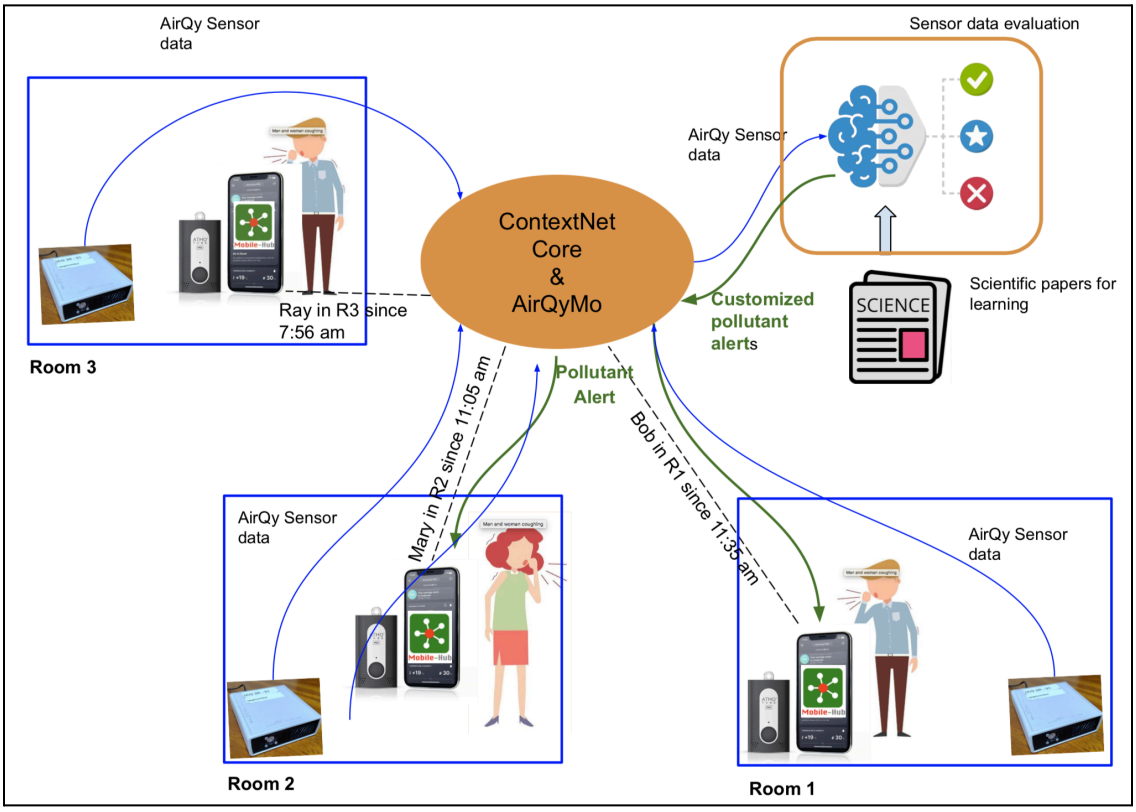
AirQyMo Project: A summary

We are always affected by the living conditions of our immediate environment, and these conditions change as we move from one location to another. Unfortunately, many environments lack the desired level of health, whether in terms of air quality, noise, insufficient ventilation, or a lack of natural light, which can affect each of us but have a particularly significant impact on the well-being of individuals with fragile health, allergies, or who are easily irritable.

Drawing upon the ContextNet and Mobiel Hub middlewares, Project AirQyMo (Air Quality Monitoring) aims to implement a system that collects environmental data - from sensors - of specific spaces, identifies the people that are in these spaces, their number, and for how long they have been in this room, and using ML models, derives the correlation between critical sensor values of different pollutants and possible allergies or disreases. This is done by using agentic AI that “reads” scientific papers and learns the implications of measured pollutants and chronic diseases. By such, the AirQyMo system is able to pinpoint the specific pollutant problem of each spot (i.e. a room, a mortar, a laboratory bench, the surroundings of a machine that emits many particles or a strong odor), and using ContextNet and the Mobile Hub (the latter, running in the smartphone of the employees) can then emit specific automatic alarms to exactly the group of people that are working in this hazardous place for too long.



The figure shows two employees (Mary and Bob) receiving a pollutant alert because they have been too long in a room where the sensor device read bad air quality data during a certain time period.

In addition to ConetxtNet and Mobile-Hub, AirQyMo will use sensor devices (initially the IAQ 3R air quality monitor), Bluetooth Low Energy beacons with photovoltaic technology (for assessing the presence of users in rooms), Flutter/M-Hub integration, ContextNet's Processing Node and GroupDefiner service (for sending alerts only to the people in the room) N8N workflow automation and ChatGPT for building a vectorized information basis about respiratory problems and their causes.

The AirQyMo Team is:
Ricardo Leda
Marcello Nacif
João Marcello Lima
Lucas Manoel de Souza
Luiz Tavares
Markus Endler

Final Course Projects (TCS):
Anything that extends and/or improves the functionality and performance of this system, including energy harvesting, Context Awareness, Indoor localization with BLE beacons, Sensor data pre-processing (Edge computing), alert creation and delivery, mobile user Interface, ML learning optimization, etc.