

Strengthening User Experience and Trust in Cardiac Monitoring with Kardi AI

AN EVALUATION BY HITLAB



This report presents HITLAB's Heuristic Evaluation of Kardi AI, a digital health platform designed to enhance cardiac care through continuous ECG monitoring, real-time insights, and AI-enabled clinical decision support.

Charul Narain, MPH

Varsha Srivastava, PhD

Vandana Yadav, MS

Stan Kachnowski, PhD, MPA



Table of Contents

Executive Summary	3
Why Current Cardiac Monitoring Isn't Enough?	4
Evidence Base for Advanced Cardiac Monitoring Technologies	8
Kardi AI	10
Heuristic Evaluation	14
Conclusion	21
References	22

Executive Summary

This whitepaper presents HITLAB’s heuristic evaluation of Kardi AI, a digital cardiac monitoring platform designed to improve heart-health outcomes through continuous ECG tracking, real-time insights, and AI-enabled clinical support. The platform combines a lightweight wearable ECG chest strap with an intuitive mobile application, enabling users and clinicians to access long-term cardiac data that enhances early detection and ongoing heart-health management.

Using Jakob Nielsen’s Usability Heuristics for User Interface Design, HITLAB conducted a comprehensive review of Kardi AI’s mobile application and device experience. The evaluation examined the platform’s design, interaction flow, system feedback, instructional clarity, error-recovery mechanisms, and alignment with established usability principles to determine overall effectiveness for both patients and clinicians.



Findings indicate that Kardi AI excels in device simplicity, clinical-grade aesthetic design, intuitive onboarding, and real-time ECG visibility, making it approachable and confidence-building for users. The platform demonstrates strong potential to support continuous cardiac monitoring with minimal burden on the user. However, opportunities exist to strengthen usability through improvements such as real-time recording guidance, clearer electrode preparation instructions, proactive connectivity and battery alerts, and enhanced help documentation.

Overall, Kardi AI shows strong adherence to user-centered design and stands out as a scalable model for technology-enabled cardiac care. HITLAB’s insights provide a structured roadmap for usability enhancements that can promote greater user confidence, improved data quality, and stronger engagement across diverse patient populations.

Why Current Cardiac Monitoring Isn't Enough?

Early and accurate detection of cardiac arrhythmias remains a major challenge in clinical practice, largely because traditional ECG assessments capture only short snapshots of heart activity. Routine 12-lead ECGs and standard Holter monitoring (24–48 hours) frequently miss intermittent or transient arrhythmias, resulting in delayed diagnosis and under-treatment (Barrett et al., 2014; Steinberg et al., 2021).

Recent advances in wearable biosensors and artificial intelligence (AI) have demonstrated significant potential to improve detection rates through long-duration, medical-grade ECG recording combined with automated real-time analysis (Hannun et al., 2019; Rosenberg et al., 2020)

Snapshot diagnostics miss intermittent arrhythmias



- **The Problem:** Most ECGs and 24–48h Holter tests record only a brief window of heart rhythm, making them poorly suited for capturing intermittent or short-lived arrhythmias (Barrett et al., 2014; Kim et al., 2023).
- **The Consequence:** Patients with symptoms such as palpitations, dizziness, or syncope receive non-diagnostic results, delaying arrhythmia detection and contributing to preventable stroke, HF admissions, or recurrent emergency visits (Chua et al., 2020).

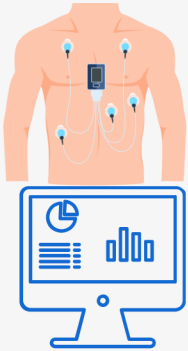
Monitoring duration is too short for low-frequency events



- **The Problem:** Traditional devices rarely exceed 24–48 hours of continuous recording, however, clinically significant arrhythmias emerge over 7–14 days (Barrett et al., 2014; Steinhubl et al., 2018).
- **The Consequence:** Diagnostic yield remains low, leading to repeated testing, higher healthcare costs, and prolonged uncertainty for patients.

Why Current Cardiac Monitoring Isn't Enough?

