

DILBot

DOCTOR-IN-THE-LOOP CHATBOT

Mohit Jain

Microsoft Research India

Examples

Cataract Bot

Onco Bot

ASHA Bot

PATIENTS NEED

timely, trustworthy, and precise medical information

DOCTOR PATIENT RATIO

India ranks 134 out of 197 countries with only 7.3 doctors every 10k people

Qs ARE SIMILAR ACROSS PATIENTS

Can I eat breakfast before the surgery?

How soon after the surgery should I visit for follow-up appointment?

Can I watch TV after the surgery?

Can I eat biryani after the surgery?

How safe is the surgery?

When can I wash my hair after the surgery?

LLMs ARE HERE

However, LLM's hallucinates, make mistakes. OAI Usage Policy restriction.

CAN DOCTORS HELP IMPROVE AI?

In return, can it help doctors attend more patients?

DILBot

DOCTOR-IN-THE-LOOP CHATBOT

Mohit Jain

Microsoft Research

Examples

Cataract Bot

Onco Bot

ASHA Bot

ENSURE

Accurate

Easy to Use

Minimal Workload for Experts

STEP 1

PATIENT ASKS A QUESTION

Multilingual and Multimodal



Patient

When can I wash my hair after the surgery?

11.13 AM

STEP 2 INSTANT LLM ANSWER + RELATED Qs

Experts' curated Knowledge Base



Doctor

Query: "When can I wash my hair after the surgery?"

Bot's response: You can wash your hair 3 days after the surgery.

Patient: Janardhan Doe, 75/F/OD, DoS 2024-05-01

Was the bot's answer correct and complete? 11.14 AM



Yes

No

[Send to Patient Coordinator](#)



Patient

When can I wash my hair after the surgery?

11.13 AM

You

When can I wash my hair after the surgery?

You can wash your hair 3 days after the surgery.




What to do next?

11.14 AM

[Related questions](#)

STEP 3 EXPERTS-IN-THE-LOOP VERIFICATION

Different experts for different query types

 **Doctor**

Query: "When can I wash my hair after the surgery?"
Bot's response: You can wash your hair 3 days after the surgery.
Patient: Janardhan Doe, 75/F/OD, DoS 2024-05-01
Was the bot's answer correct and complete? 11.14 AM



Yes

No

[Send to Patient Coordinator](#)

Sankara Eye Hospital Bangalore

Query: When can I wash my hair after the surgery?
Bot's response: You can wash your hair 3 days...

No

11.45 AM

Sankara Eye Hospital Bangalore

Query: When can I wash my hair after the surgery?
Bot's response: You can wash your hair 3 days...

Please reply with a correction.

11.45 AM

 **Patient**

When can I wash my hair after the surgery?

11.13 AM

You

When can I wash my hair after the surgery?

You can wash your hair 3 days after the surgery.



What to do next?

11.14 AM

[Related questions](#)

Sankara Eye Hospital Bangalore


You can wash your hair 3 days after the surgery.

This answer is invalid. Please wait for the correct response from the doctor.

11.45 AM

STEP 4 EXPERT EDITS THE ANSWER

Free-form edit

 **Doctor**

Query: "When can I wash my hair after the surgery?"
Bot's response: You can wash your hair 3 days after the surgery.
Patient: Janardhan Doe, 75/F/OD, DoS 2024-05-01
Was the bot's answer correct and complete? 11.14 AM

☒


[Yes](#) [No](#)

[Send to Patient Coordinator](#)


Sankara Eye Hospital Bangalore
Query: When can I wash my hair after the surgery?
Bot's response: You can wash your hair 3 days...
No 11.45 AM

Sankara Eye Hospital Bangalore
Query: When can I wash my hair after the surgery?
Bot's response: You can wash your hair 3 days...
Please reply with a correction. 11.45 AM

Sankara Eye Hospital Bangalore
Query: When can I wash my hair after the surgery?
Bot's response: You can wash your hair 3 days aft...
Btr to avoid for 2 wks 11.47 AM

 **Patient**

When can I wash my hair after the surgery? 11.13 AM

You
When can I wash my hair after the surgery?
You can wash your hair 3 days after the surgery.

What to do next? 11.14 AM

[Related questions](#)

Sankara Eye Hospital Bangalore
You can wash your hair 3 days after the surgery.
This answer is invalid. Please wait for the correct response from the doctor. 11.45 AM


You
When can I wash my hair after the surgery?
Better to avoid washing your hair for 2 weeks after the surgery. 11.47 AM

☒

Sankara Eye Hospital Bangalore
Better to avoid washing your hair for 2 weeks after...
This answer has been verified by a doctor.

