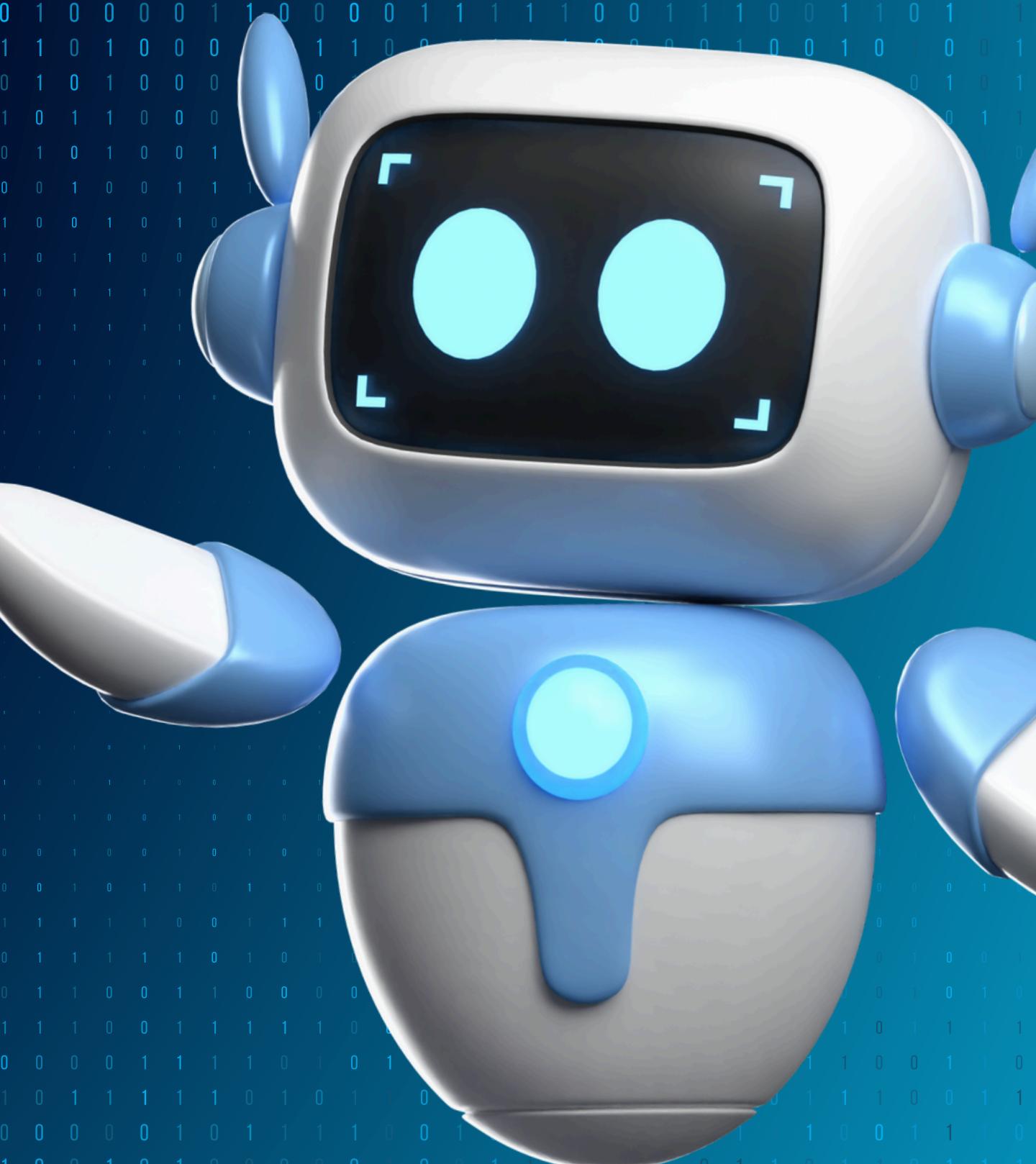


IDENTIFYING HIGH-RISK AREAS FOR MOTORCYCLES TANDEM-RELATED CRIMES IN THE PHILIPPINES

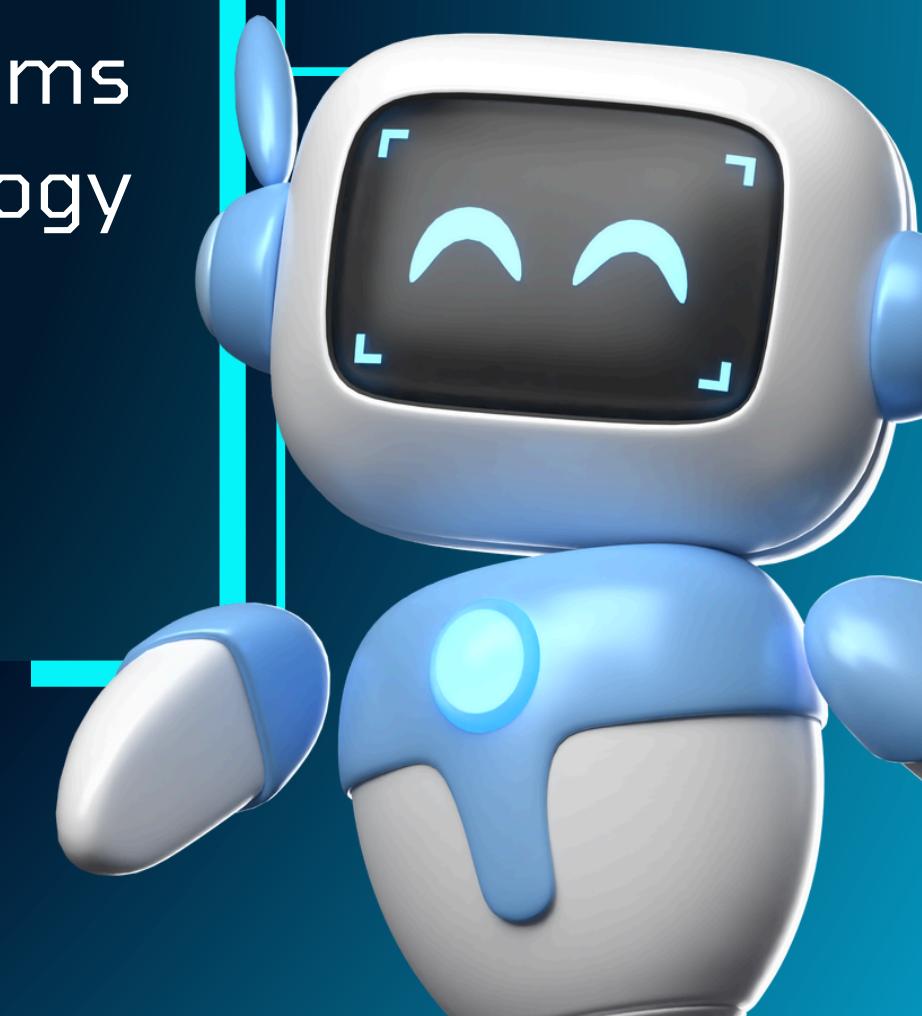


Presented by: Beatriz Asuncion, Aldrin Galvez, Kamira Allison Pagulayan
College of Computing and Information Technology, National University