Poor comfort and wearability limit adherence

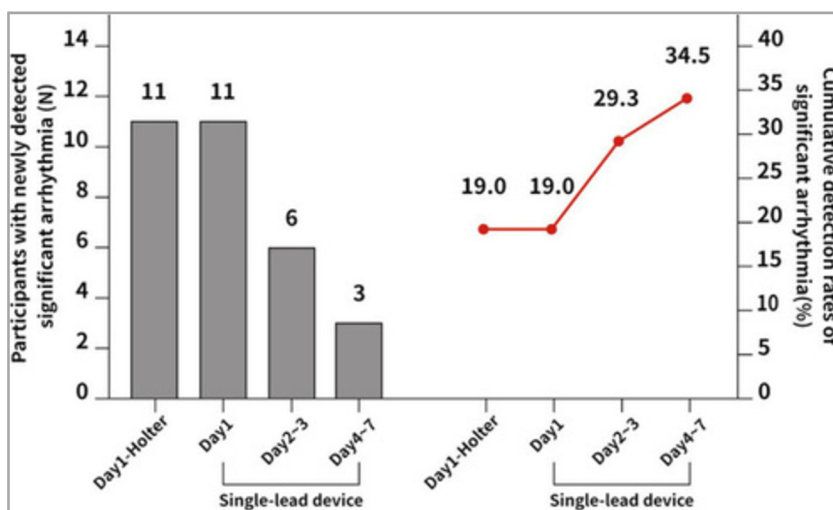


- **The Problem:** Bulky monitors, adhesive irritation, and device-related discomfort reduce wear time and generate incomplete datasets (Rosenberg et al., 2020; Jämsä et al., 2021).
- **The Consequence:** Reduced data quality and shorter monitoring durations further lower arrhythmia detection rates and undermine clinical decision-making.

Noise, motion artefacts, and variable signal quality degrade detection



- **The Problem:** Ambulatory ECG data are highly susceptible to motion artefacts, baseline wander, and inconsistent signal quality (Ansari et al., 2023; Baca & Palomino Valdivia, 2025).
- **The Consequence:** Algorithms misclassify or miss arrhythmias, increasing false positives, false negatives, and clinician workload due to manual verification.



Detection and cumulative rates of significant arrhythmias using 24-h Holter and 7-day MEMO patch monitors (Kim et al., 2023)

Why Current Cardiac Monitoring Isn't Enough?

Manual review makes long-duration ECG clinically unsustainable

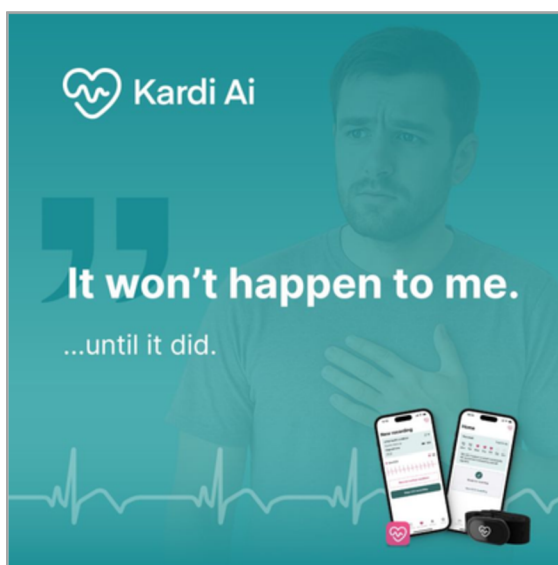


- **The Problem:** Multi-day ECG recordings require extensive manual analysis by specialists (Hannun et al., 2019).
- **The Consequence:** Clinics face bottlenecks, variable interpretation quality, and delays in reporting, slowing timely intervention for high-risk patients.

Limited evidence of outcomes and cost-effectiveness

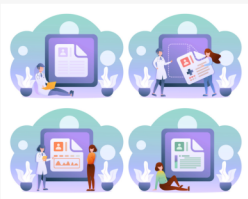


- **The Problem:** Although extended monitoring improves detection, few large-scale prospective trials demonstrate impact on stroke prevention, earlier treatment, or healthcare cost reduction (Hirten & Mooney, 2016; Steinhubl et al., 2018).
- **The Consequence:** Health systems remain hesitant to adopt long-term ambulatory ECG and AI-enabled solutions at scale.



Why Current Cardiac Monitoring Isn't Enough?

Fragmented data and poor EMR integration hinder clinical action



- **The Problem:** Most monitoring systems generate lengthy reports but lack standardized triage pathways or real-time integration with EMR systems (Proesmans et al., 2019; Steinberg et al., 2021).
- **The Consequence:** Clinicians receive delayed or non-actionable data, weakening the impact of early arrhythmia detection on patient care.



Accessibility gaps limit who receives advanced diagnostic monitoring

- **The Problem:** Patients in primary-care settings often lack access to extended ECG monitoring or electrophysiology services (Rosenberg et al., 2020).
- **The Consequence:** Underserved populations experience delayed diagnoses, avoidable complications, and unequal outcomes.

