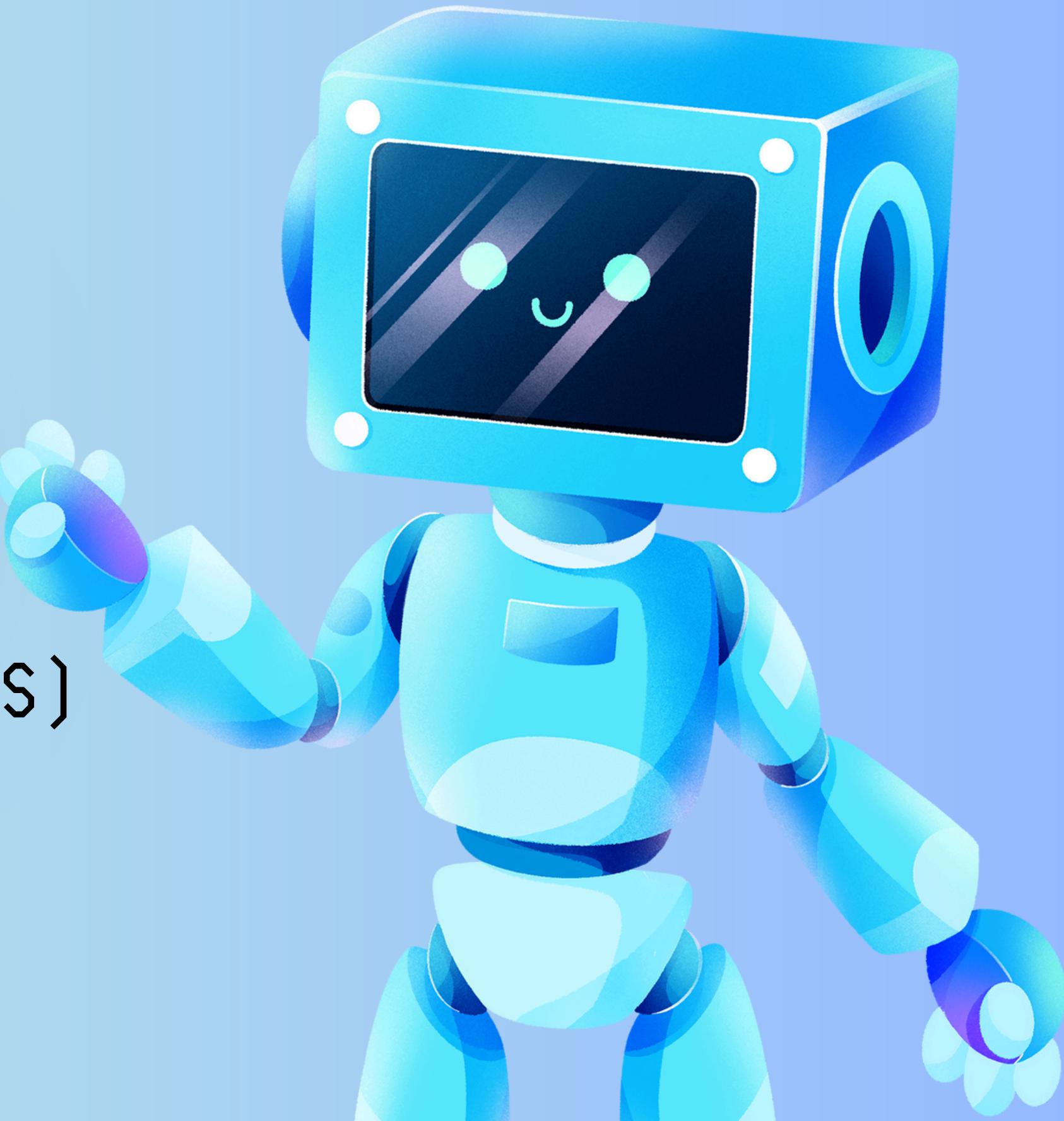


# CHAT BOT

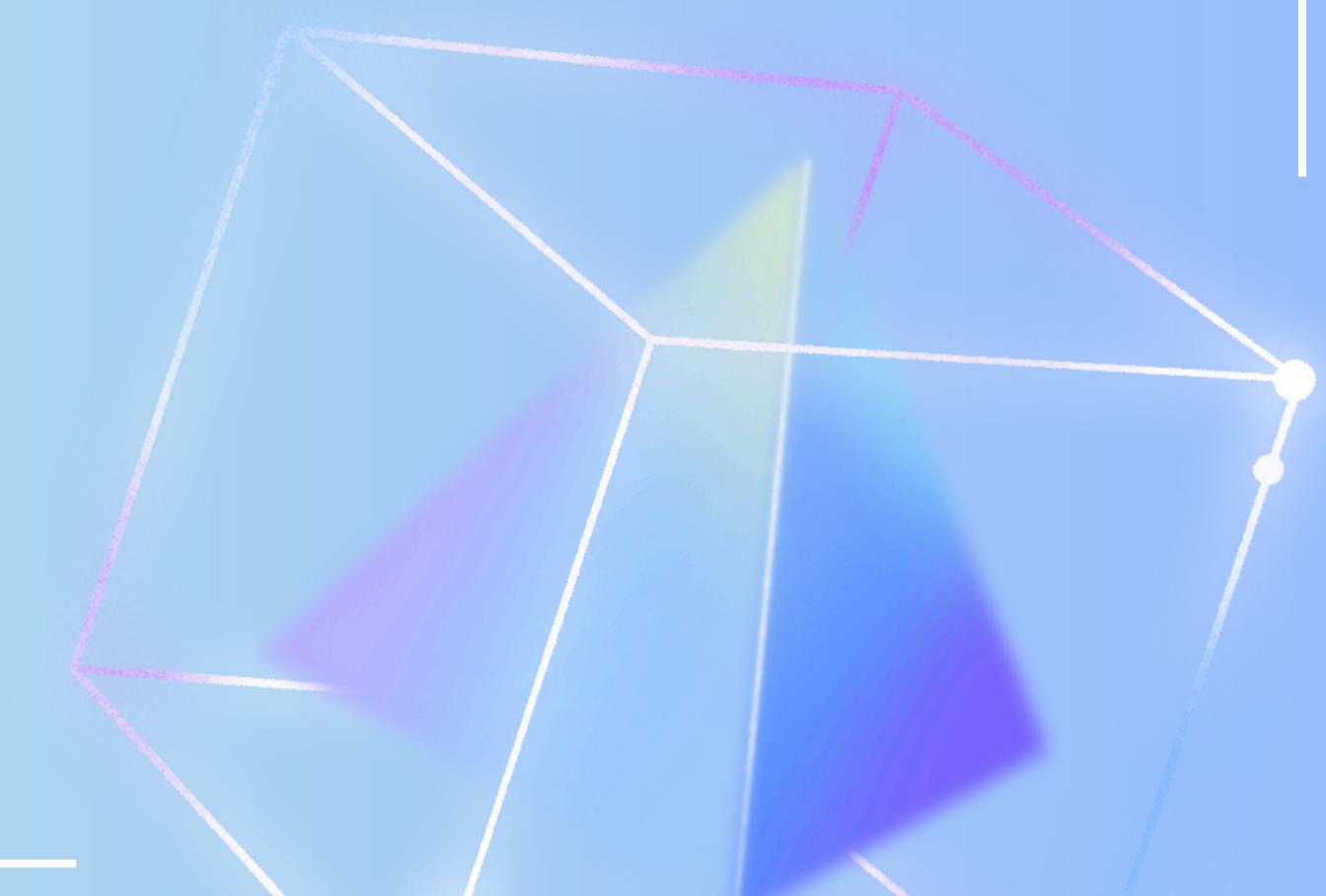
FOR EHR(ELECTRONIC HEALTH RECORDS)  
GROUP NO 6





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# WHAT ARE CHATBOTS IN HEALTHCARE?