STEP * PRE-VERIFIED ANSWERS

Knowledge Base Update

**Patient**


Surgery is done, can I shampoo?
11.13 AM

You
Surgery is done, can I shampoo?
A similar question was answered previously.
Question: When can I wash my hair after the surgery?
Answer: Better to avoid washing your hair for 2 weeks after the surgery.
Does this answer your question?
11.14 AM

YesNo


Sankara Eye Hospital Bangalore
A similar question was answered previously.
Question: When can I wash my hair after the...
Yes
11.15 AM

Thank you for your response.
11.16 AM


 [Related questions](#)

STEP * ESCALATIONS AND REMINDERS

Real-world deployment

 **Doctor**

Query: "Can I do anilom villom after surgery?"
Bot's response: I do not know the answer to your question. If this needs to be answered by a doctor, please the hospital.
Patient: Janaki Doe, 64/F/OD, DoS 2024-05-01
Was the bot's answer correct and complete? 11:14 AM



Sankara Eye Hospital Bangalore
Query: "Can I do anilom villom after surgery?"
Bot's response: I do not know the answer to your...

Escalating it to Dr. Kaushik 13:14

Sankara Eye Hospital Bangalore
Query: "Can I do anilom villom after surgery?"
Bot's response: I do not know the answer to your...

Please respond to this query. 17:14

Cataract Bot @ SANKARA EYE HOSPITAL

(Bengaluru, Hyderabad, Jaipur)



1800+

Patients and
Attendants

7500+

Questions
Answered

18+

Experts
(12+ Doctors,
6+ Coordinators)

