iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** XI **Month of publication:** November 2023

DOI: https://doi.org/10.22214/ijraset.2023.56442

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue XI Nov 2023- Available at www.ijraset.com

Survey on Different Micro Services, Recommendation Model and AI based Chatbot used for Recruitment System

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Abstract: ***Nowadays, it's all about AI-powered chatbots and recommender systems to make user experiences better. The recommender system uses machine learning to give you personalized content suggestions, and the chatbot gives you real-time support. This article looks at a new way to combine these technologies to make user interactions more smooth and engaging. The recommender systems analyze your data and use advanced algorithms to give you recommendations that match your preferences. This helps you get more engagement and conversions. But what happens when you need help or have questions? That's where the recommendations system and microservices come in.***
Keywords: Recommendation System, Chatbot, Microservices.

I. INTRODUCTION

As the human resource and talent acquisition landscape continues to evolve, technological advances are revolutionizing the traditional recruitment methods. This paper will provide an in-depth analysis of the various components of modern recruitment systems, from microservices to recommendation models to chatbots powered by artificial intelligence. By taking a comprehensive look at these advancements, we will be able to identify the collective influence ofthese components and how they could potentially revolutionize the talent acquisition landscape. In this era of rapid technological progress and changing workforce demographics, finding,engaging, and retaining the best talent is essential for businesses of all sizes.In recent years, therehave been a lot of changes in the tech world, and companies are turning to these new technologies to help them solve their recruitment problems. Microservices architecture is a great example of this, as it allows companies to break down their recruitment systems into a bunch of modular services. This helps them be more agile, scalable, and adaptable, so they can quickly respond to changing talent needs. Plus, recommendation models are becoming more and more popular, thanks to the power of AI and machine learning. These models use huge data sets to predict how candidates will fit in, match them with roles, and even identify skill gaps, making hiring decisions more accurate and improving talent pipelines.AI-powered chatbots are revolutionizing how candidates are engaged and supported. They provide personalized, 24/7 interactions with candidates, answer questions, help with applications, and even do initial assessments. This paper looks at how these chatbots can help streamline recruitment systems andmake them more data-driven and candidate-focused. It's a combination of theoretical research and real-world examples, and it'll give organizations, HR pros, and researchers the tools they need to stay ahead of the competition.

II. LITERATURE SURVEY

1) Feasibility of big data recommendation technology in accurate employment:The feasibility of leveraging Big Data Recommendation Technology for Accurate Employment is being explored. This technology is capable of predicting the likelihood of events through the application of algorithms to large volumes of data. Currently, accurately recommended services have been implemented in Alibaba and Jingdong to provide users with information about the goods they wish to purchase in China. This technology can be used to provide scientific advice to college students, streamline the work of universities and colleges, and help graduates gain a better understanding of the job and its requirements. Additionally, it can help to save time in the job search process.
2) Features of employment recommendation algorithm mahout:The feasibility of leveraging Big Data Recommendation Technology for Accurate Employment is being explored. This technology is capable of predicting the likelihood of events through the application of algorithms to large volumes of data. Currently, accurately recommended services have been implemented inAlibaba and Jingdong to provide users with information about the goods they wish to purchase inChina.

This technology can be used to provide scientific advice to college students, streamlinethe work of universities and colleges, and help graduates gain a better understanding of thejob[7] and its requirements. Additionally, it can help to save time in the job search process.

$$. \quad w_w = \sqrt{\sum_{i=1}^{n} (x_i - y_i)^2}$$

The Jaccard's formula is as follows:

$$w_w = \frac{|N(u) \cap N(v)|}{|N(u) \cup N(v)|}$$

The cosine similarity formula is:

$$w_w = \frac{|N(u) \cap N(v)|}{\sqrt{|N(u)| \bullet |N(v)|}}$$

Once the similar users and their respective commodity list have been identified, the preferences of the current users for each commodity in the commodity list will also be evaluated. The formula for calculating preference is as follows:

$$p(u,i) = \sum_{veS(u,K) \cap N(i)} w_{uv} r_{vi}$$

This list is made up of K users who are close to user u's interests. It shows the set of people who have scored on commodity i, the similarity of interest calculated by user u and user v, and the score for user v on commodity I. Basically, there are three steps: first, you get a list of users fromthe K user sets (u, k) {U1, u2,... Uk}; second, you exclude the items that user u has looked at from the set of items that the K users are looking at, and then you set the remaining items to I
{I0, i1,...Im}. Finally, you calculate the preference value of p (u, i), and the items in set I will be sorted from high to low based on that value, and the first N items will be recommended to user u.

