the following elements

6. SIGNIFICANCE oF CONFIG.XML

The program has the capacity to read the config.xml file and scan the information regarding the module. The configuration details are extracted from the data provided in the configuration tag. The configuration tag begins with "<configuration>" and ends with "</configuration>" tag. The modules name is mentioned in this section along with the version of the module. The "isinstall" tag is used to categorize the module whether the module being integrated in the application will be installed or uninstalled. A unique identifier is also provided which is inserted in the backend database so that the identifier is used as a slug to perform database manipulation operation on the specified module. The module description is provided in this section as well. This detail is displayed in the right side of the module's list management section.

The developer tag is used to provide the necessary details about the module writter and the copyright owners. The name, email and the website address is explicitly mentioned in this section. The developer tag begins with "<developer>" and ends with "</developer>" tag.

The database file name is placed in the sql folder that was mentioned in the fig 2. The file name is mentioned in this section. The program opens the folder named sql and searches for the file name provided in the "databasename" tag. The program runs the file and the database for the specific module is created in the backend. The database tag begins with "<sql>" and ends with "</sql>" tag.

The menus tag is the last section of this config.xml file. This section contains the menu list information that appears in the left menu bar when the module is being installed. The menus tag begins with "<menus>" and ends with "</menus>" tag.

The config.xml file begins with "<module>" and ends with "</module>" tag. The structure mentioned in this file is quintessential for the modules addition in the program. The cconfig.xml is actually the information directory of the module.

Table. 1: The elements in the config.xml are defined

```
<module>
<configuration>
  •<name>module1</name>
  •<version>2.0</version>
  •<isinstall>1</isinstall>
  •<identifier>1</identifier>
  •<description>This is a new module</description>
</configuration>
<developer>
  •<name>ejuicy</name>
  •<email>ejuicy@gmail.com</email>
  •<website>dev.ejuicysolutions.com</website>
</developer>
<sql>
  •<databasename>database.sql</databasename>
</sql>
<menus>
  •<heading>VIPEMAIL</heading>
  •<name>villabesok</name>
  •<url>http://dev.ejuicysolutions.com</url>
  •<identifier>ss</identifier>
</menus>
</module>
```

7. CONCLUSIVE ANALYSIS

The Bioinformatics scientific research process can be aided with a customized CRM system. This can turn out to be a personalized warehouse as well where the system settings facility is also sanctioned This protocol is a platform for scientific workflow system. The modules can be designed can be selected by the scientist who intends to use in accordance with the requirements of the projects he is working on. This plugin system will basically be a series of hand-picked apps which can also be developed by the user himself using PHP5 as a development platform. The system can be used as a "app-hub" which can aid in the integration of tiny but useful tools such as [5] [6].The feature selection section allows the user to install or uninstall the module that is required. Basically requirement management will suit the scientists demand. A single click functionality will provide the scientist a working environment that suits eht requirement. This effort will lead to the development of a virtual learning environment On the same token, crowd-sourcing concept is also complemented by launching this application..

8. FUTURE PERSPECTIVE

The research group will launch a web repository centre to provide the end users with bioinformatics tools in particular to integrate in the application. A website devoted for sole purpose of support system for this application is currently under development

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Supplementary Material

The readme.txt file provided along with the core php files at : http://dev.ejuicysolutions.com/ROLA_application guides the users to follow the rules in steps as well implementation instructions are available in the file

Abbreviation	Description
ROLA	Robust optimized lab for apps
MD5	cryptographic hash function
CRM	client request management
apps	applications