ideology

Remote Area Healthcare Ai

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PROBLEM STATEMENT

In rural and remote areas of India, Accredited Social Health Activists (ASHAs) serve as the frontline health workforce. However, limited access to medical professionals, weak internet connectivity, and language barriers hinder effective healthcare delivery.

ASHA workers often lack real-time guidance for patient queries and rely on outdated training or inaccessible communication with doctors. There's an urgent need for an intelligent, offline-compatible, multilingual health advisory system that supports ASHA workers in delivering timely, context-aware, and medically-informed advice without dispensing prescriptions.

ABSTRACT

This project proposes a multilingual, AI-powered, chat-based advisory system designed for ASHA workers operating in remote and low-connectivity regions. Leveraging a hybrid architecture of localized Small Language Models (SLMs) deployed on mobile devices and a continuously updated central Large Language Model (LLM), the system enables ASHA workers to interact in their native languages using speech or text. Bhashini, or an equivalent translation model, is used for language translation, facilitating communication between the user and the AI in real-time. The SLMs, embedded with region-specific medical knowledge, operate offline and consult the central LLM via intermittent connectivity through edge sub-servers for anomalous or escalated cases. This architecture ensures responsiveness, scalability, data decentralization, and continuous learning, while adhering to ethical

INTRODUCTION

ASHAs (Accredited Social Health Activists) serve as the backbone of rural healthcare in India but often lack real-time guidance due to poor connectivity and limited resources.

To support them, we propose an offline, mobile-based AI assistant powered by Small Language Models (SLMs) trained on local health data. These models provide quick, region-specific advice without giving prescriptions.

For complex queries, SLMs connect to a central Large Language Model (LLM) via edge servers when the network is available. Using Bhashini, ASHAs can interact with the AI in their native languages, making the system both accessible and effective.

LITRATURE REVIEW

Paper 1: The Rise of Small Language Models in Healthcare

- SLMs (≤7B) offer fast, low-power, private inference—ideal for mobile use in rural health.
- Tasks include question answering, triage, summarization—no prescriptions needed.
- Compression (quantization, distillation) makes them fit for offline deployment.

Garg, M. et al. (2025) The rise of small language models in Healthcare: A Comprehensive survey. https://arxiv.org/abs/2504.17119

LITRATURE REVIEW

Paper 2: Open-source SLMs for Medical Chatbots

- SLMs can run on phones with no cloud dependency—ensures data privacy.
- Evaluated models show good performance in intent detection and empathetic replies.
- Ideal for disease-specific chatbots (e.g., chronic care)—just like your ASHA use case.

Magnini, M., Aguzzi, G. and Montagna, S. (2025) 'Open-source small language models for personal medical assistant chatbots,' Intelligence-Based Medicine, 11, p. 100197. https://doi.org/10.1016/j.ibmed.2024.100197

LITRATURE REVIEW

Paper 3: SHAKTI: A 2.5B Param Edge AI Model

- Shakti is optimized for smartphones and supports Indian languages.
- Uses efficient attention and memory-saving techniques for real-time chat.
- Tuned for domains like healthcare—matches your regional SLM goal.

Shakhadri, S.A.G., Kr, K. and Aralimatti, R. (2024) SHAKTI: a 2.5 billion parameter small language model optimized for edge AI and Low-Resource environments. https://arxiv.org/abs/2410.11331

