ASK YOUR SENIOR
“YOUR PLACEMENT PARTNER"

Dr Rakesh Kumar M
Computer Science and Engineering
Rajalakshmi Engineering College,
Chennai, India
rakeshkumar.m@rajalakshmi.edu.in

Sakthilakshmi M
Computer Science and Engineering
Rajalakshmi Engineering College,
Chennai, India
210701223@rajalakshmi.edu.in

Raveena Sri R
Computer Science and Engineering
Rajalakshmi Engineering College,
Chennai, India
210701210@rajalakshmi.edu.in

Abstract—**Students face difficulty while preparing for their interviews. They have various doubts like how to prepare and what to prepare for technical rounds.**

Ask Your Senior is a bridge between the juniors and seniors which will help them to obtain information relevant to placements and the preparation strategies for interviews. Students can clear their doubts by asking their queries to the chatbot. We are collecting the information about the placements from the seniors who have attended the interview and have experience in how to prepare for the interview. This is our creative idea which will guide the students in preparing for their placements. Our chatbot will provide details about how many companies have come to the college, number of rounds in the company, what are the questions asked in each round, topics from which questions asked and how to prepare for that round. So it will be very easy for the students to prepare for that round and easily crack their placements.

Keywords — Natural language processing, chatbot, LangChain, Flask app, Recursive Character Text Splitter, text embeddings, FAISS database, interviews, Google Gemini API, React Js

I. INTRODUCTION

Nowadays, chatbots play a vital role in our daily life by addressing the queries of the people in various fields. Increase in the usage of chatbot helps the students while doing assignments, preparing presentations and to clear their doubts. Students face various difficulties in preparing for their interviews. They find it difficult to find methodologies to prepare for each round. They are not aware of questions asked in each round. So we are creating a chatbot to help students by clearing the doubts in their placement journey. Seniors have more experience in their placement journey because they have attended various interviews of various companies. So it is very easy for the juniors to crack their placements if they communicate with their seniors. But the problem is there is a communication gap between the seniors and juniors. The main role of our chatbot is to break the communication gap and provide a bridge between the juniors and seniors. We are using React.js to build the frontend of the website. It gives the best user experience. React.js uses component based architecture. This architecture is used to break down the complex user interface into reusable

components. We are using Flask as the backend. Flask is a lightweight and flexible Python web framework. It is ideal for building small to medium sized web applications and APIs. Flask's lightweight nature ensures fast performance. We are using Gemini Pro API to build the chatbot. Gemini Pro API is used to interact with the professional tier models within the Gemini family of large language models by Google AI. Gemini 1.0 pro model excels at handling natural language tasks, multi-turn conversations and code generation. It has various capabilities like text generation, question answering, code understanding and generation and multimodal reasoning.

We are using LangChain to simplify the large language model integration. It provides a set of tools and abstractions that make it easier for developers to work with LLM. This includes things like common interfaces for different LLMs, functions for managing prompts and components for building complex workflows. The benefits of using LangChain are faster development, flexibility and modular design. The key features of LangChain includes models and prompt chains, Retrieval Augmentation Generation (RAG), agents and evaluations.

II. LITERATURE SURVEY

[1] Piccolo, M. (2021). Job selection with a chatbot?: Ethnographic research on chatbots requirements (Master degree thesis, University of Twente). The literature puts a finger on the dual role fulfilled by the chatbot software on the candidates through the technical and social tools in the process of the selection. The technical features comprise NLP, ML, and fast integration that will allow an easy linking. Sociality for the chatbots stands for the ability of understanding human interactions, then displaying the emotion of empathy, and lastly, maintaining the context. The challenge is to determine the practically feasible ratio of technical and social elements to really connect with the candidates. Such an integration leads to creating personalized experiences and therefore, efficiency in selection processes.

