Workplace Safety – Demo Script

Overview

The Workplace Safety demo has two (2) components: Location Intelligence, and AI on the Edge. The demo and code (available on GitHub) show how Azure can be used to deliver and end-to-end workplace safety solution.

Site Safety

Site Safety will be implemented using Azure Maps and geofencing to alert when employees or equipment are in physical location that creates an unsafe work environment.

Personal Protection Equipment (PPE) compliance

Verifying PPE compliance will be done via AI on Edge. Azure IoT Edge technologies will be used to identity that employees are missing Personal Protection Equipment (PPE) therefore creating an unsafe work environment.

Pre-requisites

- This script assumes the workplace safety demo located here has been deployed successfully.
- Open up the PBI template located here
- Connect the AI DevKit to local WiFi. Instructions on how to do this are located here

Demo

Workplace safety is a business-critical activity and, for many companies, part of their corporate values. Companies want to know that the tools and training they put into place are working and respond quickly and appropriately to safety issues. Let's see how a fictitious company, Contoso, can use the Azure IoT platform can help.

Site safety

To decrease the potential for safety incidents to occur, Contoso would like to identify:

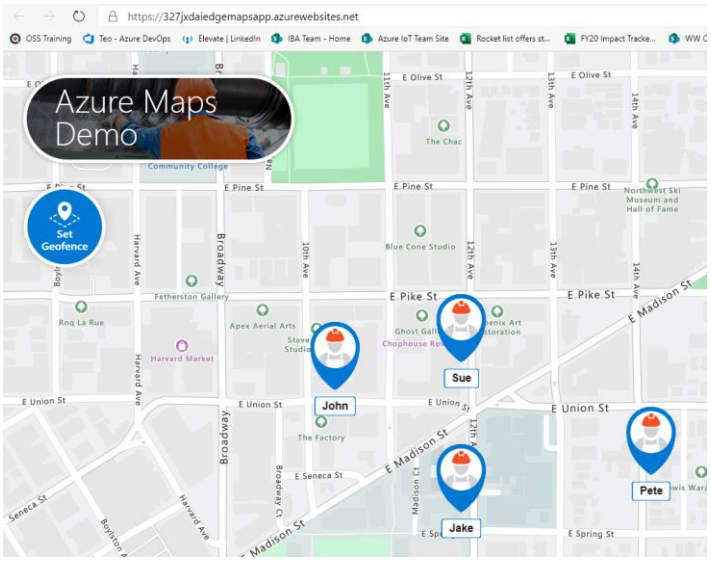
- hazards at the site
- Sensitive assets that are required to be in a safe and reliable location

Contoso would like to use real-time visualizations and notifications to help meet their safety goals.

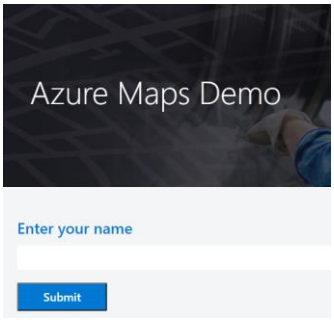
Solution

Contoso leverages **Azure Maps** geolocation features to identify hazardous areas and equipment location / areas. They'll use **Office 365** integration with **Azure** to deliver email notifications and **PowerBI** for real time visualizations.

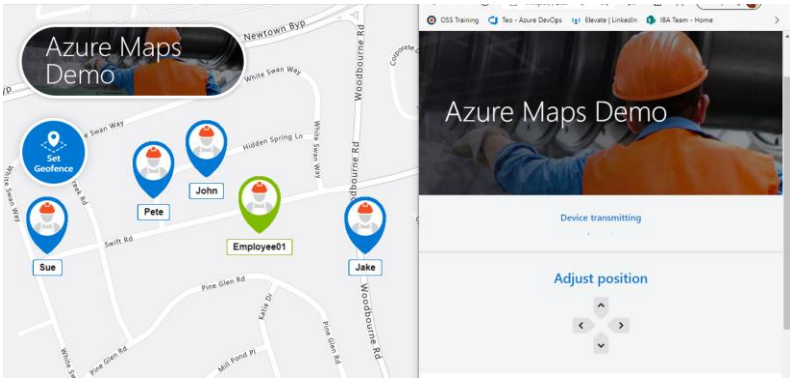
1. In a browser, visit the URL of the WebApp that was deployed