3) Design flow of recommendation management system: The workflow for posting an employment recommendation on Hadoop platform is as follows:

a) Data collection: The job information will be collected from a number of active recruitment websites (e.g. www. 51job.com), as shown in Figure1.
b) Web crawler will configure the data extraction expressions.
c) The content collected from HTML will be converted to CSV format.
d) The content will include all job name skills and information in CSV format according toformat requirements.
e) One CSV file per post will be collected.
f) The collected data will be saved in HDFS.

III. METHODOLOGY

A. Types of Recommendation System

The use of recommendation systems can be divided into three main categories: collaborative, content based, and hybrid. For collaborative filtering, it is recommended to read "Item-Based Collaborative Filtering Recommendation Algorithms" by Sarawar et al. For content based filtering, Joachims offers insights into text-based approaches through the use of text categorization with support vector machines and learning with many relevant features. Matrix factorization techniques are a popular approach for collaborative filtering, with Koren et Al. providing a fundamental paper on matrix factorization techniques for recommendation systems. Additionally, deep learning has been extensively used in recommendation systems, with Zhang etal.'s "Deep Learning for Recommendation Systems" providing a comprehensive overview[8].

1) Matrix Factorization Techniques

Matrix factorization is one of the most widely used collaborative filtering techniques. The paper "Matrix factorization techniques for Recommender Systems" (Koren et al) is a fundamental work on matrix factorization.

2) Deep Learning in Recommendation

The use of deep learning in recommendation systems has proven to be very successful.

The article "Deep Learning for Recommendation Systems" (Zhang et al) provides an in-depthlook at deep learning techniques used in recommendation systems.

B. Microservices

Microservices architecture is a service-oriented computing-influenced style of architecture that has recently started to gain traction. Before we dive into the current state of affairs in the field, let's take a look at the history of software architecture, why objects and services were first adopted and microservices later, open problems, and future challenges. This survey is mainly intended for those new to the discipline, but we'll also provide an academic perspective on the topic. We'll also explore some practical issues and highlight a few possible solutions.

A microservice, on the other hand, is a single, self-contained process interacting through messages. For example, a service designed to compute calculations should, to be considered a microservice, provide arithmetic operations that can be requested through messages, but not other (maybe loosely related) functions such as plotting and displaying functions.[5]

Technically, a microservice should be self-contained, deployed independently, and have dedicated memory persistence tools (for example, databases). Because all the parts of the microservice architecture are microservices, what makes a microservice unique is the composition and coordination of its components through messages.[7]

C. What's a Microservice?

A microservice is a small app that can be deployed on its own, scaled on its own, and tested on its own. It has a single responsibility, which means it has a single reason for changing and/or replacing something. On the other hand, the other axis is called a single responsibility because itonly does one thing at a time and it's easy to understand.[1]

1) Background

Microservices are based on the idea of functional decomposition, usually in the context of a domain-based design[2]. They're defined and published with well-defined interfaces, and each service is completely autonomous and full stack. So, if you change a service implementation, it won't affect the other services because communication only happens through interfaces. It's all about the functional decomposition of the app and the team, and that's the key to building a successful architecture. This allows for loose coupling with REST interfaces, and high cohesion[3], where multiple services can work together to define higher-level services or applications. This helps with things like agility, flexibility, and scalability.

2) Chatbot

Chatbots have been rapidly adopted in many areas in recent years. Marketing, supporting systems, education, health care, cultural heritage, and entertainment are just some of the areas in which chatbots have been adopted in recent years.

In this article, we will first look at the history of the global interest in chatbot.Then, we will look at the motivations behind the use of the chatbots.

We will also look at the usefulness of the chatbot in various areas.

Finally, we will focus on the impact of the social stereotypes on the design of the chatbot.

After clarifying the necessary technical concepts, we will move on to the classification of thechatbots according to various criteria.