[2] Barghi, B. (2022). How chatbots are used in recruitment and selection practices? (Master's thesis, Universitat Politècnica de Catalunya). While the literature shows that global diversity and remote work has an impact on the people acquisition process and are starting to change the recruitment strategies. It mainly reviews the series of transformation of recruitment from analog to Digital Recruiting 3. 0, as great strides are made in AI. Bots act as a job posting core, resume screening, and candidate in this AI conversational effect. Their combination improves HR processes by providing each employee with individual help and in faster recruitment processes. More precisely, AI is currently used in a variety of functions in HRM which mirrors the application of technology in keeping up with the changing face of modern workforce.

[3] Sonawane, B., Ombase, A., Rajmane, P., & Kamble, D. (2020). Chatbot for Institutional Purpose. no, 7, 585-601. The literature emphasizes both the purpose and architecture of chatbot systems, which are outlined in simulating human conversation through both language models and computational algorithms. Advances in data mining and machine learning have bolstered the decision-making capabilities of chatbots to expand the practicality across a range of lifestyle applications that include help desks, information retrieval, and E-commerce.

Chatbots, in E-commerce, streamline tasks in product search and information retrieval to enhance the customer's decision-making process. Much emphasis is put on the user attitudes toward chatbots, though the literature does acknowledge that chatbots have the potential for being an efficient solution towards enhancing user experiences and facilitating interactions through diverse domains.

[4] Reddy, V. N., Reddy, S. M., Vamshi, A. Y., Reddy, K. N., Dhanunjay, B., & Gopal, S. V. (2022). WHATSAPP CHATBOT FOR CAREER GUIDANCE. In the literature piece, the stress is on the significance of chatbots in this specific period of consumption of e-information. Chatting is a very dominant means of communication, including sales and marketing, with Reliance, Airtel, Myntra, Flipkart, and Amazon, among others, have captured this opportunity. The poll brings one to the conclusion that the problem can be viewed from multiple angles in order to identify the main goal for chatbot usage, the extent and the peculiarity of these systems, and their effect on the public. It indicates application of chatbots in customer service and marketing tactics in general, and in improvement of user experience. Ultimately, chatbots do more than that. They are becoming the necessary ingredient in the making of the customer-oriented ecosystem and the successful communication in the digital age.

[5] Lopez, T., & Qamber, M. (2022). The benefits and draw students at Jonkoping University. The literature shows the change in chatbots from the keyword matching to the complex conversation interfaces within the limits of the marketing and education sector. Chatbots are making a mark in the business world where they're employed in firms like Reliance, Myntra, and Amazon. The effective use of AI in these customers' applications is what creates impact. Education domain puts chatbots to good use through high levels of engagement and learning outcomes with less smoothness about the user's trust. According to some studies the advantages of the chatbot integration in the MOOCs are evident already, but more research is needed to fill the gaps of knowledge on overall effects. The inclination of chatbots is quite high among younger people, which implies that their birth rates will increase in the future.

[6] Patel, D., Shetty, N., Kapasi, P., & Kangriwala, I. (2023). College enquiry chatbot using conversational AI. International Journal for Research in Applied Science &
Engineering Technology (IJRASET), 11(5). This literature review will cover the territory of college search chatbots that enables students to receive fast and convenient answers on major subjects quickly. It elaborates the integration of chatbots created with AI based algorithms which are utilized in SDA bot so as to amplify the whole experience and handover repetitive roles to the students. The analysis then goes further to contrast the competence of Azure versus chatbots with rule-based and Rasa chatbots showing that Azure is appropriate for massive conversational AI applications. By analyzing various projects applies the methods of ML, NLP and AIML, then draws the strengths, weaknesses and college settings.