EVER FOUND YOURSELF WAITING ON HOLD FOR AGES JUST TO SCHEDULE A DOCTOR'S APPOINTMENT? OR MAYBE YOU'VE HAD TO DIG THROUGH PAGES OF INFORMATION ONLINE, TRYING TO FIGURE OUT WHAT SYMPTOMS COULD MEAN. IT'S FRUSTRATING, ISN'T IT? WELL, THIS IS EXACTLY WHERE HEALTHCARE CHATBOTS COME INTO PLAY, OFFERING A HELPING HAND (OR, RATHER, A VIRTUAL ONE) WHEN YOU NEED IT THE MOST.

A HEALTHCARE CHATBOT IS AN AI-POWERED ASSISTANT DESIGNED TO STREAMLINE PATIENT CARE AND COMMUNICATION. THESE DIGITAL ASSISTANTS CAN HELP WITH EVERYTHING FROM ANSWERING BASIC MEDICAL QUESTIONS TO BOOKING APPOINTMENTS. YOU'VE PROBABLY ENCOUNTERED ONE WITHOUT EVEN REALIZING IT—THROUGH YOUR HOSPITAL'S WEBSITE OR A HEALTHCARE APP.

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- Through this presentation, we will explore the technology, benefits, and challenges of EHR-integrated chatbots in healthcare delivery.

# Literature Survey

Paper Title	Year	Architecture	LLM Used	Evaluations	Summary
Clinical GPT	2023	Based on a large and diverse medical dataset including cMedQA2, cMedQA-KG, MD-EHR, MEDQA-MCML, and MedDialog.	BLOOM-7B	<p>Evaluated on medical conversation, medical examination, diagnosis suggestion, and medical question answering.</p> <p>ClinicalGPT outperformed other LLMs on diagnosis tasks, achieving an average accuracy of 80.9% across all disease groups.</p>	<p>ClinicalGPT is a large language model that is fine-tuned on a diverse range of medical data. The authors find that ClinicalGPT demonstrates superior capabilities in understanding and generating medical and clinical-related responses. It performs particularly well in diagnosis tasks, demonstrating its potential for real-world clinical applications</p>

Paper Title	Year	Architecture	LLM Used	Evaluations	Summary
Med-Gemini	2024	Med-Gemini leverages the Gemini family of models, specifically highlighting the use of Med-Gemini-L 1.0 and Med-Gemini-M 1.5 in different contexts.	The source does not explicitly state the base Gemini model architectures. It mentions that Med-Gemini builds upon the existing capabilities of the Gemini family.	Evaluated on multiple medical reasoning benchmarks, including MedQA (USMLE), NEJM CPC, and GeneTuring. Also evaluated for multimodal capabilities on tasks like visual question answering and long-context processing in clinical and research scenarios.	Med-Gemini is a family of large language models specifically trained for medical applications. It combines the conversational capabilities of the original Gemini model with fine-tuned medical knowledge, allowing it to engage in medical dialogues, perform diagnoses, and generate summaries from medical records and research papers.

Paper Title	Year	Architecture	LLM Used	Evaluations	Summary
Aloe	2024	Used SFT(Supervised Fine tuning )which included synthetic medical data, High quality general datasets and curated public medical datasets, models are adjusted with human preferences using DPO	The source focuses on evaluating and comparing various LLMs in the medical domain, including Aloe, without detailing their specific architecture s.	Evaluated using the Medprompt strategy, which incorporates nearest neighbour examples into prompts. Also assessed on bias and toxicity benchmarks, demonstrating competitive performance while highlighting areas for further improvement.	The study evaluates Aloe and other LLMs in the medical domain using a novel prompting strategy called Medprompt. Aloe shows promising performance on medical question answering and bias and toxicity benchmarks, indicating its potential for healthcare applications. However, the study also highlights the need for continued research and development to address ethical considerations and potential risks associated with using LLMs in healthcare.

