

# Using Computer Vision to Improve the Airport Lounge Experience

How visitor tracking software and Microsoft technology optimized airport-lounge usage and supply-chain management

**Client:** A global airline that handles over 140 million passengers a year

**Industry:** Travel

**Project Type:** Using modern data capture software to create real-time insight with visualization and analytics

## Overview

### 1 Challenge:

Our client – a global airline – asked Luxoft to optimize the usage and operation of more than 50 airport lounges in 31 airports, worldwide. They needed a computer vision solution to improve the overall lounge-customer experience, streamline operations and drive revenue by upscaling the services for members and non-members alike.

### 2 Approach:

Luxoft's aim was to unify the guest experience and lounge operations by using smart space technology to provide reliable occupancy data. A strong partnership with Microsoft enabled extensive use of their technology, cutting costs and development time of visitor tracking software concepts and prototypes. Our team uncovered how a computer vision system could generate reliable occupancy data that unlocks valuable insights from lounge utilization rates.

### 3 Solution:

Our customized solution integrated Microsoft computer vision hardware and IoT management software to establish a contactless occupancy monitoring process and a reporting dashboard for decision support tools. In just 6 weeks, we had a working prototype which could detect the entry and exit of over 9,500 customers with more than 90% tracking accuracy. This unobtrusive solution enables lounge operators to enhance the guest experience, and unlock new revenue streams.

### 4 Result:

The airline established a platform for the smart-space-enabled airline lounge. Real-time utilization rates have enabled new capabilities, including:

- Anticipating and addressing overcrowding
- Improving supply chain and logistics management
- Exploring demand-based pricing for passengers at times of low occupancy

## Challenge

### Who, When, Where?

Our client – a global airline handling more than 140 million passengers a year – asked Luxoft to use computer vision techniques to help optimize the usage and operation of more than 50 airport lounges in 31 airports, worldwide. Typically, preregistered passengers (or those with day passes), would make their way to the lounge after checking in. Then, having arrived at the concierge desk and scanned their boarding passes, they would be free to relax, connect to the wifi, have something to eat and drink, read a newspaper, or simply work on their laptops until their flight is called. However, the visitor experience would fluctuate according to how busy the lounge was, whether a favorite food item was available, if the newspapers had already been claimed and so on.

Consequently, the client needed a visitor tracking software solution to improve the overall lounge-customer experience, streamline operations and drive revenue by upscaling the services for members and non-members alike.

## Approach

### Optimizing Occupancy Levels

The Luxoft team realized that, before doing anything else, they needed to bring the airline up-to-speed with how many visitors were occupying their airport lounges at any one time. They also needed to understand the impact of different days of the week and times of day on crowd analytics, to be able to predict and avoid overcrowding and improve the management of lounge amenities (e.g., food and beverage inventories). That included operational costs and the inevitable inconvenience associated with a manual check-in/check-out process.

Luxoft realized their idea of a connected, technology-driven smart space, through a series of computer vision concepts and prototypes. While the ultimate objective was to upgrade the lounge-customer experience, our technology roadmap began with the kind of core-enabling capability that often accompanies smart spaces: visitor tracking. While the airline had data for individual passengers entering the lounge, there was nothing to tell them when those passengers left. This blocked valuable insights into lounge utilization rates that could have unlocked a series of downstream capabilities.

In step with the airline's partnership with Microsoft, Luxoft used as much of their technology as possible to cut both costs and development time, while maintaining a level of accuracy that would underline the benefit of crowd analytics. Later iterations of the technology focused on accuracy and technology optimization.

## Solution

### Smarter Spaces

For the initial prototype, the team selected a Microsoft Kinect, a Surface Pro 4 with built-in LTE, Microsoft's Azure IoT suite for streaming data ingestion and a custom data-visualization dashboard, built as a responsive web app for mobile and fixed kiosk viewing. On the back-end, Luxoft leveraged the Kinect SDK to write a custom algorithm for motion-based feature detection. The Kinect hard-lined to a wall-mounted Surface Pro for processing, real-time occupancy count visualization and data upload via LTE to the client's Azure cloud instance. In Azure, the architecture leveraged IoT Hub and DocumentDB, with APIs exposing the data for downstream consumption. Through these APIs, historical data was integrated into a manager dashboard for status visualization and trend analysis.

#### Main Features:

- Visitor tracking
- Real-time reporting on nationwide lounge occupancy
- Data visualization and reporting
- Manager dashboard for decision support tools

The individual identity of lounge visitors is anonymized. But the solution still gathers a range of insights, like the average duration of passenger visits and variations in that average at different times of the year, as well as taking it a stage further to anticipate low-demand days and times. In turn, this allows our client to better-manage individual lounge utilization and maintain closer ties with their customers.

#### Partner Technologies:

- Microsoft Xbox Kinect
- Microsoft Azure IoT Suite
- Microsoft Power BI
- Microsoft Surface Pro 4 with LTE

## Result

### An Impressive Track Record

In just 6 weeks, Luxoft launched a working prototype at Chicago's O'Hare International Airport (one of their busiest lounges) prior to the holiday season, which tracked the entry and exit of over 9,500 visitors with over 90% accuracy. This set the stage for future development and scalability across a network of international locations, establishing a platform for the smart-space-enabled airline lounge. With real-time utilization rates at the discrete lounge level, the airline unlocked several new capabilities, including:

- Knowing when to anticipate and how to address overcrowding (in line with capacity limitations). With future improvements, the solution aims to proactively reduce overcrowding through machine learning and trend analytics. For example, in airports with multiple lounges, the airline can hand-off balances to lounges with lighter utilization
- Improving supply chain and logistics management for food, beverages and other lounge amenities, plus reducing waste and costs by not carrying any more inventory than strictly necessary
- Exploring demand-based pricing for passengers at times of low occupancy

The addition of a computer vision system gave the airline real-time occupancy-monitoring capability. The resulting data allowed more operational agility, enabling the lounge and airport to maintain high-quality customer experiences, globally. Importantly, the system created a secure foundational data stream for making informed, long-term planning decisions.

This concept can be applied to many other industries. Any location with reasonable footfall can benefit from accurately tracking and analyzing variables like staffing, revenue, operational performance and overall efficiency. It enables deeper visitor engagement through the gathering of richer data and more-specific visitor tracking solutions.

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