

Bridging the gap in rural and underserved areas through AI-enabled solutions

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Healthcare disparities between urban and rural populations remain one of the most pressing challenges in global health. In underserved areas, patients face numerous obstacles, including a lack of healthcare infrastructure, long distances to medical facilities, shortages of skilled professionals, and limited access to real-time medical resources. These challenges result in poor health outcomes, higher mortality rates, and increased disease burden in rural communities.

However, artificial intelligence (AI) is emerging as a transformative tool in addressing these healthcare gaps. By leveraging AI-driven solutions, we can create sustainable and scalable healthcare models that improve access, enhance the quality of care, and optimise resources for underserved populations. This article explores how AI is revolutionising rural healthcare, with a focus on the practical applications that can make a meaningful difference.

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Understanding healthcare disparities in rural areas

Rural and underserved communities often experience structural and systemic barriers to healthcare, including:

- Limited infrastructure – many areas lack hospitals, clinics, and diagnostic facilities.
- Long travel distances – patients must travel significant distances for medical care, leading to delayed treatment.
- Shortages of medical professionals – rural regions often have fewer doctors, nurses, and specialists per capita.
- Limited internet and technology access – many households lack smartphones or reliable internet connectivity, restricting their ability to engage with digital health services.

These barriers contribute to preventable deaths, increased prevalence of chronic diseases, and poorer overall health outcomes. AI has the potential to mitigate these challenges by enabling more efficient and accessible healthcare services.

How AI can revolutionise rural healthcare

AI is well-suited to address the unique challenges of rural healthcare. Key applications include:

- Telemedicine – AI-powered virtual consultations connect patients with doctors remotely, reducing the need for travel.
- Predictive analytics – AI models can analyse health trends and predict disease outbreaks, allowing for proactive intervention.
- Image recognition and remote diagnostics – AI can analyse medical images (X-rays, computed tomography (CT) scans) to assist doctors in making accurate diagnoses, even from a distance.
- AI-powered mobile health (mHealth) solutions – AI chatbots, remote monitoring devices, and virtual health assistants can support chronic disease management and provide real-time health education.

By integrating these AI solutions into rural healthcare, we can improve early diagnosis, optimise treatment plans, and enhance overall patient outcomes.

Use case: Aflu Med healthcare virtual care centres in the Eastern Cape Province

While AI and telemedicine are powerful tools, they require internet connectivity and smartphone access – two resources that remain scarce in many rural areas. Recognising these limitations, Aflu Med Healthcare has pioneered the establishment of virtual care centres in underserved regions of the Eastern Cape.

These centres bridge the digital divide by providing:

- Access to AI-powered virtual consultations – patients visit the centres where trained facilitators assist them in connecting with remote doctors via AI-enabled telehealth platforms.
- Medical equipment and connectivity – centres are equipped with diagnostic tools, internet access, and computers, allowing patients to receive virtual care without needing a personal smartphone or internet at home.
- Local support for digital navigation – trained community healthcare workers guide patients through the consultation process, ensuring accessibility for the elderly and those unfamiliar with technology.
- Integration with electronic health records – patient data are securely stored and accessible across different healthcare touchpoints, ensuring continuity of care.

These virtual care centres serve as a scalable model for expanding healthcare access in remote regions, proving that AI-driven healthcare can work even in environments with limited personal technology access.

Building the infrastructure for AI-enabled rural healthcare

To successfully implement AI in rural healthcare, several critical components must be in place:

- Reliable data sources – AI models require quality healthcare data to provide accurate predictions and diagnostics.
- Affordable internet connectivity – investments in digital infrastructure, such as community WiFi and satellite internet, are necessary for AI-driven healthcare solutions.
- Training for healthcare professionals – doctors, nurses, and community health workers need training on how to use AI tools effectively.
- Public-private partnerships – governments, healthcare organisations, and tech companies must collaborate to scale AI solutions.

Ethical considerations and community engagement

As AI is integrated into healthcare, ethical considerations must be addressed, including:

- Data privacy and security – ensuring that patient data are protected and used responsibly.
- Equitable access – preventing AI from exacerbating existing healthcare disparities by making solutions affordable and accessible.
- Cultural sensitivity – AI solutions must be tailored to the needs of local communities, incorporating language preferences and cultural contexts.

Community engagement is crucial to the success of AI healthcare initiatives. By involving local leaders, healthcare workers, and patients in the development and deployment of AI tools, we can create sustainable solutions that genuinely meet the needs of underserved populations.

Future prospects and research opportunities

Looking ahead, several emerging AI applications could further enhance rural healthcare:

- AI-driven disease modelling – predicting and preventing disease outbreaks in real time.

- Wearable technology for remote monitoring – devices that continuously track vital signs and alert healthcare providers of potential health issues.
- AI-powered decision support systems – tools that assist healthcare providers in making data-driven clinical decisions.

To maximise AI's potential, ongoing research, investment, and collaboration between academia, healthcare providers, and technology firms are essential.

Discussion

AI has the power to transform healthcare in rural and underserved areas by addressing infrastructure challenges, optimising medical resources, and improving patient outcomes. The success of Aflu Med Healthcare's virtual care centres in the Eastern Cape demonstrates that AI-enabled healthcare can be accessible even in regions with limited personal technology access.

As we move forward, it is imperative to invest in the infrastructure, policies, and training required to scale these innovations. By harnessing AI responsibly and equitably, we can bridge the healthcare gap and ensure that quality medical care is available to all – regardless of geographic location.

Call to action

Healthcare leaders, policymakers, and technology innovators must collaborate to:

- Expand AI-driven healthcare initiatives in underserved regions
- Invest in the digital infrastructure required to support AI applications
- Prioritise ethical AI deployment to ensure fair and equitable healthcare access.

By taking these steps, we can move closer to a future where no one is left behind in accessing quality healthcare.