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eGov Conference **2024**

# Smart Governance with GovTech

Enhancing Citizen Experience and Engagement

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# Predicting Crime Using Analytics and Big Data

*Leveraging on Data for Safer communities*



# Agenda



Law Enforcement Challenges

Predictive Analysis

Big Data & Analytics

AI in Crime Prediction

Operation Decision Support



# Law Enforcement Major Challenges



- Reduce crime rates in the community.
- Predict where and when crimes are likely to occur.
- Take proactive measures to prevent crime before it happens.
- Allocate resources more effectively.
- Provide a better service to the public.
- Use historical data to make predictions and take informed decisions.

# What is Predictive Analysis?

- Advanced analytics that uses data/big data, artificial intelligence and machine learning techniques for prediction.
- Types of Predictive Analysis:
  - Forecasting:** Predictions about the future based on historical data.
  - Tree Map:** Provides a hierarchical view of the history making it easier to spot patterns.
  - Point Map:** Visualisation of geospatial data on maps based on a variable.
  - Heat Map:** Visual representation of data where the values are depicted by color.



# Big data

Big data refers to large and complex datasets that are difficult to process using traditional data processing applications. These data sets are mainly characterised by:

- Volume
- Variety
- Velocity



- Analytics refers to the systematic computational analysis of data or statistics, allowing informed decision making.
- Allows the discovering of meaningful patterns, trends, and insights in data.



- Increasingly being used successfully by law enforcement for high-impact crime prevention measures.
- Provides the ability to process and analyze vast quantities of data from multiple sources in real-time, aiding threat assessment and strategic planning using:
  - **Machine Learning:** Used to analyze crime data and make predictions about future criminal activity.
  - **Natural Language Processing (NLP):** Analyze text data, such as social media posts or police reports, to extract valuable insights about criminal behavior and trends.
  - **Computer Vision:** Analyze video footage to detect suspicious behavior or identify individuals involved in criminal activity.
  - **Geospatial Analysis:** Map crime data to identify crime hotspots and understand how crime patterns are influenced by factors such as location and environment.
  - **Big Data Analytics:** Process large volumes of crime data from multiple sources to identify patterns and trends that can be used for predictive analysis.



# Benefits of Predictive Crime Analytics



- ✦ **Public Safety Planning:** Help law enforcement agencies to plan public safety initiatives and allocate resources for emergency response based on predicted crime patterns.
- ✦ **Crime Hotspot Identification:** Identify emerging crime hotspots, allowing law enforcement agencies to implement targeted interventions to prevent crime in these areas.
- ✦ **Reduced Response Times:** By predicting where and when crimes are likely to occur, law enforcement agencies can deploy resources more strategically, leading to faster response times to incidents.
- ✦ **Effective Resource Allocation:** Help agencies to allocate their resources, such as patrol officers, detectives, and equipment, more effectively to areas with the highest likelihood of criminal activity.
- ✦ **Improved Crime Prevention:** By identifying patterns and trends in criminal behavior, predictive analysis can help law enforcement agencies develop more targeted crime prevention strategies, such as community outreach programs or increased patrols in high-risk areas.

