

Development process for Dengue's AI Predictive Model

XX%

1. Business Understanding

95%

Defining project priorities and objectives based on the needs of the Secretary of Health.

- **Business Knowledge**
 - Systematic Literature Review
 - Understanding sessions
 - Collaboration of experts

Deliverable:

Systematic Literature Review (SLR) - State of the Art of AI for Dengue Prediction and Prescription

2. Data Understanding

95%

Types of Variables Completeness of Information

Spatial analysis grid Epidemiological week

- Collect data
- Exploratory Analysis
- Definition of spatial and temporal granularity

Deliverable:

Weather Stations' Data Quality Evaluation

3. Data Preparation

90%

Downscaling
Training of machine learning models that learn patterns of climatic variables at large resolutions, to extrapolate to smaller resolutions.

Transformers
Neural network techniques that will understand patterns from Cali nomenclatures to standardize addresses.

Train 60%

- Imputation of missing values (AI)
- Georeferencing and spatio-temporal aggregation of data (AI)
- Hypothesis Testing
- Feature Engineer and Feature Select
- Data partitioning
- Standarization and Scaling

Deliverables:

Geocoding of Addresses in Cali's Nomenclature

Downscaling Process for Climate Data

4. Modeling

85%

Machine Learning and Deep Learning model training to understand patterns of dengue cases at the space-temporal level.

TCN, LSTM, GRU, XGBoost, SARIMAX, Mixed architectures: LSTM/TCN + Dense (MLP) layers

Cross-temporal space validation technique, which guarantees generalization of the trained models.

Bayesian optimization to choose the best hyperparameters of the model

- Predictive models (AI)
- Space-Temporal Cross-Validation (AI)
- Hyperparameter Optimization (AI)

Deliverable:

Reproducibility and Initial Adaptation of Model Version 1

5. Evaluation

70%

Endemic Channel and other baselines (EWARS)

- Calculating metrics on the Test Set
- Comparison with Baseline
- Retrain the model with all the data
- Feature Importance

6. Deployment

30%

Deploying Predictive Model

Deliverables:

Predictive Model

Project Overview and User Interface Preliminary Designs

Chart notation:

- Final product
- Intermediate product
- AI Development
- Activity