Implementation of Java Frameworks and APIs for Web Applications

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ABSTRACT

In this paper represents the web design frameworks as a conceptual methodology to expend the probabilities reuse in Web applications. Firstly I have presented the importance for construction abstract and reusable directional design structures, demonstrating with different kinds of Web information Systems. Struts 2 is an elegant, extensible framework for creating enterprise ready web applications. It provides with a controller Servlet to manage and intercept the flow of requests. Hibernate Framework Technology as unique and well-organized resources to take immeasurable databases and also on how to implement persistent features in object-oriented system finished it. Java also consists of many useful APIs or Application Program Interfaces, some of which are mention in this paper. Java accepts a N-tier framework of MVC Model in platform and uses EJB, Struts WEB Framework and Hibernate technology.

Keywords: Framework, Struts, Hibernate, J2EE, spring, Web Design

I. INTRODUCTION

A study of the Java language expending the framework of abstract generous has been the subject of substantial research in the last decade. A main part of the enhancement of an avocation application involves the creation and supervision of the persistence layer used to assemble and retrieve objects from the database of choice. Hibernate phases in to fill this crack, provided that an easy-to- use and authorized object relational persistence Framework for Java applications. And Design patterns to identify, name and abstract frequent problems in software development and to identify best practice solutions. Tools and techniques for testing parallel Java programs are still under active research and include dynamic analysis, static analysis, model checking, and combinations of these techniques. The objective of this paper refer to a practical library and practise to model check Java programs for endorse simultaneous components without the essential to install other more convoluted tackles. The Struts Framework provides perfect programming and configuration model for new Java-based enterprise applications - on any kind of deployment platform.

II. STRUTS FRAMEWORK ARCHITECTURE

Struts framework extends the Java Servlet API and engages MVC architecture. It means Model View Controller .Model hold JavaBeans, EJB and View hold JSP files and Controller hold out by Actions. It gives you a chance to create formable web applications based on JSP pages, Java Beans and XML. Struts architecture shown below
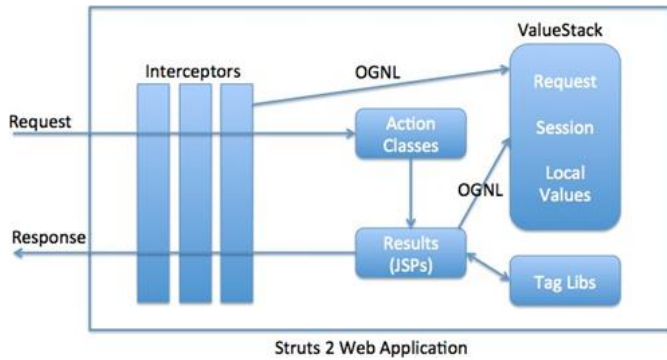
Figure 1. Struts framework architecture

Struts is an open source framework that extends the Java Servlet API and employs a Model, View, Controller (MVC) architecture. It enables you to create maintainable, extensible, and flexible web applications based on standard technologies, such as JSP pages, JavaBeans, resource bundles, and XML.

HTTP request issued by the client browser. The request will received by the action servlet. The Action particulars are contained in the Struts-

Config.xml file and action forms and Actiom mappings and Action Fowards as well. The Action Servlet reads the struts-config.xml file and builds a database of composition objects. Struts Interceptors are like Servlet Filters that executes before and after the request is being processed. They are used to perform common operations for different actions. For example logging, session validation, adding common headers to response etc. the Action Servlet makes decision by referring to this object while it is processing.it does some tasks When the Action Servlet receives the request ,gathers all request values into a JavaBean class. Decides which action class to appeal to process the desire. Approve the data enrolled by the user. With the help of the model component the action class processes the request. The model process the request by interacting with the database. Action class returns an Action Forward to the controller after completing the request processing.

III. SPRING FRAMEWORK ARCHITECTURE

Spring framework is an open source Java platform. Spring is lightweight when it comes to size and transparency, and one of the most popular application development framework for enterprise Java. Spring enables developers to develop enterprise-class applications using POJOs. The benefit of using only POJOs is that you do not need an EJB container product such as an application server. It is organized in a modular, and alongside struts it acts as a listener framework to provide various functions such as translating technology specific exceptions.