# Benefits of Predictive Crime Analytics Cont'd

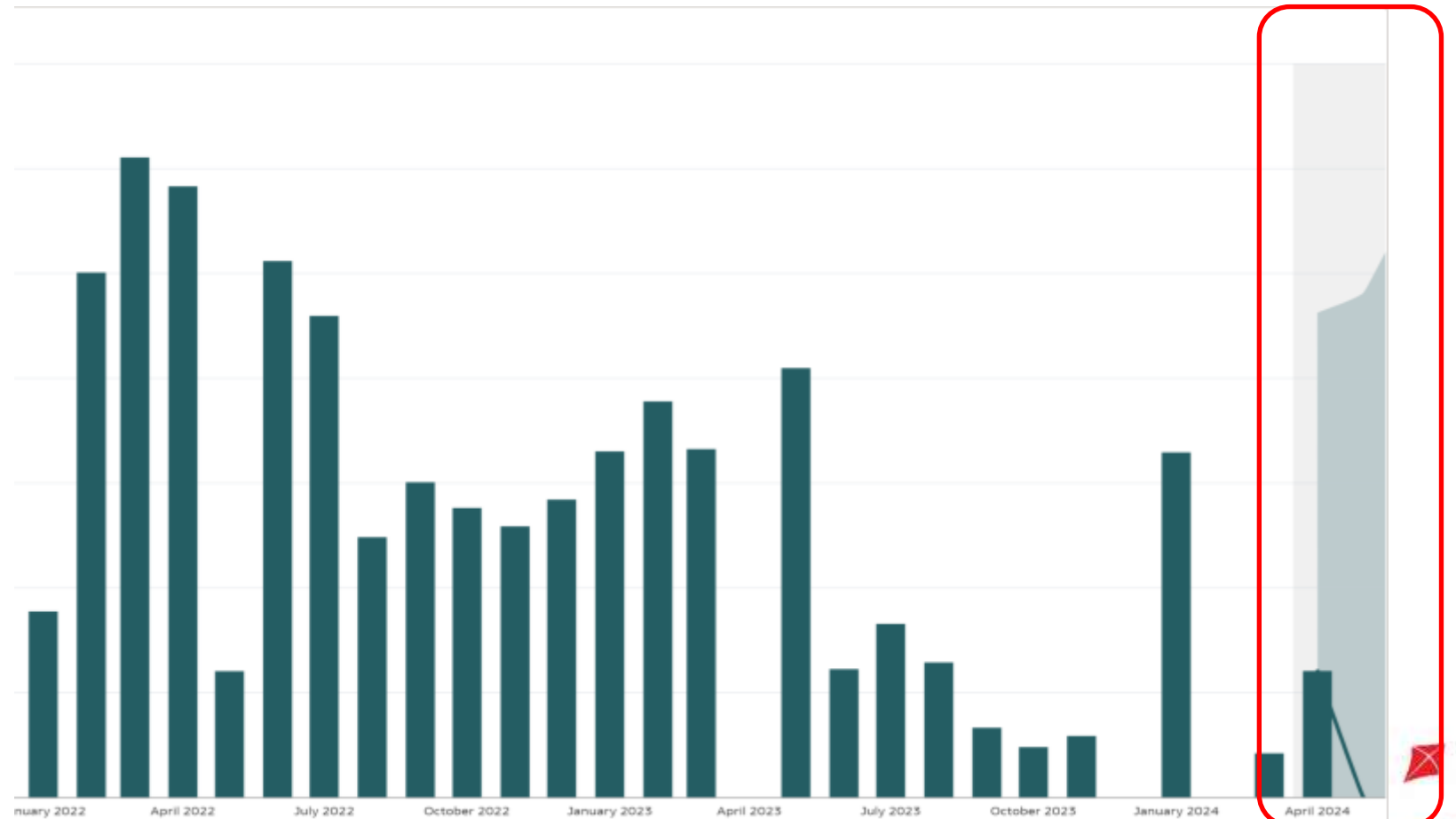


- ✦ **Enhanced Investigations:** Assist in criminal investigations by providing investigators with leads and insights into potential suspects and motives based on historical data and trends.
- ✦ **Strategic Planning:** By analyzing long-term crime trends and patterns, predictive analysis can help law enforcement agencies develop more effective long-term strategies for reducing crime and improving public safety.
- ✦ **Community Engagement:** Help build trust and cooperation between law enforcement agencies and the community by demonstrating a proactive approach to crime prevention and public safety.
- ✦ **Cost Savings:** By reducing crime rates and improving the efficiency of law enforcement operations, predictive analysis can lead to cost savings for agencies and communities.
- ✦ **Real-Time Monitoring:** Monitor real-time data streams, such as social media or CCTV feeds, to detect and respond to criminal activity as it occurs.