Individuals at risk of arrhythmias need continuous, reliable monitoring, yet standard ECG and Holter tests often miss intermittent events. The lack of accessible long-term, medical-grade monitoring limits early detection and timely care. AI-enabled continuous ECG platforms like Kardi.ai fill this gap by providing real-time, actionable insights that help prevent missed diagnoses and reduce cardiac complications.

Evidence Base for Advanced Cardiac Monitoring Technologies

AI-enabled long-term ECG monitoring improves detection of intermittent arrhythmias that routine ECGs and short Holter tests often miss. By combining wearable ECG sensors with real-time AI analysis, these systems enhance continuous rhythm assessment and significantly increase diagnostic yield (Steinberg et al., 2021; Barrett et al., 2014)

Limitations of Traditional Arrhythmia Detection

- Standard 12-lead ECGs provide only a brief snapshot, making them insufficient for identifying infrequent arrhythmias (Steinberg et al., 2021).
- Holter monitors—despite being the longstanding standard for ambulatory ECG monitoring—typically record only 24–48 hours of data.
- Studies consistently show that clinically relevant arrhythmias can be missed within these short monitoring windows (Barrett et al., 2014).



Wearable ECG Devices and Continuous Monitoring

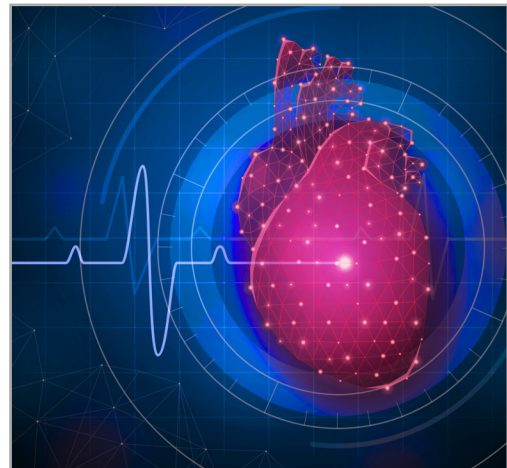


- Wearable ECG technologies have demonstrated higher diagnostic sensitivity due to extended monitoring duration.
- Multi-day or multi-week ECG recordings allow for a significantly improved detection rate of atrial fibrillation, premature beats, conduction abnormalities, and other arrhythmias (Rosenberg et al., 2020).

Evidence Base for Advanced Cardiac Monitoring Technologies

Role of Artificial Intelligence

- AI and machine-learning algorithms enhance cardiac monitoring by enabling automated, real-time rhythm analysis.
- Studies show that AI improves accuracy in identifying arrhythmias and reduces clinician workload by filtering noise, flagging abnormalities, and supporting early intervention (Hannun et al., 2019).
- AI-enabled systems have also demonstrated performance comparable to expert cardiologists in certain diagnostic tasks.



Impact on Early Diagnosis and Patient Outcomes

- Continuous ECG monitoring combined with AI significantly improves early diagnosis of clinically meaningful arrhythmias, thereby enabling timely treatment and reducing the risk of stroke, heart failure progression, and adverse cardiovascular events (Steinberg et al., 2021; Proesmans et al., 2019).
- This underscores the value of modern digital cardiac monitoring solutions.



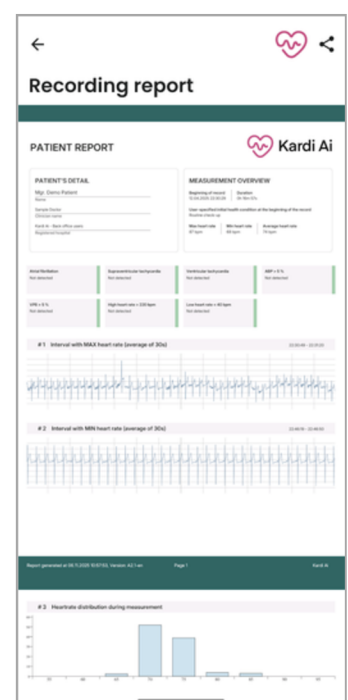
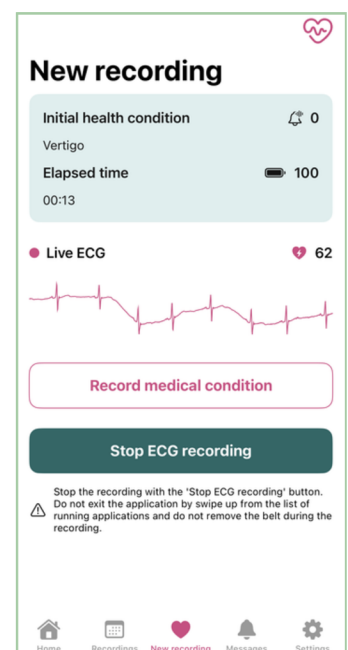
Kardi AI

Enhancing Usability and User Confidence in the Digital Health Platform

Kardi AI is an advanced digital cardiac monitoring platform that combines a medical-grade wearable ECG chest strap with an AI-enabled mobile application to support continuous, real-world heart-rhythm assessment. Designed for both patients and clinicians, the platform captures long-duration ECG recordings, displays real-time heart-signal data, and delivers AI-generated analyses and medical reports through a secure cloud environment.

