EXPLORE AND BUILD A USE CASE

CSCI5410 - Assignment 5 – Part A

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Amazon Kinesis

Amazon Kinesis [1] is a service provided by Amazon Web Services (AWS) that allow developers to set up high volume pipelines to store and analyze the stream of data at any scale. Analyzing data using Kinesis allow customers to find patterns, catch exceptions, manage operational details and keep track of all the insights to perform crucial action immediately. Amazon Kinesis allow financial firms to perform minute-by-minute analytics on real-time data and create dynamic dashboards, revise the financial models as soon as new data arrives in the pipeline. Amazon Kinesis provide various services such as:

- Kinesis Streams – Allows low latency data streaming. [1]
- Kinesis Analytics – Performs real-time analytics on data streams received from Kinesis Streams using SQL. [1]
- Kinesis Firehose – Connects to various AWS services such as S3, DynamoDB, Redshift to load data streams. [1]

Usecase for Amazon Kinesis

Winters in Halifax are freezy and extremely windy. The whole city is covered with a giant white blanket and, it becomes difficult to step out of the house. While the snow is removed promptly from the roads as vehicles are mounted with large snowploughs, this is not the case with the sidewalks, footpaths, driveways and outside the house. It requires manual ploughing, which is done by people from Provincial Plowtracker using snowploughs. The problem is that people have to wait for them to come by their street, which might take days. Additionally, the people responsible for ploughing are not always aware of the conditions which lead to snow accumulation, thereby giving rise to heaps of snow. This is especially applicable in harsh weather conditions where the snow gets continuously accumulated over short time intervals.

Figure 1 displays the block diagram of analytic application for snow ploughing that uses Amazon Kinesis.

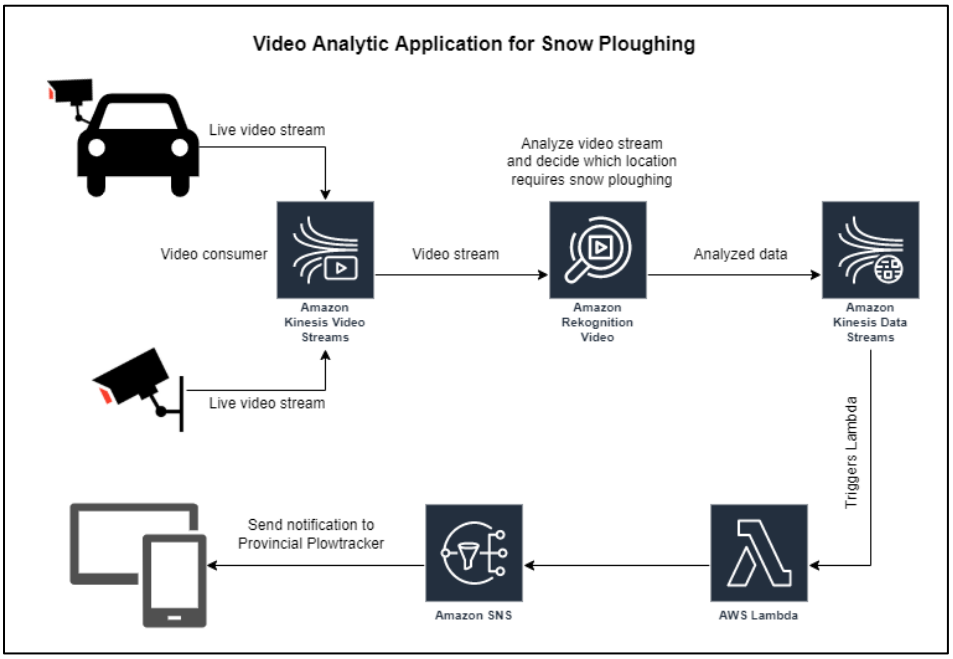

Figure 1 - Block diagram (Architecture) for video analytic application for snow ploughing [2]

The solution is to create a video analytic application that uses Amazon Kinesis to securely stream video from vehicles and streets equipped with cameras. Cameras mounted on vehicles and streets capture a live video stream of sidewalks, footpaths, and driveways are consumed by Amazon Kinesis Video Streams. The live feed is sent to Amazon Rekognition Video, which analyzes the feed and decides which location requires snow ploughing based on multiple parameters. Data prepared from the analysis is written to the Amazon Kinesis Data Stream. For each data entry in Data Stream, a Lambda function is triggered, which read records one at a time. Each record consists of crucial data points like the location where snow ploughing is required and urgency. Based on how the Lambda function is configured, email and text notifications are triggered by Amazon Simple Notification Service (SNS) and sent to registered emails and mobile numbers.

References

[1] Amazon, "Amazon Kinesis," Amazon, [Online]. Available: https://aws.amazon.com/kinesis/. [Accessed 20 November 2021].

[2] draw.io, "Flowchart Maker & Online Diagram Software," draw.io, [Online]. Available: https://app.diagrams.net/. [Accessed 20 November 2021].