Challenge 1

Intelligent EHS (Environment, Health, and Safety) System on the Construction Site

One of the core values of Atlas Ward is to ensure the highest standards of occupational health and safety on construction contracts, both for our own employees and those of our Partners. We are seeking a solution that will provide us with knowledge and enable preventive and rescue actions, particularly focusing on:

Monitoring presence and counting people: delivering real-time information about the number of people currently on the construction site for potential evacuation needs, with the ability to distinguish between our own employees and the employees of individual Partners.

The solution may additionally cover the following areas:

1. **Predicting, detecting, and alerting about unusual human behavior:**

   The system should recognize and alert about human behavior that deviates from the norm or pattern, which may indicate possible health problems, such as fainting or heart attacks.

2. **Predicting, detecting, and alerting about unusual machine behavior:**

   The system should recognize and alert about machine behavior that deviates from the norm or pattern, which may indicate possible technical problems or improper use or security, such as excessive tilting, unsecured hooks, or excessive emission of exhaust fumes.

3. **Recognizing and alerting about potentially dangerous situations:**

   The system should detect and alert about the lack of appropriate protective clothing, working at heights without protection, person-vehicle collision risks, or unsecured earthworks.

4. **Detecting and alerting about accidents:**

   The system should recognize and immediately alert about accidents to enable rapid emergency response.

5. **Detecting and communicating the exceedance of environmental work standards:**

   The system should detect and communicate excessive noise, poor air quality, or excessive vibrations.

Challenge 2

Reporting Construction Progress in the BIM Model Based on Image Analysis

Atlas Ward aims to develop the BIM (Building Information Modeling) methodology within the organization to improve the efficiency and quality of the investments we undertake. We are seeking a solution that enables automatic reporting of construction progress through image analysis and integration with the BIM model. The solution/ system should be capable of processing images from the construction site, identifying and classifying the progress, and updating the BIM model with the latest data.

The solution should specifically provide:

1. **Data Collection:**

    A method for collecting images from the construction site, with photos taken from various perspectives to ensure a comprehensive overview of the progress.

2. **Image Analysis:**

    The use of image recognition technology to identify construction elements (e.g., walls, windows, doors), analyze changes in the construction status compared to previous images and the BIM model.

3. **Integration with the BIM Model:**

    Updating the BIM model with data related to construction progress (changes in the geometry of objects, the addition of new elements, marking completed work, etc.).

4. **Reporting and Visualization:**

    Generating reports that present construction progress in an accessible form (3D visualizations, charts, tables, etc.), which should be available to various project stakeholders, including engineers, project managers, and investors.

5. **Additional Features:**

    For example, forecasting the completion time based on the current progress, detecting potential delays and issues, and the possibility of integration with other construction project management systems.