Paper Title	Year	Architecture	LLM Used	Evaluations	Summary
MedTrinity-25M	2024	Leverages a multimodal approach using image-ROI description triplets. It incorporates a medical knowledge database built using PubMed, StatPearls, and medical textbooks.	The study explores the use of various multimodal foundation models, including LLaVA-Med, Med-Flamingo, and Med-PaLM, without specifying their underlying LLM architectures.	Evaluated by fine-tuning various MLLMs on the dataset for medical VQA and captioning tasks. LLaVA-Med++, an enhanced version of LLaVA-Med, achieved state-of-the-art results on the VQA-RAD and SLAKE benchmarks.	MedTrinity-25M is a large-scale medical dataset composed of image-ROI-description triplets. It includes multi-granular textual descriptions for each image and incorporates external medical knowledge retrieved from sources like PubMed and StatPearls. The study finds that MLLMs trained on MedTrinity-25M show substantial improvements in medical VQA and captioning tasks, demonstrating the dataset's value in advancing medical AI.

Paper Title	Year	Architecture	LLM Used	Evaluations	Summary
Med42-v2	2024	The study focuses on fine-tuning strategies for LLMs in the clinical domain using Med42-v2, which is built upon the Llama3 architecture.	The study employs various Llama3 models, including Med42-Llama3-8B, Med42-Llama3-70B, Med42-Llama3.1 8B, and Med42-Llama3.1-70B.	Evaluated using Eleuther AI's evaluation harness framework for zero shot performance on medical benchmarks like MMLU, MedMCQA, MedQA, USMLE, PubMedQA, and ToxiGen.	Med42-v2 is a suite of clinical LLMs that are fine-tuned from Llama3 models. The study evaluates these models on a range of medical benchmarks, showcasing their strong zero-shot performance and potential for clinical use.

