

# Garmin Usage Instructions for CSI Project 4

October 19, 2025

## 1 Proposed Challenge

The increasing availability of heterogeneous data is dramatically changing how we observe and interpret individual well-being. This data can now be accessed through commercial wearable devices, enabled by APIs and SDKs that facilitate interoperability. This creates opportunities for personalized wellbeing monitoring in homes, workplaces, and shared spaces. Promising applications include sleep analysis, cognitive performance, and sports performance. However, integrating and analyzing multimodal time-series (TS) data presents computational challenges. To overcome these issues, solutions have been developed that enable inference and training of learning models reducing the sharing of sensitive data. Federated Learning (FL) is one such paradigm, which allows for distributed model training while keeping the data locally on edge nodes. This enables the development of intelligent architectures that can dynamically respond to individual needs and contexts.

The proposed challenge will focus on analyzing sleep data using FL techniques, and it will be detailed during the dedicated lectures:

1. 13/11/2025 - 12:30/14:00 aula 25.0.2
2. 20/11/2025 - 12:30/14:00 aula 25.0.2
3. 24/11/2025 - 12:30/14:00 aula 3.1.3
4. 01/12/2025 - 12:30/14:00 aula 3.1.3
5. 04/12/2025 - 12:30/14:00 aula 25.0.2

**In particular, the challenge will focus on sleep quality assessment. Each of you will be provided with a Garmin Vivoactive 5. You will be asked to continuously wear the smartwatch for 1 month. This is fundamental, as the collected data will be used to create datasets for the course challenge.** During the lessons, you will learn how to download data using the Garmin API and SDK; however, for simplicity, the data you collect will be downloaded by us, divided into datasets, and then provided to you. At that point, you will be able to work and train your models using the wearable device data, and explore various insights and correlations within them.

## 2 Overview of Garmin Vivoactive 5

The Garmin Vivoactive 5 is a versatile smartwatch designed for health and fitness tracking. It includes features such as:

- Advanced sleep tracking and heart rate monitoring
- Built-in GPS and various sports modes
- Comprehensive wellness and fitness tracking, including stress tracking and body battery
- Smart notifications and compatibility with Garmin's ecosystem

Here you can find the specifications for what concerns in particular sleep monitoring: <https://www.garmin.com/en-US/garmin-technology/health-science/sleep-tracking/>.

### 3 Steps for Setup and Usage

1. **Download Garmin Connect App**

Install the Garmin Connect app from the App Store or Google Play Store. You can get started with Garmin by visiting this link: <https://connect.garmin.com/start/>.

2. **Create an Account**

Sign up using your **Polimi email address** and the password **CSI\_sept2526**.

3. **Device Usage**

Wear the Garmin device **at all times**, especially during sleep. The data will be used to generate datasets that will be shared with you (anonymized) for the challenge.

We recommend wearing the device **during the day** and **during physical activity** as well, as this will provide additional data that could be useful for exploring interesting correlations.

### 4 Garmin Device Assignment

The Garmin devices can be picked up at NECSTLab from Susanna Bardini (susanna.bardini@polimi.it) on the following dates and times:

- Monday **27th October**, between 14:00 and 19:00
- Tuesday **28th October**, between 10:00 and 19:00

Please note that the delivery will be recorded, meaning each device will be assigned to a specific student. Furthermore, coordinate with Susanna via email to decide when to pick up your device on the above-mentioned days. The Garmin devices will be returned at the end of the data collection period on **November 28th**, also to Susanna Bardini.