The Educator

Team: GameChangers

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Edge Runners 3.2

Problem Statement

Challenges in accessing education in remote areas:

- Lack of access to high speed internet
- Lack of access to high performance computers and laptops
- Lack of steady electricity supply

Link

Solution Overview

Project Overview

- A mobile and server-based AI application
- Designed to provide educational support in remote areas with limited or no internet.
- Utilizes lightweight open-source text generation models, llama-3.2-1B and 3.2-3B, enabling students access to GenAI technology offline.
- A server, installed at a central location like a school, runs more advanced models, llama-3.2-11B and 3.2-90B, with multi-modal capabilities.
- When connected, the app can process images and leverage RAG to provide enhanced, detailed explanations.

The Core Technologies

Llama-3.2-1B and 3.2-3B (Lightweight LLMs)

Smaller open-source language models designed to run efficiently on mobile devices. Enables offline question-answering and educational support directly on student smartphones, without requiring internet access.

Llama-3.2-11B and 3.2-90B (Advanced LLMs with Multi-modal Capabilities)

larger models run on a local server, offering more powerful AI capabilities, including the ability to process text and images. App can perform more complex tasks like explaining images from textbooks and delivering richer educational content.

Multi-modal Capabilities

The ability of the AI models to understand and process different types of data, such as text and image. Students can take pictures of textbook content, and the server-based models can provide detailed explanations, enhancing learning through visual aids

Retrieval-Augmented Generation (RAG)

Combines language model outputs with external documents to provide more accurate and contextually relevant answers. The AI can pull information from a school's database or stored documents to deliver precise responses, improving the relevance of the educational content provided to students.

System Architecture

Hardware

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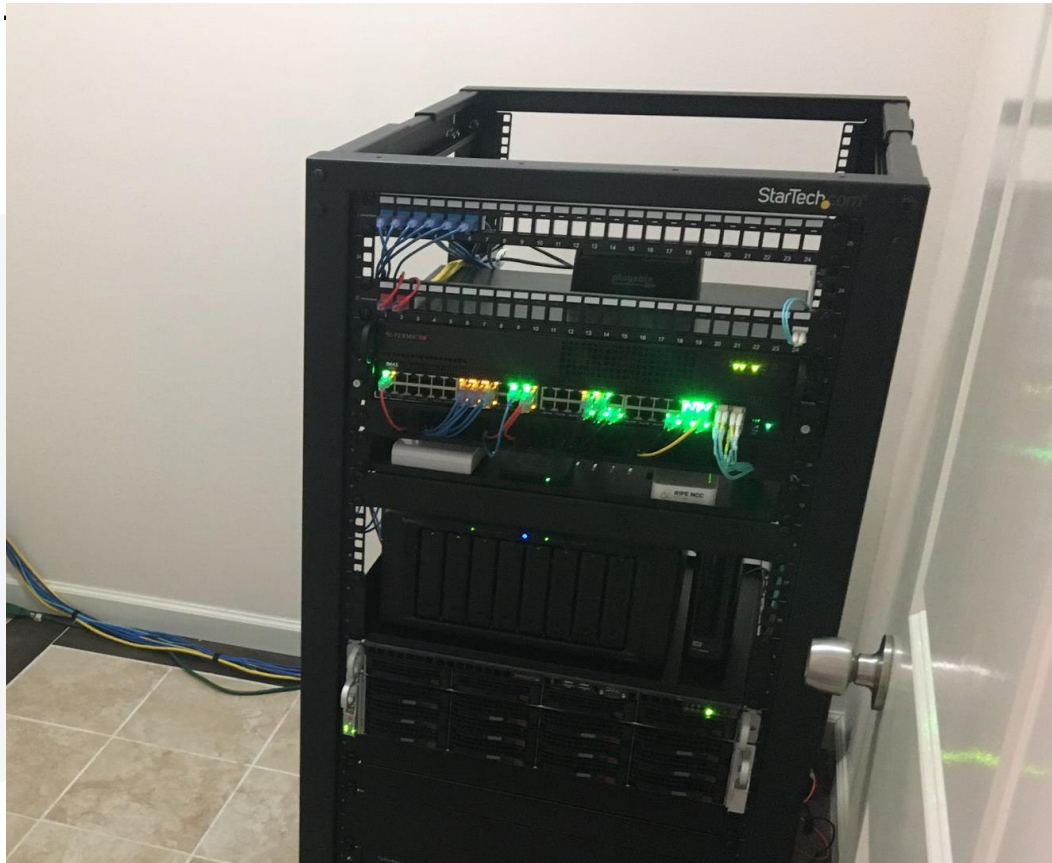


