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Docent Cyborg-Genai in Museums

N. Prashanth[1], S. Praveen[2], R. Sanjay[3], Dr. K. Baskar[4], Mrs. S. Sangeetha[5]

3rd Year AI & DS, Kongunadu College of Engineering, and Technology Tamil Nadu, India[1,2,3]

Associate Professor Department of AI & DS, Kongunadu College of Engineering, and Technology Tamil Nadu, India[4]

Assistant Professor Department of IT, Kongunadu College of Engineering, and Technology Tamil Nadu, India[5]

ABSTRACT: Majority of the population seems to prefer visiting shopping malls and parks over museums although it is a home to a wealth of cultural treasures. The complete history behind each artefacts have not provided to the visitors with proper guide. AI has the potential in transforming the exposing way of museums with a personalized experience, increasing visitors happiness and engagement. A solution can be built using generative AI technology to overcome the lack of appropriate information on artefacts and the limited interactivity of existing chatbots in the museums. A chatbot is made with text generating information functionality. This could give better exposure about artifacts which will improve the visitor's experience. The visitor can engage with the chatbot which also includes a textbox. The chatbot is connected to internet in wireless manner, and when a visitor asks any inquiries or information about the artefacts, then the input is picked up by the chatbot and sent to a server, where the request is received. The server sends the response to the chatbot with help of trained model, which will be delivered to the visitor.

KEYWORDS: Generative AI, Museum Experiences, Chatbot Systems, Educational Value, Interactivity.

I. INTRODUCTION

Many museums struggle to give visitors with detailed and complete information about the artefacts on show. Visitors frequently want to know more about the historical, cultural or scientific relevance of the artefacts but, they are met with insufficient or incomplete information. So, This deficiency reduces the overall educational value and engagement of the museum experience. Furthermore, while some museums have deployed chatbot systems to assist visitors, these chatbots sometimes lack in interactivity and fail to provide a pleasant user experiences.

They may deliver pre-defined solutions which are unable to answer precise questions, resulting in a less immersive and participatory experience for visitors. A solution can be built using generative AI technology to overcome the lack of appropriate information on artefacts and the limited interactivity of existing chatbots in the museums. A chatbot is made which assists the visitor. This could give better exposure about artifacts which will improve the visitor's experience. The visitor can engage with the chatbot in their navigation pathways and it includes the interactive mode via its display, which also includes a textbox. The chatbot is connected to internet in wireless manner, and when a visitor asks any inquiries or information about the artefacts, then the input is picked up by the textbox and sent to a server, where the request is received. The server sends the response to the chatbot with help of trained model, which will be delivered to the visitor.
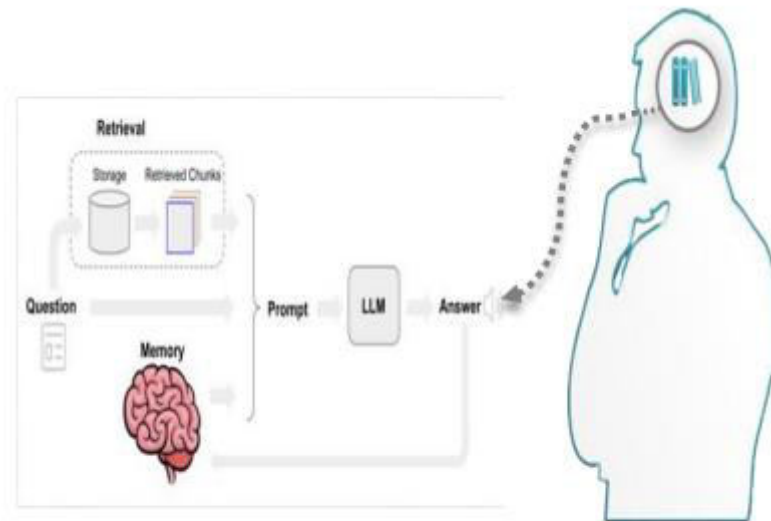
FIGURE 1. INTRODUCTION OF DOCENT CYBORG