[7] Bansal, Latesh, et al. "PLACEMENT PORTALS WITH APPIAN." (2023). The Placement Driver project has been instituted to increase efficiency in job search for students of the organization. An access to

such information through the dedicated website of the college is very much convenient and can easily be done by the students who are interested in placements. In this regard, the subunit provides such information as the companies recruitment procedures, which puts students in a better position to learn the basics for their interviews. Similarly, the website will showcase a question bank which will address the students on the most commonly asked interview questions, providing them with a coordinated way to perfect their interview skills. With this resource, students will be able to learn about the requirements of recruiters and carry out appropriate responses so that they could claim these jobs. In addition to the main functions of the Placement Driver website, other features like a forum for conversations and interactions among students will beincorporated where students can talk, seek information from fellow students and professionals. This platform by its nature gives a hint of community where knowledge is passed on and shared thus improving the confidence of the students before their real time placement.

[8] Vardhan, Alaukika, et al. "EDUSPACE–A SIMPLE PLACEMENT PREPARATION SITE."The modern business world is a competitive place, anybody who is looking to develop a successful career must be prepared for this. Students are supported by building a web platform with a lot of resources such as handouts, tips, advice chats, educational information, videos designed to help them during the placements. The aim of the platform is to enhance the readiness of the course for business registration and help the placement team to see the promising researchers who require development of their skills and relationships. It is a hub that contains all pages for the placement resources such as job descriptions, professional cover letters and resumes, interview preparation tips, and tips on how to get the employer to love you. This architecture is achieved through integrating extensive information which eases job search and researchers can begin their careers with full confidence.

[9] Godiwala, Bhumi, et al. "Training and placement cell android application." Proceedings of the 3rd International Conference on Advances in Science & Technology (ICAST). 2020
Placement and Training (PAT) cell is the bridge between the students and companies that visit the campus for recruitment so that all PAT cell information and activities are important . By automating critical PAT cell tasks such as displaying notifications, holding student information, student qualifications, company requirements, training sessions, schedule of interviews, planning seminars, etc. The program aims to reduce human resources and errors. To achieve that automation, we developed an Android framework. The proposed system is an Android application to monitor mobile student information and keep them up to date on the latest activities at the college,recruitment drives etc . The program will be used by the students, teachers and parents.

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III. Existing System

Students often find it difficult to go through the process of preparing for an interview and although the use of applications such as Glassdoor, indeed and Geeks for Geeks available is useful, but also raises many challenges. Nonetheless, if one only wants to find a specific information, for example, which preparaton strategy is better – he or she will have a quite hard time finding the necessary information on these platforms. This issue arises from the fact that there is an overwhelming number of materials, and finding the necessary information takes considerable time while its search is accompanied by the risk of being misleading due to the variety of the sources and materials available for the given topic. In essence, if the students are not careful and diplomatic, especially in coordinating their searching strategy, they might fail to get some vital pieces of information; thereby, diluting their preparation process.

Glassdoor is an extremely popular American website which allows current and former employees to publish sensitive reviews of companies. It provides a more extensive employment index and allows candidates to find jobs, learn about an organization's reputation and employees' experiences, salaries, interviews, and benefits, based on other people's experiences. Another key facet of Glassdoor is that it offers a deeper look into the interview procedures, which aids in preparation for the experience. However, what can become a quandary is the fact that there are a lot of reviews and recommendations posted online, and it becomes quite difficult to sift through them to locate the best information that would be suitable for a certain kind of job or a certain company. This may pose a challenge to frail students who need time and intense preparation as a result of the limited time.

Indeed is another major one which started in November, 2004, and is a job search engine which is used on hundreds of job boards, recruitment agencies, associations, company's recruitment web sites, etc.
Headquartered in Austin, Texas, Indeed is a wholly owned subsidiary of Japan Based Recruit Holdings Co., Ltd.; it primarily monetizes through hiring partnering companies access to enhanced job listings and resume databases. It also provides users with an application feature for sending in their resume and applying for a certain job. Although the website is equipped with a large listing of potential employers, as well as simple and easy to navigate, students may not be able to find specific interview preparation guidelines among the numerous advertisements for job vacancies. This is because selecting the relevant information from such a vast amount of information may sometimes be tiresome as well as time-consuming.

