

ECOLE MAROCAINE DES SCIENCES DE L'INGENIEUR

Team: ECHOLYTIX

Members: Mounsef Litniti, Othmane Sadiki, Bader Eddine Tadlaoui

D3. APPROACH AND DEV PLAN

Initial Question & Methodology:

How might we help Moroccan cities like Casablanca monitor and reduce noise pollution using AI and real-time citizen feedback?

We used the Design Thinking methodology to deeply understand the pain points of urban noise through empathy, ideation, and prototyping. We brainstormed over 20 ideas ranging from smart earplug alerts, noise-reporting mobile apps, predictive noise forecasting models, to dynamic quiet-zone mapping.

We selected an integrated AI system combining sound detection, social listening, and noise heatmaps for its balance of technical feasibility, real-time capabilities, and data-rich insight.

Solution Architecture:

The architecture involves IoT noise sensors across the city feeding acoustic data to an Edge AI engine for real-time classification. Simultaneously, NLP modules analyze complaints from citizens and news feeds. Data is stored in a central knowledge base, visualized via dashboards, and used to train predictive models.

Milestones:

1. Data collection setup with sensors and web scraping tools
2. Model training and validation (sound classification and sentiment analysis)
3. Integration of system components (sensor input, NLP, dashboard)
4. User testing with municipalities and feedback loops
5. Deployment and monitoring

Validation Strategy:

We will validate our approach via a mixed-method evaluation: precision and recall of sound classification, accuracy of sentiment analysis on real citizen feedback, and usability tests with city officials. We will use controlled field recordings and annotated datasets to benchmark AI performance. Pilot testing in one district

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will help refine system responsiveness and guide city-wide scaling.