



Creating smart cities using 3D City Models:

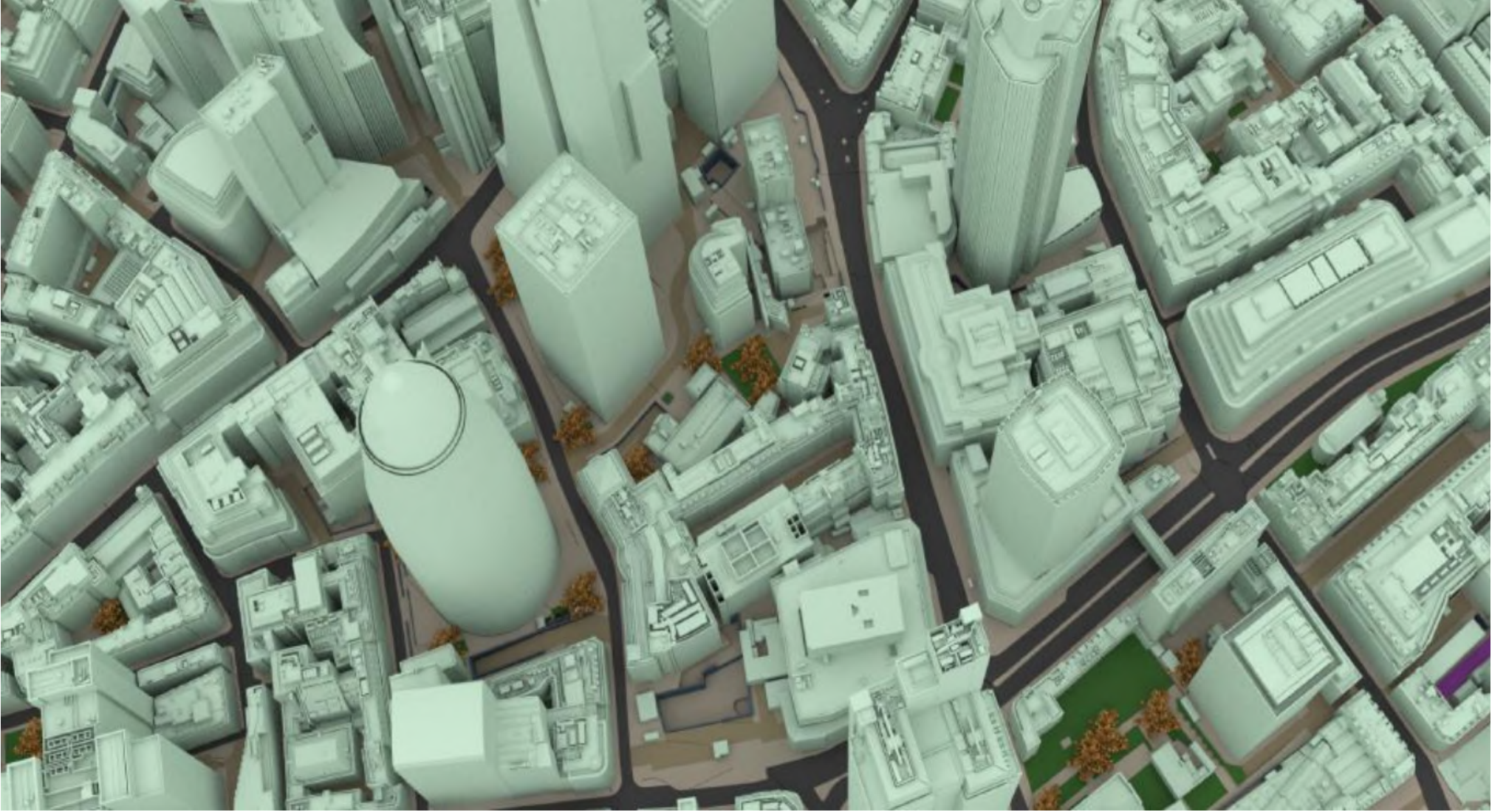
How we used AI/ML for change detection and studied the transformation of London city over the last three years

OVERVIEW

3D models of cities provide urban planners and other officials with realistic and up-to-date digital representations of their cities. It helps them visualize the multiple features and structures in the areas of interest and make informed decisions about smart city planning, infrastructure development, environmental management, and disaster response. Change detection in 3D models of cities enables planning platform providers to monitor and update the models to reflect real-world changes accurately.

VU.CITY, our client, is a smart city planning platform that simulates real-world environments to help developers visualize multiple use case scenarios before development. Planners use the platform to communicate the value of their schemes, reduce risk, and get planning approval.

They needed a partner who could deliver complex 3D models of multiple cities in the UK to a high standard and update their existing models for change detection.



Scope of work

- Develop 3D models of 25 cities in the UK using LOD-300 standards to be used for various purposes, including urban planning, architecture, engineering, and decision-making.
- Update existing 3D models to enhance accuracy and consistency with the latest aerial imageries.

PROCESS

We started the project by scaling up the team with domain experts (3D modelers, project managers, and support staff) to meet the requirements. The team processed the high-quality aerial imagery they received from VU.CITY, and used specialized 3D modeling software (3Ds Max, AutoCAD, and ArcGIS) to build the 3D models from scratch. All models were developed per LOD-300 standards and underwent multiple quality checks, including visual quality checks, geometric precision checks, and model validation and verification.