Geeks for Geeks is an online platform that addresses people, especially students preparing for technical examinations and placements. It provides a list of numerous articles that have been contributed by people

who have worked out on their placements along with technical inputs. Though this platform is awesome due to completely focused content, the key issue is that the number of articles is considerably large in terms of quantity; therefore, students have to devote considerable time to find and gather the relevant information. The process described above can be very time consuming and can become even more irritating when
the students are preparing for interviews and the time is already running out.

Across all these platforms, one common issue stands out: Overstimulation of information The term comes from the abbreviation of two words, Information and Stimulation derived from overstimulation of Information. This confusion is painful in the
sense that the student is overwhelmed by the amount of information that is required in the interview and the amount of resources available as sources of information. Due to the increased amounts of information, it is also exhaustive and rife with potential errors – sometimes students may lose important pieces of information or fail to notice useful tips amidst overwhelming volumes of material.

Understanding these considerations as burdens and barriers, it was decided to create a new system that can possibly help students prepare for the interview more effectively. This format will allow our system to gather all the current information sources in our subject area, and present them in an easily searchable and approachable manner. It is because of this that we will work to concentrate the content which we provide to one subject and make sure that it is as short and sweet as possible, allowing for the removal of wasted time and effort that is currently inherent in the current platforms. The intention of our work is to design a system that enables students to navigate the pool of information available in a way that streamlines the preparation process and can potentially increase the likelihood of gaining employment in a particular occupation. As many candidates are troubled with the problem of information overload, our system will help the students to find the necessary information quickly and assure them about potential job offers, thus preparing them for the interview confidently. This innovation will bring significant changes to the interview preparation experience, which will be beneficial for the student as this tool will be useful in helping them prepare effectively for the job market while helping them save time and minimize errors they would make during the preparation process.

IV. Proposed System

A. *Objectives:*

- To build a chatbot which helps the students during their interview preparation.
- To collect information from the seniors regarding their placements.
- The information include number of rounds, questions asked in each round and how to prepare for each round.
- The information gathered from the seniors is stored in a text file.
- The Machine Learning model is trained using the text file with the help of Google Gemini API Pro.

B. *Approach:*

- *Data Collection:*

The data is collected from the seniors. We have a form on our website which collects

the information from the seniors. In the form we collect the details such as name of the company, number of rounds and for each round we collect the information such as topics from which questions asked in each round, questions which are asked in each round and how to prepare for each round. This process is very essential to gather information to train the chatbot.

- Preprocessing:

For the preprocessing we use the Recursive Character Text Splitter library. The library here is LangChain. This library in turn can be helpful if we plan to split a large document into smaller parts. Two key parameters are: chunk_size and chunk_overlap parameter.

chunk_size: This includes provision for themaximum size of the text chunk.

chunk_overlap: The amount of characters overlapped between the adjacent chunks to support the context continuity.

- Generate Embeddings and store in FAISS Database:

Text embeddings are condensed vector representations with meaning information of the text. The vectors are used in different NLP tasks such as comparison, search and text analyzation with a qualitative and relational effectiveness. Google's Generative AI models make semantic representations at a high level of quality possible due to the implementation of advanced ways of embedding.

Key Functionalities:

Model Selection: Pick up one of the models, for example, from the available ones that create the embeddings. Here the embedding model-001 is clicked.

Embedding Generation: Turn the text regions of different sizes into dense vectors which encode the meaning of the words.

Integration with Vector Stores: Analyze

and accumulate these embeddings into a vector database with ease such as FAISS.

- Creation of conversational chain: Prompt Template:

There is a prompt template which is a predefined code and which is used to define a model about how to organize its replies.

The sentence chosen here contains the prompt template that tells the model to give elaborate responses. The prompt passes further information about context and question appearing in the sentence. If the answer isn’t available among the lines, the model is taught to say "answer is not available in the context".

