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Street-Level Imagery Analysis

■ Project Kickoff: February 13, 2025



Advancing urban infrastructure analysis by creating an AI-driven platform that streamlines the processing, classification, and visualization of street-level imagery, enhancing the precision and utility of geospatial data for urban planning and development. In this 8-week challenge, you will [join a collaborative team of 50 AI engineers](#) from all around the world.

The problem

X Close

Street-level imagery offers a wealth of information that can aid urban planners, policy teams. However, manually analyzing such data is time-intensive, prone to errors, and this process can improve the precision, efficiency, and consistency of insights generated from street-level imagery.

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Despite advancements in AI and machine learning, challenges remain in applying these techniques to real-world scenarios, especially in diverse and region-specific contexts. Variations in data quality, infrastructure types, and environmental factors complicate the development of reliable and adaptable solutions.



Impact of the Problem:

The manual analysis of street-level imagery presents significant bottlenecks in urban development and emergency management. Urban planners and disaster response teams often rely on outdated or inaccurate data due to the slow and error-prone nature of manual processes. This can lead to inefficient resource allocation, suboptimal urban planning, and potentially life-threatening delays in emergency response. Furthermore, the inability to scale these processes adequately means that rapidly growing or changing environments may not be monitored effectively, leading to gaps in critical infrastructure and public safety measures. Automating the analysis of street-level imagery not only promises to enhance the accuracy and timeliness of data but also ensures that interventions are better informed and more responsive to the actual needs of urban and regional development.

This project to automate the classification and segmentation of roads and building materials not only aims to address these specific technical challenges but also has the potential to significantly impact broader economic, social, and environmental outcomes by enhancing the effectiveness of urban planning, disaster management, and infrastructure development.

The goals

The principal aim of this project is to refine street-level geospatial data analysis by employing AI-based tools. These tools are intended to enhance the detection and classification of specific Earth features such as road conditions and rooftop materials, utilizing cutting-edge machine learning technologies. This initiative will significantly elevate the precision and efficiency of the data used for various applications, including urban planning and infrastructure development. By automating and improving upon the existing methods of geospatial data analysis, the project will facilitate superior decision-making and operational efficiency.

Project Goals:

1. Data Preprocessing and Feature Definition:

- This initial stage will focus on the preparation of the data, which includes cleaning and labeling street-level imagery.
- Key features such as road conditions and rooftop materials will be identified, and baseline workflows will be established to guide the development of detection and classification models.

2. Implementation and Initial Testing of Feature Extraction Methods:


- The project will implement advanced feature extraction methods, such as YOLOv4, for accurate road classification and segmentation.
- Early testing phases will involve classifying types of roads (e.g., paved vs. unpaved) and segmenting different rooftop materials, employing techniques like ensemble learning or transfer learning to boost performance.


3. Refinement of Methods and Development of Visualization Tools:

- Methods will be refined based on the initial results and feedback from stakeholders.

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- Visualization tools will be developed to effectively present the results of classifications and segmentations, such through interactive maps or detailed reports.

The models' outputs will be validated against benchmark datasets and assessed for consistency across regional variations.



4. Interim Reporting and Strategic Planning for Improvement:

- An interim report will be compiled to summarize the findings, outline encountered challenges, and offer recommendations for further project development.
- This report will also highlight specific areas where model accuracy and usability can be improved in preparation for the Top Talent phase.

5. Consolidation of Workflows and Final Reporting:

- The consolidation phase will ensure that all workflows and data processing pipelines are well-documented and replicable.
- A final comprehensive report will be prepared, detailing methodologies, findings, and demonstrating practical use-cases.

By achieving these goals, the project is set to deliver robust, efficient AI tools that greatly improve the capabilities of street-level geospatial data analysis. This initiative will not only advance the state of AI in geospatial analytics but also empower various stakeholders to utilize more accurate and timely data for enhanced decision-making and strategic planning.

Why join? The uniqueness of Omdena AI Innovation Challenges

A collaborative experience you never had in your working life! For the next eight weeks, you will build AI solutions to make a real-world impact and go through an entire data science project lifecycle. This covers problem scoping, data collection, and preparation, as well as modeling for deployment.

And the best part is that you will join a global and collaborative team of changemakers. [Omdena AI](#) Challenges are not a competition or hackathon but a real-world project that will take your experience of what is possible through collaboration to a new level.

[Find more information on how an Omdena project works](#)

View Skillsets Covered in the Project

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First Omdena Project?

- Join the Omdena community to make a real-world impact and develop your career
- Build a global network and get mentoring support
- Earn money through paid gigs and access many more opportunities

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Your Benefits

- ✔ Address a significant real-world problem with your skills
- ✔ Get hired at top companies by building your Omdena project portfolio (via certificates, references, etc.)

 Access paid projects, speaking gigs, and writing opportunities



Requirements

- ✔ Good English
- ✔ A very good grasp in computer science and/or mathematics
- ✔ (Senior) ML engineer, data engineer, or domain expert (no need for AI expertise)
- ✔ Programming experience with Python
- ✔ Understanding of Machine Learning, and/or Geospatial Data Science

This challenge is hosted with our friends at



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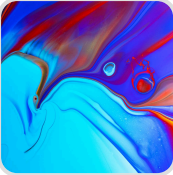
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