The initiative, which addresses several facets of cultural and educational enrichment,has great social value since it attempts to transform museum experiences with generative AI technology. Museums play a crucial role in protecting our cultural heritage as they house priceless artifacts. The project's emphasis on improving visitor experiences supports the larger goal of raising public awareness and preserving cultural heritage. Through the use of AI-guided data, the project transforms into a catalyst for education, sharing granular and individualized insights that transform museum visits into chances for increased public awareness. The project also promotes accessibility and inclusivity, making it possible for people with impairments or language challenges to interact meaningfully with historical artifacts. It brings cultural institutions into line with the current era and draws in a skilled in technology audience by representing a technology improvement in those organizations. The focus on increased involvement promotes a lifelong learning attitude and active investigation and comprehension of our cultural history in addition to increasing visitor enjoyment. The project surpasses its initial objective by fortifying neighborhood ties and bolstering local economies via heightened tourism, symbolizing a socially noteworthy endeavor that corresponds with wider societal goals.

II. LITERATURE SURVEY

Artificial Intelligence (AI) is becoming more and more important in cyber security. A Chief Information Security Officer (CISO) needs a wide range of knowledge about Cyber Security solutions, current events and incidents in the industry, and the latest advancements in the field in order to perform their role, support their team in carrying out various tasks related to Cyber Security, and assist their management with a Cyber-resilient organization. Because of this, CISOs need to invest a lot of time in learning in order to carry out their responsibilities and effectively manage and avoid threats for their companies. This study investigates if ChatGPT, an AI-based Chat Generative Pre-Trained Transformer, can support CISOs in their duty. and if they can effectively use it as a tool to carry out their roles are examined.

In order to reconcile data realism with privacy preservation, this research article investigates the use of Generative Artificial Intelligence (GAI) approaches to construct synthetic medical datasets. Due to the sensitive nature of medical records, GAI offers a possible solution to the problems with data access and sharing. In order to assess StyleGAN2, CLIP, T5, ViT, and customized Tabular GANs, the study looks at five important methods in three important areas: distribution fidelity, attribute correlation preservation, and pattern recognition accuracy. The outcomes show the advantages and disadvantages of each method for producing accurate medical data. StyleGAN2, CLIP, and T5 are excellent in every way, which makes them perfect for a range of uses that call for premium synthetic medical datasets. Specialized Tabular GANs exhibit potential but differ in performance, whereas ViT shows promise but may require

fine-tuning for particular use cases. This examination of comparisons offers For scholars and professionals working at the nexus of healthcare data production and generative artificial intelligence, this comparative analysis offers insightful information. It highlights how generative AI may be used to address the problem of tabular data generation in medical records by providing practical and private-minded solutions for data use and model training.

AI has impacted many facets of people's life because to the quick development of technology and the growth of data that is available. Large Language Models (LLMs) are accomplishing a high degree of communication with humans while also improving answer accuracy. One example of an LLM is ChatGPT. These AIs can help businesses with a variety of duties, such as customer support and paperwork, by enabling them to react to consumer requests in an effective and reliable manner. Additionally, depending on the training data, AI is predicted to be utilized in business to generate a wide range of digital resources, including texts and photos. But there are also moral questions raised by AI's extensive deployment. It is important to carefully assess the possibility of inadvertent bias, discrimination, and the ramifications for privacy and security. Consequently, even if AI can make our lives better, it also has the potential to make social inequities and inequality worse. This essay seeks to investigate and evaluate the unexpected consequences of artificial intelligence on society. When developers and users are aware of the possibility of unexpected results, they can implement the necessary safety measures. Such trials are crucial to reducing the possible adverse social effects of AI use, accountability, and transparency. We will also talk about ethical and social issues in an effort to identify long-term AI solutions.

