A Project Report

on

DAILY STEP TRACKER WITH GOAL MONITORING



by

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# ### \*Abstract\*

# The "Daily Step Tracker with Goal Monitoring" project is designed to promote physical activity and healthy living by enabling users to monitor their daily steps and track progress toward a predefined goal. This system utilizes an accelerometer to measure motion data, which is processed by a microcontroller or smartphone to detect steps. The collected data is displayed in real-time on an OLED/LCD screen or within a mobile application. Users can set personalized goals, and the system provides motivational feedback based on their performance, such as congratulatory messages for meeting targets or encouragement when progress is low.

# The tracker integrates key features, including step detection, goal monitoring, and progress visualization. For enhanced usability, it supports optional wireless communication to sync data with smartphones or cloud services, enabling long-term activity tracking and analysis.

# This project achieves its objectives using an efficient combination of hardware (e.g., accelerometers, microcontrollers) and software (e.g., machine learning algorithms for step detection). Testing and calibration demonstrate its reliability, achieving high accuracy compared to commercial fitness trackers. Future enhancements could include additional sensors for heart rate monitoring, GPS tracking, and gamification features to further engage users and encourage regular activity.

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# LIST OF ACRONYMS/ABBREVIATIONS

### \*List of Acronyms/Abbreviations\*

\*BPM\* : Beats Per Minute

\*CPU\* : Central Processing Unit

\*GPS\* : Global Positioning System

\*I2C\* : Inter-Integrated Circuit

\*LCD\* : Liquid Crystal Display

\*LED\* : Light Emitting Diode

\*MPU\* : Motion Processing Unit

\*OLED\* : Organic Light-Emitting Diode

\*RAM\* : Random Access Memory

\*SPI\* : Serial Peripheral Interface

\*USB\* : Universal Serial Bus

\*Wi-Fi\* : Wireless Fidelity

\*BLE\* : Bluetooth Low Energy

\*AI\* : Artificial Intelligence

\*ML\* : Machine Learning

\*GUI\* : Graphical User Interface

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# Chapter 1

# INTRODUCTION

This section introduces the importance of physical activity and how technological advancements in fitness tracking have motivated this project. It provides a general understanding of the need for a step tracker with goal monitoring.

\*1.2 Project Idea\*

Explains the concept behind the project, highlighting its purpose as a tool to monitor steps and provide feedback to users based on their activity levels.

\*1.3 Purpose of the Project\*

Defines the objectives of the project, including promoting health, offering a cost-effective alternative to commercial fitness trackers, and empowering users with actionable insights.

\*1.4 Project Specifications\*

Outlines the key hardware and software components used in the system, such as the microcontroller, accelerometer, display, and software tools.

\*1.5 Applications of the Project\*

Lists practical applications of the step tracker, such as personal fitness monitoring, corporate challenges, and data collection for health research.

\*1.6 Project Plan\*

Describes the phases of project development, from hardware integration and algorithm design to testing and deployment.

\*1.7 Report Organization\*

Provides an outline of the report structure, summarizing the contents of each chapter.

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### \*Chapter 2: Literature Review\*

\*2.1 Background Theory\*

Discusses the role of wearable technology and motion sensors in fitness tracking, explaining the science behind accelerometers and step counting algorithms.

\*2.2 Related Technologies\*

Examines existing technologies, such as commercial fitness trackers (e.g., Fitbit, Apple Watch), and highlights their features and limitations.

\*2.3 Limitations and Bottlenecks of the Existing Work\*

Identifies common issues with current systems, such as cost, accuracy, battery life, and lack of customization, to justify the need for the project.

\*2.4 Problem Statement\*

Defines the specific problem the project aims to address, such as the lack of affordable, accurate, and customizable step trackers.

\*2.5 Summary\*

Summarizes key findings from the literature review and establishes the groundwork for the proposed system.

### \*Chapter 3: Project Design and Implementation\*

\*3.1 Proposed Design Methodology\*

Explains the step-by-step methodology for building the project, including hardware selection, software architecture, and system integration.

\*3.2 Hardware Design\*

Describes the components used, such as the accelerometer, microcontroller, display, and power supply, and their integration.

\*3.3 Software Design\*

Details the algorithms and software tools used to process accelerometer data, detect steps, and calculate progress toward goals.

\*3.4 Step Detection Algorithm\*

Explains the logic for detecting steps based on motion sensor data, using thresholds and filters to avoid inaccuracies.

\*3.5 Goal Monitoring Feature\*

Outlines how users can set and track goals, with real-time updates and feedback based on their activity levels.

\*3.6 Summary\*

Summarizes the design and implementation process, emphasizing the integration of hardware and software components.

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### \*Chapter 4: Tools and Techniques\*

\*4.1 Hardware Tools\*

Provides details of the physical components, such as accelerometers, microcontrollers, displays, and power modules.

\*4.2 Software Tools\*

Lists and explains software tools and libraries used, such as Python, Arduino IDE, TensorFlow, and Matplotlib, for algorithm development, simulation, and visualization.

\*4.3 Summary\*

Concludes with an overview of how these tools contributed to the system's development.

### \*Chapter 5: Results and Evaluation\*

\*5.1 Presentation of Findings\*

Presents the results of the system, including step count accuracy, goal tracking functionality, and user feedback.

\*5.2 Testing and Calibration\*

Describes the testing process, including comparisons with commercial trackers, adjustments to thresholds, and validation of the step detection algorithm.

\*5.3 Accuracy Comparison\*

Compares the project’s results with existing systems, highlighting its strengths and areas for improvement.

\*5.4 Summary\*

Summarizes the performance of the system and its potential impact.

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### \*Chapter 6: Conclusion and Future Work\*

\*6.1 Conclusion\*

Summarizes the project, highlighting its success in achieving the objectives, such as accurate step detection and effective goal monitoring.

\*6.2 Future Work\*

Discusses possible improvements, such as adding heart rate monitoring, GPS tracking, advanced data analytics, or gamification features to enhance user engagement.

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### \*Appendices\*

\*Appendix A: Code Snippets\*

Contains detailed snippets of the code used in the project, such as the step detection algorithm, goal monitoring logic, and display integration. Example:

python

def detect\_step(accel\_data):

threshold = 1.2 # Motion threshold

if accel\_data > threshold:

return True

return False

\*Appendix B: Hardware Schematics\*

Includes detailed circuit diagrams and component connections. Example:

- Diagram of MPU6050 accelerometer connected to Arduino.

- Power supply wiring for the system.

- LCD/OLED display connections.

\*Appendix C: Additional Data Tables\*

Provides data collected during testing, such as step counts, error rates, and comparisons with commercial trackers. Example:

|  |  |  |  |
| --- | --- | --- | --- |
| TEST CASE | ACTUAL STEPS | DETECTED STEPS | ERROR(%) |
| WALIKNG | 1000 | 995 | 0.5% |
| RUNNING | 500 | 510 | 2.0% |

\*Appendix D: Graphs and Charts\*

Includes charts and visualizations showing system performance:

- Step count accuracy over multiple tests.

- Goal achievement rates among users.

\*Appendix E: Dataset Information\*

Details about the dataset used for training and testing (if applicable):

- Dataset source: Kaggle or custom data.

- Number of samples: 5000 entries.

- Features: Step count, time, activity type (e.g., walking, running).