ECOLE MAROCAINE DES SCIENCES DE L'INGENIEUR

Team: ECHOLYTIX

Members: Mounsef Litniti, Othmane Sadiki, Bader Eddine Tadlaoui

DATA STRUCTURE, METADATA DESCRIPTION & VISUALIZATION

Understanding the Data

The ECHOLYTIX system integrates multi-source urban noise data from three key streams:

1. Acoustic Data: Captured by IoT devices using microphones across city hotspots.
2. Citizen Reports: Complaints and feedback from public platforms and apps.
3. Media & News Streams: Textual noise-related content scraped and analyzed.

These datasets are unified and structured in a centralized knowledge base enabling real-time classification, trend detection, and decision-making.

Metadata Description

Field Name	Type	Description
source_id	String	Unique identifier for the data source (sensor, social media, etc.)
timestamp	Datetime	Time of recording or publication
location	GeoPoint	Latitude and longitude of the data point
noise_level_dB	Float	Decibel value measured from the sound data
noise_type	Categorical	Type of noise (traffic, construction, nightlife, etc.)
source_type	String	Origin (IoT sensor, citizen report, media, etc.)
sentiment_score	Float	Sentiment polarity from social listening (range: -1 to 1)
tagged_keywords	List	Extracted keywords (e.g. 'jackhammer', 'loud music')
confidence_score	Float	Model's confidence in classification or sentiment analysis

Visualization Examples

- Noise Heatmaps: City maps dynamically display noise intensity by zone using a color gradient.

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- Time Series Charts: Track noise levels and citizen sentiment over time.
- Bar Charts: Distribution of noise types and complaint frequency by district.

(Visuals to be generated based on simulated or real-time dataset using tools like Power BI or Plotly.)

Objective

Our goal is to empower city planners and policymakers with granular, real-time insights into urban noise patterns. This data structure facilitates dynamic monitoring, historical trend analysis, and predictive modeling to build healthier and more resilient Moroccan cities.