# TECHNOLOGY BEHIND CHATBOTS IN EHR

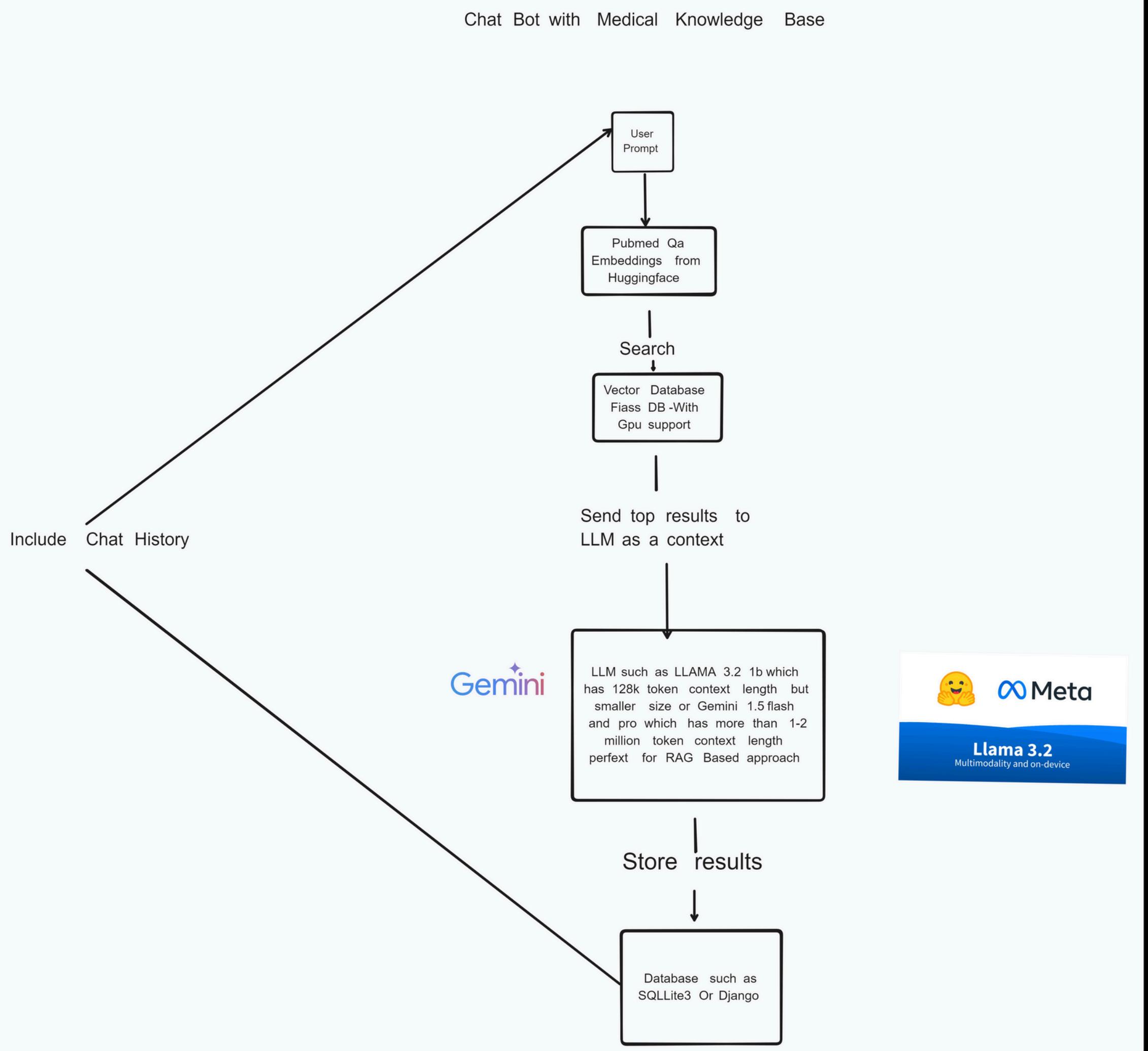
**ARTIFICIAL INTELLIGENCE (AI):** AI ENABLES CHATBOTS TO SIMULATE HUMAN-LIKE UNDERSTANDING AND RESPONSES, ALLOWING THEM TO INTERPRET PATIENT INQUIRIES AND PROVIDE PERSONALIZED ASSISTANCE. IN EHR SYSTEMS, AI-DRIVEN CHATBOTS CAN ACCESS AND PROCESS LARGE AMOUNTS OF PATIENT DATA, OFFERING INSIGHTS AND MAKING RECOMMENDATIONS BASED ON INDIVIDUAL HEALTH PROFILES. THIS CAPABILITY TRANSFORMS CHATBOTS INTO INTELLIGENT VIRTUAL ASSISTANTS THAT SUPPORT BOTH PATIENTS AND HEALTHCARE PROVIDERS.

**RETRIEVAL-AUGMENTED GENERATION (RAG):** RAG COMBINES RETRIEVAL OF RELEVANT INFORMATION FROM EHR DATABASES WITH GENERATIVE CAPABILITIES, ALLOWING CHATBOTS TO PROVIDE ACCURATE AND CONTEXT-SPECIFIC RESPONSES. BY RETRIEVING SPECIFIC PATIENT HISTORY OR MEDICAL RECORDS, THE CHATBOT ENSURES THAT ITS ANSWERS ARE INFORMED BY UP-TO-DATE DATA, ENHANCING THE PRECISION AND RELEVANCE OF RESPONSES. RAG IS PARTICULARLY VALUABLE IN HEALTHCARE, WHERE PERSONALIZED AND RELIABLE INFORMATION IS CRUCIAL.