Without a doubt, the pinnacle of digital transformation in 2022 has been the development of Generative AI (GenAI) models. Understanding the effects of various GenAI models, such as ChatGPT and Google Bard, from a cybersecurity standpoint is crucial as they develop in complexity and capability. Recent events have shown how GenAI capabilities can be used in both offensive and defensive cybersecurity scenarios, with an emphasis on the technology's ramifications for privacy, society, and ethics. The limitations, difficulties, dangers, and possibilities of GenAI in the fields of cybersecurity and privacy are highlighted in this research study. The work exposes ChatGPT's flaws, which malevolent users can employ to exfiltrate harmful data and get over the model's ethical limitations. The document presents examples of successful assaults on the ChatGPT, including quick injection attacks, reverse psychology, and jailbreaks. The paper also explores the scenarios in which adversaries could use ChatGPT to create social engineering attacks, phishing attacks, automated hacking, attack payload generation, malware creation, and polymorphic malware. It also looks into how cyber offenders could use GenAI tools to develop cyberattacks. After that, this paper looks at defense strategies and how GenAI tools can be used to enhance security measures. These strategies include automating cyber defense, reporting, threat intelligence, secure code generation and detection, attack identification, creating ethical guidelines, creating incident response plans, and detecting malware. We will also talk about ChatGPT's ethical, legal, and social ramifications. The study concludes by outlining unresolved issues and potential paths forward to ensure the security of this GenAI.

A country's historical monuments, which portray its art, legacy, historical significance, custom, culture, and lessons, define its cultural heritage. The significance and worth of heritage monuments extend beyond the current era and are linked to earlier periods when people were able to connect with the past. Artificial Intelligence (AI) has grown dramatically in the automation space in recent years due to technological advancements. In order to employ technology for heritage monument conservation, preservation, restoration, and awareness-raising, it is now necessary to use and integrate it in the field of digital heritage and monuments. The proposed study has concentrated on the multiclassification of Indian monuments in order to close this gap. hybrid convolutional neural networks (CNNs) and long short-term memory (LSTM) models for the purpose of multiclassifying well-known Indian cultural landmarks after they have been recognized. The entire study was split into two main sections: the binary classification of Indian monuments, which produced an accuracy of 92.37% when used to identify heritage Indian monuments, and the multi-classification of Indian monuments into four additional classes, which produced an accuracy of 95.89%. The remarkable accuracy outcomes for both categories of classification have validated the effectiveness of the DL model for image-based classification tasks pertaining to Indian monuments. Furthermore, for readers and experimenters in the aforementioned domain, the proposed effort aids in improved quality of life, community betterment, and technology transfer.

An efficient framework for handling difficult processing jobs on massive data sets is Apache Spark. It can be used independently or in conjunction with other distributed computing tools to divide up data processing work among

several compute instances. The requirement to complete intricate feature engineering and pre-processing, as well as model training quickly, has become essential due to the growth of machine learning models and the volume of data being processed. A cluster of compute instances demonstrates a notable performance gain to enable faster data processing when compared to a single compute instance. Utilizing a cluster arrangement comes at a very high total cost because a cluster is made up of several compute instances (Worker Nodes) that are coordinated by a Master Node.However, because some clusters, such as Databricks and EMR, are managed by the cloud platform and offer the option of pay as you use, it is evident that there is a huge cost decrease. The cluster can be configured to deliver optimal performance at reduced costs, contingent on workload. However, designing a cluster requires a high level of technical expertise and experience, and this process is manual. The method that is being provided demonstrates the automation of the cluster selection process,by creating a recommendation engine based on GEN-AI. Conditional generative adversarial networks (cGANs) are introduced in this work, and they are employed to generate additional samples from the joint distribution of sparse custom training data. The recommendation engine recommends the instance type for the master and worker nodes as well as the required number of worker nodes based on the data burden, anticipated usage duration, and budget that are provided.