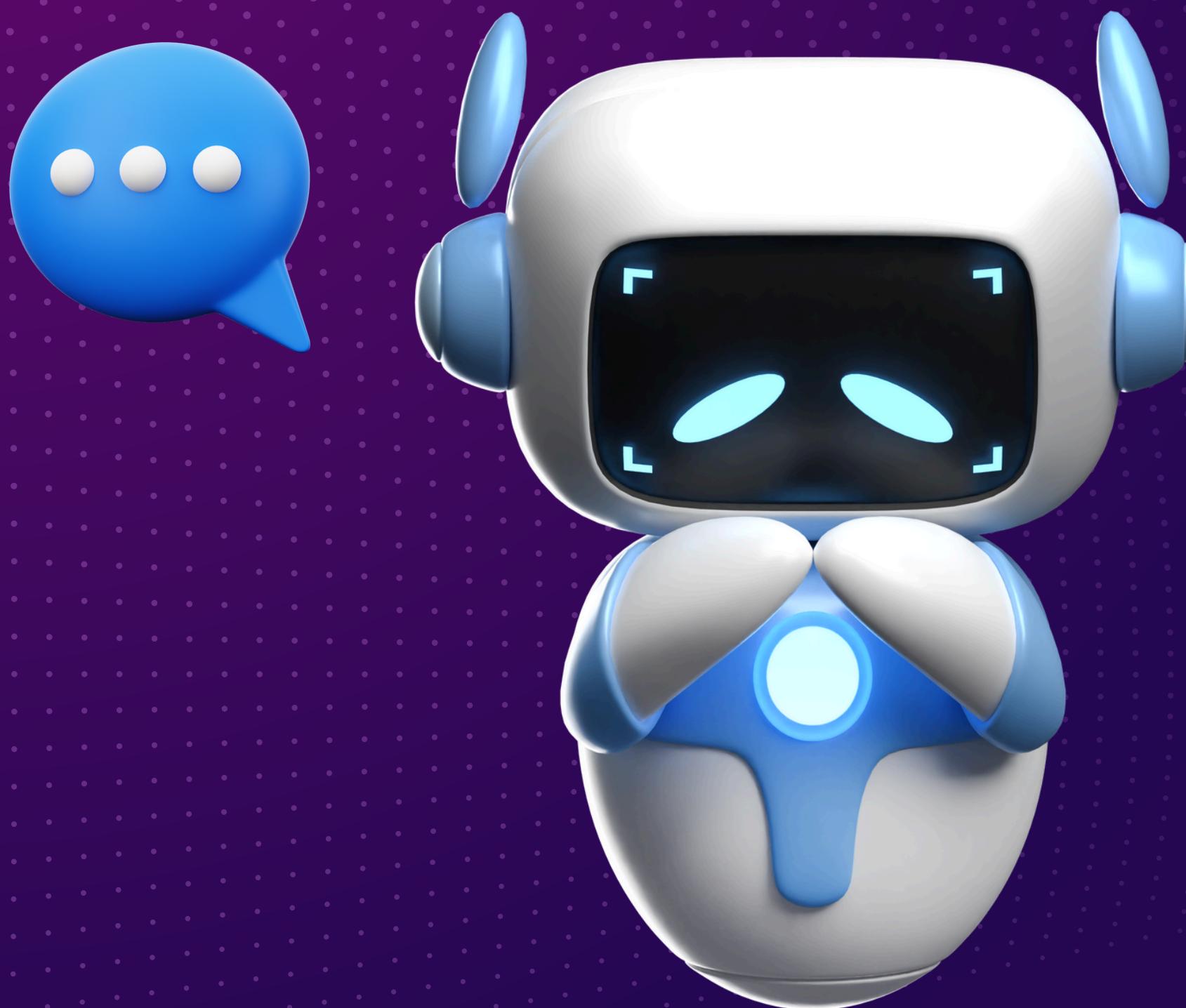
INTRODUCTION

Motorcycle tandem-related crimes are a significant public safety concern in the Philippines. Crimes such as robbery, homicide, and drug-related offenses are commonly executed using motorcycles. This study aims to use Geographic Information System (GIS) technology to analyze crime patterns and identify high-risk areas.



2

OUR OBJECTIVE



IDENTIFY HIGH-RISK AREAS FOR
MOTORCYCLE TANDEM CRIMES,

UTILIZE CLUSTERING ALGORITHMS
FOR CRIME PATTERN ANALYSIS

PROVIDE DATA-DRIVEN
RECOMMENDATIONS FOR LAW
ENFORCEMENT AND POLICYMAKERS.

3

REVIEW OF RELATED LITERATURE



Crime mapping and hotspot identification assist in law enforcement resource allocation. Previous studies focused on police interventions, while this study emphasizes predictive crime mapping. Policies such as the Doble Plaka Law have been implemented but face enforcement challenges.

4

METHODOLOGY

Data was sourced from Kaggle and the Philippine National Police via data.gov.ph. The study applied clustering methods such as K-Means, DBSCAN, and Agglomerative Clustering. Data preprocessing included handling missing values, feature selection, and standardization.

Riding in Tandem Killings

2011-2013 summary of "riding in tandem" crimes

Data Card Code (0) Discussion (0) Suggestions (0)

About Dataset

Content
2011-2013 Recapitulation on incident involving motorcycle riding criminals in the Philippines

Acknowledgements
This data is from data.gov.ph. Philippine's own collection of datasets from government offices.

