A STUDY ON AI FOR PERSONALISED HEALTH COACHING AND LIFESTYLE OPTIMISATION IN SMARTWATCHES

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Abstract

AI-powered smartwatches are transforming personal health and lifestyle management by providing real-time, personalized coaching. This article explores the integration of AI technologies in wearable devices, focusing on their ability to analyze data, deliver tailored health insights, and promote better habits. The study investigates current capabilities, user experiences, and barriers to adoption, while highlighting the transformative potential of AI in improving health outcomes. Emphasis is placed on AI's role in fitness tracking, sleep management, nutrition guidance, and stress reduction. Additionally, ethical considerations such as data privacy and bias in algorithms are addressed. The findings reveal a growing demand for accessible, customizable health solutions driven by wearable AI and propose recommendations for future developments in this field.

Keywords: *AI powered smartwatches, Personal health management, Lifestyle management, User experience.*

Introduction

The proliferation of wearable devices, especially smartwatches, has redefined how individuals monitor their health and manage their lifestyles. These devices now incorporate sophisticated AI technologies capable of providing personalized health coaching, which surpasses traditional fitness tracking.

Smartwatches equipped with AI algorithms can analyze a user's physiological data—such as heart rate, sleep patterns, and activity levels—in real time. They then deliver actionable insights tailored to individual goals, whether for fitness, stress management, or chronic disease prevention. However, while these capabilities are promising, challenges such as data accuracy, user engagement, and privacy concerns persist.

This article examines how AI is shaping the future of health coaching in smartwatches. By analyzing existing technologies, user experiences, and emerging trends, the study identifies opportunities for improvement and innovation in personalized health coaching and lifestyle optimization.

Review of Literature

Research by **Park et al. (2022)** shows that gamified feedback mechanisms, such as rewards for meeting step goals or streaks for consistent activity, can significantly enhance user engagement.

Research by **Huang et al. (2021)** highlights how AI models combine these data streams to provide a holistic view of user health, enabling targeted interventions like stress management, improved sleep hygiene, and fitness optimization. For instance, AI-driven insights might suggest specific workout timings based on sleep patterns or recommend stress-relieving activities during high HRV periods. These suggestions align with user-specific goals, improving the overall quality of life.

Study by **Wang et al. (2020)** demonstrates that machine learning models can accurately predict user activity levels and suggest improvements based on historical data. AI-powered virtual health assistants like Fitbit's "Smart Coach" or Garmin's "Coach" offer dynamic, goal-based coaching by adapting recommendations to the user's progress and preferences. This personalized approach has been shown to increase motivation and long-term adherence to healthy behaviors.

Studies like **Smith et al. (2019)** reveal that AI models can predict cardiovascular events, such as arrhythmias, through continuous ECG monitoring. Smartwatches equipped with predictive algorithms can alert users to consult healthcare professionals before symptoms escalate, thus reducing the risk of severe health complications.

Objectives

- To examine the primary health and wellness objectives of individuals using or interested in AI powered smartwatches.
- To assess the satisfaction levels and comfort levels of users with smartwatch features.

Research methodology

It is a descriptive study to explore the integration of AI technologies in smartwatches for personalised health coaching and lifestyle optimisation. A simple random sampling technique was used to select a sample of 50 users. The selection was based on various factors including age, gender, occupation. This study is based on primary data. A structured questionnaire was administered with selected respondents of 50.

Data analysis and Interpretation

Table 1: Demographic and Socio-Economic Profile of the user

S No	Particulars	Classification	Frequency	Percentage
1.	**Gender**	Male	25	50
		Female	25	50
		Total	**50**	**100**
2.	**Age**	18-24	17	34
		25-34	9	18

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		35-44	10	20
		45-54	7	14
		Above 55	7	14
		Total	**50**	**100**
3.	**Occupation**	Student	11	22
		Government Employee	5	10
		Private Employee	12	24
		Self-employed	14	28
		Retired	4	8
		Other	4	8
		Total	**50**	**100**
4.	**Brand**	Apple	17	34
		Samsung	9	18
		Noise	8	16
		Boat	11	22
		Redmi	8	16
		Other	1	2
		Total	**50**	**100**

Sources: Primary data

Interpretation

Gender Distribution: The sample comprises an equal distribution of genders, with 50% male and 50% female respondents. This balance ensures a gender-neutral perspective in the analysis. Age Distribution: The majority of respondents fall within the 18-24 age group (34%), indicating that the sample primarily consists of younger individuals. The second-largest age groups are 35-44 (20%) and 25-34 (18%), showing a gradual decline as the age increases. The older age groups (45-54 and above 55) collectively contribute 28%, indicating limited representation from older demographics. Occupation: The highest percentage of respondents are self-employed (28%), showcasing a significant entrepreneurial presence. Private employees (24%) and students (22%) form the next largest groups, highlighting diverse professional backgrounds. Government employees (10%), retired individuals (8%), and other occupations (8%) make up a smaller proportion, indicating fewer public-sector workers and retirees in the sample. Brand Preference: Apple leads with the highest preference among respondents (34%), followed by Boat (22%) and Samsung (18%). This reflects a strong inclination towards premium and mid-range brands. Noise (16%) and Redmi (16%) have comparable shares, suggesting popularity among value-conscious consumers. Other brands account for only 2%, indicating minimal diversity in brand preference outside the top choices.

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Table 2: Brand preferences

Particulars	Total	Rank
Apple	159	I
Samsung	149	III
Noise	157	II
Boat	142	V
Redmi	143	IV

Sources: Primary data

Interpretation

Apple (Rank I, Total: 159) is the most preferred brand, showcasing strong consumer loyalty and perceived premium value. Noise (Rank II, Total: 157) performs exceptionally well, likely due to affordability and fitness-oriented features. Samsung (Rank III, Total: 149) remains a strong contender, balancing brand reputation and feature offerings. Redmi (Rank IV, Total: 143) is slightly ahead of Boat (Rank V, Total: 142), indicating a preference for cost-effective yet reliable options.