III. PROPOSED METHODOLOGY

Many museums struggle to give visitors with detailed and complete information about the artefacts on show. Visitors frequently want to know more about the historical, cultural or scientific relevance of the artefacts but, they are met with insufficient information. Implementing a chat Generative AI can be done without creating huge LLMs as it has limited data on some specific domains. So, This deficiency reduces the overall educational value and engagement of the museum experience. Future trending technologies was incorporated like LangChain, Hugging Face, GPT Models. The ultimate goal is to design a chatbot called "Chit Chat" using generative AI and robotics for museums. The AI model within that Chit Chat is trained to answer any questions about the artifact. To achieve this, Langchain have been used to create the model which uses OpenAI's GPT-LLM model. For responding the visitors question, this trained model will retrieve the required data/answer from a vectorstore which contains the info about the artifacts in that museum. The vectorstore will contain the data about the artifacts, which is loaded in a text file. The role of the LLM is to provide meaningful answers to questions asked by visitors about the artifacts and to maintain the flow of the conversation. Finally, a chat interface has created using Gradio. Also, to enhance the user experience, the visitor can ask questions through Textbox then, a text generation module will convert the text as an input and give it as the input to the model. This whole application will be loaded on a display of a Self phased chatbot that can move taken with with the user and will always be ready to clear the queries of the visitor.

IV. TECHNOLOGIES USED

1. LANGCHAIN:
LangChain is a framework that helps developers create applications using large language models (LLMs). One of the most common ways to use LangChain is to convert local data to a vectorstore. This allows LLMs to access and process local data more efficiently. After the data is connected to the LLM, it can be used to create a variety of applications, such as chatbots, question answering systems, and summarization tools.

2. OPENAI:
OpenAI provides an API that allows developers to connect to their LLMs. This API is like a bridge that connects the developer's computer to the LLM. Once the bridge is built, the developer can send requests to the LLM and receive responses. To use the API, the developer needs to create an OpenAI account and get an API key. The API key is like a password that allows the developer to access the LLMs.

3. CHROMADB:
ChromaDB is a vector database that can be used to store and query large amounts of data. To use ChromaDB to create a generative AI model with local data, you would first need to convert your data into a vector format. Once the data is in vector format, it can be stored in ChromaDB.

4. GRADIO:

Gradio is a tool that allows developers to create interactive web applications that use machine learning models. To use Gradio, a machine learning model should be created first. Once the model is created, it can be exported to a format that Gradio can understand. Gradio supports a variety of formats, including TensorFlow SavedModels, PyTorch Models, and more Models.

5. OUTPUT:

The input is picked up by the textbox and sent to a server, where the request is received. The server sends the response to the chatbot with help of trained model, which will be delivered to the visitor.
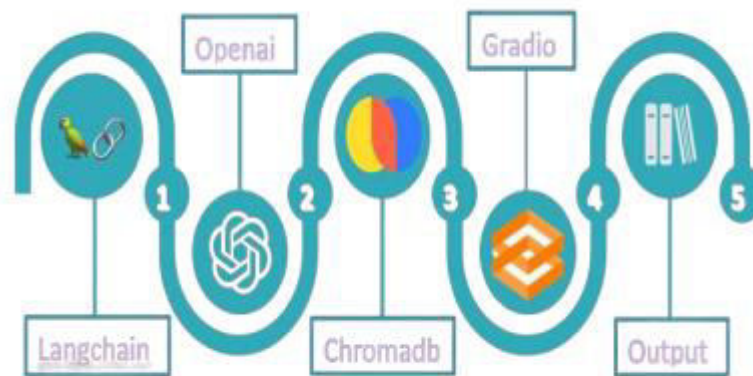

FIGURE 2. TECHNOLOGICAL ARCHITECTURE

WHY GENAI?

