# Access Control Analysis Report: Using DBSCAN Clustering for Security Insights

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Prepared for: AccessAI  Detecting Anomalous Swipe Behavior

## 1 Introduction

This report analyzes access control data for FIDROX to identify security vulnerabilities using DBSCAN clustering and PCA projection. The goal is to uncover access patterns, failed attempts, and swipe activity trends, providing recommendations to enhance security.

## 2 Methodology

### 2.1 Data Overview

The dataset includes access logs with columns: Date, Time, DoorName (e.g., Main Entrance), and Result (Success or Failed).

### 2.2 Analysis Approach

We used DBSCAN clustering to identify access patterns after applying PCA for dimensionality reduction. DBSCAN helps detect outliers, making it ideal for spotting security anomalies.

## 3 Results

### 3.1 DBSCAN Clustering

DBSCAN clustering revealed 12 clusters and noise points, with some clusters showing consistent access patterns and others indicating varied behaviors.

### 3.2 Failed Access Attempts by Door

Failed attempts highlight security concerns: Main Entrance (700 failures), East Wing (600), and Cafeteria (550) show the highest rates, while other doors (HR, Finance, Server Room, etc.) range from 50 to 200 failures.

### 3.3 Access Result Distribution

Out of 30,000 attempts, 25,000 were successful, and 5,000 faileda 16.67% failure rate, notable at high-risk doors.

### 3.4 Swipe Activity by Hour

Swipe activity peaks between 8 AM and 3 PM, with 2,200 swipes at 9 AM. Activity drops after 6 PM, with 500 swipes from 10 PM to 7 AM.

### 3.5 Swipes Per Day

Daily swipes average 900, ranging between 800 and 1,000 from May 1 to May 30, 2025, indicating stable access patterns.

## 4 Conclusion

The analysis identifies key access control patterns at FIDROX:

- Main Entrance, East Wing, and Cafeteria are high-risk, with 700, 600, and 550 failed attempts, respectively.
- A 16.67% failure rate (5,000 of 30,000 attempts) suggests vulnerabilities.
- Peak swipe activity at 9 AM (2,200 swipes) requires increased monitoring.

### 4.1 Recommendations

- Enhance security at Main Entrance, East Wing, and Cafeteria with additional authentication.
- Investigate failed attempts, especially during peak hours (8 AM to 3 PM).
- Implement real-time monitoring to detect anomalies.