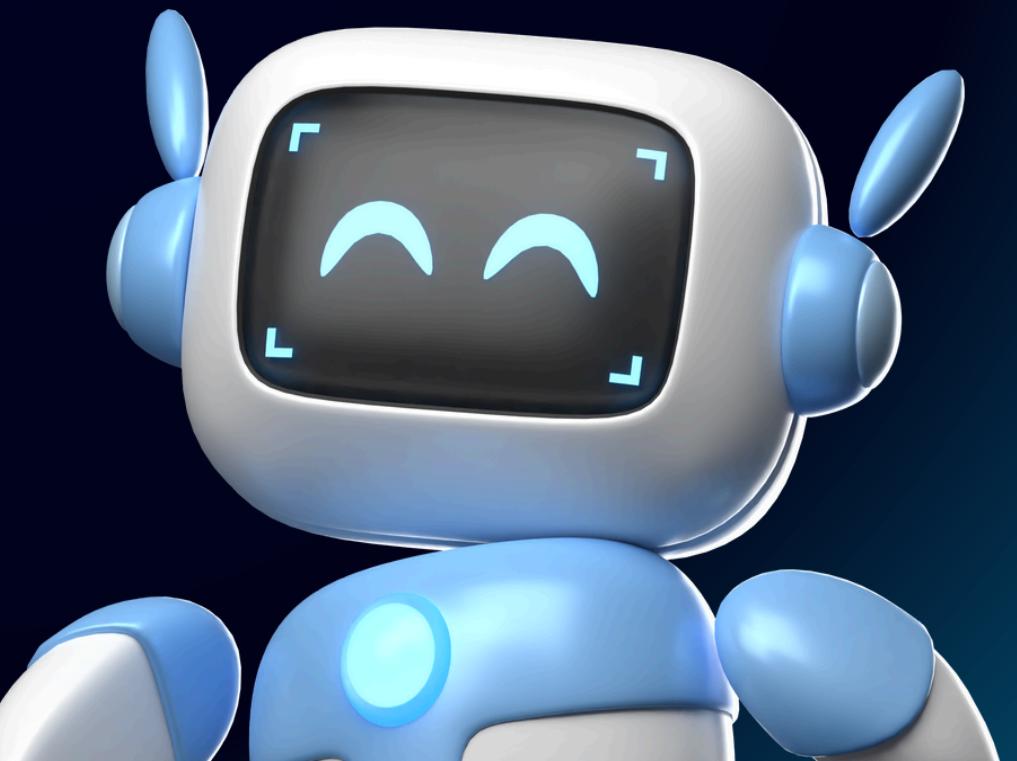
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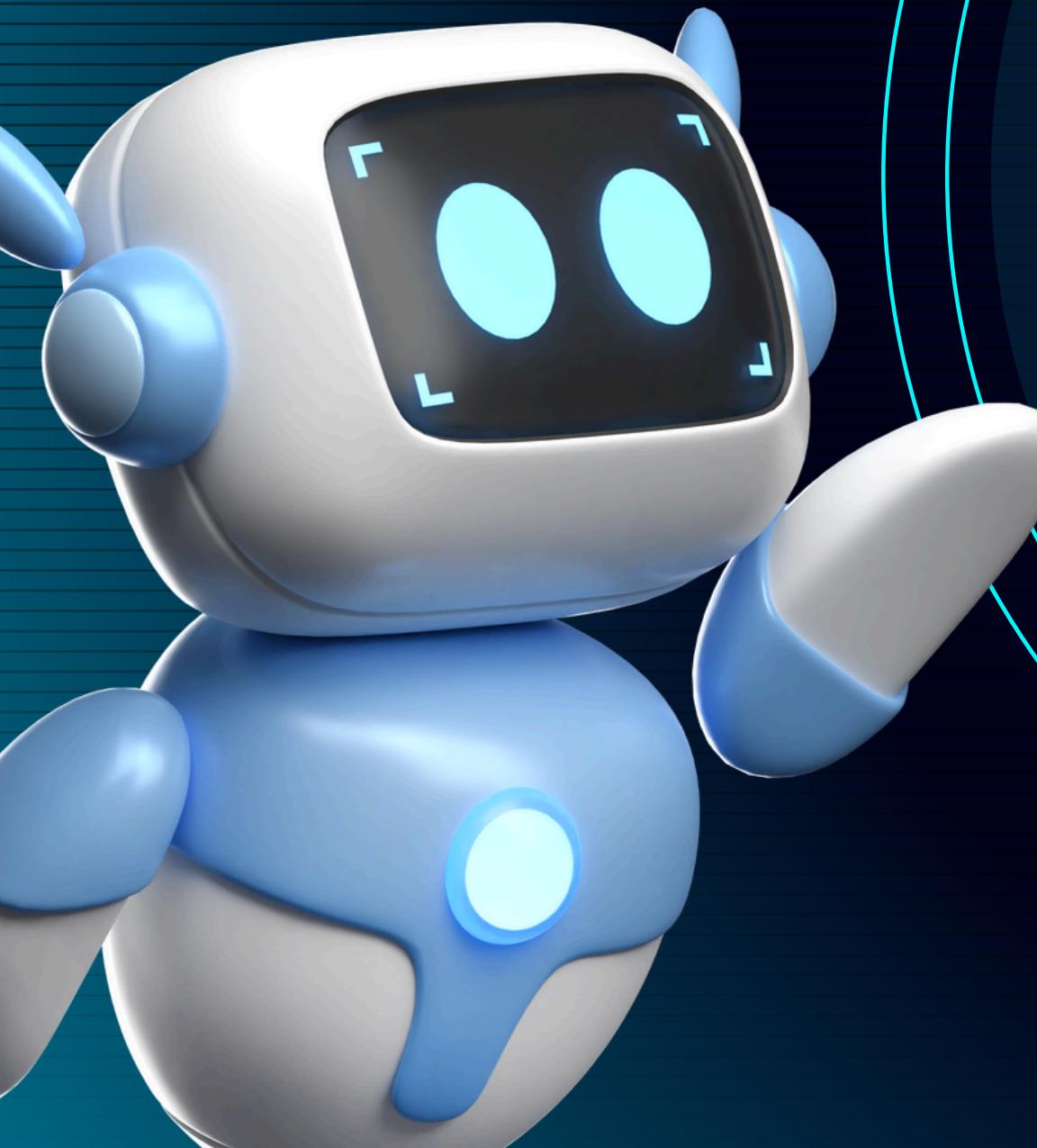
License CCO: Public Domain