By adopting spring it is simple to create Java enterprise applications. It brings anything you need to embrace the Java language in an enterprise environment, with support for Groovy and Kotlin as alternative languages on the JVM, and with the flexibility to create many kinds of architectures depending on an application's needs. The Spring Framework arrange for about 20 modules which can be used based on an application requirement.

In the spring architecture modules have placed in the top down approach. Core, Beans, Context and Expression modules are placed in the core container.

The elemental concept is Bean Factory is it provides a discharge of Factory Pattern which creates the bean as per the shape given by the developer in XML .XML developers can assign method-interceptors and point cuts to keep the concerns apart it is allowed by the Aspect Oriented Programming. The compilation step is skipped by arranging it at the run time.it is easier to maintain because it targets at declarative transaction management. The DAO module provides low level task of creating a connection, releasing it etc. It further maintains a ranking of essential barring instead of throwing heavy error codes from database vendors. It uses AOP manage transactions. Programmatically also transactions can be managed. Spring doesn't provides its own ORM application but

offers combination with famous Object Relational mapping tools like iBATIS SQL Maps, Hibernate, Oracle TopLink and JPA etc. The JEE module provides support for JMX, JCA, EJB and JMS etc. In lots of cases, JCA (Java EE Connection API) is much like JDBC, except where JDBC is focused on database JCA focus on connecting to legacy systems.
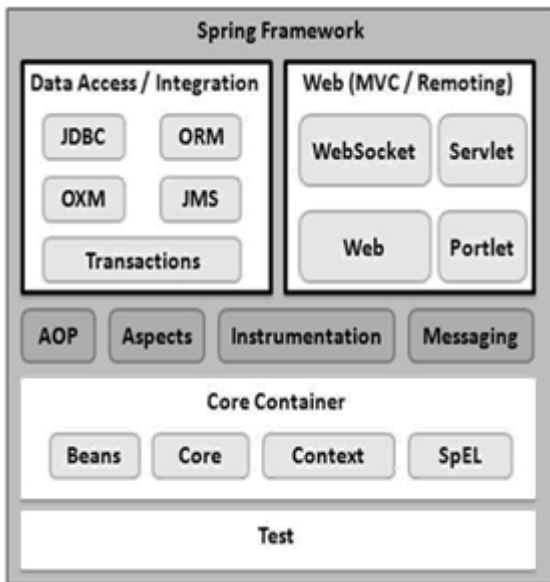

Figure 2. Spring Architecture

IV. TILES FRAMEWORK ARCHITECTURE

Struts provides integration support with apache tiles framework. So we can simply manage the layout of the Spring MVC application with the help of spring tiles support.

Advantage of Tiles support in Struts MVC

Re usability: We can reuse a single component in multiple pages like header and footer components.

Centralized control: We can control the layout of the page by a single template page only.

Easy to change the layout: By the help of single template page, we can change the layout of the page anytime. So your website can easily adopt new technologies such as bootstrap, jQuery, etc.
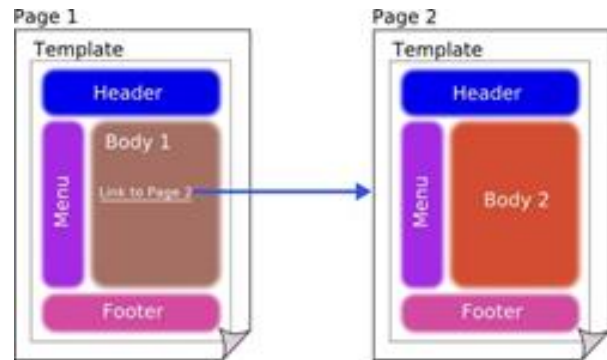

Figure 3. Tiles Architecture

V. JSP ARCHITECTURE

Java Server Pages (JSP) is a server side technology for developing dynamic web pages. This is mainly used for implementing presentation layer (GUI Part) of an application. A complete JSP code is more like a HTML with bits of java code in it. JSP is an extension of servlets and every JSP page first gets converted into servlet by JSP container before processing the client's request.