Kardi AI App — Key Features

- **Real-Time ECG Display:** Shows a live ECG waveform and heart rate to confirm proper signal quality.
- **Long-Duration Recordings:** Supports extended ECG sessions (365 days along with doctor's overview) with automatic cloud upload and AI evaluation.
- **AI-Driven Insights:** Provides automated rhythm analysis, color-coded results, and medical reports for users and clinicians.
- **Condition Tagging:** Allows users to label recordings with symptoms or health states for better clinical interpretation.
- **Simple Onboarding & Pairing:** Step-by-step guidance for strap placement, device pairing, and starting a measurement.
- **Notifications & Status Indicators:** Displays recording status, analysis progress, and result alerts within the app.
- **Secure Data Sharing:** Enables clinicians to access detailed ECG histories, trends, and monthly summaries.
- **Cross-Platform Support:** Available on both iOS and Android.



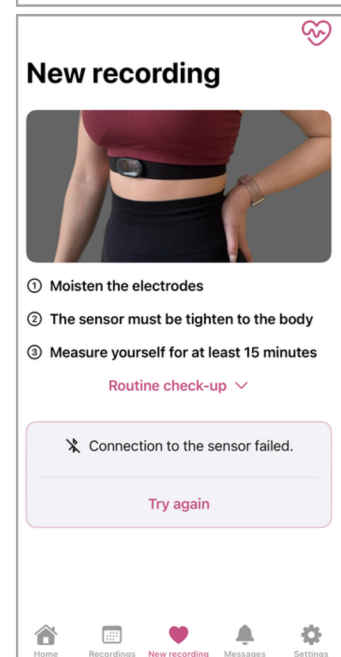
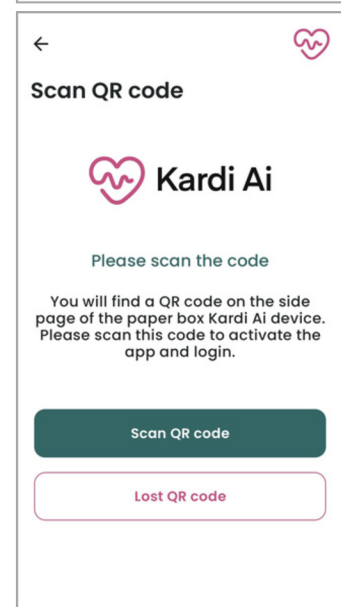
Kardi AI

Enhancing Usability and User Confidence in the Digital Health Platform

Kardi AI Device (Chest Strap) — Key Features

- *Continuous, Patient-Owned Cardiac Monitoring:* A patient-owned device is available 24/7, enabling continuous and long-term monitoring whenever needed. Compared to a doctor-provided device used only for a limited period (typically 24 hours), it captures more clinically relevant data over time and improves the chance of detecting intermittent conditions.
- *Medical-Grade ECG Sensor:* Uses a high-precision Polar H10-based sensor for accurate electrical heart data.
- *Comfortable Wearable Design:* Lightweight, adjustable, waterproof strap suitable for daily, under-clothing wear.
- *Reliable Connectivity:* Bluetooth integration ensures stable real-time data transmission to the app.
- *Extended Monitoring Capability:* Enables continuous ECG recording for 3, 6, and up to 12 months.
- *Easy Maintenance:* Uses a replaceable CR2025 battery; strap and electrodes are washable with clear care guidance.
- *Optimized Skin Contact:* Moistening the electrodes with water or gel enhances signal quality.
- *Automatic Activation:* The sensor turns on automatically when placed on the body.

Kardi AI demonstrates strong potential as a clinically reliable, user-centered cardiac monitoring platform, effectively combining wearable technology with AI-driven insights. Targeted refinements in guidance, feedback, and user support will further strengthen trust, improve adherence, and enhance overall long-term usability.