Expected update frequency Not specified

Tags Sports, Crime, Public Safety

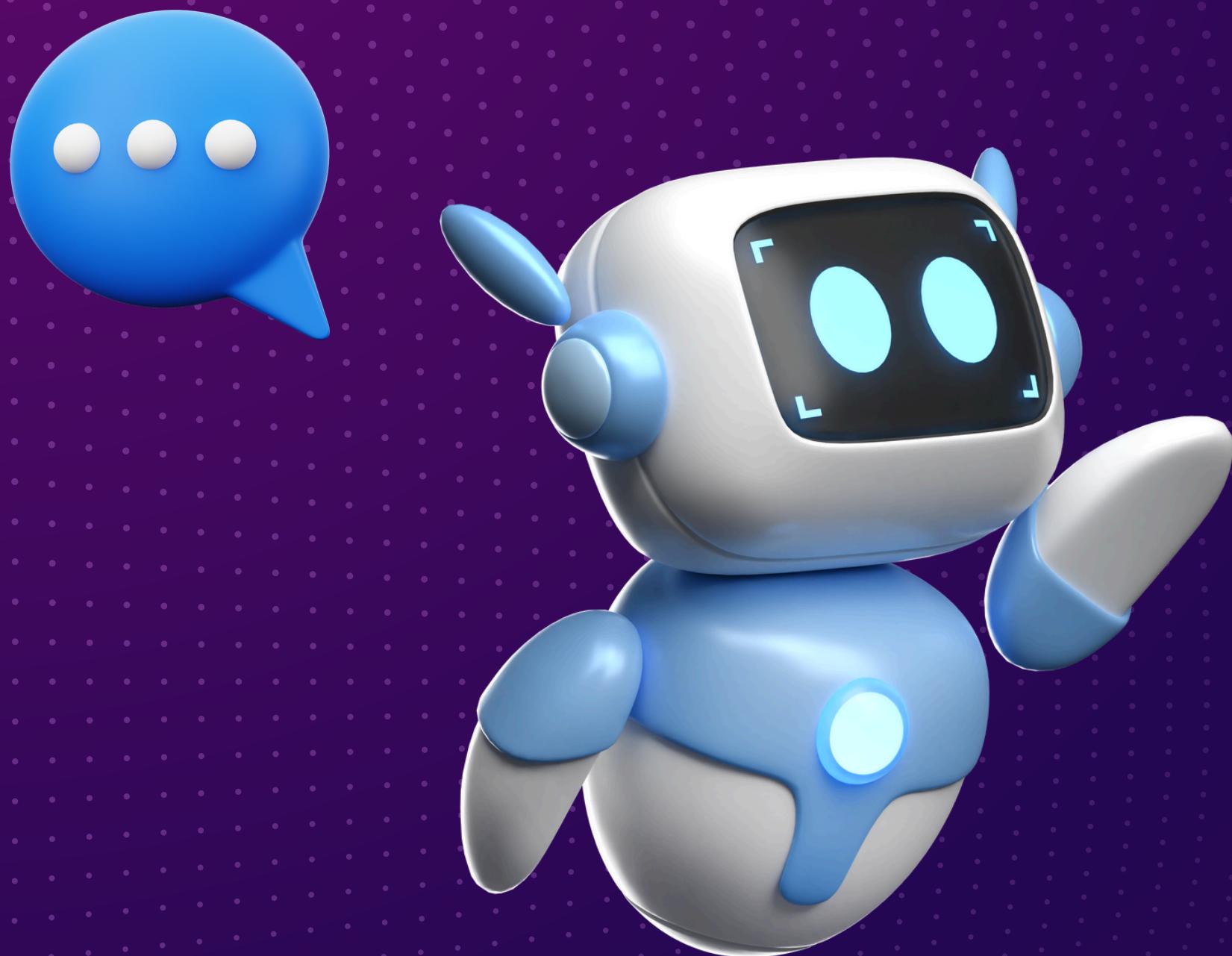






CLUSTERING
ALGORITHMS
USED

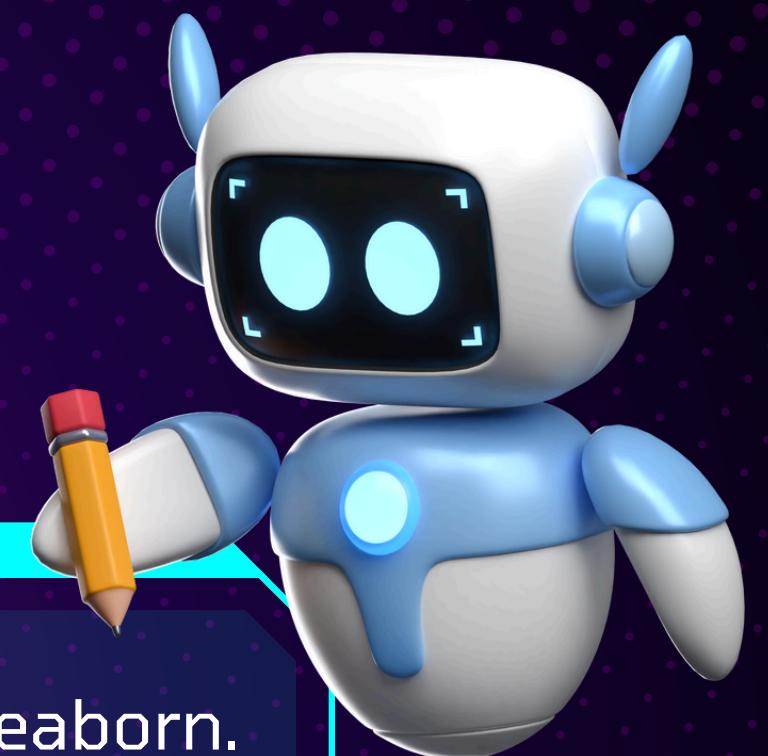
5 THE ROLE OF AI IN LANGUAGE LEARNING



K-MEANS CLUSTERING GROUPS CRIME INCIDENTS INTO CLUSTERS BASED ON FEATURE SIMILARITY

DBSCAN IDENTIFIES DENSE CLUSTERS AND DETECTS NOISE OR OUTLIERS.

AGGLOMERATIVE CLUSTERING USES HIERARCHICAL GROUPING FOR CRIME PATTERN ANALYSIS.



The study utilized Python, Scikit-learn, Pandas, NumPy, Matplotlib, and Seaborn. Google Colab was used as the cloud-based environment. Hyperparameters were optimized using the Elbow Method, K-Distance Graph, and Dendrogram Analysis.