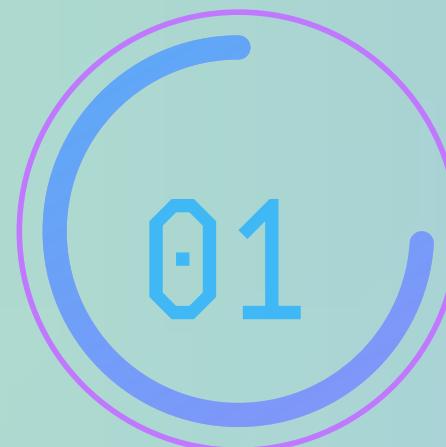
**INTEGRATION WITH EHR SYSTEMS:** ADVANCED APIs ALLOW CHATBOTS TO INTERACT WITH EHR DATABASES SECURELY, ACCESSING PATIENT HISTORY AND UPDATES TO DELIVER CONTEXT-AWARE RESPONSES. THIS INTEGRATION ENSURES ACCURATE, REAL-TIME ASSISTANCE FOR PATIENTS AND SEAMLESS SUPPORT FOR HEALTHCARE PROVIDERS.

**SECURITY FEATURES:** CHATBOTS INCORPORATE ENCRYPTION AND AUTHENTICATION PROTOCOLS TO PROTECT SENSITIVE PATIENT DATA, MEETING HEALTHCARE COMPLIANCE STANDARDS AND ENSURING TRUST IN DIGITAL HEALTH TECHNOLOGIES.

# ChatBot Architecture

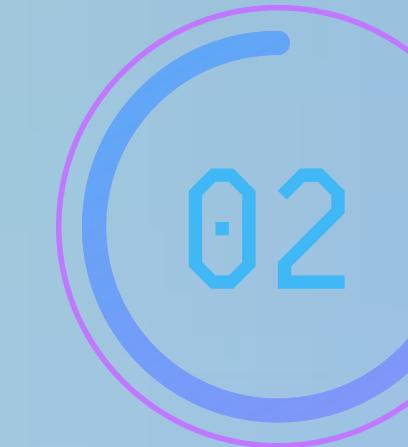


# APPLICATIONS OF CHATBOTS IN EHR



## APPOINTMENT SCHEDULING AND REMINDERS

SCHEDULING APPOINTMENTS AND SENDING REMINDERS IS ONE OF THE MOST COMMON AND IMPACTFUL USES OF CHATBOTS IN HEALTHCARE. THESE SYSTEMS CAN AUTOMATICALLY BOOK APPOINTMENTS, CONFIRM AVAILABILITY, AND REMIND PATIENTS OF UPCOMING VISITS, REDUCING NO-SHOWS. ADA HEALTH, FOR EXAMPLE, INTEGRATES THIS FUNCTIONALITY SEAMLESSLY, HELPING PATIENTS MANAGE THEIR TIME EFFICIENTLY WHILE REDUCING THE WORKLOAD ON ADMINISTRATIVE STAFF.



## MEDICATION MANAGEMENT

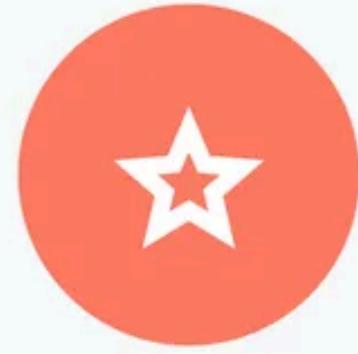
MANAGING MEDICATIONS CAN BE COMPLEX, PARTICULARLY FOR PATIENTS WITH MULTIPLE PRESCRIPTIONS. CHATBOTS LIKE SENSELY HELP REMIND PATIENTS TO TAKE THEIR MEDICATIONS ON TIME, TRACK DOSES, AND MONITOR SIDE EFFECTS. SENSELY CLAIMS A 94% SUCCESS RATE FOR DAILY CHECK-IN COMPLETION WITH ITS VIRTUAL NURSE, MOLLY, HIGHLIGHTING HOW CHATBOTS CAN IMPROVE HEALTH OUTCOMES BY ENSURING PATIENTS STAY ON TRACK WITH THEIR TREATMENT PLANS.