Java Server Pages are each of 3-tier architecture. Java Server Pages supported by the server. This server will mediate between client browser and a database. In MVC architecture JSP will works as a View component. To provide the runtime environment and other services which JSP needs, A JSP container works with the web server. The position of JSP container and JSP files in a Web application are as shown in the below diagram.
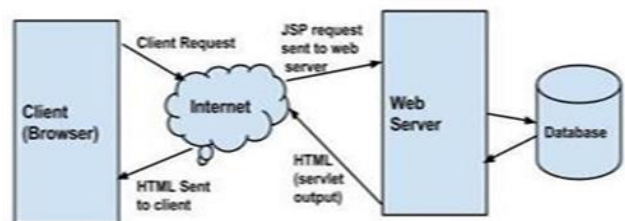

Figure 4. HTTP request to the web server.

Your browser sends an HTTP request to the web server. The web server recognizes that the HTTP request and forwards it to a JSP engine. This will process by using the URL or JSP page which will be

ends with .jsp. It converts it into servlet content when JSP engine Loads the JSP page from disk. JSP engine forwards the original request to a servlet engine by compiling the servlet into an executable class. A part of the web server called the servlet engine loads the Servlet class and executes it. The servlet produces an output in HTML format during execution. The output is further passed on to the web server by the servlet engine inside an HTTP response. In terms of static HTML content the web server forwards the HTTP response to the browser. Finally, the web browser handles the HTML page inside the HTTP response.

In my project, I have created an online chatroom where the server automatically loads the action to my index page, which is the JSP view file in my MVC model web application.

Figure 5. My JSP view file

VI. CHAT APP USING PUSHER & STRUTS2

The need for realtime chat can't be overemphasized. This includes realtime communication with your users which increases customer satisfaction and, as a result, make your business more credible, convenient and reduces wait times etc. Pusher is a hosted service that makes it super-easy to add realtime data and functionality to web and mobile applications. Pusher makes communication and collaboration APIs that power apps all over the world supported by easy to integrate SDKs for web, mobile, and backend. It consists of a chatkit and scalable channels with unique cluster, appIDs and Keys.

1. Requirements

· Java SDK
· Eclipse IDE
· JavaScript (JQuery).
· Java language, frameworks and APIs
· Maven

2. Group Chat

Various steps involve creating a pusher channel, setting up a maven project on Eclipse, setting up Struts 2 and adding Pusher Java Library. Crafting the chat interface using CSS and Jquery, creating an action class with setter and getter methods linked to Struts, and Linking the app to a common named channel provided by Pusher.
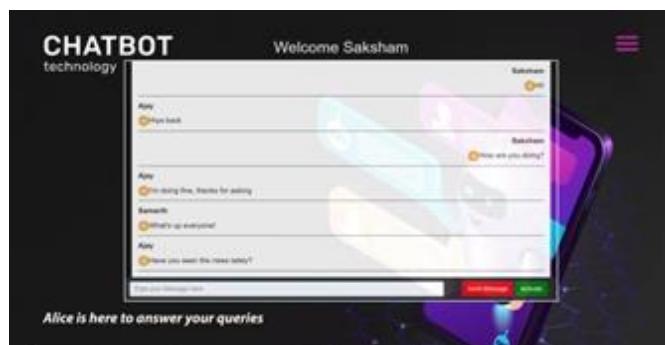
Figure 6. Group Chat Interface

VII. INTEGRATING AIML CHATBOT WITH CHATAPP

AIML (Artificial Intelligence Markup Language) is an XML dialect for creating natural language software agents. It contains the basic rules which Natural Language Understanding (NLU) unit uses internally. It can be thinking of as a heart of the engine. The more rules we add in AIML – the more intelligent our Chatbot will be.
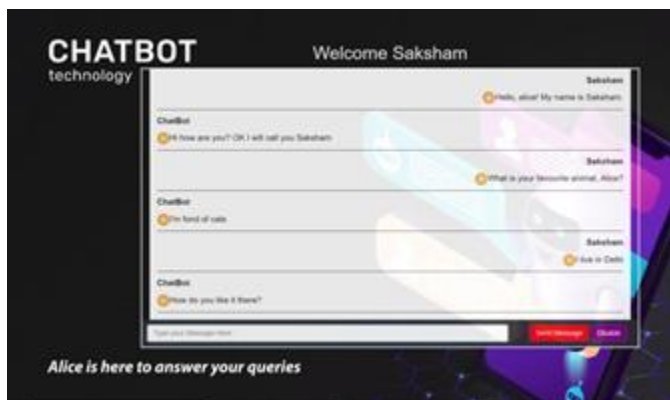
Figure 7. AIML chat bot Implementation

These AIML files can range from Personality & Inquiries to train various sets such as Places, Names and Animals and distinguish each one of them by their proper pronouns. AIML can be implemented in Java as well as it's frameworks. In my case, I integrated a modification of the A.L.I.C.E. (or Artificial Linguistic Internet Computer Entity) Bot with my online chatroom to add better functionality along with online search and results. By calling out 'Alice', the chatbot is activated and simulates a more natural conversation with human users.