6

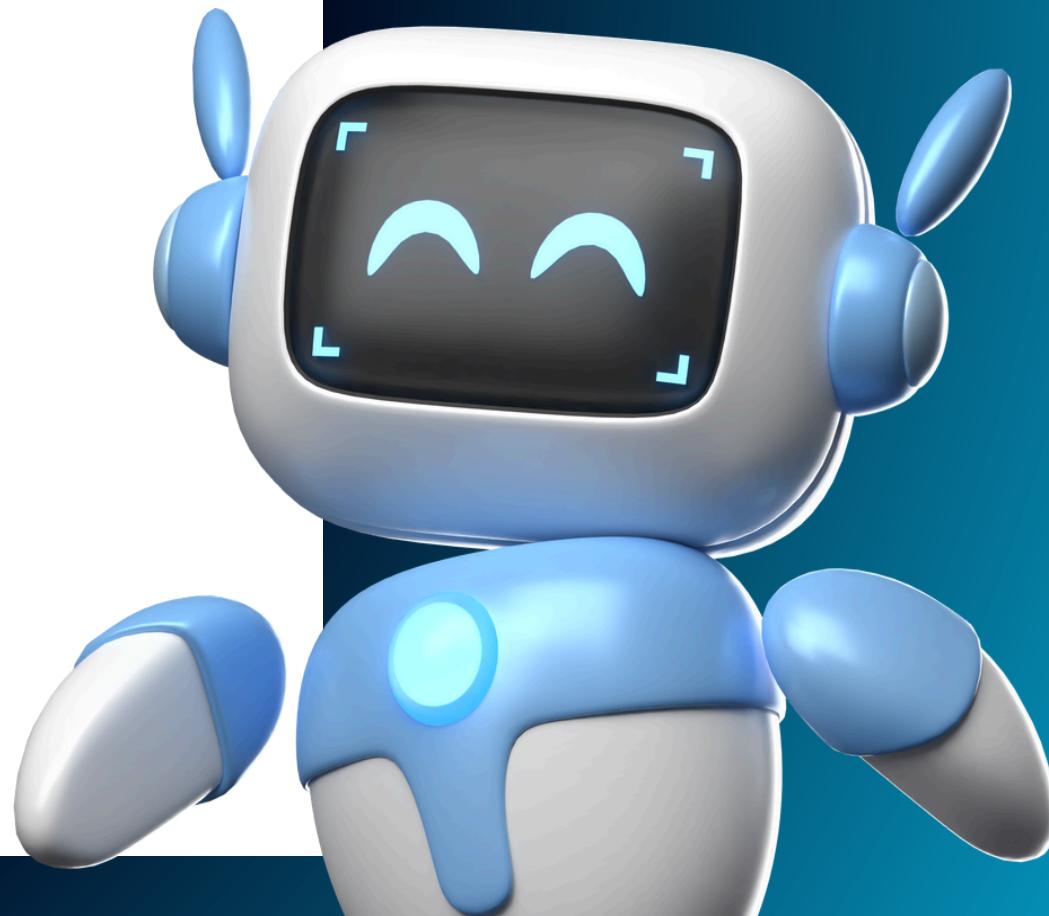
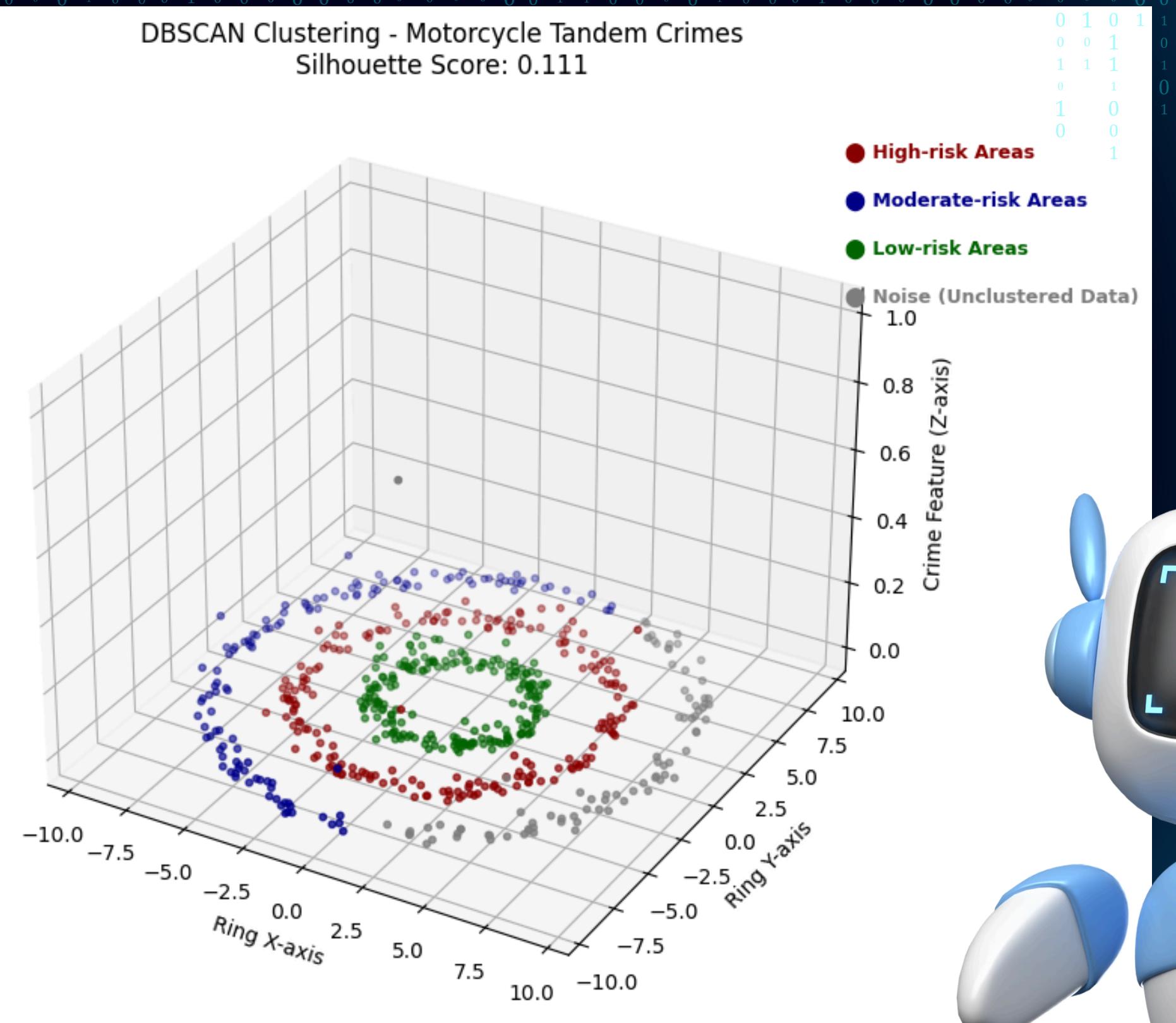
RESULTS AND DISCUSSION