AI Model:

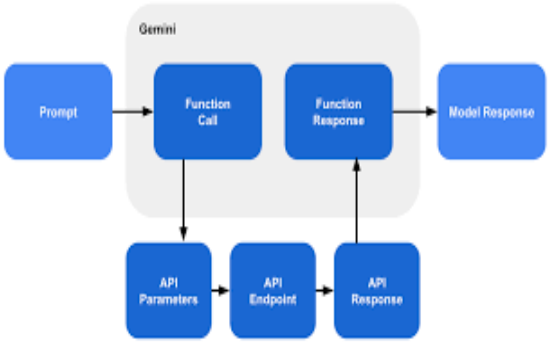
The appropriate AI model employed is called ChatGoogleGenerativeAI with model ID: gemini-pro.

The system is installed at a temperature of 0.3. As has been mentioned above, depending upon the nature of the system requirements and facilities, the installation process may vary accordingly. The third constituent is the function, however, having to do with the depths and randomness of output in relation to NN architecture, is commonly taken to mean the function. Predictability, which is higher at lower technical analysis values, is the other aspect to note.

Question-Answering Chain:

load_qa_chain is a function that loads the question-answering chain with the model

and the prompt type that is said. This chain will apply the procedure by using the contextual question and then we pass them to the model which will then proceed to provide an appropriate response.



V. Working

- Interactive frontend:

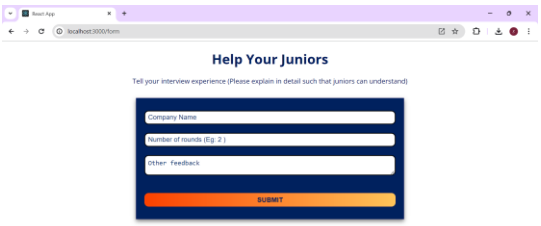
  The frontend is built using React Js to give the best user experience. The user interface is easy to navigate and explore.

- Home Page:

  The home page features the navigation to the various parts of the website and it also provides details of the website.

- Data Collection:

The data is collected from the seniors. We have a form on our website which collects the information from the seniors. In the form we collect the details such as name of the company, number of rounds and for each round we collect the information such as topics from which questions asked in each round, questions which are asked in each round and how to prepare for each round. After submitting the form, the content of the form will be stored in a text file.



Storing the data in text file:

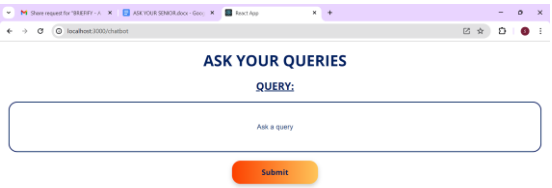
The data from the form will be stored in the text file to train the model. The model will train itself from the text file by learning by chunks.For the preprocessing we use the Recursive Character Text Splitter library. The library here is LangChain. This library in turn can be helpful if we plan to split a large document into smaller parts.

CHATBOT:

This chatbot is built using LangChain and Google Generative AI. The backend is designed using Flask. We will process the text file and convert it into manageable chunks. We will embed it using Google's Generative AI. We will store the embeddings in the FAISS vector database. We will handle the queries of the user by generating responses using conversational AI model. We have to secure the API key so we are using dotenv to load the environment variables.

The function ‘get_text_from_files’ is used to read the text from the file. Next we use the Recursive Character Text Splitter library from LangChain. The text is then taken from the file

and, using the ‘get_text_chunks’ from the Recursive Character Text Splitter, it is split into usable parts. This splitter function breaks down the text in to portions that are equivalent to 10,000 characters only. It has an overlap of 1000 characters when the end of text in the source language is aligned with the beginning or within the first 100 characters of the target language. This is used to ensure continuity from one chunk to another so that chunks make sense as smaller parts of a whole text. Splitter library from LangChain. The text from the file is processed using the ‘get_text_chunks’ from the Recursive Character Text Splitter. This splitter function divides the text into chunks which contain 10,000 characters. It has an overlap of 1000 characters. The overlap is used to preserve the context across the chunks. It is important for generating coherent responses.