90%+

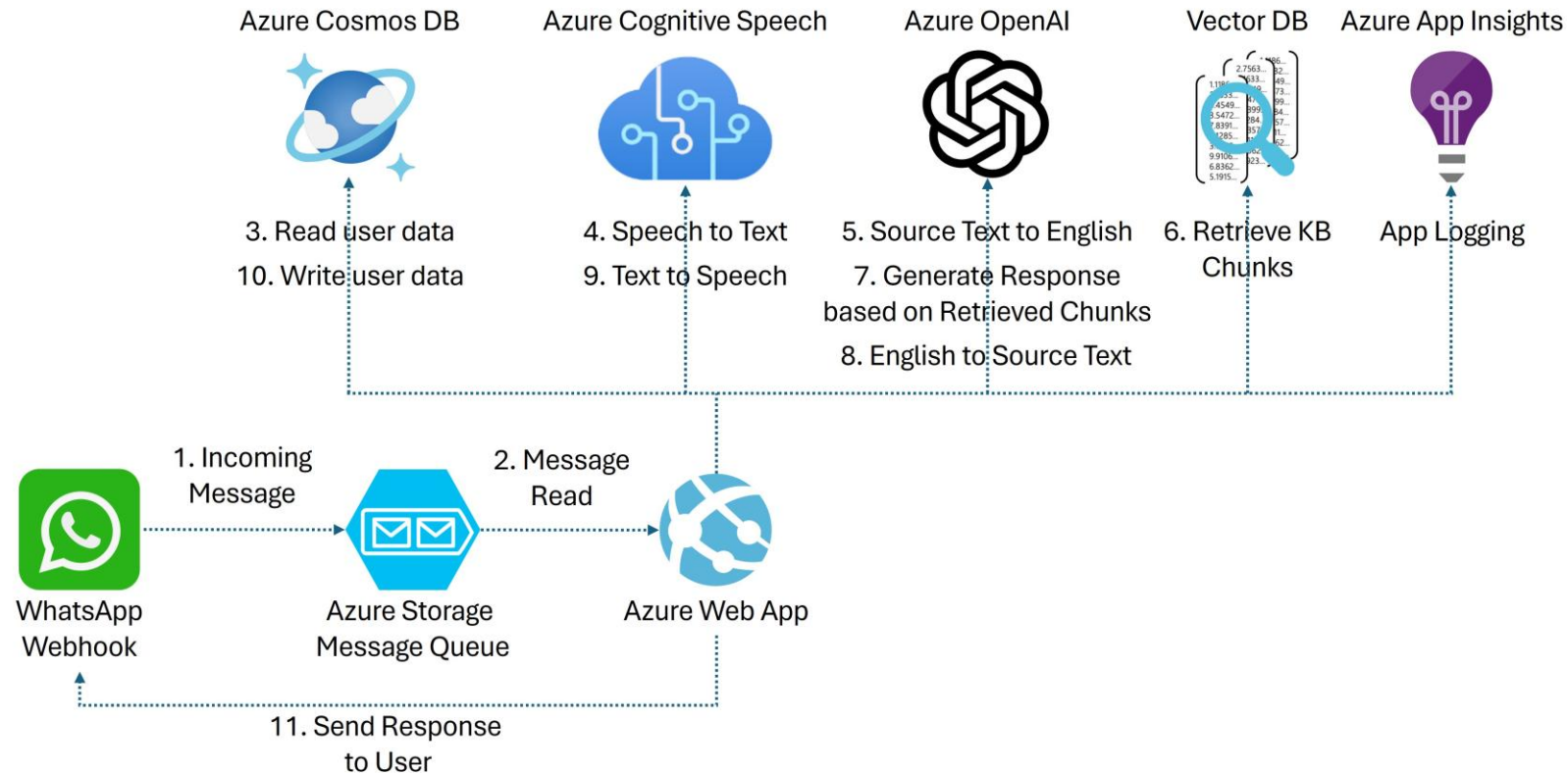
'Yes' Answers




Build Your Own **expert** Bot

<https://github.com/microsoft/byoeb>

Make a bot in **10**mins!



ONCO BOT @ Kasturba Hospital Manipal

 **Doctor**

Query: "I am not able to taste anything, what to do?"
Bot's response: Radiotherapy can cause changes in taste sensations. It is important to eat small frequent meals to avoid losing weight, and drink lots of water.
Patient: Janardhan Doe, M/56, DoS 15-03-25
Was the bot's answer correct and complete? 11.14 AM

☒

OncoBot
Query: I am not able to taste anything, what to do?
Bot's response: Radiotherapy can cause chang...


No 11.45 AM

OncoBot
Query: I am not able to taste anything, what to do?
Bot's response: Radiotherapy can cause change...

Please reply with a correction.

OncoBot
Query: I am not able to taste anything, what to do?