Kardi AI

Enhancing Usability and User Confidence in the Digital Health Platform

Key Value Propositions

For Doctors (Clinicians / Cardiologists / Neurologists / GP)

- *Continuous Remote Monitoring:* Offers real-time access to long-term (every 3-6-12 month and also on daily basis) aggregated view of patient measurements supporting more accurate and context-rich diagnosis and treatment planning.
- *AI-Assisted Analysis:* Leverages AI to scan ECG recordings, flag abnormalities, and convert large datasets into clear, clinically actionable reports—saving time and enhancing diagnostic confidence.
- *Enhanced Arrhythmia Detection:* Extended monitoring improves the detection of intermittent or paroxysmal rhythm disorders that short-duration tests frequently overlook.



- *Enhanced Patient Engagement:* Enables clinicians to remotely track patient progress, provide personalized feedback, and better assess the effects of lifestyle changes or medications.
- *Efficient Clinical Workflow:* Cloud-based data access and monthly summary reports streamline case review, reduce manual analysis, and minimize the need for frequent in-person consultations.
- *Preventive Care & Risk Management:* Early detection of subtle or asymptomatic cardiac risks supports timely intervention and helps prevent serious events such as stroke or heart failure.

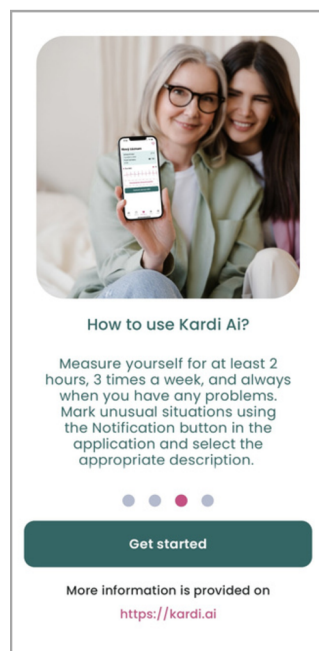
Kardi AI

Enhancing Usability and User Confidence in the Digital Health Platform

Key Value Propositions

For Users (Patients)

- *Continuous Heart Monitoring:* Provides round-the-clock ECG tracking during daily activities, supporting timely detection of rhythm irregularities.
- *Medical-Grade Accuracy:* Delivers clinical-quality ECG data through the chest strap, complemented by AI-based alerts for early identification of potential abnormalities.
- *Ease and Comfort:* Lightweight, washable, and easy to use; the strap and smartphone-based system allow seamless everyday wear without clinic visits or bulky devices.



- *Preventive Savings:* Early detection of arrhythmias and proactive risk monitoring help reduce costly complications, emergency visits, and invasive diagnostics.
- *Clinician Collaboration:* Users can share comprehensive ECG reports with their doctors, enabling informed decisions, timely interventions, and personalized care.
- *Accessible & Affordable:* A subscription-based model provides continuous, high-quality heart monitoring at a lower cost than repeated clinical tests, making advanced cardiac care more accessible.

Heuristic Evaluation

Conducted by HITLAB

METHODOLOGY

The evaluation was designed to reflect the experiences of Kardi AI's primary end users—including patients conducting daily ECG measurements and clinicians relying on long-term cardiac data—while providing expert assessment of the platform's design, usability, and functional performance.

Guided by Jakob Nielsen's Ten Usability Heuristics, a globally recognized framework for evaluating interface design, each principle—visibility of system status; match between system and the real world; user control and freedom; consistency and standards; error prevention; recognition rather than recall; flexibility and efficiency of use; aesthetic and minimalist design; help users recognize, diagnose, and recover from errors; and help and documentation—was systematically applied to identify key usability strengths and areas for improvement.

The evaluation involved a multi-day review of both the Kardi AI mobile application and its accompanying wearable ECG chest-strap device. Test scenarios were developed to simulate real-world user interactions, focusing on essential tasks such as pairing the device, starting a recording, viewing live ECG data, tagging symptoms, reviewing historical reports, and interpreting AI-generated results. The assessment also examined onboarding, instructional clarity, device preparation steps, and the overall feedback and notification pathways critical to successful long-term cardiac monitoring.

Personas

HITLAB conducted a heuristic evaluation of the Kardi AI platform, using structured usability inspection methods to assess its effectiveness, efficiency, and alignment with the needs of patients and clinicians engaged in continuous cardiac monitoring. The evaluation examined how well the platform supports accurate, accessible ECG recording and AI-driven insights that enhance user confidence, early detection, and continuity of care.

Heuristic Evaluation

Conducted by HITLAB

Evaluation Persona 1

54-year-old At-Risk Working Professional



Reid Miller

Occupation: Corporate Manager

Age: 54 years



"I'm not a doctor, but I want to understand what my numbers mean... before it becomes a problem."