RED POINTS: INDICATE HIGH-RISK AREAS

BLUE POINTS: REPRESENT MODERATE-RISK AREAS

GREEN POINTS: SIGNIFY LOW-RISK AREAS

GRAY POINTS: NOISE OR UNCLUSTERED DATA



6

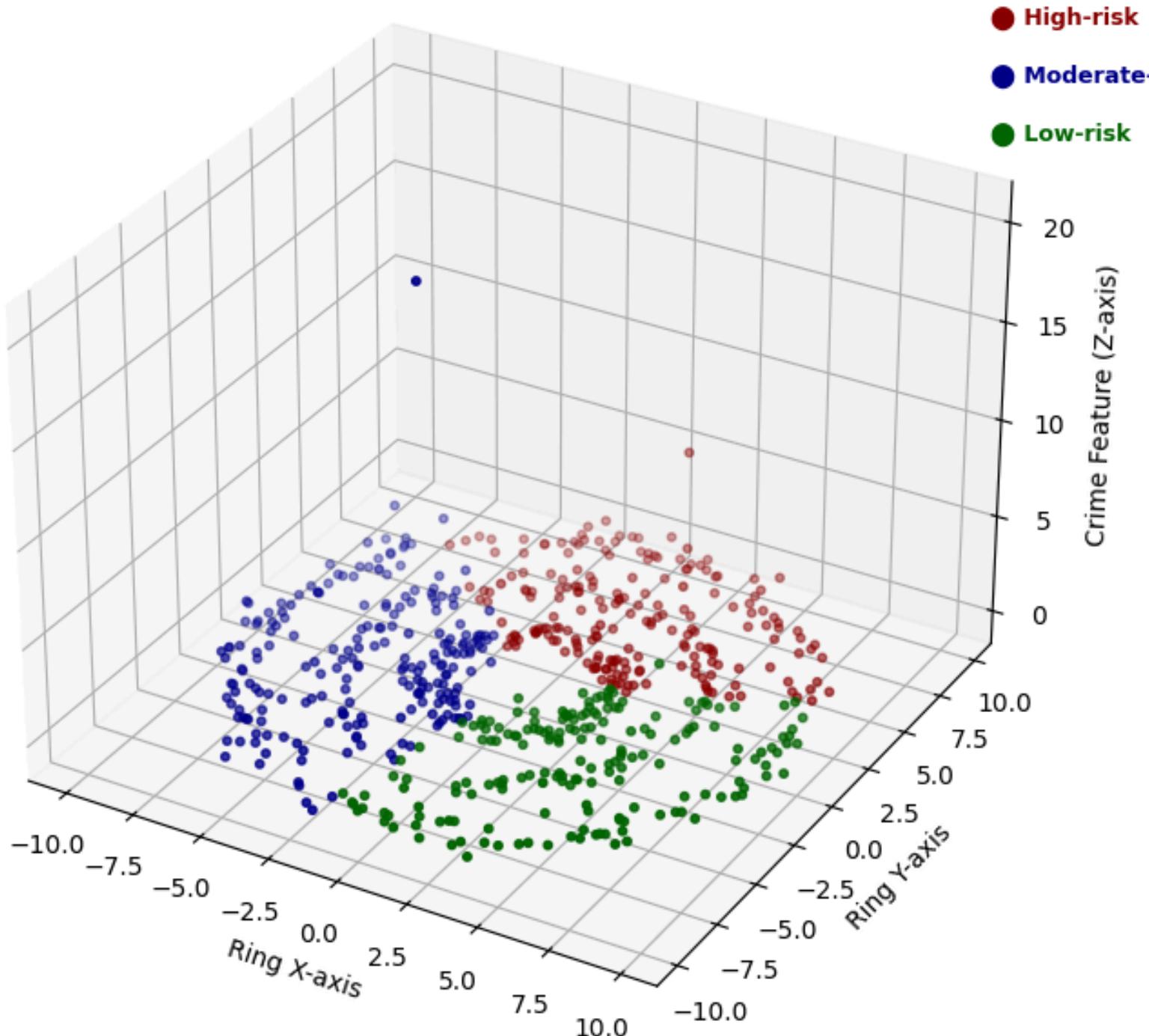
RESULTS AND DISCUSSION

RED POINTS REPRESENT HIGH-RISK AREAS, WHERE CRIME INCIDENTS ARE CONCENTRATED.

BLUE POINTS INDICATE MODERATE-RISK AREAS, WITH A BALANCED DISTRIBUTION OF CRIME OCCURRENCES.

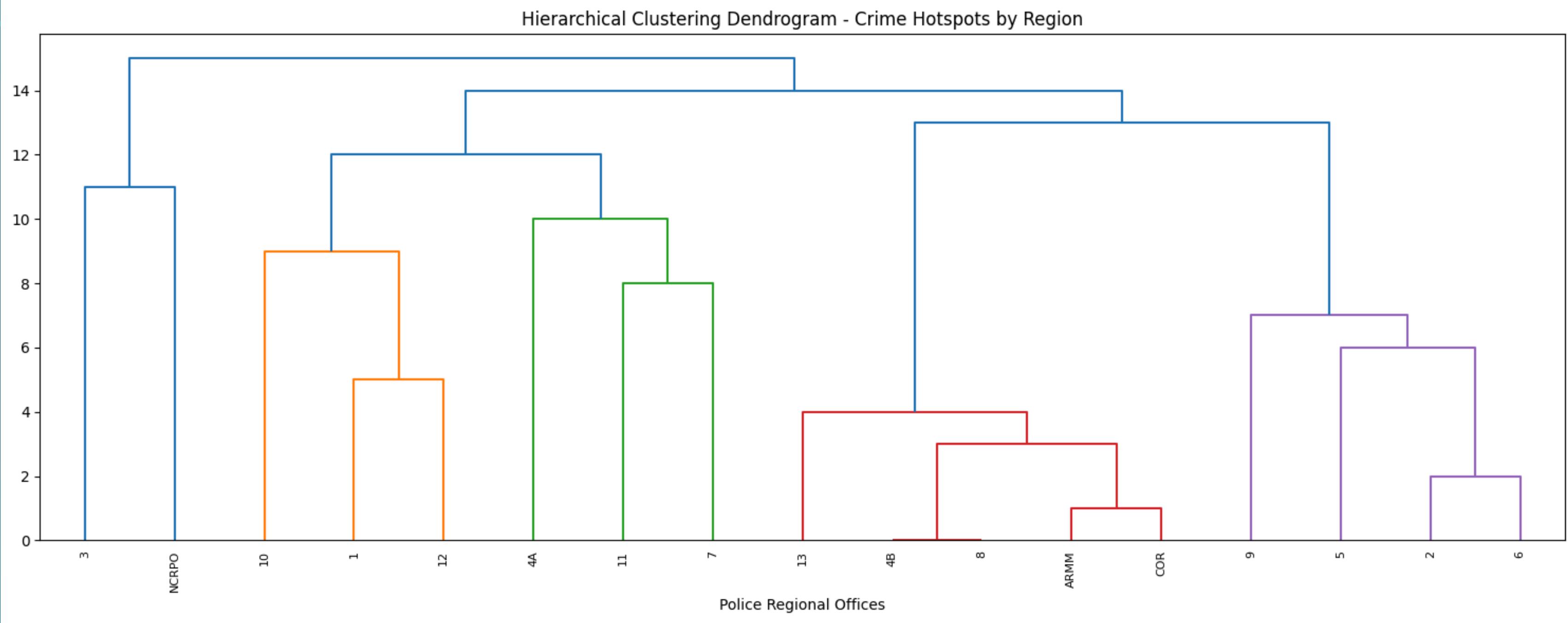
GREEN POINTS SIGNIFY LOW-RISK AREAS, WHERE CRIME ACTIVITY IS MINIMAL.

K-Means Clustering - Motorcycle Tandem Crimes
Silhouette Score: 0.364



6

RESULTS AND DISCUSSION





Crime hotspots were successfully identified using GIS and clustering algorithms. High-risk areas require targeted law enforcement interventions. Data-driven strategies can enhance crime prevention efforts.



LIMITATIONS AND FUTURE WORK

Crime data had noise and inconsistencies, and external factors such as unreported incidents and law enforcement responses affected results. Future research should improve data preprocessing, explore deep learning techniques, and integrate real-time surveillance and traffic data.