VI . CONCLUSION

In regards to the technical aspects of this project, the key features of this application are effective combination of up-to-date technologies to ensure its users would have an opportunity to easily share and analyse the specific interview experiences. The frontend part developed using React JS guarantees good and efficient theming and browsing the website. I have incorporated a form in an attempt to make the process of data collection smoother in that it will involve seniors completing a form for each interview that has been conducted, which will entail company name, number of rounds, topics covered, questions asked, and any tips on preparing for an interview for the specific company. The collected data is then written to a text file for further processing of the data that has been collected.

For convenience and data processing, the preprocessing for this project is done by the Recursive Character Text Splitter library from LangChain. This also enables the text to be segmented into discreet portions, while keeping an eye on the overall context to guarantee reaction coherence.

The most significant component of the backend is the chatbot, developed with the help of tools including LangChain and Google Generative AI. The created with Flask, this application takes the text file as input, assumes it with Google’s Generative AI and store the insight in the FAISS vector database. It sustains to its responsibilities of handling users request by generating answers through an advanced conversational AI system, this makes interaction both strong and quick.

In summary, this project shows the well-discussed strategy of the collection, processing, and analysis of data for an interactive user experience. The use of React JS, LangChain, and Google Generative AI with other cutting-edge features added to the site ensure that the users who find themselves in the interface looking for interview preparation tips will have the best experience as well as secure data handling practices

VII. FUTURE ENHANCEMENT

Possible improvements for the “Ask Your Senior” project would be the development of a feature utilizing machine learning algorithms to generate the individual learning schedule for the particular user based on multiple parameters, including prior achievements. The extension of real-time chat support with seniors

and market specialists could also create a gear shift in social media interaction. Furthermore, the use of videos or webinars on how the placement test should be conducted can also help in learning. Some advantages include: Extending the functionalities of the chatbot to accommodate for multiple languages and regional organisations will lead to greater accessibility. Another advantage that can be obtained for students' training process is the application of machine learning in the correction of mock interviews and evaluation of their preparation. These enhancements can be viewed to be more of an expansion of the functionality and usefulness of the platform in order to optimize the abilities of students for placement.

REFERENCES

[1] G. T. P. Lauw, A. Lim, and K. Wang, "Text mining for the integration of information resources in e-learning systems," 2009 IEEE International Conference on Industrial Engineering and Engineering Management, Hong Kong, 2009, pp. 684-688, doi: 10.1109/IEEM.2009.5372950.

[2] J. Cross, J. Sheard, and M. A. Hamilton, "The role of online communities in student learning networks," 2012 IEEE Frontiers in Education Conference (FIE), Seattle, WA, 2012, pp. 1-6, doi: 10.1109/FIE.2012.6462410.

[3] S. Braun, A. Schmidt, and M. Walter, "A review on online peer support for students in higher education," 2016 IEEE Global Engineering Education Conference (EDUCON), Abu Dhabi, 2016, pp. 496-505, doi: 10.1109/EDUCON.2016.7474581.

[4] R. Sohail, T. Ali, and M. A. Shah, "A Chatbot for Facilitating Student Communication in University," 2018 14th International Conference on Emerging Technologies (ICET), Islamabad, Pakistan, 2018, pp. 1-4, doi: 10.1109/ICET.2018.8603556.

[5] A. Singh, R. Jain, and A. K. Das, "Development of a Campus Recruitment Training System Using Chatbot," 2018 IEEE 9th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON), Vancouver, BC, 2018, pp. 912-917, doi: 10.1109/IEMCON.2018.8614881.

[6] K. P. S. Bagade and V. H. Khachane, "AI-based Chatbot for Job Application Processing," 2020 4th International Conference on Electronics, Communication and Aerospace Technology (ICECA), Coimbatore, India, 2020, pp. 173-178, doi: 10.1109/ICECA49313.2020.9297392.

