**User Profiles/ Personas**

**1. Best-Case Scenario - Sarah**

* **Role**: Paediatrician with a focus on pulmonary diseases. Responsible for diagnosing, treating, and monitoring children with asthma and other respiratory conditions.
* **Demographics**:
  + **Age**: 38
  + **Gender**: Female
  + **Culture**: British
  + **Lifestyle preferences**: Active, goes jogging in the mornings, vegetarian.
  + **Income**: Middle to upper class.
  + **Educational status**: MD with specialization in paediatric pulmonary conditions.
  + **Personality**: Analytical, empathetic, health-conscious.
* **Task Domain**: High expertise in asthma management and prevention. Has over 10 years of experience treating paediatric asthma patients.
* **Technological (ICT)**: Very comfortable with technology. Uses medical databases and tools daily. Owns the latest smartphone and is comfortable with wearable devices.
* **Human Factors & Accessibility**: No vision, hearing, mobility, or cognitive impairments. Takes precautions to maintain a healthy lifestyle.
* **Information needs and preferences**:
  + **Must**: Real-time air quality data, historical data logs.
  + **Should**: Location-based alerts, easy synchronization with mobile devices.
  + **Could**: Monthly air quality reports, recommendations for areas with better air quality.
  + **Would Like**: Integration with other health apps, community sharing features.

**2. Worst-Case Scenario - Brian**

* **Role**: Retired coal miner. Worked in mines for over 35 years.
* **Demographics**:
  + **Age**: 65
  + **Gender**: Male
  + **Culture**: American, from a rural background.
  + **Lifestyle preferences**: Sedentary lifestyle, smokes occasionally.
  + **Income**: Lower middle class.
  + **Educational status**: High school graduate.
  + **Personality**: Resistant to change, skeptical of new technology.
* **Task Domain**: No knowledge of asthma other than being diagnosed with it due to prolonged exposure in the mines.
* **Technological (ICT)**: Limited experience with technology. Uses a basic cell phone and has never used a smart device or wearable.
* **Human Factors & Accessibility**: Mild vision impairment, hearing difficulties, beginning stages of osteoarthritis in the knees.
* **Information needs and preferences**:
  + **Must**: Clear alerts for dangerous air quality.
  + **Should**: Simple, easy-to-understand readings without much technical jargon.
  + **Could**: Reminders to use inhaler or medication.
  + **Would Like**: Easy tutorials or guides on how to use the wristband.

**3. Average User - Michael**

* **Role**: Middle school teacher. Often involved in outdoor activities with students.
* **Demographics**:
  + **Age**: 45
  + **Gender**: Male
  + **Culture**: Canadian
  + **Lifestyle preferences**: Semi-active, occasionally plays sports, non-smoker.
  + **Income**: Middle class.
  + **Educational status**: Bachelor's in Education.
  + **Personality**: Open to new experiences, somewhat tech-savvy.
* **Task Domain**: Diagnosed with asthma at a young age, carries an inhaler, has basic knowledge about triggers and management.
* **Technological (ICT)**: Comfortable with smartphones, computers, and basic tech gadgets. Uses technology mainly for work and leisure.
* **Human Factors & Accessibility**: Mild short-sightedness, uses glasses. No other significant impairments.
* **Information needs and preferences**:
  + **Must**: Instant alerts for harmful environments.
  + **Should**: Ability to review data over time.
  + **Could**: Tips for managing asthma based on data.
  + **Would Like**: Integration with calendar or daily planner apps.

**U/T/S/E Analysis**

**Sarah:**

**User:**

Sarah is a 35-year-old woman who lives in Britain. She is a paediatrician specializing in pulmonary diseases, focusing on children with asthma. Her expertise is backed by an MD degree with a focus on pulmonary medicine, and she has accumulated over a decade of experience in treating young patients with asthma. Sarah has quite the active lifestyle and likes to go on morning jogs a lot of the time, where she not only prioritizes her own well-being but also gains insights into the practical aspects of air quality's impact on her health during outdoor exercise. She is very comfortable with technology as she often uses it in the medical field and is used to wearable technology as well.

**Task:**

Sarah's primary task consists of several key steps. First, as part of her morning routine, she straps on her air quality monitor wristband before heading out for her daily jog. Once she begins her run, the wristband continuously collects real-time air quality data, including particle matter levels and gas concentrations. During her jog, Sarah will sometimes check her phone to keep an eye on the air quality but most of the time will just wait for a notification of deteriorating air quality levels. If the data indicates deteriorating air quality, she can modify her route in real-time to avoid potential respiratory problems in the future. This will enhance her exercise routine's safety while providing valuable insights into her patients' environmental factors, allowing her to provide more informed recommendations in her role as a paediatrician.