Table 3: Factors influence the decision to purchase smartwatches

Particulars	Frequency	Percentage
Accuracy	15	30
Cost	19	38
Ease of use	29	58
Data privacy	18	36
Integration with other devices or apps	9	18

Sources: Primary data

Interpretation

Ease of Use (58%): The most significant factor, indicating that users prioritize simplicity and user-friendly interfaces when choosing a smartwatch. Cost (38%): Cost is the second most influential factor, suggesting that affordability plays a crucial role in purchasing decisions. Data Privacy (36%): Privacy concerns are moderately important, highlighting user awareness of data security issues. Accuracy (30%): Accurate tracking and monitoring are valued but rank lower than ease of use and cost. Integration with Other Devices or Apps (18%): This is the least important factor, implying that connectivity features are less critical compared to other considerations.

Table 4: Smartwatches Features

Particulars	Total	Rank
Tracking heart rate	271	VII
Accurate BP levels	291	II
Monitoring sleep patterns	238	X

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Recording steps	257	VIII
Calories burned	291	II
Running/ Walking	312	I
Receiving calls, messenger & calls	285	IV
Controlling music	275	VI
Setting alarms, timers	281	V
Accessing weather	256	IX

Sources: Primary data

Interpretation

Running/Walking (Rank I, Total: 312) is the most preferred feature, highlighting the importance of basic fitness tracking. Accurate BP Levels and Calories Burned (Rank II, Total: 291 each) are equally valued, reflecting health-conscious preferences. Receiving Calls, Messaging (Rank IV, Total: 285) and Setting Alarms/Timers (Rank V, Total: 281) show functional importance in daily use. Controlling Music (Rank VI, Total: 275) and Tracking Heart Rate (Rank VII, Total: 271) are moderately valued, with users appreciating convenience and basic health metrics. Recording Steps (Rank VIII, Total: 257) and Accessing Weather (Rank IX, Total: 256) indicate lower but consistent usage. Monitoring Sleep Patterns (Rank X, Total: 238) is the least prioritized, suggesting limited reliance on this feature.

Table 5: Satisfaction level of features in smartwatches

Particulars	Total Weightage point	Mean score	Rank
Accuracy of health data	151	10.06	IV
Ability to detect and record	147	9.8	VI
Variety of workout modes	147	9.8	VI
Utility of voice assistant features	144	9.6	VIII
Ability to customise watch	156	10.4	II
Ease of navigating the interface	145	9.6	VIII
Voice recognition reliability	151	10.06	IV
Gesture control accuracy	158	10.5	I
Accurate time management	156	10.4	II
Entertainment Management	137	9.1	X

Sources: Primary data

Interpretation

Gesture Control Accuracy (Rank I, Mean Score: 10.5) is the most valued feature, indicating high importance placed on seamless control. Customization and Accurate Time Management (Rank II, Mean Score: 10.4) are highly regarded, emphasizing personalization and reliability in timekeeping. Accuracy of Health Data and Voice Recognition Reliability (Rank IV, Mean Score: 10.06) highlight the importance of precise monitoring and

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communication efficiency. Ability to Detect and Record & Variety of Workout Modes (Rank VI, Mean Score: 9.8) show balanced interest in fitness tracking. Utility of Voice Assistant and Ease of Navigation (Rank VIII, Mean Score: 9.6) suggest lesser emphasis but remain relevant. Entertainment Management (Rank X, Mean Score: 9.1) is the least prioritized, indicating it is not a key decision factor.

Findings

1. **Demographic Insights:** Equal representation of genders ensures a balanced perspective. Majority of respondents are aged 18-24, indicating younger users dominate smartwatch usage. Self-employed individuals (28%) and students (22%) are prominent users, reflecting diverse occupational backgrounds.
2. **Brand Preferences:** Apple is the most preferred brand due to its premium features. Affordable brands like Noise and Redmi appeal to value-conscious consumers.
3. **Key Features:** Gesture control accuracy, customization, and time management are the most appreciated features. Running/walking tracking and BP monitoring are highly valued functionalities. Entertainment-related features like music control and sleep pattern monitoring are less prioritized.
4. **Usage Trends:** Fitness tracking (steps, calories, and running) remains a primary motivator for smartwatch use. Functional features like messaging and alarms are valued for convenience.
5. **Barriers to Adoption:** Challenges include concerns about data privacy, algorithmic biases, and reliance on technology. Some users report dissatisfaction with data accuracy and ease of navigation.

Suggestions

1. **Enhancing Health Features:** Improve sleep pattern monitoring accuracy to address the unmet needs of health-conscious users. Focus on refining BP and calorie tracking to build trust in health metrics.
2. **User-Centric Design:** Enhance interface navigation and gesture control to improve overall usability. Offer greater customization options for diverse user preferences.
3. **Affordable Options:** Promote budget-friendly yet feature-rich models to capture the mid-tier market.
4. **Data Privacy and Security:** Implement transparent data usage policies and advanced encryption to address privacy concerns.
5. **Education and Awareness:** Provide users with educational materials to optimize device usage for health and wellness.

Conclusion

AI-powered smartwatches are transforming health and lifestyle management through personalized coaching, fitness tracking, and real-time monitoring. While their adoption is rising, barriers like data privacy concerns and feature inaccuracies must be addressed to

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enhance user satisfaction. By prioritizing user-centric designs, ethical practices, and robust functionality, smartwatch brands can further revolutionize personal health management.

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