## PATIENT TRIAGE AND SYMPTOM CHECKING

CHATBOTS LIKE ADA HEALTH ARE CHANGING THE WAY PATIENTS ASSESS SYMPTOMS AND RECEIVE MEDICAL ADVICE. HEALTHCARE CHATBOTS USE AI TO ASK PATIENTS A SERIES OF QUESTIONS, TRIAGE THEIR CONDITIONS, AND RECOMMEND APPROPRIATE ACTIONS, WHETHER IT'S SELF-CARE OR SEEING A DOCTOR.

# Benefits of Chatbots in Healthcare



Improved patient engagement



Increased efficiency



24/7 availability

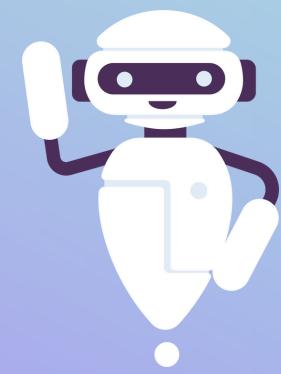


Cost reduction



Enhanced data analytics

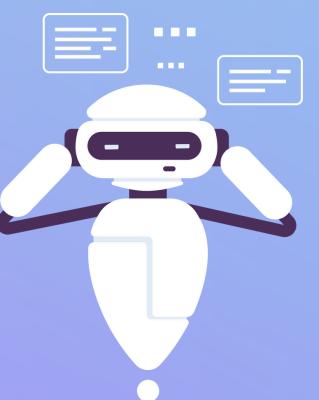
# CHALLENGES AND LIMITATIONS



DATA PRIVACY AND SECURITY  
SAFEGUARDING PATIENT  
DATA REMAINS A MAJOR  
CHALLENGE, WITH  
SENSITIVE INFORMATION  
REQUIRING ROBUST  
SECURITY MEASURES.



ACCURACY AND RELIABILITY  
ENSURING THE CHATBOT  
PROVIDES ACCURATE  
INFORMATION IS  
CRITICAL, ESPECIALLY  
FOR HEALTH ADVICE AND  
SYMPTOM ASSESSMENT.