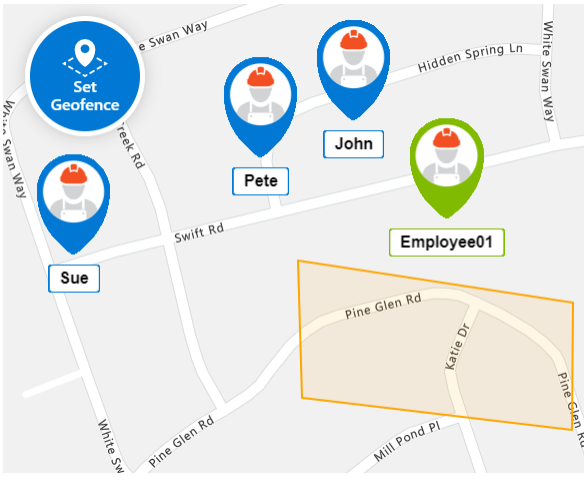
2. Simulate an employee or equipment by opening a new browser tab and adding /register at the end of the url. Alternatively, visit the /register page on a mobile phone.



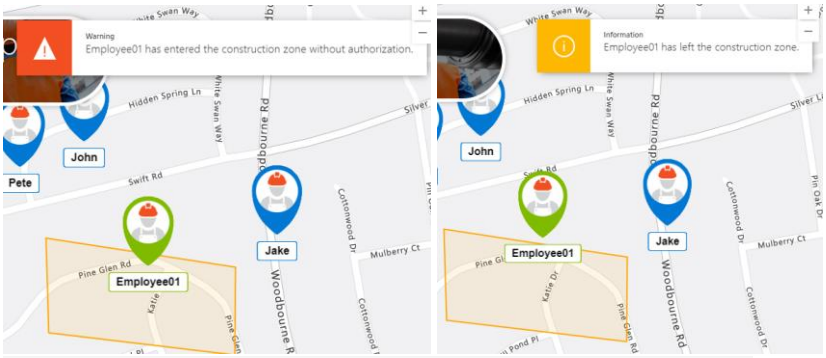
3. Filling in a name and clicking Submit results in the location of the user of the page being shows on the Azure Maps screen. In addition, the tab or device where the /register page was setup can now move their location using the controls under **Adjust position**



4. On the original tab, click on **Set Geofence** and add some points to create a boundary / geofence.



5. Use the controls on the /register page to move the object created in and out of the geofence. An alert should show up on the screen, and an email should be received.



Geofence Event

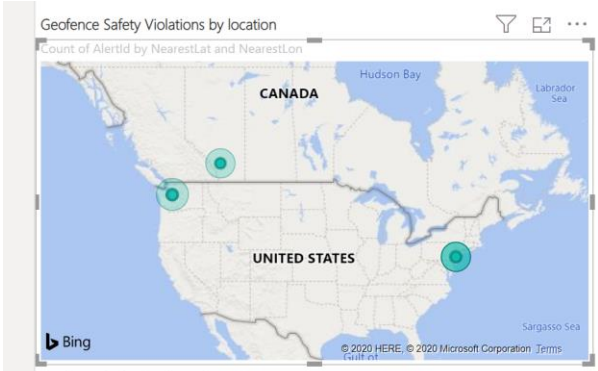
Teo De Las Heras
To Teo De Las Heras

This message was sent with Low importance.

A non-authorised employee has entered/exited the construction area.

Event Type: Microsoft.Maps.GeofenceEntered
Event Time: 2020-03-23T20:13:57.3802072Z
Device Id:{"deviceId":"Employee01","udId":"d31c75d8-2ecf-55bf-28f9-b6d1e1519c5a","geometryId":"1","distance":-999.0,"nearestLat":40.218507,"nearestLon":-74.911788,"nearestZ":0.0}

6. In PBI, refreshing the dashboard data should display additional data-points on the mapping visualization. You can display the devices per location by clicking on the relevant points on the map.



Geofence Safety Violations Details

DeviceId	NearestLat	NearestLon
Employee01	40.22	-74.91
Teo1	40.22	-74.91

PPE Compliance

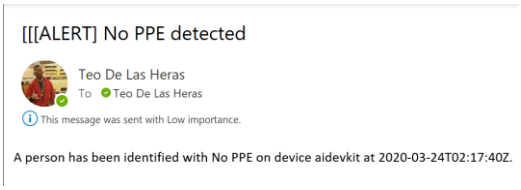
To decrease the potential for safety incidents to occur, Contoso would like to identify when employees are working in an area that requires Personal Protective Equipment (PPE) like hard hats and safety vets.

Contoso would like to use real-time visualizations and notifications to help meet their safety goals.