The team also updated the existing 3D models based on changes in the real-world city. Finally, the 3D models were delivered to the client in different formats (3DS MAX, AutoCAD, GDB shapefile, FBX formats) and validated to ensure their accuracy against ground truth data.

CHALLENGES

- Handling massive production volumes, allocating resources, managing time, and maintaining data quality while producing 3D models of 25 cities.
- Ensuring the accuracy of the 3D models so that they adhered to LOD-300 standards.
- Getting proper inputs for high-quality aerial imagery, terrain and building data for multiple cities and updating the-existing 3D models for change detection.

SOLUTION

Scalable production capabilities

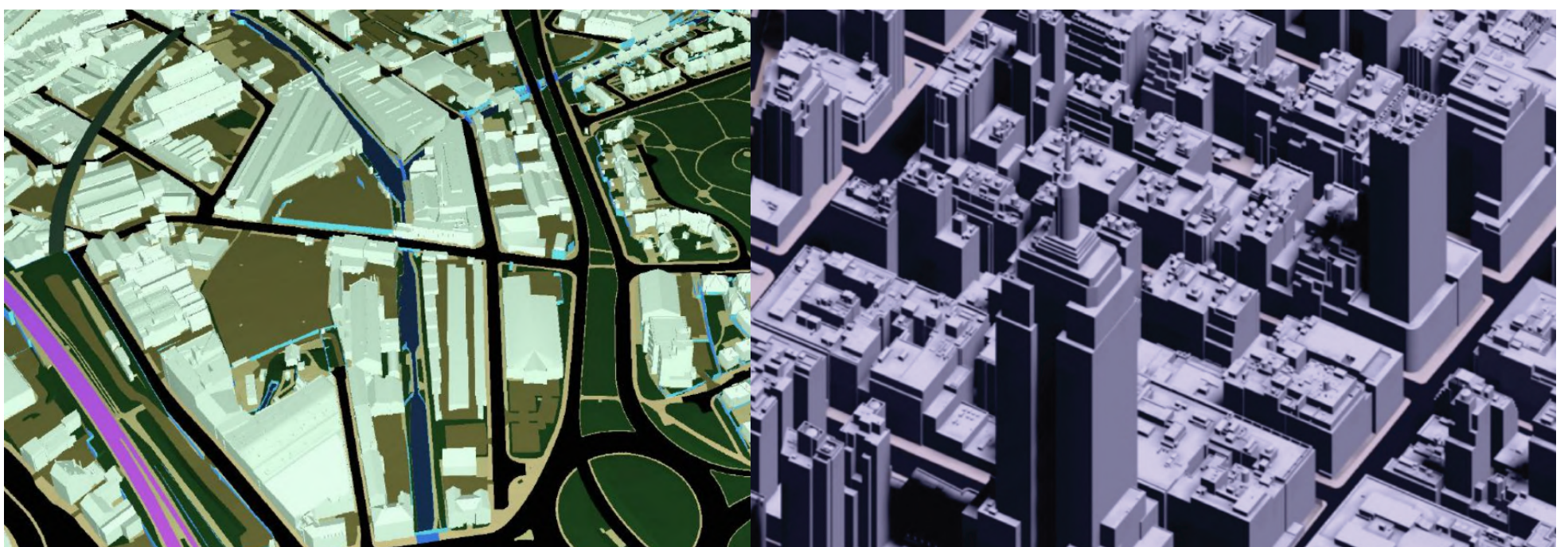
We kept pace with the tight deadlines and the high workload by leveraging best-in-class technology stack and working on a parallel computing architecture for modeling. This enabled us to manage the massive production volumes, perform quality checks at different stages effectively, meet the delivery timelines, and deliver high-quality outputs to VU.CITY.

Domain expertise

The team assigned to the project had in-depth knowledge and years of experience in 3D modeling and LOD-300 modeling practices. The team empowered with advanced software and tools, reviewed the models carefully and worked closely with VU. CITY's project managers to ensure that the models adhered precisely to LOD-300 standards.

Effective collaboration

Our team worked closely with VU.CITY's change detection experts to capture new aerial images and update the existing models. They also collaborated effectively with VU. CITY's project managers to ensure accuracy and consistency, and adherence to LOD-300 standards.



OUTCOME

Improved accuracy and consistency

Our domain experts, empowered with advanced tools, ensured that the 3D models were highly accurate (accuracy levels from 3m to <15cm XYZ) and met LD-300 standards precisely.

Enhanced visual representation

The updated and refined 3D models enabled our client to offer their users more interactive and precise visual representations of cities.

Improved efficiency

Our scalable production capabilities enabled VU.CITY to handle large production volumes while saving time, resources, and costs.

Better services and operations

VU.CITY's clients can make more informed decisions based on their accurate 3D models. This will ultimately lead to better and more informed choices for urban planning, architecture, engineering, and other areas.

CONCLUSION

Our accurate, detailed and lightweight 3D city models added precision and interactivity to the VU.CITY smart city platform. It enabled our client to utilize data that was an accurate and up-to-date representation of on-ground reality, generate actionable insights for their users, and help them create viable development proposals.

In the long term, the platform will enable city officials to offer sustainable economic development opportunities, improved government efficiencies, healthier environments, better traffic flow, increased safety, and upgraded infrastructure to their constituents.