A. L.I.C.E was created by Dr Richard S.Wallace, who is an American author of AIML and Botmaster of A.L.I.C.E. He is also the founder of the A.L.I.C.E Artificial Intelligence Foundation. In my case, I created a super bot that can invoke various other commands such as setting alarms, mailing chat transcripts to the email you specify, and speech to voice conversion, as well as integrating it in a web based chat. Even though AIML has many tags which you can use, like giving some option to configure Sraix to invoke external REST based web services for online searching, it's functionality is limited, so I implemented my own search bot that parses Google and Wikipedia URLs using JSOUP and extracts the necessary information.

1. What is JSOUP?

JSoup is an open source Java library used mainly for extracting data from HTML. It also allows you to manipulate and output HTML. It has a steady development line, great documentation.

In simpler terms, it is used for web scraping, and was used due to Google's own API being deprecated for Java.

It provides a very convenient API to extract and manipulate data, using the best of DOM, CSS, and jquery- like methods. It implements the WHATWG HTML5 specification, and parses HTML to the same DOM as modern browsers do.

2. How my Search Bot Works

My search bots works on the search queries on the Google and Wikipedia website and parses those pages to extract important information and pictures that is relevant to the Chat user's query, and prints them out in the chat room. The images loaded are raw images loaded from Wikipedia's OgImage meta tags.

These queries can range from asking about various objects such as People, Locations, Media and other various things.

You can ask about the weather, the date of a holiday, or when a person was born etc. It does have limited functionality and spelling mistakes may cause queries to fail.

Below are examples are how the Search bot is implemented in tandem with my Chat bot.

Figure 8. Ask simple Queries for brief descriptions

Figure 9. Asking Queries for more concise answers

VIII.   CONCLUSION

In this review paper that I have presented an original abstract interpretation framework, which is generic in terms of the source language use means Java programming language. Spring and Struts provides the help of the user for development, debugging and testing the software, as well providing a dynamic connection to the database using JSON and POJOs. JSoup acts as a flexible parser for HTML websites. Pusher sits as a realtime layer between your servers and your clients. Pusher maintains persistent connections to the clients - over WebSocket if possible and falling back to HTTP-based connectivity.

These frameworks can be used in tandem with one another to create multiple web applications such as enterprise websites and Online chatrooms integrated with Chatbots.

IX.   REFERENCES

[1]. Thrash Mane,K. C. (2013,july). The Spring Framework: AN OPEN SOURCE JAVA PLATFORM FOR DEVELOPING

[2]. ROBUST JAVA APPLICATIONS. International Journal of Innovative Technology and Exploring,Engineering (IJITEE),3(2),138-143.

[3]. Dimitris K. Iakovidis,D. D. (2014,July). OPEN-ACCESS FRAMEWORK FOR EFFICIENT OBJECT-ORIENTED DEVELOPMENT OF VIDEO ANALYSIS SOFTWARE. Journal of Software Engineering and Applications,730- 743. doi:10.4236/jsea.2014.78068

[4]. https://www.pusher.com

[5]. https://chatbotslife.com/rule-based-standalone-aiml-chatbots-chatbots-part-2-f5dca9f15956/

[6]. https://www.journaldev.com/

[7]. LI Gang. the actual practice of Lightweight Java EE enterprise Application-Integration development using Struts 2,Spring and Hibernate M]. Beijing: Electronic industry press,2007.

[8]. YANG Shabo. J2EE Project training- Hibernate frame technology M]. Beijing: Tsinghua university press,2008.

[9]. LIU Bin. Proficient in Java Web integration and development:JSP+AJAX+Struts+Hibernate M]. Electronic industry press,2007.11.

Cite this article as :