Bot's response: Radiotherapy can cause chang...

taste is usually back 1-6 mo post treatment 11.47 AM

 **Patient**

I am not able to taste anything, what to do? 11.13 AM

You
I am not able to taste anything, what to do?

Let me check with Dr. Salins and get back to you with a verified answer. Until then, feel free to ask more questions.

What to do next? 11.14 AM

[Related questions](#)

You
I am not able to taste anything, what to do?

Radiotherapy can cause changes in taste sensations. It is important to eat small frequent meals to avoid losing weight, and drink lots of water. The sense of taste usually returns 1-6 months after treatment.

(Verified by Dr. Salins at KMC Hospital) 11.47 AM

☒

ASHA Bot



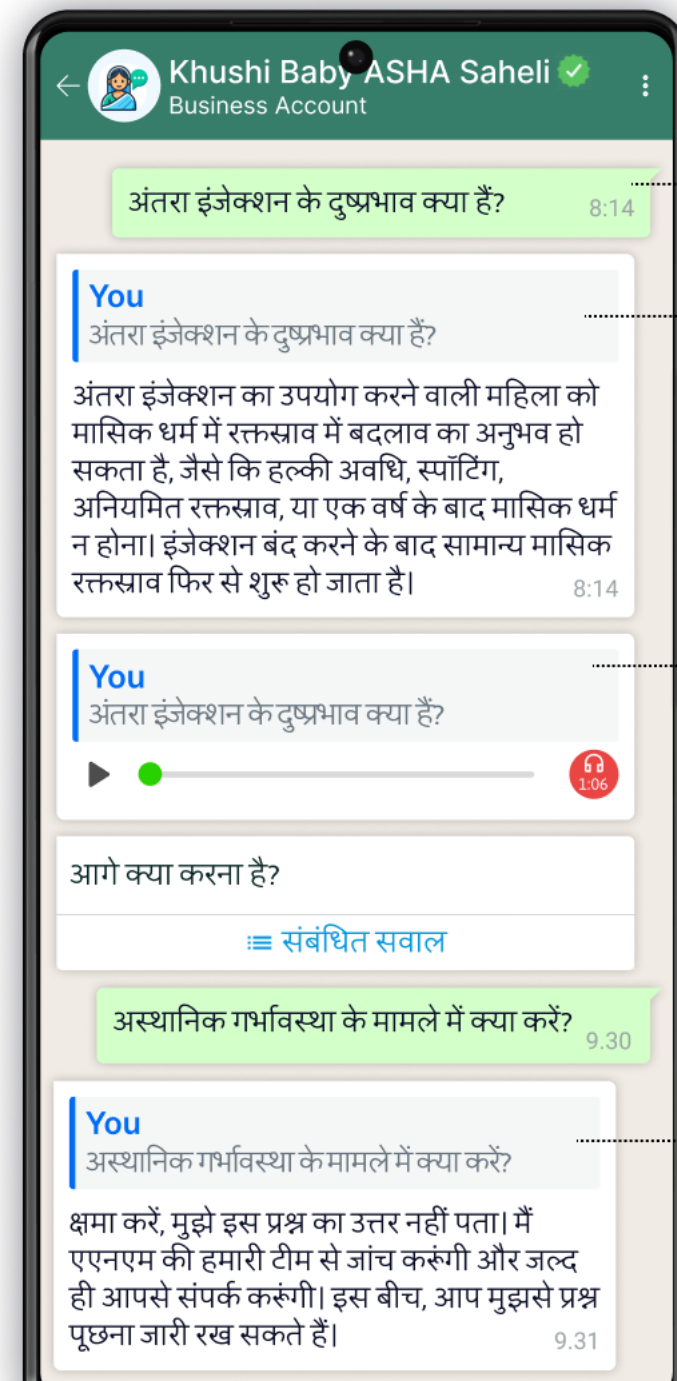
Deployed with Khushi Baby
In Salumbar and Udaipur, Rajasthan