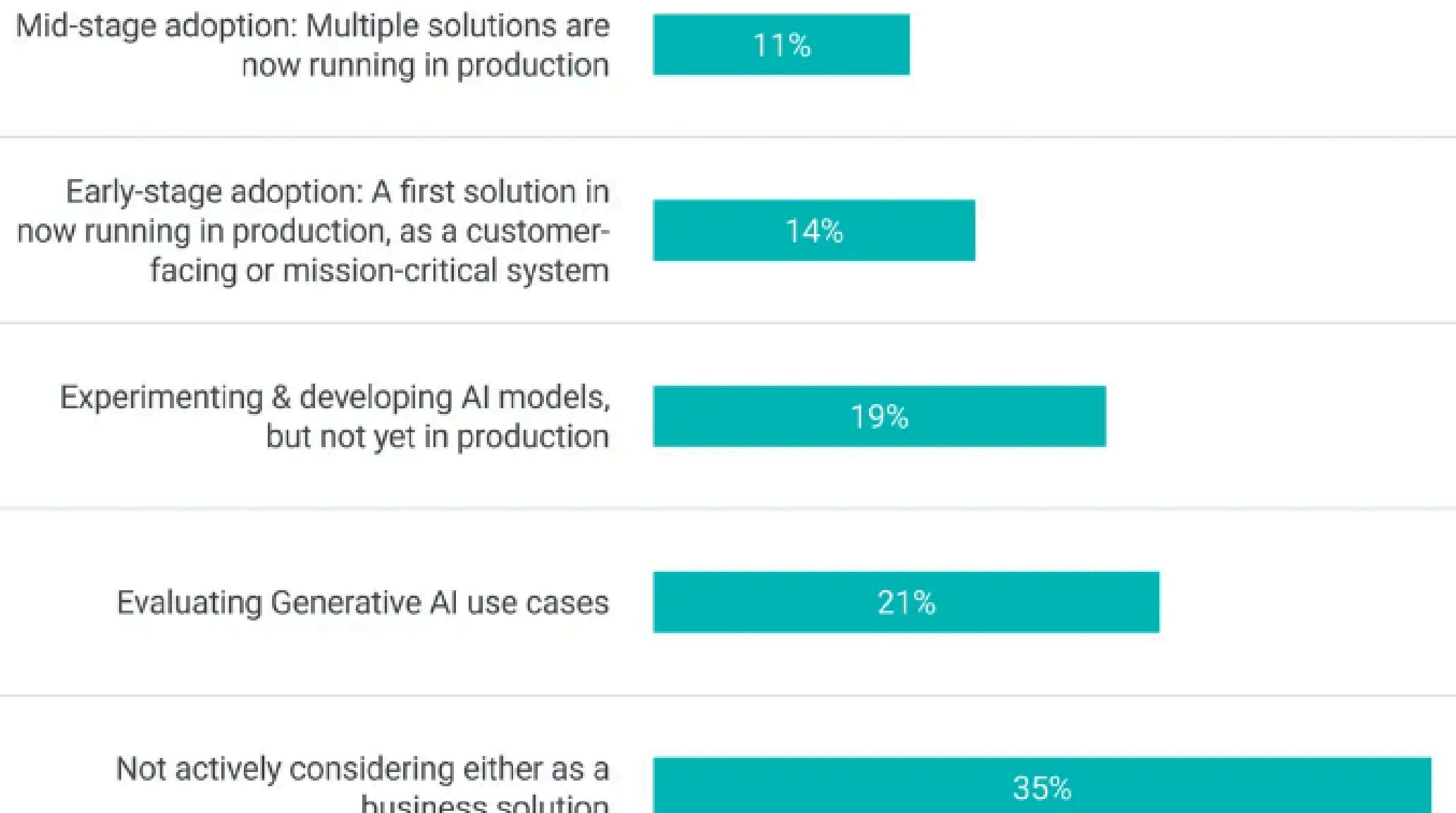


INTEROPERABILITY ISSUES  
INTEGRATING CHATBOTS  
WITH EXISTING EHR  
SYSTEMS AND ENSURING  
DATA CONSISTENCY CAN BE  
COMPLEX.



ETHICAL AND REGULATORY  
CONCERN  
CHATBOTS IN HEALTHCARE  
MUST ADHERE TO PRIVACY  
LAWS AND ETHICAL  
STANDARDS, EMPHASIZING  
PATIENT RIGHTS

# ADOPTION OF CHATBOTS IN HEALTHCARE INDUSTRY



# CONCLUSION

**Summary of Benefits:** Chatbots in EHR systems offer substantial advantages, including improved patient access to health information, reduced administrative workload for healthcare providers, and personalized patient support. By automating routine tasks like appointment scheduling and medication reminders, chatbots enhance both efficiency and patient engagement.

**Challenges to Address:** Despite their promise, chatbots must overcome critical challenges in data privacy, accuracy, and interoperability. Ensuring the reliability of medical information, integrating seamlessly with various EHR systems, and adhering to stringent data security regulations are necessary to maximize their potential in healthcare.

**The Role of Innovation and Regulation:** Ongoing advancements in AI and natural language processing, along with evolving regulatory frameworks, will play a crucial role in shaping the future of chatbots in healthcare. Compliance with regulations like HIPAA and GDPR will ensure that patient data remains protected, fostering greater acceptance and trust.

**Future Vision:** Looking forward, chatbots have the potential to become an integral part of patient-centered care, bridging gaps in accessibility and delivering reliable, 24/7 support. As AI models become more refined and healthcare systems adopt standardized protocols, chatbots will likely transform healthcare delivery by providing proactive, personalized care on a broader scale.

# THANK YOU

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