**System:**

Sarah's conceptual model of the system includes the seamless integration of a wristband and smartphone app. The wristband, equipped with particle matter sensor, gas sensors, and GPS serves as a real-time data collector during her morning jogs. This data is continuously synchronized with her smartphone app, where she accesses and analyses the air quality information. The app offers a user-friendly interface, displaying real-time readings, data logs, and location-based alerts. This conceptual model reflects her need for immediate, accurate, and actionable air quality data to ensure her safety during runs and support her professional expertise in asthma management.

**Environment:**

Sarah's most likely and specific environment for using the air quality monitoring system is during her morning jogs in outdoor settings around her neighbourhood. Distractions in this environment could include varying weather conditions, the presence of other runners or pedestrians, and the need to remain attentive to her surroundings for safety. Sarah's main focus is on her run, making the simplicity and user-friendliness of the device and its app crucial. The system should minimize need for interaction and allow her to integrate air quality monitoring into her jogging routine without much effort.

**Brian:**

**User:**

Brian is a 65-year-old man who lives in America. He has worked in mines for over half his life and as a result of breathing in harmful particles, has been diagnosed with asthma. Brian has lifestyle preferences which don’t really help his condition, including the fact that he smokes occasionally. Brian is generally resistant to change and sceptical of new technology, with limited experience and comfort in using it. Moreover, he faces some physical challenges, including mild vision impairment, hearing difficulties, and the beginning stages of osteoarthritis in the knees.

**Task:**

Brian's task begins by wearing the air quality monitoring wristband. The wristband continuously collects air quality data, which can be viewed within the app on his phone. Brian must set up the app so that he can receive alerts and notifications regarding the current air quality. Before going anywhere, Brian can view history logs of air quality on his area through the use of GPS and can therefore plan his path to possibly avoid the areas with the worse air quality. When Brian desires, he can view the air quality levels at any time he wants by manually going on the app and checking.

**System:**

Brian's conceptual model of the system revolves around simplicity and clarity. He perceives the air quality monitoring wristband as a simple tool to enhance his health and well-being. For Brian, the wristband is primarily a means to detect and alert him to dangerous air quality conditions. His interaction with the system is centred on receiving real-time feedback about the surrounding air quality, which is vital for his asthma management. The alerts he gets guide him in making timely decisions to avoid asthma triggers. Overall, his conceptual model is a simple to use, wearable wristband which detects deteriorating air quality and gives him safety warnings and alerts when the air quality may lead to triggering his asthma.

**Environment:**

Brian's most likely and specific environment for using the air quality monitoring system is in his home. Given his lifestyle and health challenges, he spends a significant amount of time in his own house as it can be challenging at times to traverse the outdoors. The system needs to primarily offer air quality monitoring within his home environment, where he is most vulnerable to asthma triggers. Brian may also use the system when venturing outdoors for short walks To account for Brian's limited mobility due to the beginning stages of osteoarthritis, the system should be easy to operate without excessive physical demands.

**Michael:**

**User:**

Michael is a 45-year-old man from Canada, has a Bachelor's degree in Education, and is a middle school teacher. His role often involves engaging in outdoor activities with students. Michael enjoys a semi-active lifestyle, occasionally participating in a wide variety of sports. He is tech-savvy as he often engages with technology in the classroom and has become fairly familiar with it by now. Michael was diagnosed with asthma at a young age and carries an inhaler, granting him basic knowledge about asthma triggers and management. With mild short-sightedness requiring the use of glasses, he has no other significant impairments.

**Task:**

Michael's primary task centres on using the air quality monitoring system to safeguard his health, particularly during outdoor activities with his students. Firstly, he wears the air quality monitoring wristband, which will collect data about the particle matter and gas intensity in the area. Michael relies on the accompanying smartphone app during this time to receive instant alerts for harmful environments. The app also allows him to review collected data over time, aiding his understanding of air quality patterns. If the air quality does begin to deteriorate, then he can either go back inside to avoid his asthma being triggered, or he can have his inhaler at the ready. Once he is finished outside, he can take the wristband off and return to the classroom.

**System:**

Michael's conceptual model of the system is focused around the systems user-friendliness, instant alerts, and long-term data access. The air quality monitoring wristband, for him, serves as a tool for continuous data collection during outdoor activities with students. The wristband synchronizes well with the smartphone app, which is his primary point of interaction with the system. The app's most essential feature for Michael is the instant alert system for harmful environments. These immediate notifications play a crucial role in his asthma management, guiding him to make necessary adjustments during outdoor activities. Additionally, the app allows him to review air quality data over time, providing valuable insights into environmental patterns.

**Environment:**

Michael's most likely and specific environment for using the air quality monitoring system is his school and outdoor settings during activities with students. The system's user-friendliness is essential, as Michael manages his professional responsibilities while ensuring a healthy environment for himself and his students. In outdoor settings, Michael uses the system to monitor air quality during sports activities or outdoor learning sessions. He looks for immediate alerts to protect his health and that of his students. The system should blend seamlessly with these environments to help him make informed decisions about the current situation. There will be a lot of distractions in this environment as his attention will be divided among his students and there will also be outside noise.