These criteria include:

The area of knowledge that the chatbot refers to

The need that the chatbot serves and others. The general architecture of the modern chatbots

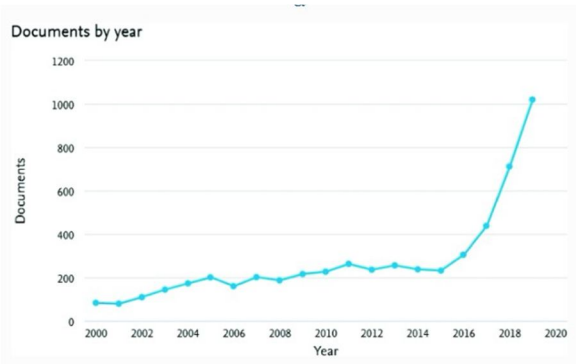
The main platforms for the creation of the chatbots

3) History

The first chatbot was created by Alan Turing in 1950 (“Can Machines Think?”) and it was around this time that the term “chatbot” began to be used. Eliza was developed in 1966 (“Eliza” stands for “psychotherapist”) [9] and was a simple program that responded to user utterances using a question form. Eliza’s conversational ability wasn’t great, but it fooled people at the time when they weren’t used to talking to computers and motivated them to develop other chatbots. Another chatbot, PARRY, was developed in 1972 (“Parry” standing for “Personal Assistant”). Another chatbot, SmarterChild, was developed in 1995 (“SmarterChild” stands for”). ALICE was created in 2000 (“Most Human Computer”) and “Most Human” (“ALICE”) in 2004 (“The Most Human Computer”). AlICE is based on an AIML-based algorithm that allows developersto define “building blocks of the knowledge that a chatbot knows.” ALICE was awarded the Loeb

Search results in Scopus by year for “chatbot” or “conversation agent” or “conversationalinterface” as keywords from 2000 to 2019.

D. Types of Chatbot



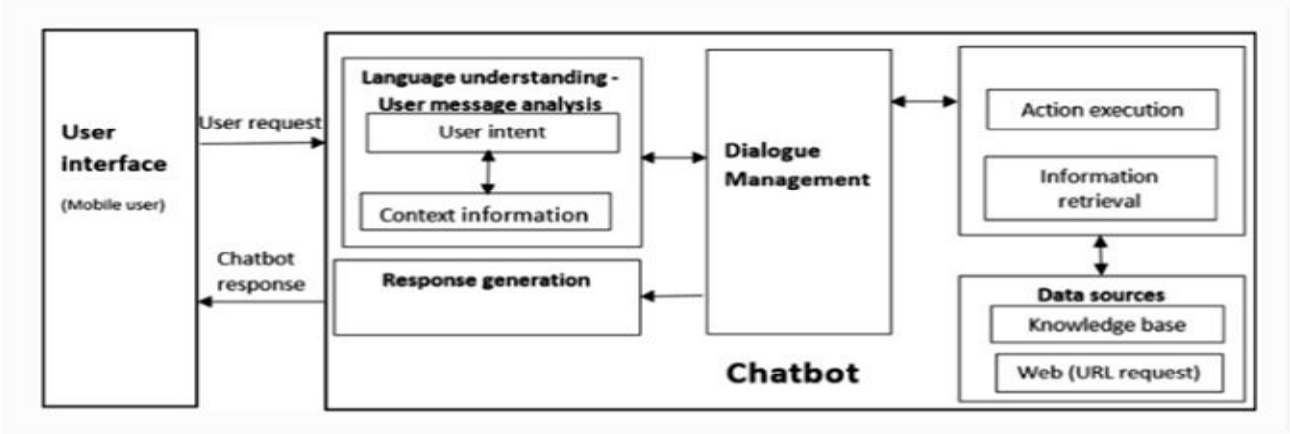
Chatbots are classified according to the following criteria: knowledge domain, service provided, goals, input processing and answer generation method, human-aid method, build method, and more[11].

The knowledge domain refers to the knowledge that a chatbot is able to access or the data that it is trained on. An open domain chatbot can talk about generic topics and respond accordingly, while a closed domain chatbot is focused on a specific knowledge domain and may not be able toanswer other questions[11].

The service provided category refers to the emotional connection that the chatbot has with theuser. It also depends on the task being performed.

Interpersonal chatbots are part of the communication domain and offer services such as restaurant booking, flight booking, FAQ bots, etc. They do not interact with the user but get information from the user and pass it on to them.[12] They may have personality, friendliness, and will likely remember information about them, but are not required or expected to.

Interpersonals exist within the user's personal domain, such as Messenger, WhatsApp, etc.



