Unleash Live Uses AWS to Help Miami-Dade County Transit Safely Collect Data During Pandemic

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Executive Summary

Miami-Dade County Transit uses artificial intelligence (AI) data to maximize operational efficiency and public safety on its Metrorail system after opening its station gates in response to the COVID-19 pandemic. Unleash live implemented a remote AI solution for Miami-Dade County that collects ridership data and provides daily analytics. Unleash live's AI platform runs in the AWS Cloud and uses Amazon EC2 to process the data and Amazon API Gateway to push the data to a web app.

Miami-Dade County Rapidly Responds to Pandemic

Around the globe, the COVID-19 pandemic has reshaped the way people move around and live their lives. Safety and social distancing are top of mind for most, and public transportation systems that serve a mobile population have had to make adjustments to keep their ridership and employees safe. This is true for the Miami-Dade County Department of Transportation and Public Works, which served a ridership of 300,000 before the pandemic and now serves roughly 150,000. Even with reduced ridership, the county must meet social distancing requirements, with the trains and buses capped at carrying no more than 25 percent of their normal capacity at a given time.

In March 2020, Miami-Dade County took the approach of proactively relieving possible congestion hotspots at ticketing gates, making the service temporarily free. With no gate receipts, the county had to come up with a new way of accounting for and assessing commuter volume because the ticketing system was the primary method of capturing data on commuter traffic. This data is vital to the county transit system staff who rely on it to make day-to-day operating decisions. Carlos Cruz-Casas, assistant director of the Department of Transportation and Public Works for Miami-Dade County, was tasked with finding a new method for collecting ridership data—one that supported public safety during the pandemic.

"All of a sudden, we lost our opportunity to count riders," says Cruz-Casas. "If we don't have insight into how many users are getting into the train station, it is nearly impossible to adjust the service to facilitate social distancing." The impact of not knowing how many people are using the transit system at a given time was troubling for Cruz-Casas. He needed ridership data quickly so that his staff could make operational decisions to maximize the safety of transit riders and employees and minimize the need for nonessential interactions.

Cruz-Casas reached out to Unleash live—a member of the Amazon Web Services (AWS) Public Sector Partner Program, a Public Safety and Disaster Response Competency Partner, and an AWS Advanced Technology Partner—which was developing artificial intelligence (AI) solutions based on AWS technology to solve problems resulting from the pandemic, such as social distance monitoring. James Kwong, head of product at Unleash live, explained to Cruz-Casas how his team could develop a customized software-as-a-service (SaaS) solution that leveraged AI and deploy it to Miami-Dade County's existing closed-circuit television (CCTV) video cameras. He described how the solution could use the existing video feed to collect data on ridership and then run custom analytics on that data. Kwong was confident that the solution could be implemented in a matter of weeks. Cruz-Casas was pleased by both the timeline and the fact that no additional capex was needed, so he signed on.

Implementing an AI SaaS Solution on a Fast Track

Because the solution is camera-agnostic, Kwong and his team were able to implement it remotely. They identified key cameras throughout the transit system and connected those cameras to their AI SaaS solution. Unleash's AI engine ingests video and imagery streams

About Miami-Dade County Department of Transportation and Public Works

MIAMI-DADE COUNTY

Miami-Dade County Department of Transportation and Public Works provides public transit services for the county—including an extensive train and bus system—for a population of over 2 million. Metrorail is the county's primary rail system, with 25 miles of dual tracks and 23 train stations. It currently serves about 150,000 daily commuters and expects that ridership will return to 300,000 in 2021.

from cameras, which are then processed using Amazon Elastic Compute Cloud (Amazon EC2) instances and split across raw streams and AI streams from on-the-fly analytics. To protect privacy, the footage is anonymized to ensure that any personal identifiable information (PII) is not captured.

Various AWS Lambda functions push media storage into Amazon Simple Storage Service (Amazon S3) storage buckets and relevant data into the fully managed Amazon DynamoDB database service. Amazon Kinesis Data Streams then push the analyzed metadata through different channels. Depending on the output path and endpoint, a Lambda function pushes the data to Amazon API Gateway for display and retrieval through Unleash's content delivery service and for visualization within a web app. This enables users to access insights and data on any browser or device. Finally, Amazon Cognito manages user authentication.

The Unleash team worked with Miami-Dade County to determine the data format it needed and set up an algorithm to automatically push the data into the county's SFTP service daily before 7 AM. With this data, Miami-Dade County Transit staff generates reports that the county's leadership uses in its daily planning sessions.

The entire implementation took less than three weeks—most of which was devoted to testing the solution. Kwong and his team tested camera connectivity, streaming quality, and resolution. Knowing that streaming video data can be particularly taxing on bandwidth, they also performed operational and optimization analyses to determine the minimum number of bands required to get good data results. Next, Kwong's team submitted the SaaS solution to a range of security assessments to ensure that the connections adhered to the county's specific safety and security protocols.

Enhancing Public Safety with Data

As a result of having detailed ridership information, the county was able to adjust its services and put more trains into operation to meet higher demand within the limited capacity of social distancing. This helps prevent crowds from forming at high-demand stations and creating potential hotspots for disease spread. The county also uses the data to prevent unnecessary exposure of its frontline staff by deploying them only where they are needed to enforce social distancing.

Miami-Dade County continually monitors the transit system to ensure that it is implementing all possible safety precautions to minimize the spread of COVID-19. In addition to ridership data, Cruz-Casas believes that Unleash's solution has the potential to enhance public safety in other ways. He is exploring how to use the solution to test the efficacy of the county's messaging about public safety. "Are people adhering to our messaging about facial coverings and social distancing? And are riders keeping a six-foot separation between them? The fact that we can identify these things is really eye opening. I'm excited to see how we can leverage the system resources and bring innovation to the conversation about public safety."

About Unleash live

Based in New South Wales, Australia, Unleash live delivers AI solutions via its AWS-based cloud platform. The Unleash engine uses AI on live video and imagery input from a number of different sources and pushes structured data into customers' existing systems.

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