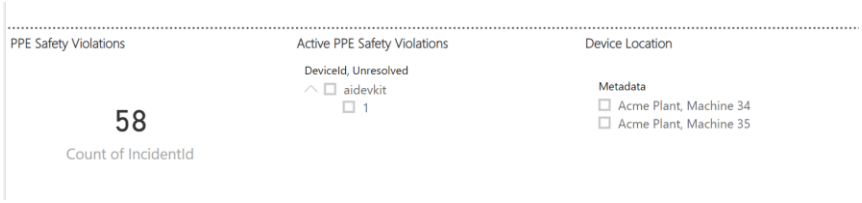
Solution

Contoso leverages **IoT Edge**, **Stream Analytics**, and **Vision AI models** to identify employees that are not wearing PPE. Contoso will use **Office 365** integration with **Azure** to deliver email notifications. **Time Series Insights (TSI)** and **PowerBI** will be used for real time visualizations.

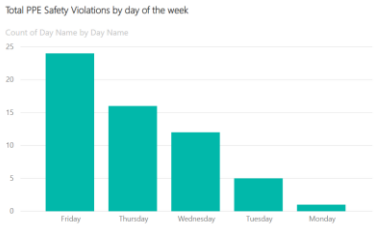
1. A Contoso employee steps in front of the camera without any PPE (Personal Protective Equipment)
2. An email will be generated that a safety violation has occurred



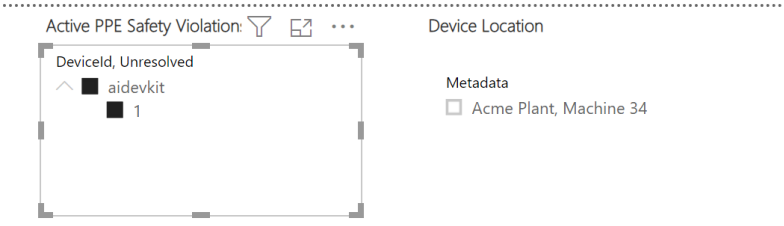
3. Open the PBI dashboard and show the number of PPE Safety Violations Increases and Active PPE Safety Violations. Refresh the data and show the count increasing in both



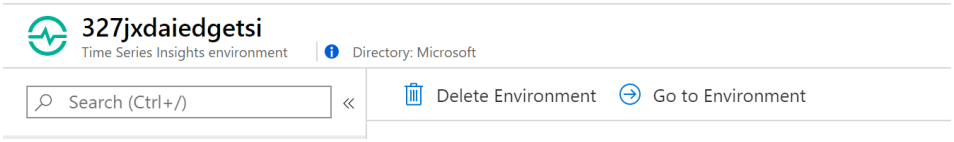
4. Show the days of the week most violations occur



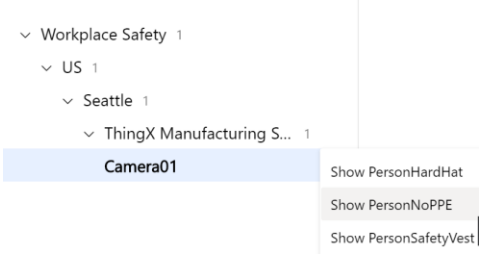
5. Clicking on the DeviceId under Active PPE Violations will show the device location. Note: This correlation is done using features of PBI.



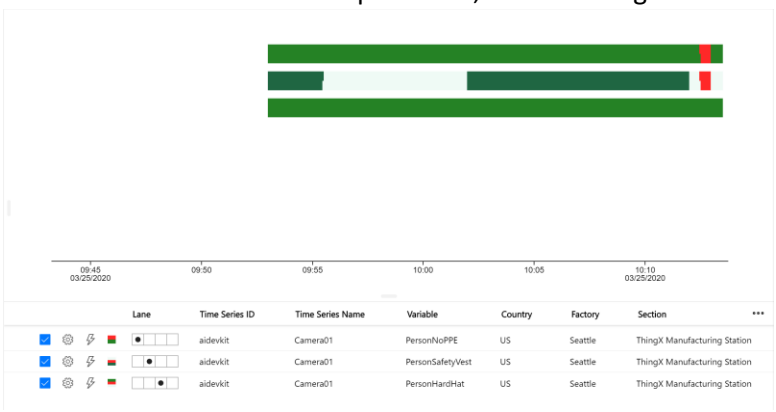
6. In the Azure Portal, under Time Series Insights, open the TSI Explorer by clicking on **Go to Environment**



7. Expand the hierarchy until the device is shown. Click on the device and choose Show PersonNoPEE. This is a categorical value that will show when PPE compliance issues happen



8. On the top right, choose a time window that has data. Note that it may take some time for the TSI environment to warm up and historical data may need to be used.
9. Show how TSI displays categorical values and how additional data points can be used for real time correlation. In the example below, TSI is labeling PPE violations in red.



10. Moving out of the frame will cause the business logic to detect that there is no longer a safety issue (since no one is in the frame). This will clear the value of Active PPE Safety Violations in PBI and send an email alert.