



## Role of AI in Modern hearing aids

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### Background

As per The World Health Organization (WHO) reports that over 1.5 billion people worldwide experience some degree of hearing loss, with approximately 430 million enduring disabling hearing loss worldwide.

In India, it's even severe with approx. 63 million people suffering from significant auditory impairment, which significantly affecting individuals' quality of life and posing substantial economic challenges too. Data clearly indicate hearing disability is becoming serious global health concerns.

### AI in hearing aids

Artificial Intelligence (AI) is disrupting the entire healthcare ecosystem through digitalization process including the Hearing Aids. New generation hearing aids offering personalized experiences through improve sound clarity, Improve and customize design, cordless charging system and many more. key highlights of AI in hearing Aids are:

- Automate Sound Environment
  - AI detects different listening environments, e.g. a quiet surrounding Vs. a noisy Surrounding and automatically adjusts settings for optimal hearing.
  - AI-powered hearing aids use deep learning algorithms to distinguish speech from background noise and suppress unwanted background noise.
  - Improve sound quality by suppressing unwanted sounds like wind, traffic, crowd noise, Loud music noise etc
  - It improves users' comfort and reduces the need for manual adjustments.
- Personalized Hearing Experience
  - AI Powered hearing aids learns from real-world data and customizes sound settings for individual needs.
  - AI analyses users' listening habits and preferences over time.
- Voice Recognition and Integration with Virtual Assistant
  - AI-powered hearing aids can recognize voices and prioritize familiar ones.
  - They can also integrate with virtual assistants like Alexa, Siri, Google assistant or any other virtual assistant for hands-free control.
- Real-Time Language Translation
  - Some AI-enabled hearing aids offer real-time language translation, helping users understand foreign languages.
- Connectivity and IoT Integration
  - AI-driven hearing aids connect with smartphones, TVs, and other smart devices via Bluetooth.
  - Users can control settings through mobile apps.
- Health Monitoring and Data Insights
  - Some hearing aids use AI to track health metrics like heart rate, activity levels, and cognitive health.
  - They can alert users to potential hearing issues and provide insights for audiologists.
- Self-Learning and Updates
  - AI-based hearing aids receive firmware updates that improve performance over time.
  - Machine learning allows them to refine sound processing as they gather more data.
- AI Powered, Virtual Assistant for Effective care of Hearing Aids
  - Integration of AI Powered, Multilingual Chatbot can guide users' effective uses and daily maintenance.
  - Text and Video based interactive guideline make very user friendly.

## Conclusion

AI hearing aids use machine learning algorithms to continuously adapt to specific environments and situations. The incorporation of Artificial Intelligence into hearing aid technology has transformed these devices into intelligent systems capable of providing personalized, adaptive, and high-quality auditory experiences. AI can help tailor treatments more effectively to individual patient needs [1-4].

As AI continues to evolve, we can anticipate further innovations that will enhance the quality of life for individuals with hearing impairments.

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