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Artificial Intelligence of Things (AIoT) -TPs

2^{EMME} ANNÉE MASTER
SDIA
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24-25

Integrated Geoportal for Smart Management of Public Infrastructure with AIoT

TP-2

Description

The goal is to develop a system for managing and monitoring urban infrastructure based on AIoT with direct integration into a geoportal. The system allows to:

- **Monitor and analyze** urban infrastructure such as roads, bridges, water networks, and buildings using IoT sensors.
- **Geolocate infrastructure** and visualize their status in real-time on a geoportal.
- **Predict and detect** potential failures using artificial intelligence models.
- **Plan maintenance interventions** based on predictive analysis and real-time alerts.
- **Facilitate decision-making** for local authorities through geolocated reports and intervention recommendations.

Project Components:

IoT Sensors:

- Temperature, humidity, and vibration sensors to monitor roads, bridges, and buildings.
- Environmental sensors to monitor weather conditions and air quality in different geographic areas.
- Sensors for monitoring water networks (pressure, leaks) or other critical infrastructure.

Project Components:

Geoportail :

- An interactive map visualization platform that displays the location and status of infrastructure in real-time.
- Integration with geographic information systems (GIS) like ArcGIS or open-source solutions like QGIS.
- Ability to display maintenance alerts, failure predictions, and statistics as map overlays.

Project Components :

3. Artificial Intelligence Models:

- Supervised learning models and anomaly detection to predict infrastructure failures based on sensor data.
- Resource optimization algorithms to plan maintenance interventions based on geolocated priorities.
- AI is used to analyze infrastructure wear trends in different geographic areas.

Project Components:

Real-Time Data Processing:

1. Data collection from IoT sensors installed on infrastructure, transmitting the data to a cloud platform for analysis.
2. Edge computing processing to handle urgent alerts locally and reduce latency for critical actions.

Project Components:

Automation and Notifications:

- Implementation of an **automatic notification** system based on sensor data to alert local authorities of detected issues.
- Generation of geolocated recommendations for maintenance teams based on data analysis results.

Project Components:

Security and Privacy:

- Implementation of security protocols to protect sensitive data collected by sensors and stored in the system.
- Blockchain integration to ensure data transparency, especially for public contracts, for example.