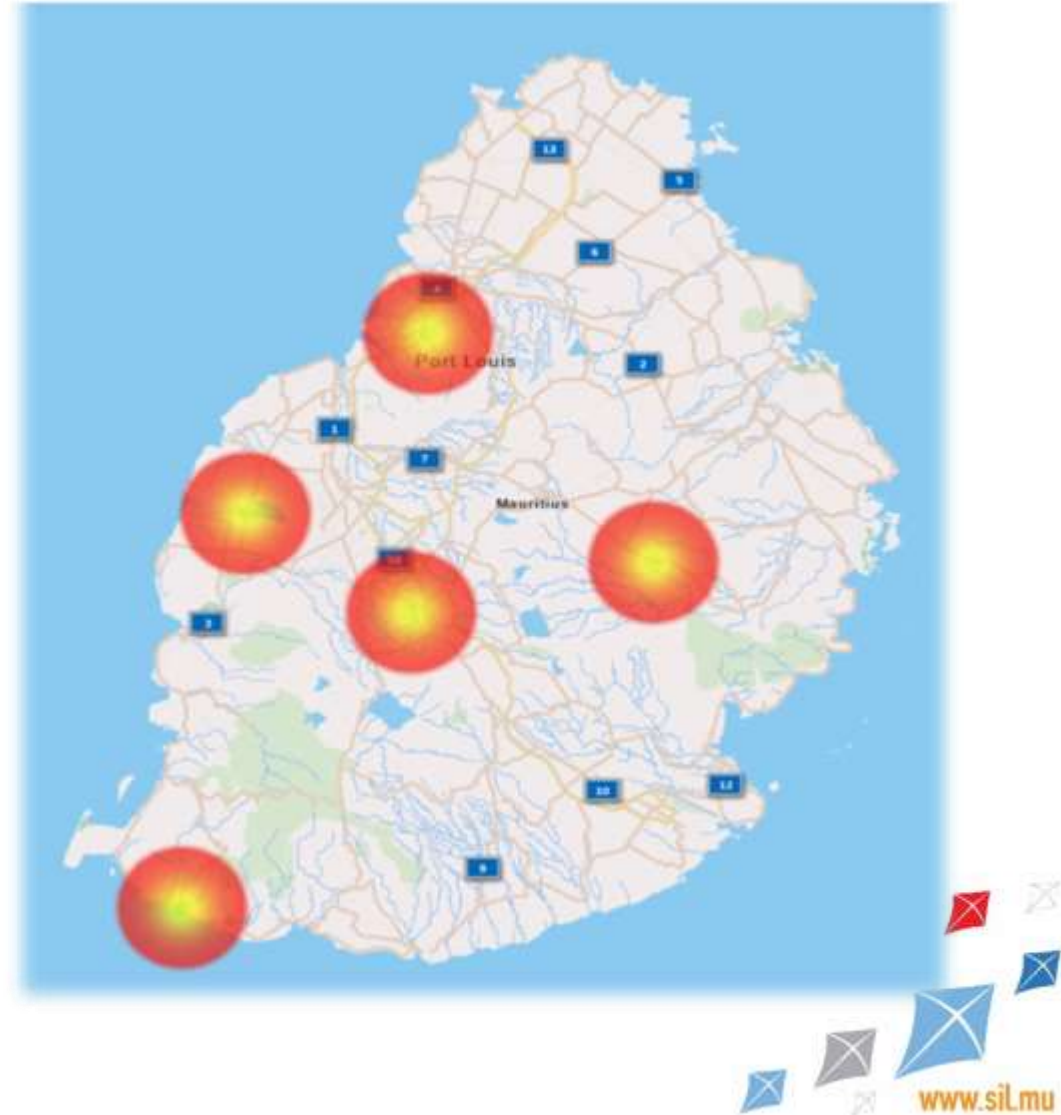
# Strategic Decision Support - Forecasting

- Forecasting is the use of data and statistical techniques to predict the likelihood of future criminal activities.
- The trend shows the number of robbery cases and the forecasted number of cases in the month of April 2024.