Generative AI can be very interactive to the visitors and can enhance the experience of the visitors. It can make conversations in a flow with the reference to the previous context. Overall, the knowledge about the artefacts can be delivered precisely. With the Gen-AI and Robotics Technology, this "Chit Chat" Robotic Bot will give the better visitors satisfaction with its effective responses of trained AI model.

CHIT CHAT BOT:

• The Gen-AI trained model establishes an interactive conversational chatbot interface using the gradio library. This chatbot utilizes components from the langchain library, OpenAI GPT-3 model and a VectorStore-based index for conversation retrieval.
• Users engage with the chatbot by entering text queries in a dedicated textbox. The main function, main_func, orchestrates the core logic and it maintains a chat_history to track conversation context and history.
• Depending on the persistence setting (PERSIST), the code either loads an existing or creates a new VectorStore index, offering efficient data storage and retrieval. Conversation history is managed through ConversationBufferMemory, which preserves the interaction flow.
• The most important part of the chatbot lies in the ConversationalRetrievalChain, which harmonizes the OpenAI model, the VectorStore index, and conversation memory. It ensures that responses align with previous interactions and relevant data. The gr.ChatInterface encapsulates the user interface, encompassing the chatbot and textbox. Users input queries, which are processed by the main_func, and responses are then displayed.

V. RESULT AND DISCUSSION

Generative AI can be very interactive to the visitors and can enhance the experience of the visitors. It can make conversations in a flow with the reference to the previous context. Overall, the knowledge about the artefacts can be delivered precisely. With the Gen-AI Technology, this "Chit Chat" Chat Bot will give the better visitors satisfaction

with its effective responses of trained AI model. The idea behind the proposed project is to leverage generative AI technology to transform museum visits in a big way. By building an extensive database of item details, including historical background and cultural relevance, and utilizing cutting-edge AI models to enable lively and interactive dialogues, the program seeks to improve the tourist experience.

A major emphasis will be on personalizing the user experience, adjusting interactions to suit unique tastes, and guaranteeing accessibility via an easy-to-use interface. Prioritizing security and privacy protocols, the project entails building a strong wireless infrastructure for smooth connection with a centralized server. In order to seamlessly integrate into the current infrastructure, which includes audio-visual displays, cooperation with museums is important. The scope is completed by maintenance and continuous improvement plans, as well as analytics software to monitor visitor interaction.

The project's flexibility and scalability will be essential to its ability to grow with new technologies and accommodate different kinds and sizes of museums. Fundamentally, the initiative aims to employ innovative technology and careful design to turn museum visits into engaging and instructive experiences. The project showcases the section showcases the technology architecture, which integrates natural language processing, machine learning algorithms, and a knowledge base of artefact information. The low-level design focuses on defining the user interface, conversation flow, and response generation mechanisms. The MVP working model demonstrates the core functionalities of the chatbot system, including real-time interaction with visitors, personalized recommendations, and continuous learning capabilities.

Tourists and travelers will pay more attention to museums It provides an efficient method for studying museums. Provides better assistance Gives detailed information about the artefacts Stays with the visitor the entire time. Capable of answering all of the visitor's questions.

Provides better assistance . Gives detailed information about the artefacts. Stays with the visitor the entire time. Capable of answering all of the visitor's questions It made an efficient method for studying museum and Provides better assistance. This chit chat chatbot will be implemented to various museums to give detailed information about the artefacts. It stays with the visitor for the entire time and engage the user/visitor/guest queries and classifications. It makes high business market potential as Tourists and travellers will pay more attention to museums. AI trained robot model is powered by a significant language model, which means that it has access to a vast amount of information about the artifacts in National Museum of India.

FIGURE 3. OUTPUT OF CHIT-CHAT CHATBOT

FIGURE 4. OUTPUT CHIT-CHAT CHATBOT

V. CONCLUSION

In fact, generative AI technology offers museums a game-changing chance to improve visitor experiences in previously unthinkable ways. Museums may close information gaps, encourage individualized connections, and provide visitors more interesting and instructive experiences by integrating AI-powered chatbot systems into their exhibitions and educational initiatives. Generative AI offers museums a number of benefits, one of which is the creation of personalized and interactive experiences. With the use of generative AI, chatbots can hold lively discussions with users and customize material to suit their unique tastes and interests.