[7] H. F. Harb and M. M. Abdel-Aal, "Design and implementation of a smart chatbot for e-learning system," 2020 15th International Conference on Computer Engineering and Systems (ICCES), Cairo, Egypt, 2020, pp. 1-6, doi: 10.1109/ICCES51560.2020.9334704.

[8] J. S. Wu, C. M. Wu, and C. Y. Chen, "Using AI Chatbot to Assist the Career Counseling for College Students," 2019 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM), Macao, Macao, 2019, pp. 1242-1246, doi: 10.1109/IEEM44572.2019.8978731.

[9] T. K. R. Nanda, S. K. Kumar, and V. R. Kumar, "An Intelligent Placement Assistance System Using Chatbot," 2019 IEEE International Conference on Intelligent Techniques in Control, Optimization and Signal Processing

[10] S. B. Sathish and M. V. Kumar, "A study on artificial intelligence based chatbot for student counseling in universities," 2018 3rd International Conference on Communication and Electronics Systems (ICCES), Coimbatore, India, 2018, pp. 793-796, doi: 10.1109/CESYS.2018.8624555

[11] A. K. Reddy, P. Y. Reddy, and A. R. P. Kumar, "An intelligent chatbot for academic queries resolution in universities," 2017 International Conference on Intelligent Sustainable Systems (ICISS), Palladam, India, 2017, pp. 926-931, doi: 10.1109/ISS1.2017.8388823.

[12] S. Kumar and A. Verma, "Design and development of chatbot using natural language processing for higher education," 2020 International Conference on Inventive Computation Technologies.

[13] N. Sharma, S. Jain, and S. Singh, "A comparative study of chatbot technologies in educational domain," 2020 International Conference on Inventive Research in Computing Applications (ICIRCA), Coimbatore, India, 2020, pp. 261-266, doi: 10.1109/ICIRCA49075.2020.9209937

[14] S. K. Raj and A. Kumar, "Development of an AI-based chatbot for educational counseling and support," 2019 IEEE Calcutta Conference (CALCON), Kolkata, India, 2019, pp. 1-5, doi: 10.1109/CALCON47608.2019.9051204

[15] R. Singh, P. Sharma, and P. Sinha, "Implementation of AI-based chatbot for educational institute," 2021 5th International Conference on Intelligent Computing and Control Systems (ICICCS), Madurai, India, 2021, pp. 1131-1136, doi: 10.1109/ICICCS50460.2021.9443092.

[16] S. K. Saravanan and P. Sriram, "Smart chatbot for educational institution using natural language processing," 2020 11th International Conference on Computing, Communication and Networking Technologies (ICCCNT), Kharagpur, India, 2020, pp. 1-6, doi: 10.1109/ICCCNT49239.2020.9225502.

[17] R. Bhattacharya and S. Chattopadhyay, "A comparative study of AI-based chatbots for educational assistance," 2021 International Conference on Electronics, Communication, and Aerospace Technology (ICECA), Coimbatore, India, 2021, pp. 399-403, doi: 10.1109/ICECA52998.2021.9451704.

[18] A. K. Sharma and A. S. Thakur, "Development of a chatbot for student engagement in educational institutes," 2020 10th International Conference on Cloud Computing, Data Science & Engineering (Confluence), Noida, India, 2020, pp. 274-279, doi: 10.1109/Confluence47617.2020.905443

[19] S. Verma and R. R. Mishra, "An AI-based

chatbot for student support services in higher education," 2021 5th International Conference on Advanced Computing & Communication Systems (ICACCS), Coimbatore, India, 2021, pp. 382-387,

[20] H. F. Harb and M. M. Abdel-Aal, "Design and implementation of a smart chatbot for e-learning system," 2020 15th International Conference on Computer Engineering and Systems (ICCES), Cairo, Egypt, 2020, pp. 1-6, doi: 10.1109/ICCES51560.2020.9334704.