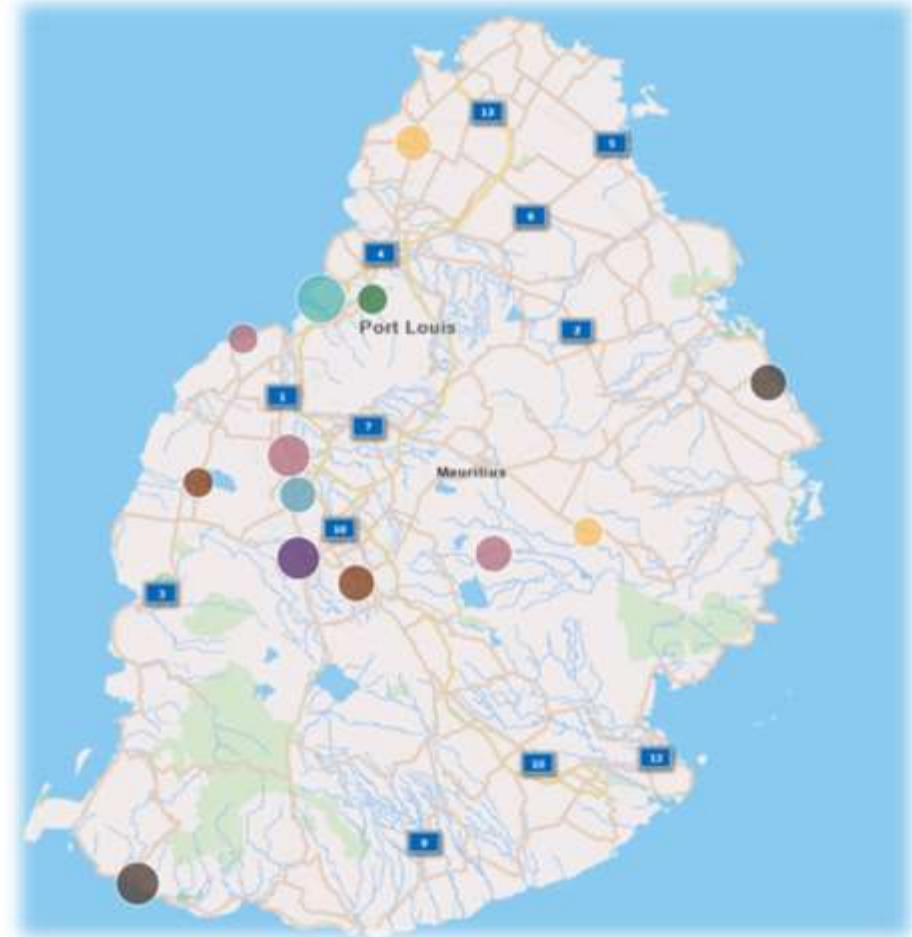


# Operation Decision Support – Heat map

- A heat map is a data visualization technique that uses color gradients to represent the density of data points in a geographic area or matrix. In the context of crime predictive analytics, a heat map can be used to visualize crime hot spots (areas) with a high concentration of criminal activity.



- ❖ Data visualization technique that uses size to represent the density of data points in a geographic area. In the context of crime predictive analytics, a point map can be used to visualize crime hotspots.
- ❖ The bigger the size, the higher the number of occurrences.



# Operation Decision Support – Tree Map

- Tree map is a visual method for displaying hierarchical data that uses nested rectangles to represent the branches of a tree diagram. Each rectangle has an area proportional to the amount of data it represents. The Tree map below demonstrates Cases by division.



- Reduce Crime rates.
- Provide a safer community.
- Effective Human resource planning.
- Take proactive measures.
- Save Money.
- Informed Strategic planning.
- Real-time or near real-time monitoring.
- Reduced response time.

# Thank You

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