Background <p>Reid is a busy corporate manager with a history of hypertension and a family predisposition to heart disease.</p> <p>He travels and struggles to make regular doctor visits. He's seeking an easy, reliable way to track his heart health and share data with his physician effortlessly.</p>	Goals <ul style="list-style-type: none">• Monitor his heart health consistently without frequent clinic visits.• Detect early warning signs of irregular heart activity.• Share clear, reliable data with his physician to improve care decisions.	Challenges <ul style="list-style-type: none">• Struggles to find time for regular checkups due to a demanding job.• Has limited medical knowledge, finds interpreting ECGs confusing.• Needs a device that's accurate but simple enough to use independently.
Motivations <ul style="list-style-type: none">• Stay healthy and active to enjoy family time.• Reduce anxiety about potential heart issues through daily insights.• Use technology as a preventive health tool, not just a reactive one.	Frustrations <ul style="list-style-type: none">• Medical jargon and complex data displays discourage consistent use.• Traditional devices feel bulky and inconvenient.• Feels uncertain about how secure his health data is in digital tools.	Needs <ul style="list-style-type: none">• Clear, AI-powered insights explained in plain language.• Seamless app experience with simple data visualization.• Secure data sharing directly with his healthcare provider.

Heuristic Evaluation

Conducted by HITLAB

Evaluation Persona 2 38-year-old Cardiologist



Maria Lopez

Occupation: Cardiologist

Age: 38

“I need smart tools that help me keep my mom healthy without adding to my workload.”

<p>Background</p> <p>Maria is a cardiologist caring for her mother with chronic heart failure. Tech-savvy and proactive, she values data-driven tools that simplify monitoring.</p> <p>She needs an accurate, user-friendly device that helps her manage her mother’s condition remotely while balancing her demanding healthcare career.</p>	<p>Goals</p> <ul style="list-style-type: none">• Ensure her mother’s heart data is tracked accurately and consistently.• Identify early warning signs to prevent ER visits or hospitalizations.• Use reliable AI-driven alerts to support clinical decision-making.	<p>Challenges</p> <ul style="list-style-type: none">• Balancing her professional duties with caregiving responsibilities.• Getting her mother to remember daily device use.• Integrating multiple health apps and systems.
<p>Motivations</p> <ul style="list-style-type: none">• Wants to empower her mother to manage her own health.• Believes in proactive, tech-enabled healthcare.• Values tools that save time and improve patient safety.	<p>Frustrations</p> <ul style="list-style-type: none">• Manual data entry or syncing between devices wastes time.• Many wearables provide too much data but not enough actionable insight.• Some devices require frequent charging or complicated setup.	<p>Needs</p> <ul style="list-style-type: none">• Easy-to-use device with automatic syncing and alerts.• AI insights that translate data into clear recommendations.• Ability to monitor multiple users or patients in one dashboard.