2,750+ ASHAs (Community Health Worker)

500+ ANMs (Auxiliary Nurse Midwife)

26,000+ Questions

[1] ASHABot: An LLM-Powered Chatbot to Support the Informational Needs of Community Health Workers. CHI 2025.



• Supports regional languages

• Instant answer: RAG over expert's curated KB

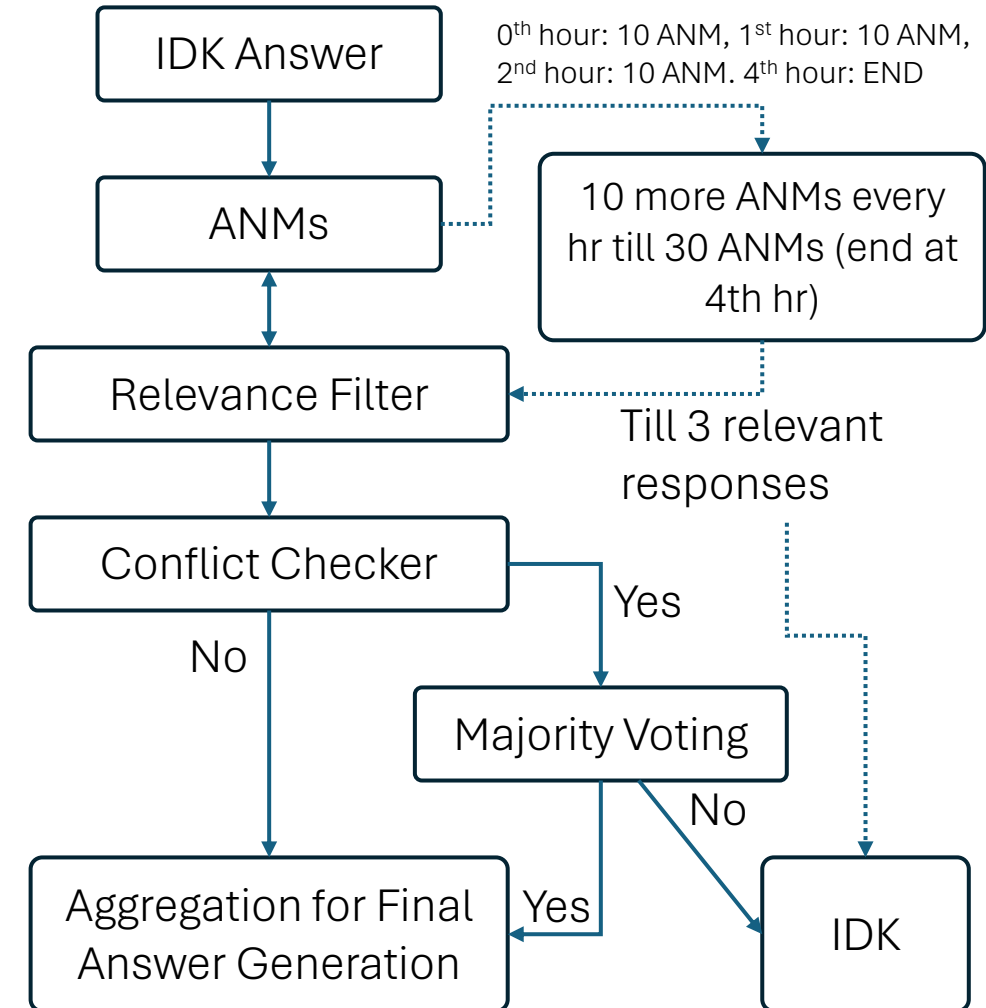
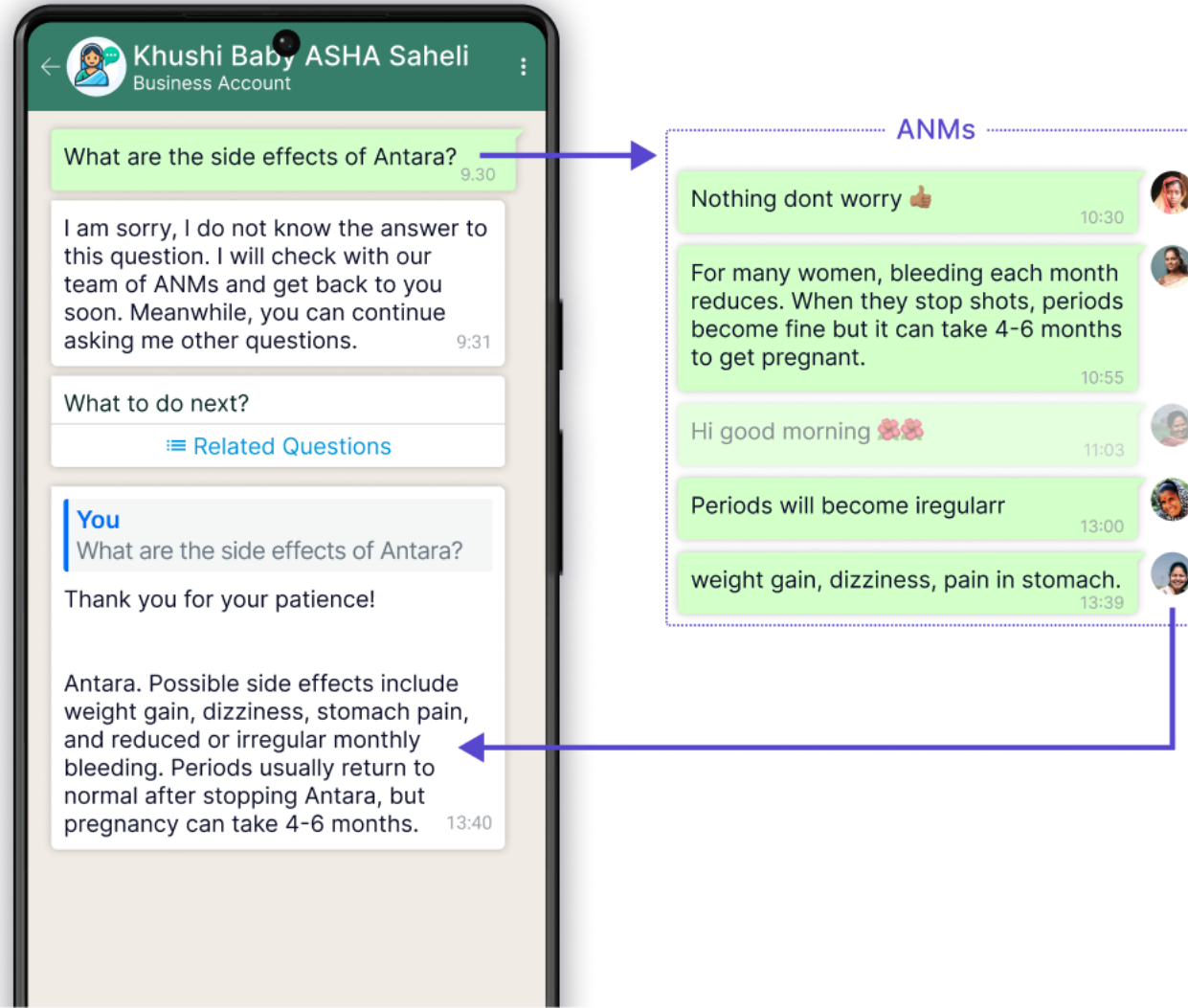
• Supports speech and text

• If ASHA Saheli does not know the answer: it asks multiple ANMs and combine their responses using a consensus algorithm.