Because of this personalisation, museums are able to serve a wide range of patrons and guarantee that each visitor will have an engaging and memorable experience. AI-driven chatbots can give multimedia information, answer inquiries, and provide more historical context may adjust to the visitor's needs and interests. Furthermore, museums can apply generative AI to get beyond restrictions in conventional information delivery methods. Chatbots can dynamically and conversationally convey information in place of static displays, brochures, or audio guides. In addition to filling in knowledge gaps, this improves interaction and enjoyment in the learning process. Aside from receiving real-time updates on exhibits, visitors can explore further into particular themes of interest and even participate in interactive learning activities enabled by AI.

Incorporating generative AI technology has the ability to completely transform the entire museum visitation experience. Chatbots with AI capabilities, for example, can help guests make their way around a museum by directing them to the exhibitions, restrooms, and other amenities. They can also provide context-sensitive information, such as historical context for objects or artworks, raising the visit's educational value. Moreover, the information gathered from conversations with AI chatbots can be used to personalize and enhance subsequent museum visits. Museums can continuously improve their educational programs and exhibitions by analyzing customer preferences, commonly asked questions, and areas of interest. Through this iterative process, museums may adjust to changing visitor expectations and maintain a dynamic and relevant experience.

In conclusion, the incorporation of generative AI technology—especially through chatbot systems—has the potential to completely transform museums by offering tailored, engaging, and instructive experiences. Museums may close knowledge gaps, have meaningful conversations with visitors, and provide a more engaging and joyful learning environment by utilizing AI surroundings. The potential to improve museum interactions using generative AI is expected to grow as technology develops, providing even more ground-breaking and inventive solutions in the future.

REFERENCES

1. Role of Artificial Intelligence based Chat Generative Pre-trained Transformer (ChatGPT) in Cyber Security S. Guru Prasad; V. Ceronmani Sharmila; M.K. Badrinarayanan 2023 2nd International Conference on Applied Artificial Intelligence and Computing (ICAAIC), 2023.
2. Comparative Analysis of Generative AI Techniques for Addressing the Tabular Data Generation Problem in Medical Records S. S. Aravinth; S. Srithar; K. Pranay Joseph; U. Gopala Anil Varma; G. Madhu Kiran; Venkatesh Jonna 2023 International Conference on Recent Advances in Science and Engineering Technology (ICRASET), 2023.
3. Dhanabal. S, Baskar. K, Sangeetha. S and Umarani. B, "Handwritten Digits Recognition from Images using Serendipity and Orthogonal Schemes," 2022 2nd International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE), Greater Noida, India, 2022,pp.139-141,doi: 10.1109/ICACITE53722.2022.9823637.
4. Generative AI for Radiological Image Data: Current Trends and Outlook Ji-Won Han; Yeon-Joon Lee 2023 14th International Conference on Information and Communication Technology Convergence (ICTC), 2023.
5. K. Baskar, G. K. D. Prasanna Venkatesan, S. Sangeetha and P. Preethi, "Privacy-Preserving CostOptimization for Dynamic Replication in Cloud Data Centers," 2021 International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE), Greater Noida, India, 2021,pp.927-932,Doi: 10.1109/ICACITE51222.2021.9404573.
6. Heuristic Analysis for Security, Privacy and Bias of Text Generative AI: GhatGPT-3.5 case as of June 2023 Takuho Mitsunaga 2023 IEEE International Conference on Computing (ICOCO), 2023.

7. From ChatGPT to ThreatGPT: Impact of Generative AI in Cybersecurity and Privacy Maanak Gupta; Charankumar Akiri; Kshitiz Aryal; Eli Parker; Lopamudra Praharaj Year: 2023.