Heuristic Evaluation



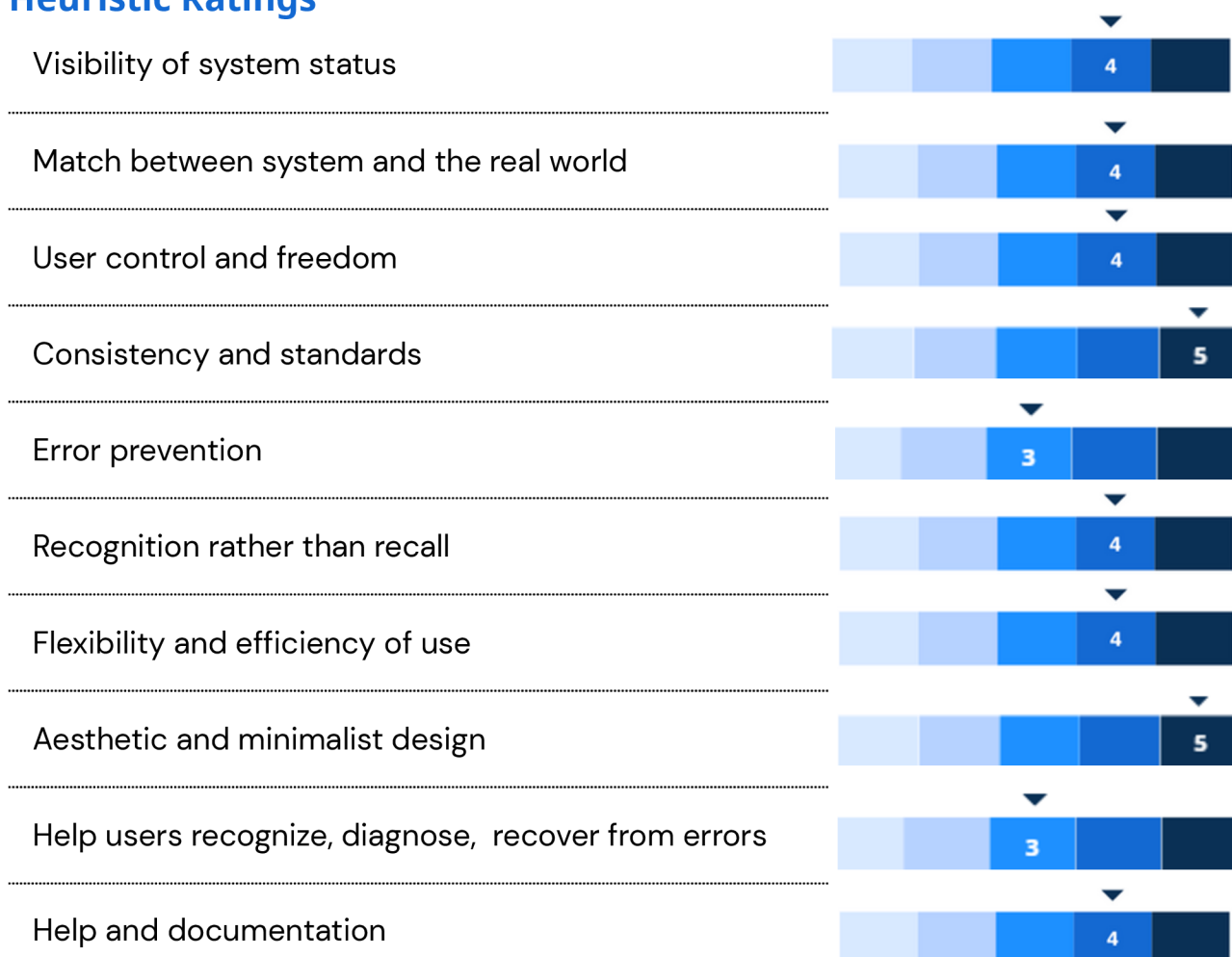
Conducted by HITLAB

Findings

The heuristic evaluation found that Kardi AI offers a strong foundation for long-term cardiac monitoring, with a clean, minimalist interface, easy device pairing, and real-time ECG visualization that supports user confidence and clinical accuracy. However, several usability gaps were identified, including limited real-time feedback on battery, connectivity, and signal quality; insufficient onboarding and guidance during ECG recordings; unclear instructions for electrode preparation and device maintenance; and delayed error messaging that appears only after a recording is complete.

The evaluation also highlighted the need for more proactive notifications, clearer documentation, and enhanced personalization to better support daily use, reduce user error, and ensure consistent, high-quality ECG data collection.

Heuristic Ratings



Heuristic Evaluation



Conducted by HITLAB

Strengths Identified

App & Software Experience:

- **Clear, Minimal Interface:** Clean, clutter-free layout with medical-grade visuals that build credibility & trust.
- **Simple, Intuitive Workflow:** Users can begin & complete ECG recordings in just a few taps, reducing friction for first-time & repeat users.
- **Real-Time ECG Visualisation:** Live waveform display reassures users that the device is functioning correctly & supports confidence during recording.
- **Immediate System Status Feedback:** Clear connection indicators & signals simplify decision-making for users.
- **Symptom/Condition Tagging:** Ability to label recordings adds clinical context & enhances provider interpretation.
- **Low Cognitive Load:** Minimal text, clean screens, & well-structured visuals help users navigate effortlessly.
- **Motivational UI Elements:** Icons, progress indicators & minimalistic prompts encourage engagement without overwhelming users.

Device Design & Usability:

- **Lightweight and Comfortable:** Sleek, unobtrusive chest strap suitable for extended daily wear.
- **Adjustable, Secure Fit:** Elastic strap adapts to different body types & maintains stable electrode contact.
- **Easy Setup:** Pairs quickly with the app for a smooth onboarding experience.
- **Anti-Slip Grip:** Circular grip elements enhance comfort & prevent strap movement.
- **Simple Fastening:** User-friendly design allows quick wearing & removal.
- **Washable Material:** Hygienic, washable strap supports long-term use.
- **Easy Battery Replacement:** Battery can be replaced effortlessly after long usage cycles (one battery lasts for 400 hours).