METHODOLOGY

ASHA WORKER INPUT

↓

BHASHINI

↓

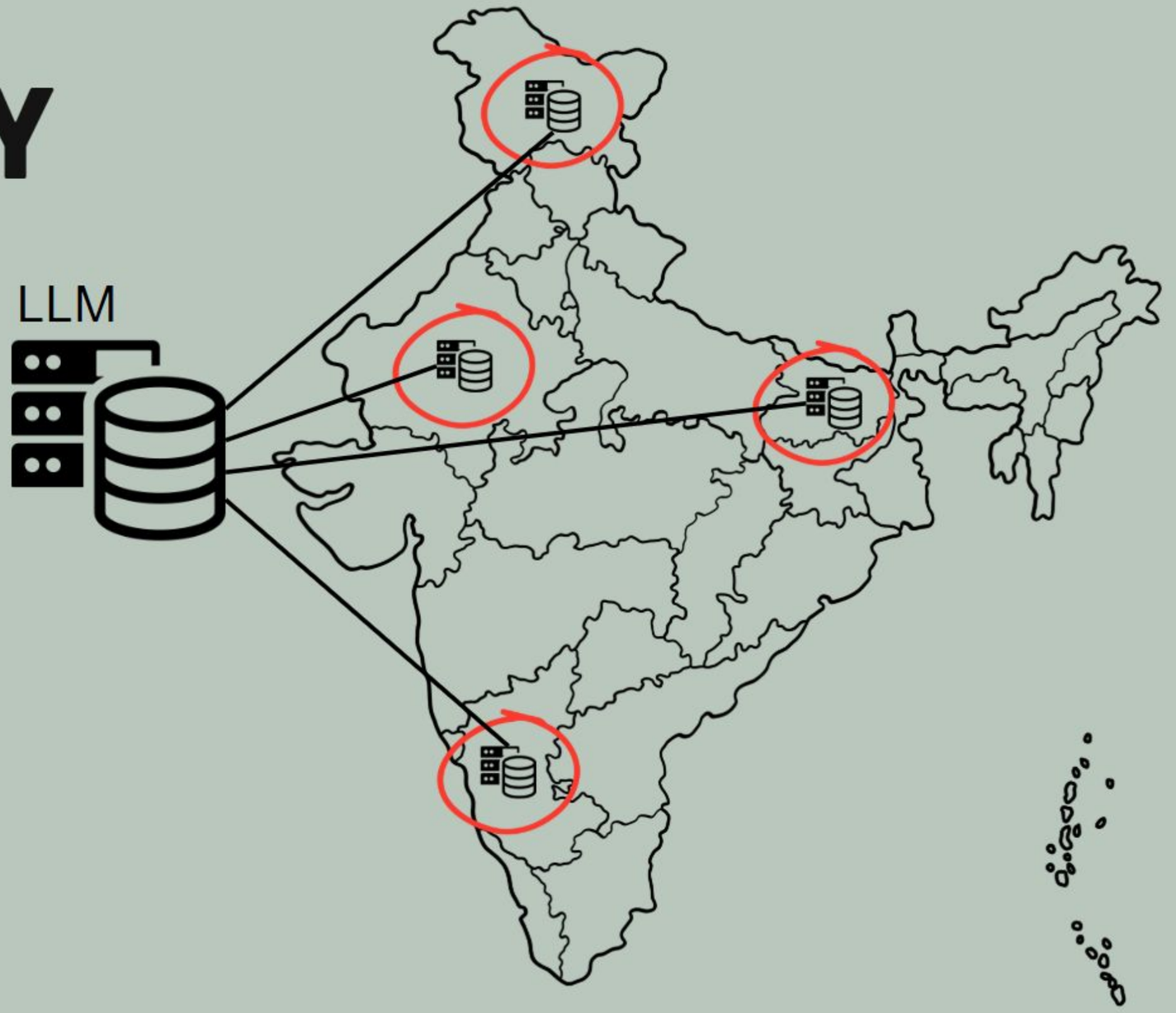
SLM

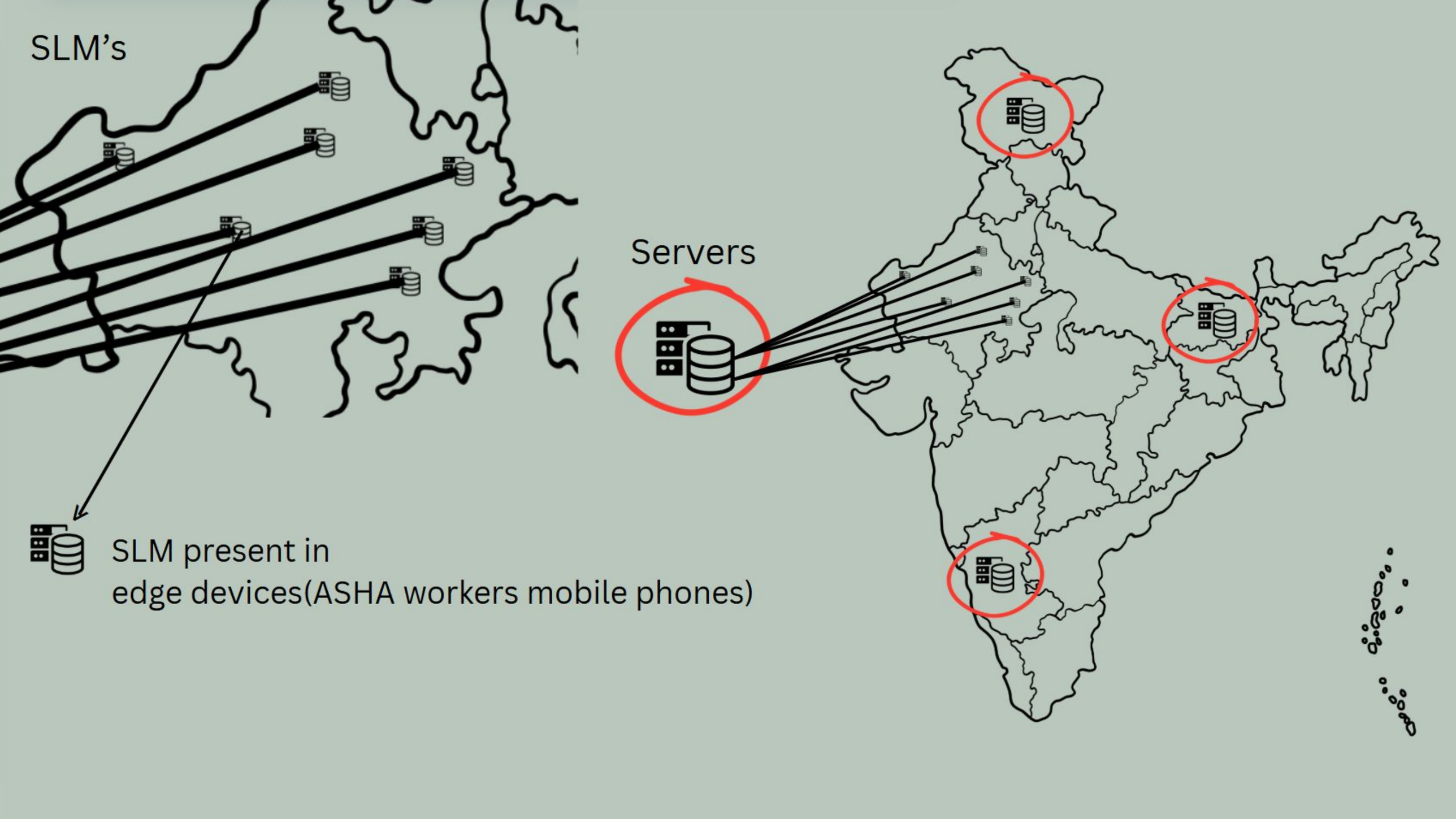
↓

BHASHINI

↓

REPONSE




SLM’s
Servers
SLM present in
edge devices(ASHA workers mobile phones)

CONCLUSION

ASHAs (Accredited Social Health Activists) serve as the backbone of rural healthcare in India but often lack real-time guidance due to poor connectivity and limited resources.
To support them, we propose an offline, mobile-based AI assistant powered by Small Language Models (SLMs) trained on local health data. These models provide quick, region-specific advice without giving prescriptions.

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