KB updates w/ consensus answers

STEP > CONSENSUS ANSWER SENT TO ASHA

Based on relevant information from ANMs



CHALLENGES and FINDINGS

CHALLENGE1: Transcription and Translation Errors

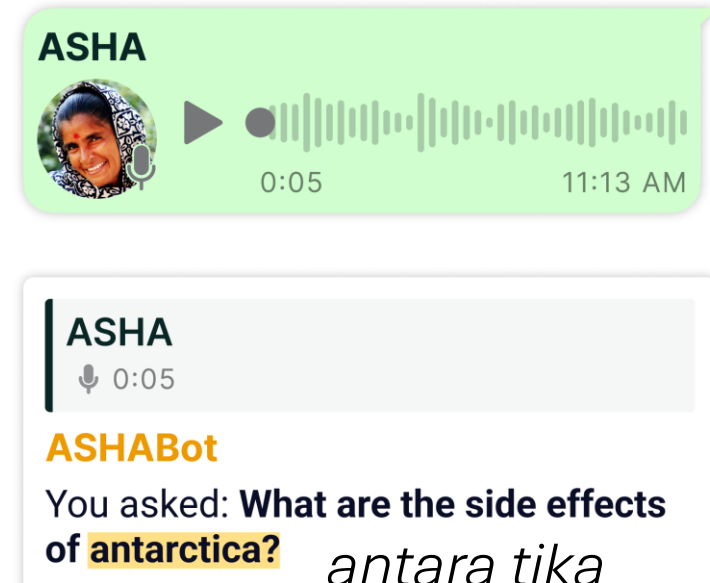
PROBLEM

Slow mother-in-law → ?

saas: 'mother-in-law'
सास vs सांस
saans: 'breath'

SOLUTION

- Azure OpenAI for translation from source to English (to provide 'context')
- Lookup table [E.g., आशा, ASHA → ~~Hope~~ Health Worker]
- Azure OpenAI for translation from English to source (for simple & Hinglish translation)



CHALLENGE 2: Knowledge Base Updation

PROBLEM

The new information can be contradictory to previous information

SOLUTION

Solution **1**: Ask LLM to modify relevant data chunks with expert edits

Solution **2**: Maintained an expert-QA file with timestamp

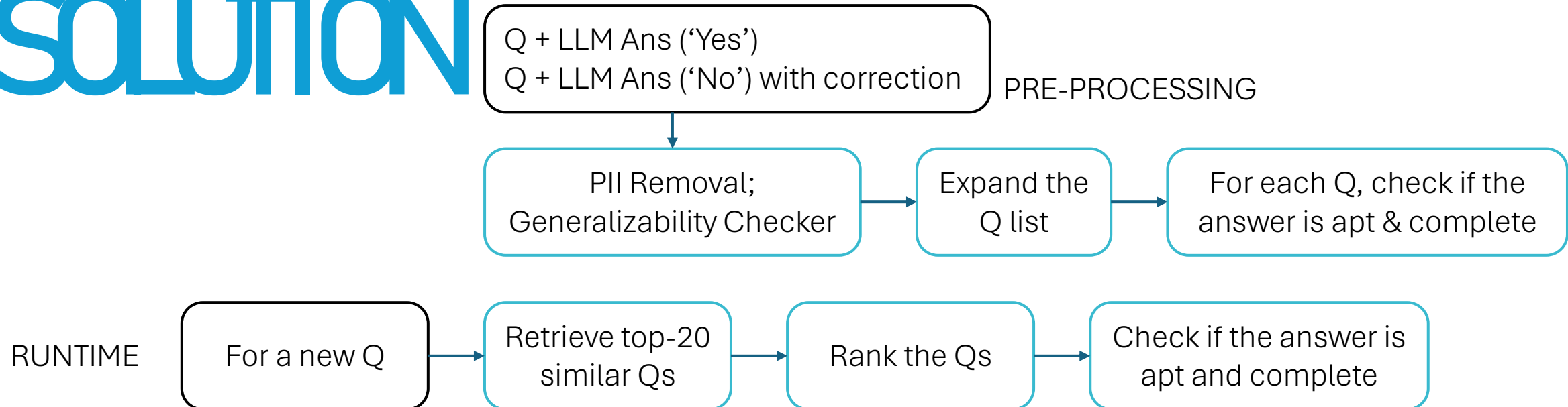
Solution **3**: Append expert edits to the relevant data chunks with timestamp