Heuristic Evaluation



Conducted by HITLAB

Opportunities for Improvement

HITLAB’s evaluation identified several targeted refinements to further improve the user experience:

- Add visual or buzzer feedback for battery status and device connectivity.
- Display clear recording instructions before starting (e.g., sit still, breathe normally, ensure strap is snug).
- Allow users to set custom recording durations while preventing selections below the minimum threshold.
- Provide real-time prompts during recording (e.g., “Signal quality low—adjust strap”).
- Introduce gentle alerts for connectivity issues, low battery, and upcoming recordings.
- Add a notifications section with customizable reminders.
- Include clear labels or icons showing how to safely remove the tracker before cleaning.
- Add a personalized home-screen greeting to enhance user engagement.
- Use motivational progress messages to encourage consistent device usage.



Heuristic Evaluation



Conducted by HITLAB

Recommended Next Steps

To systematically enhance the platform, HITLAB recommends a phased approach:

- **Immediate Refinements (0–2 months):**
 - Add visual/audio alerts for battery status, connectivity, and recording progress.
 - Provide visual guides for electrode moistening and clearer pre-recording instructions.
 - Add an on-screen timer and progress bar to prevent too-short recordings.
- **User Experience Optimization (2–4 months):**
 - Add a brief in-app tutorial for setup and strap care.
 - Introduce personalized greetings and motivational prompts on the home screen.
- **Pilot Validation & Scaling (4–6 months):**
 - Run a pilot with target personas to validate updated features.
 - Refine the experience based on pilot insights to improve adherence and data quality.
 - Explore development of a multi-user dashboard for clinicians and caregivers.

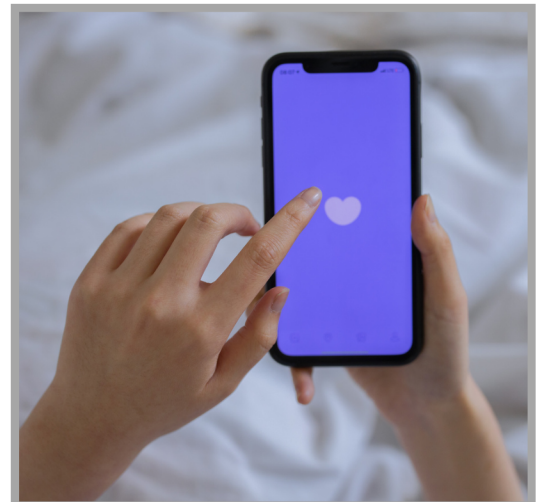
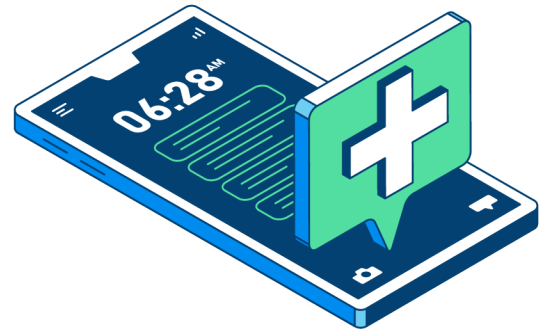


Conclusion

The heuristic evaluation conducted by HITLAB confirms that the Kardi AI platform is a robust, patient-friendly solution that successfully bridges the gap between clinical-grade cardiac monitoring and everyday health management. Its sleek, minimalist device design, combined with an intuitive and professional application interface, reflects strong adherence to core usability principles while promoting trust, accessibility, and proactive health engagement.

The evaluation highlights that Kardi AI empowers users to take an active role in their heart health through continuous, AI-supported monitoring. Its emphasis on simple task flows, live ECG feedback, and clinically relevant features like health condition tagging strengthens user confidence and supports informed dialogue with physicians. By combining a comfortable, wearable device with seamless digital functionality, the platform creates a comprehensive monitoring system that enables early detection and empowers both patients and caregivers.

The heuristic evaluation identifies a clear pathway for Kardi AI to strengthen user confidence and operational clarity. By prioritizing enhancements in real-time guidance, proactive error prevention, and comprehensive onboarding, Kardi AI can evolve from a highly functional tool into an indispensable health companion. Implementing these evidence-based refinements will further solidify its position as a trusted and empowering solution in the digital cardiac care landscape.



“

Kardi AI advances cardiac care by enabling continuous, AI-driven monitoring that replaces episodic methods. The platform provides patients and clinicians with real-time, actionable insights for early detection of heart rhythm irregularities. By uniting clinical-grade data with intuitive design, Kardi AI supports proactive health decisions and transforms patient-centered heart health management”

— **Stan Kachnowski, Chair, HITLAB**

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HITLAB

Contact us for further inquiries



Stan Kachnowski PhD MPA
212-543-0107
swk16@hitlab.org
hitlab.org

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