System Architecture

Offline Mode Functionality

- Runs on students' smartphones using llama-3.2-1B and 3.2-3B models
- App provides answers based on its locally stored knowledge
- With no internet service

Benefits:

- 24/7 Access: Students can get immediate answers to educational queries anytime.
- No Internet Dependency: Fully functional without a network connection, ensuring uninterrupted learning.

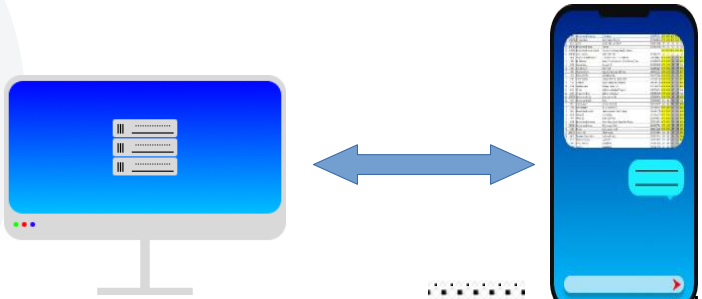
System Architecture

Server Connection Mode

- Mobile application connects to the local server via Wi-Fi
- Gains access to advanced AI models (llama-3.2-11B and 3.2-90B) with multi-modal capabilities
- Can upload images of textbook pages for detailed explanations
- Server can handle both text and image inputs, offering a richer learning experience.

Benefits:

- Vision Tasks: Students can upload images for in-depth analysis and explanation.
- Advanced AI Support: Larger models provide more comprehensive answers and support more complex queries.

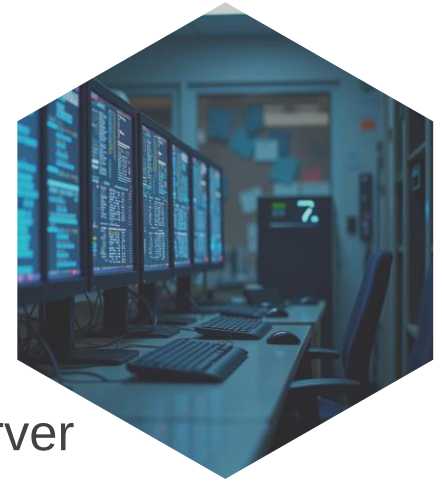


Use Cases

Scenario 1 – Visual Learning

Take Picture

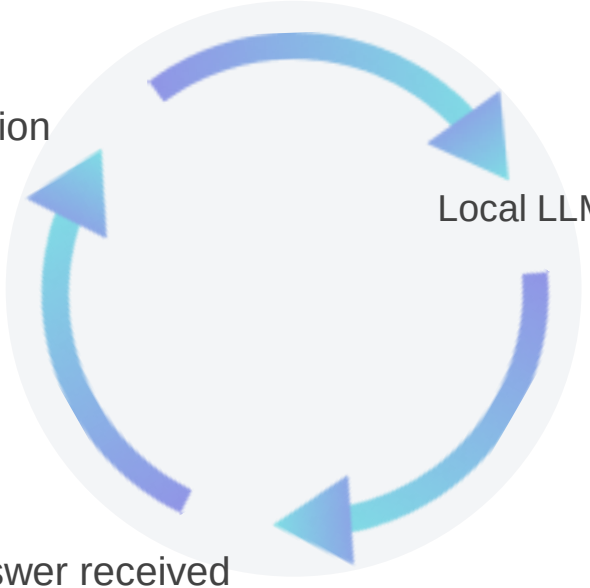
Send to Server



Explanation Received

Use Cases

Scenario 2 – Textbook Questioning



Technical Aspects

LLMs for Offline Queries:

Mobile app uses llama-3.2-1B and 3.2-3B to answer educational queries locally, ensuring offline functionality.

RAG for Enhanced Answers:

When connected to the server, the Retrieval-Augmented Generation (RAG) system pulls relevant documents to provide accurate, context-driven responses.

Vision Capabilities:

Server-based LLMs (11B, 90B) offer multi-modal learning, processing images like textbook pages and providing detailed explanations or clarifications.

Seamless Integration:

The app combines text-based and image-based AI functionalities, delivering a comprehensive learning experience for students in remote areas.

Deployment in Remote Areas

01 Server Setup in Central Location

Install the server with advanced AI models (llama-3.2-11B and 90B) at a school or community hub

02 Mobile App Distribution

Pre-install the mobile application on student smartphones, equipped with llama-3.2-1B and 3.2-3B for offline functionality

03 Local Wi-Fi Installation

Set up a local Wi-Fi network for students to connect to the server when within the vicinity.

04 Sync and Update Mechanism

Enable the app to sync with the server periodically, updating content and enabling enhanced capabilities like image recognition.

05 Ongoing Maintenance

Ensure regular server maintenance and updates to improve AI performance and expand resources.

Improved Learning Outcomes

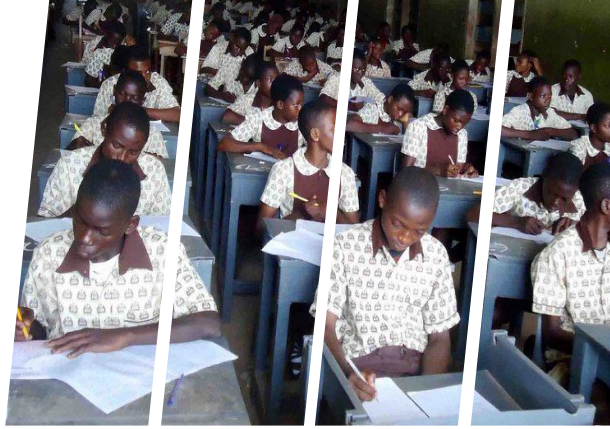
Students gain access to AI-driven, personalized support, enabling deeper understanding of complex topics.

24/7 Educational Access

The offline functionality ensures students can learn anytime, without being limited by internet availability.

Bridging the Knowledge Gap

The app provides access to vast resources and explanations, reducing educational inequality in remote areas.



Future Developments

- **Hardware Improvements**
- Future, more efficient hardware to boost performance, allowing faster, more advanced AI processing.
- **Expanded RAG Functionality**
- Broader integration of RAG, enhance the app’s ability to retrieve diverse educational materials.
- **Broader Deployment**
- Can be scaled to more remote regions globally, expanding its impact and accessibility
- **Increased Multi-modal Support**
- Continued development to handle more complex educational content, such as videos or interactive simulations.

Conclusion

Innovative AI Solution
Our mobile and server-based application brings advanced educational support to remote areas with minimal or no internet.

Accessible Learning
Offline functionality ensures students can access knowledge anytime, while server connectivity provides enhanced features like image recognition.

Bridging Educational Gaps
The solution helps reduce educational inequality by delivering personalized learning and access to vast resources in underserved regions.

Global Impact
This project holds the potential to revolutionize education in remote areas, empowering students worldwide with AI-driven knowledge.

Photo by Daily Nigerian


Thank you