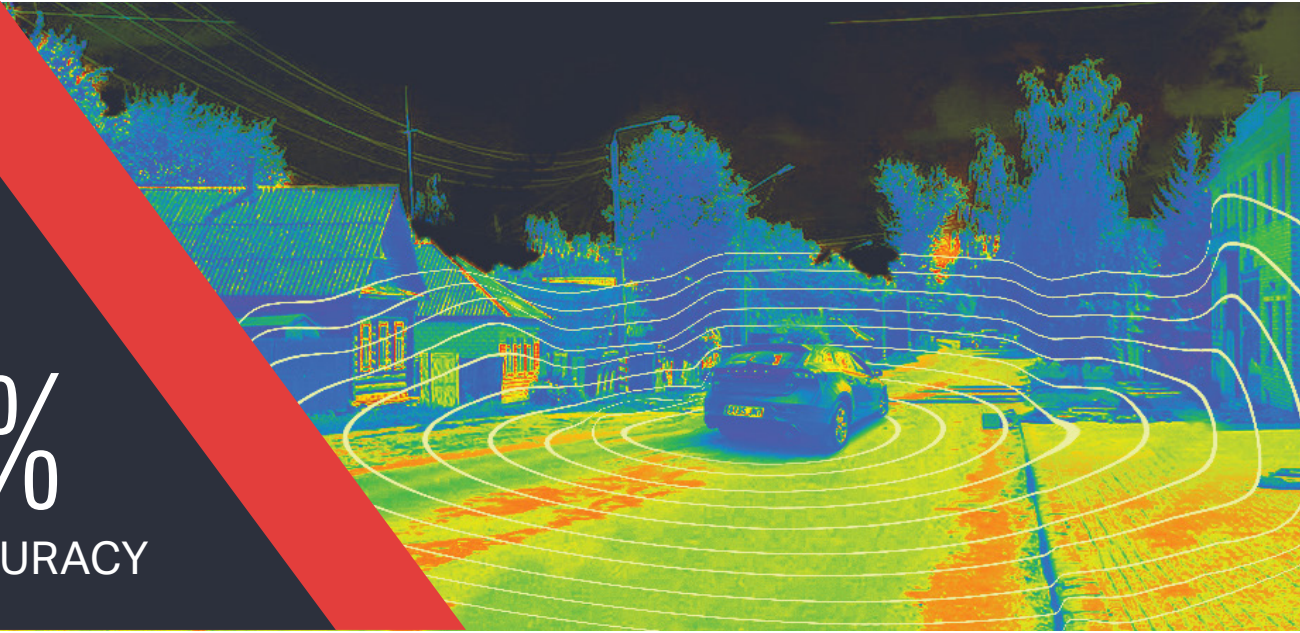# iMerit
CASE STUDY

96%
DATA ACCURACY

3D POINT CLOUD ANNOTATION FOR PERCEPTION SYSTEMS

This leading autonomous vehicle company needed precise and scalable 3D point cloud annotation services to enhance the performance of their perception system.

THE CHALLENGE

This leading autonomous vehicle company sought to develop a highly precise, secure, and reliable system for autonomous vehicle movement. This system required accurate interpretation of information from multiple sensors including navigation systems, vision modules, LiDAR, and radar.

The key to the system's performance was high-quality data and precise labels and annotations. To meet these needs, the company partnered with iMerit for 3D point cloud annotation across 2D image

> **"**
>
> *We had ongoing challenges with the quality of our 3D point cloud data that was impacting our car's performance.*
>
> *- Data Services Lead*
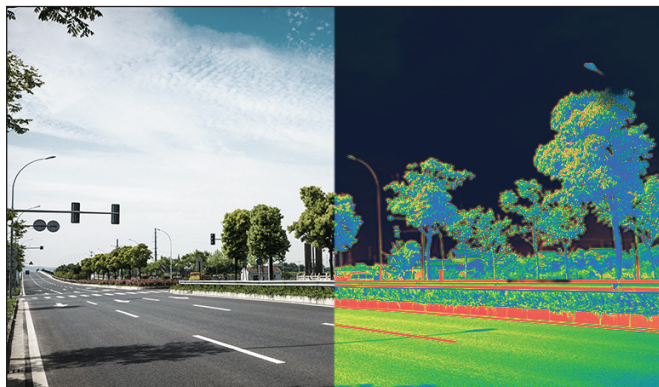
space and 3D point clouds, aiming to support its increasing training data demands. Specifically, the company needed:

- Accurate identification of targets in 2D/3D spaces
- Lane marking and road boundary designations
- Identification of 2D traffic signs and lanes in camera frames
- Annotation of targets in LiDAR/3D Point Cloud frames

THE SOLUTION

iMerit initiated the project with a comprehensive requirements review, followed by skills and system assessments. A team of 3D point cloud and sensor fusion experts was selected, consisting of annotators who scored above quality benchmarks on internal assessments. The annotators underwent rigorous training, which included:

- **Level 1**: Road rules and in-house tool training (5 days)
- **Level 2**: GIS, mapping, and semantic segmentation (1 week)
- **Level 3**: 3D point cloud annotation, simulations, complex road scene reviews and procedures for resolving edge cases (1 week)

Upon completion of this training program, annotators took a client assessment test that was custom-tailored for the project to ensure consistency and quality of outputs.

iMerit's solution architects and experts employed a two-stage approach to address the data challenges:

> " *iMerit's precision, efficiency, and scalability significantly enhanced the performance of our 3D perception system.*
>
> *- Data Services Lead*

Data Pre-Selection and Curation:

- Ensured high data quality, richness, and diversity
- Selected data with minimal occlusions, no water droplets, and diverse road types, weather conditions, lighting, reflections, and road geometries

Ground Truth from 3D Point Cloud Annotation:

- Detailed review and refinement of annotation guidelines
- Accurate demarcation of raised boundaries, crosswalks, and road surfaces
- Human-in-the-loop workflows for seamless labeling and attribution on 3D Point Cloud scenes for cars, pedestrians, poles, signs, and barriers

THE RESULT

Through iMerit's end-to-end data labeling services, this leading autonomous vehicle company achieved:

- **Enhanced Data Accuracy**: iMerit's rigorous training and selection process ensured annotators delivered high-quality, precise annotations that were crucial to the model's ability to interpret and respond to its environment effectively.

- **Increased Efficiency and Scalability**: iMerit demonstrated the ability to rapidly scale operations by rapidly expanding the annotation workforce without compromising quality or timelines.

- **Improved Data Quality**: The meticulous data pre-selection and curation processes, which included images with minimal occlusions and diverse road types and conditions, contributed to the robustness of the training data for the 3D system.

This collaboration demonstrated iMerit's capability to deliver precise and scalable data annotation solutions, crucial for the advancement of autonomous vehicle technology.

BOTTOM LINE IMPACT

97%	61%	IMPROVED
Data Accuracy	Time-Per-Task Improvement	Ground Truth