AI 101: AI Wearables

WHAT ARE AI WEARABLES?

AI wearables represent a new generation of body-worn technology. Unlike traditional devices that can only track and display data, AI wearables—including smart watches, glasses, rings, earbuds, clothing, and more—use artificial intelligence to interpret sensor data and deliver insights, alerts, and tailored support for the user. They can track health and activity, enable hands-free assistance, connect with external systems, and adapt to routines and environments.

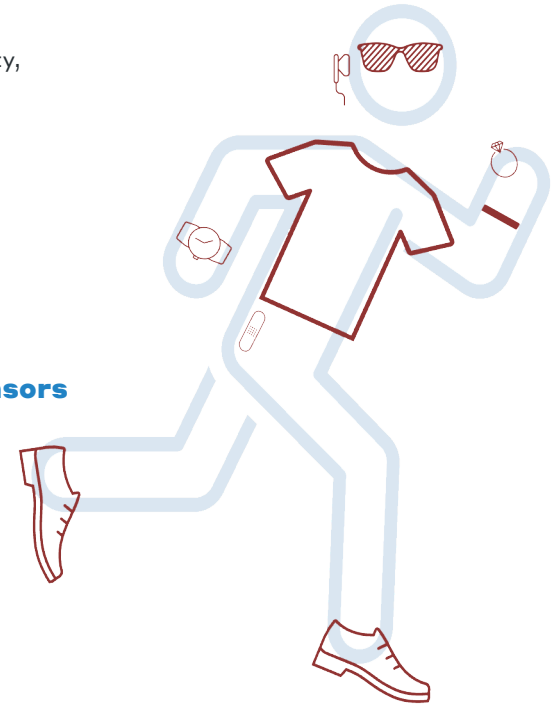
AI WEARABLE FORM FACTORS

Earbuds and Hearables
Purpose: Communication, accessibility, and AI voice assistance
Key Features: Audio processing, voice AI, real-time translation

Smart Watches
Purpose: Health monitoring, alerts, and daily productivity
Key Features: Biometric sensors, on-device AI, app ecosystem

Health Patches and Skin Sensors
Purpose: Continuous health monitoring, diagnosis, or treatment
Key Features: Biometric sensors, wireless data transmission

Smart Footwear and Insoles
Purpose: Gait analysis, injury prevention, and activity tracking
Key Features: Pressure sensors, motion detection, AI analytics



XR/VR Headsets
Purpose: Immersive experiences for work, training, and entertainment
Key Features: Spatial tracking, computer vision, gesture recognition

Smart Glasses
Purpose: Hands-free information, capture, and real-time assistance
Key Features: Cameras, computer vision, multimodal AI

Smart Rings and Straps
Purpose: Health monitoring, alerts, and activity tracking
Key Features: Sensors, on-device AI, long battery life

Smart Clothing and Vests
Purpose: Safety, productivity, and biometric monitoring
Key Features: Embedded sensors, environmental data, AI analytics

HOW AI WEARABLES WORK

STEP 1 Sense	STEP 2 Transmit	STEP 3 Process	STEP 4 Output	STEP 5 Act
Device collects body or environmental data via sensors.	Data are sent to an app, device, or cloud server.	AI model interprets patterns against training data.	Score, alert, overlay, or recommendation delivered to user.	User or connected system responds to the output.

Security, trust, and privacy frameworks—including **data protection**, **safety by design**, and **accountability measures**—guide each step, ensuring data integrity and trust among individual users, organizations, and the systems that rely on them.

AI WEARABLE ADOPTION

Sector	What AI Enables	Real-World Example
Health and Fitness	• Continuously monitors vital signs and metabolic data • Detects early warning signals before symptoms appear • Automates treatment responses • Helps users personalize training and recovery	AI-powered glucose monitors paired with automated insulin pumps are in active use by hundreds of thousands of people with Type 1 diabetes to automate insulin dosing around the clock.
Accessibility	• Reads text, signs, and menus aloud • Describes scenes and identifies people and objects • Delivers real-time captions and translation • Enables independent navigation assistance for users	In 2024, the FDA cleared consumer earbuds as over-the-counter hearing aids, making hearing assistance available without a prescription at lower cost and expanding access for roughly 30M.
Workforce	• Delivers real-time safety and environmental monitoring • Provides step-by-step, hands-free instructions in the field • Supports remote expert guidance and on-the-job training • Tracks fatigue and readiness across teams	The Department of Defense awarded a $96M contract in 2024 to deploy rings across all military branches for fatigue risk and illness detection, building on partnership that began in 2017.
Consumer	• Provides hands-free access to AI assistants and navigation • Enables real-time language translation • Delivers personalized recommendations throughout daily life • Integrates into everyday form factors people already wear	Smart glasses are driving significant growth across wearables as consumers adopt always-available AI assistants in familiar, low-friction form factors that require no new device habits.

KEY TERMS

Sensors
Components that detect and measure physical data such as motion, light, temperature, or electrical signals.

Computer Vision
AI that interprets visual input from cameras to identify objects, faces, text, or environments in real time.

Context Awareness
A device's ability to understand its environment (e.g. location, activity) and adapt accordingly.

Biometric
Unique physical measurements (e.g., heart rate, body temperature, and gait) collected by wearable sensors.

Multimodal AI
AI that processes multiple input types (e.g., voice, image, text, and sensor data) simultaneously to understand context.

Accessibility
Designing devices so people with disabilities can use them fully and independently without workarounds.

Form Factor
The physical size, shape, and design of a device. How and where it is worn affects what data it can collect.

On-Device Processing
AI computations performed locally on the wearable itself rather than being sent to a remote cloud server.

Privacy by Design
Building data protection into a product's architecture from the start rather than after the fact.

OPEN QUESTIONS

AI wearables are advancing faster than the norms, standards, and policies that govern them. Several important questions are being actively examined by industry, researchers, policymakers, and affected communities:

- **Data Ownership:** Who controls the data that wearables generate, process, or stores, and who has access?
- **Accountability:** When data shapes a health, employment, or safety decision, who is responsible for oversight?
- **Transparency:** How do users or bystanders know what data is being captured and what choices they have?
- **Access and Equity:** Are the benefits of AI wearables reaching the populations that stand to gain the most?

ASK US!

Curious about AI resources? Let us know! BPC is continually developing materials and engagements to best meet your needs. For more information, contact Geoff Lane at glane@bipartisanpolicy.org.