WASTE MANAGEMENT AUTOMATION—

from sklearn.cluster import KMeans

import numpy as np

# Example data: bin fill levels (in percentage) and their locations (latitude, longitude)

data = np.array([

[40, 51.5074, -0.1278], # Bin 1: 40% full, London

[75, 40.7128, -74.0060], # Bin 2: 75% full, New York

[20, 34.0522, -118.2437], # Bin 3: 20% full, Los Angeles

# Add more bins

])

# KMeans Clustering for route optimization

kmeans = KMeans(n\_clusters=3) # Number of collection trucks/routes

kmeans.fit(data[:, 1:])

# Print bin clusters

clusters = kmeans.predict(data[:, 1:])

data = np.column\_stack((data, clusters)) # Add cluster to the data

# Output the optimal collection routes

for i in range(3):

print(f"Route {i + 1}: Bins - {data[data[:, -1] == i]}")