General chatbot architecture

IV. CONCLUSION

In this survey paper, we look at three key areas of modern tech and user experiences that have changed a lot in recent years. We look at recommendation systems and microservices, chatbots, and AI-driven virtual assistants. Recommendation systems are essential for improving customer engagement and satisfaction, and they've evolved from collaborative filtering to more advanced algorithms. We also look at microservices and how they can be used to build robust, scalable systems and solve problems like data consistency. Finally, we look at AI-driven chatbots and how they can help streamline processes.

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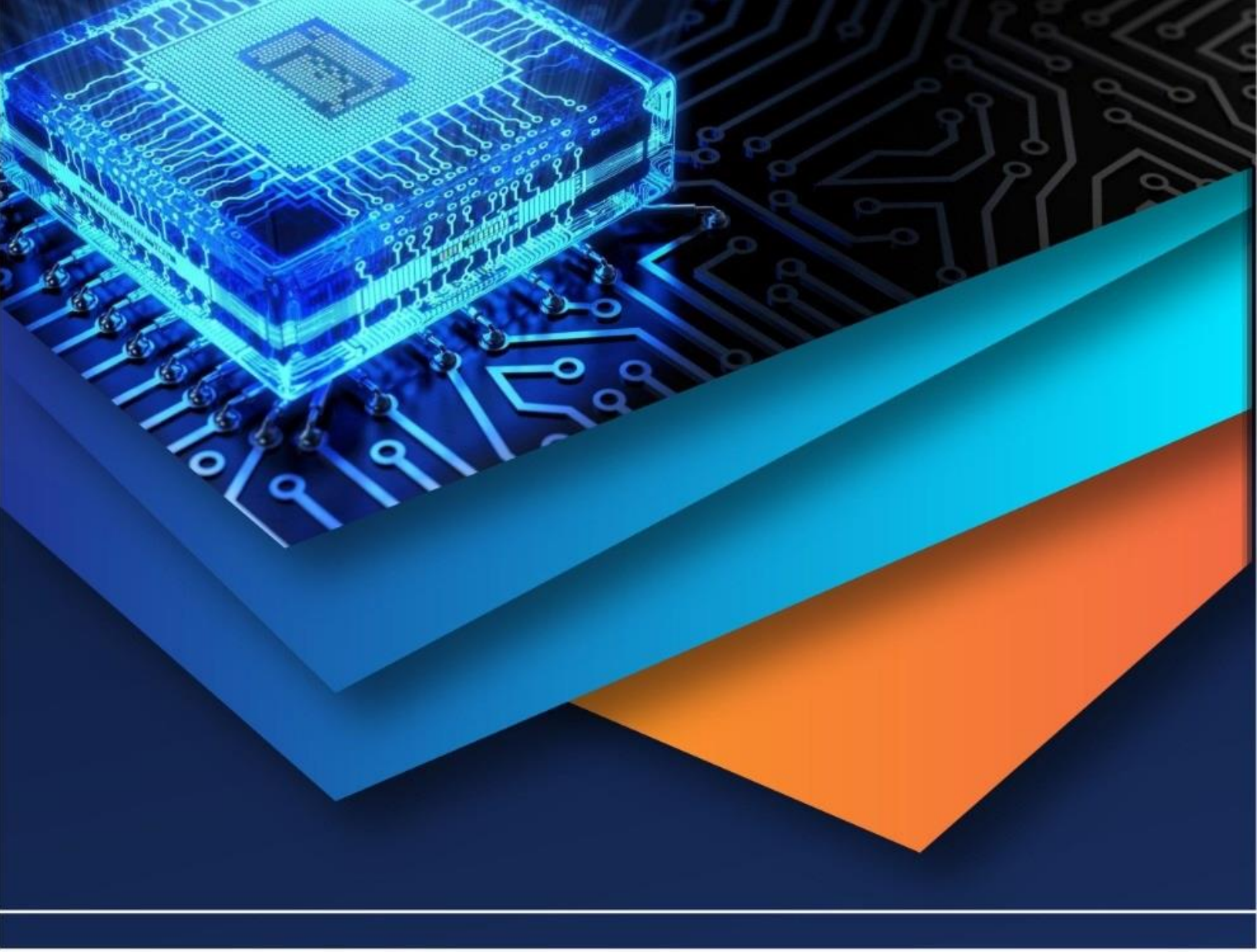

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