8. K Baskar, S Muthuraj, S Sangeetha, K Vengatesan, D Aishwarya, PS Yuvaraj, "Framework for Implementation of Smart Driver Assistance System Using Augmented Reality", International Conference on Big data and Cloud Computing, Springer Nature Singapore, 2022.

9. IoT and AI-Driven Conceptual Model of Museum Ecosystem Shinta Puspasari; Indah Agustien Siradjuddin; Rachmansyah; M. Ade Fahtu Rahman; Ditho Haversyalapa 2023 International Conference on Electrical Engineering and Informatics (ICEEI), 2023.

10. Interactive Communication Robot Handling Crowd Management and Content Delivery in Museums Employing Crowd Counting Shatadal Ghosh; Abheesht Roy; Nataraj Dasgupta; Manash Bagchi; Arnab Chatterjee; Niloy Kumar Das 2023 2nd International Conference for Innovation in Technology (INOCON), 2023.

11. K Baskar, GKD Venkatesan, R Jagatheswar, S Parthiban, " A Lightweight Secure Data Sharing Scheme for Mobile Cloud Computing", Grenze International Journal of Engineering & Technology (GIJET), 2019. 12. A Hybrid Deep Learning Approach for MultiClassification of Heritage Monuments Using a RealPhase Image Dataset Vinay Kukreja; Rishabh Sharma; Satvik Vats 2023 5th International Conference on Inventive Research in Computing Applications (ICIRCA), 2023.

13. Are We Ready to Embrace Generative AI for Software Q&A?Bowen Xu;Thanh-Dat Nguyen;Thanh Le-Cong;Thong Hoang;Jiakun Liu;Kisub Kim;Chen Gong;Changan Niu;Chenyu Wang;Bach Le;David Lo 2023 38th IEEE/ACM International Conference on Automated Software Engineering (ASE), 2023.

14. Generative AI-Powered Spark Cluster Recommendation Engine Arpana Dipak Mahajan; Akshay Mahale; Amol S Deshmukh; Arun Vidyadharan; Vijeth S Hegde; Koushik Vijayaraghavan 2023 Second International Conference on Augmented Intelligence and Sustainable Systems (ICAISS), 2023.

15. R Pavithra, Dr R Asokan, K Baskar, "Improving Privacy And Dynamic Updation Using Ranked Search Over Outsourced Cloud Data", International Research Journal of Engineering and Technology (IRJET), 2016.

16. Implementing Generative AI and Large Language Models in Education Neil Anderson; Aidan McGowan; Leo Galway; Philip Hanna; Matthew Collins; David Cutting 2023 7th International Symposium on Innovative Approaches in Smart Technologies (ISAS), 2023.

17. Smart Museum Collection and Analysis for User Online Behavior Ruiwei Meng; Huabiao Li; Yanyan Guo; Yu Wu; Nuo Cheng; Linxian Hao 2022 International Conference on Culture-Oriented Science and Technology (CoST), 2022. \

18. S. Sangeetha, K. Baskar, P. C. D. Kalaivaani and T. Kumaravel, "Deep Learning-based Early Parkinson's Disease Detection from Brain MRI Image," 2023 7th International Conference on Intelligent Computing and Control Systems (ICICCS), Madurai, India, 2023, pp. 490-495, doi: 10.1109/ICICCS56967.2023.10142754.

19. A Low Cost Virtual Guide for Next Generation Smart Museums Shatadal Ghosh; Abheesht Roy; Sriparna Saha 2021 International Conference on Recent Trends on Electronics, Information, Communication & Technology (RTEICT), 2021.

20. Safer museum guide interaction during a pandemic and further Using NLP in human interactive museum visits : Museum guide Chatbot Laura Ceuca; Ana Rednic; Emil Ștefan Chifu 2021 IEEE 17th International Conference on Intelligent Computer Communication and Processing (ICCP), 2021

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