CHALLENGE 3: Expert Workload

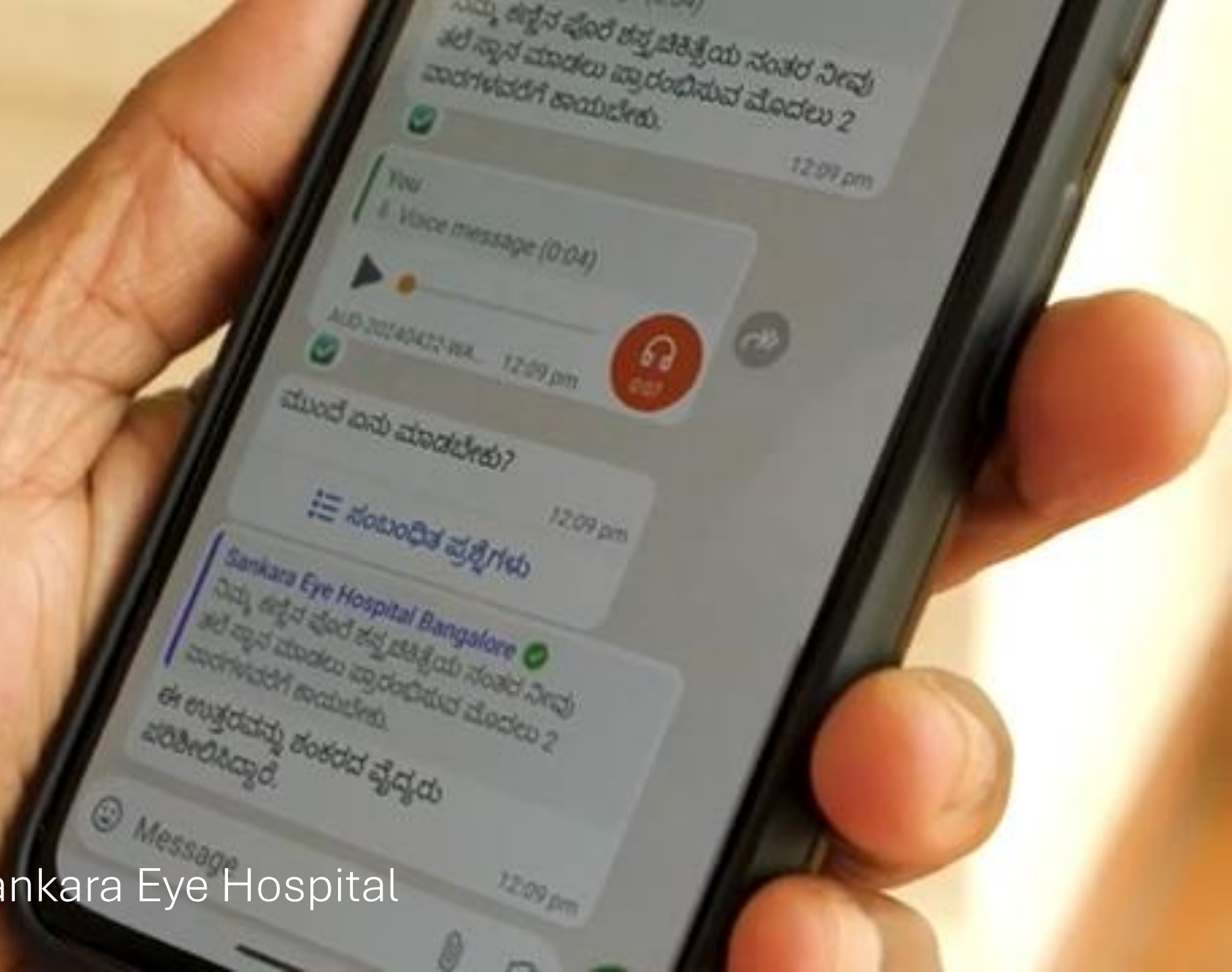
PROBLEM

Expert needs to verify every answer

SOLUTION



Dr. Saumya
Ophthalmologist, Sankara Eye Hospital



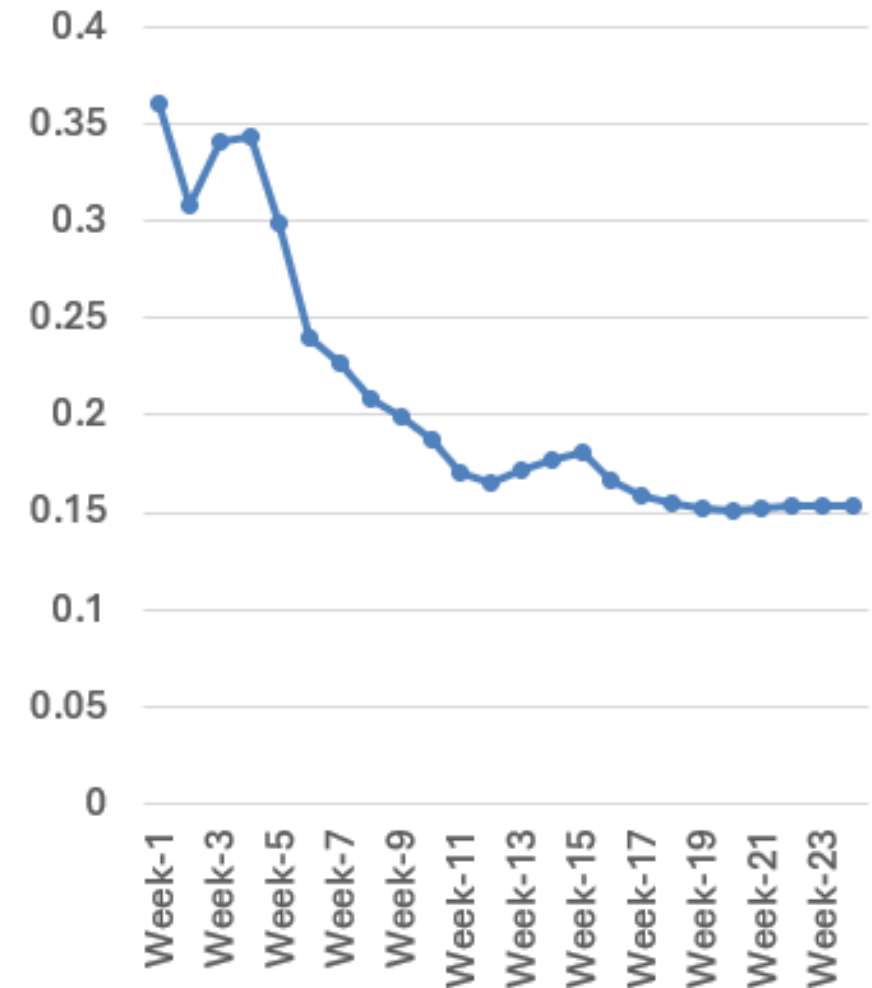
EXPERT WORKLOAD

Bot's “*accurate and complete*” answers $\uparrow 19.02\% \uparrow$

“I don't know” answers $\downarrow 7.8\% \downarrow$

When can I do ‘anulom vilom’ after surgery?

What time is my surgery?



FINDING 1: Accessible to low (tech) literate

PATIENT

“Without even asking me for help, he **(my father) was able to use that bot as it supports Tamil...** I felt it’s very useful.”

DOCTOR

“Less educated or local language speaking patients are the ones for whom this can do wonders... the others would anyways ask.”

FINDING 2: Non-judgmental

ASHA

“(e.g., Once) there was a crowd, it was chaotic, and **I mistakenly gave the vaccine (intended) for a 6-month-old child to a 3-month-old...** I asked the bot... It said that ‘*It is fine...*’ I was relaxed... **I can’t ask this to ANM...**”

PATIENT

“(My mother) has **cholesterol issues** and heart surgery... the doctor would **make faces when I ask about food** intake... but not the bot.”

FINDING 3: Trust

PATIENT

“Basically, the trust only came when I saw the **green tick mark...** Before that, I was also in the question mark zone... So, I will say it’s a machine... But then somebody is checking it, confirming it... **It’s actually then trustworthy.**”

CONCLUSION

Oncology, Gastro, Gynaec | Insurance | Patients undergoing clinical trials

It makes LLMs accessible to new populations.

Such systems help break the power difference between individuals and experts.

It is not limited to healthcare and can be generalized to domains like legal & finance.

THANK YOU

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References:

1. ASHABot: An LLM-Powered Chatbot to Support the Informational Needs of Community Health Workers. CHI 2025.
2. CataractBot: An LLM-Powered Expert-in-the-Loop Chatbot for Cataract Patients. IMWUT 2025.
3. Learnings from a Large-Scale Deployment of an LLM-Powered Expert-in-the-Loop Healthcare Chatbot. (under review)

