

LATInsights: Democratising Land Surface Temperature Analytics for Urban Climate Governance through Conversational AI

ABSTRACT: Urban climate adaptation planning requires synthesizing complex Earth Observation data, yet traditional Planning Support Systems face an “implementation gap” due to technical barriers preventing non-specialist planners from accessing specialized geospatial workflows.

We present LATInsights, a conversational agent system that addresses this gap through natural language interaction, enabling municipal planners to perform sophisticated thermal analytics without remote sensing expertise.

The system implements a novel two-tier architecture: a stateful LangGraph-based orchestration engine managing semantic reasoning and multi-turn dialogue, decoupled from a stateless Model Context Protocol Server exposing domain-specific geospatial tools. This separation enables independent scalability while ensuring analytical accountability through structured planning and three-tier error recovery with Large Language Model-driven re-planning.

We demonstrate operational efficacy through Milan’s Via Neera cycling corridor case study, where the system autonomously orchestrates multi-scenario thermal simulations.

This work demonstrates how conversational AI can democratize geospatial intelligence for evidence-based urban climate governance.