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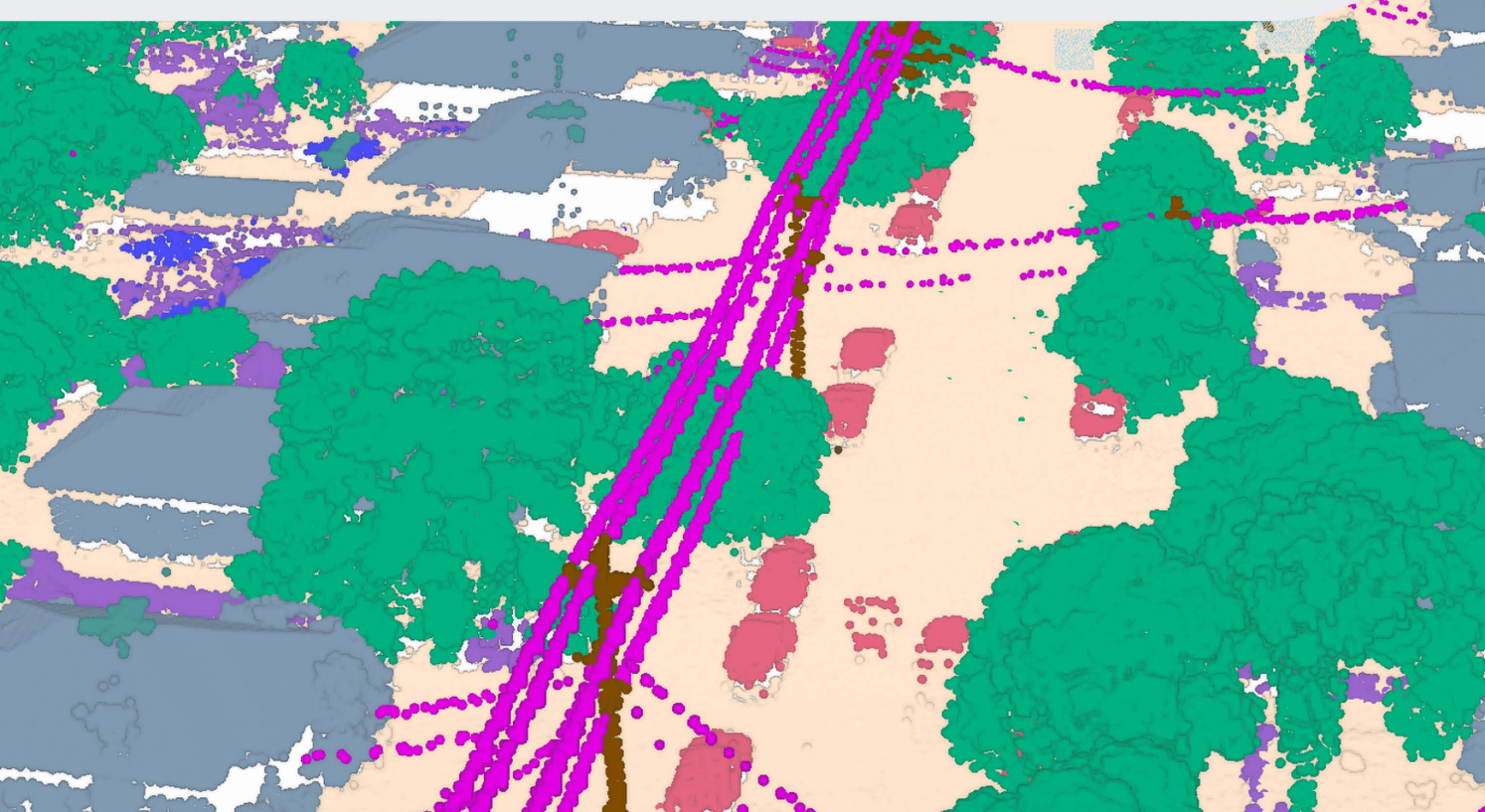
3 Common Manual Utility LiDAR Classification Errors

You Can Solve With Automation

1. Objects get classified inconsistently

2. Disparate objects easily get conflated in dense areas

3. Assets missing from GIS records remain undetected



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LiDAR classification is traditionally a manual process which can be time-consuming and expensive. Manually classifying LiDAR across a 10k square mile network area can take 80k hours and cost nearly $30m — not only is it expensive, but even the most painstaking manual effort is subject to common avoidable errors.

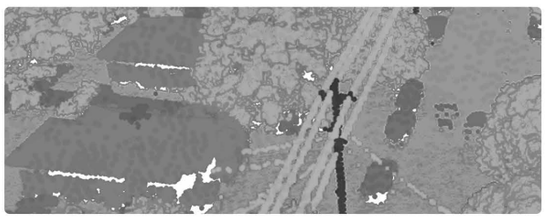
Classification errors are problematic for two reasons — they create expensive, repeat labor that constrains geospatial teams' capacity and leave utilities with limited visibility into critical operations.

First, geospatial teams have to make re-classification attempts and sometimes need to repeat the capture exercise. Most capture exercises require scheduling expensive resources before the team even starts the data processing phase over again. Secondly, errors leave utilities with deficient data, which impairs their ability to prioritize operations and keep their communities safe.

Aside from mounting costs, this dynamic can also delay projects by an average of a month. Geospatial teams end up pouring more resources into existing projects and have less capacity for new projects, while utilities operate for prolonged periods without high-quality data.

Geospatial teams are increasingly embracing automatic LiDAR classification because they can significantly reduce manual error frequency. Automation has long been a popular means of saving time, but until recently, was not sufficiently accurate.

Raw LiDAR scan → Automatically classified LiDAR



Today's AI/ML technology can not only help geospatial companies and utility divisions speed classification, but it can also significantly improve accuracy and consistency. Automatic LiDAR classification leverages neural networks that allow rapid pattern-matching across vast databases to accurately identify objects that the naked human eye cannot.

The result?

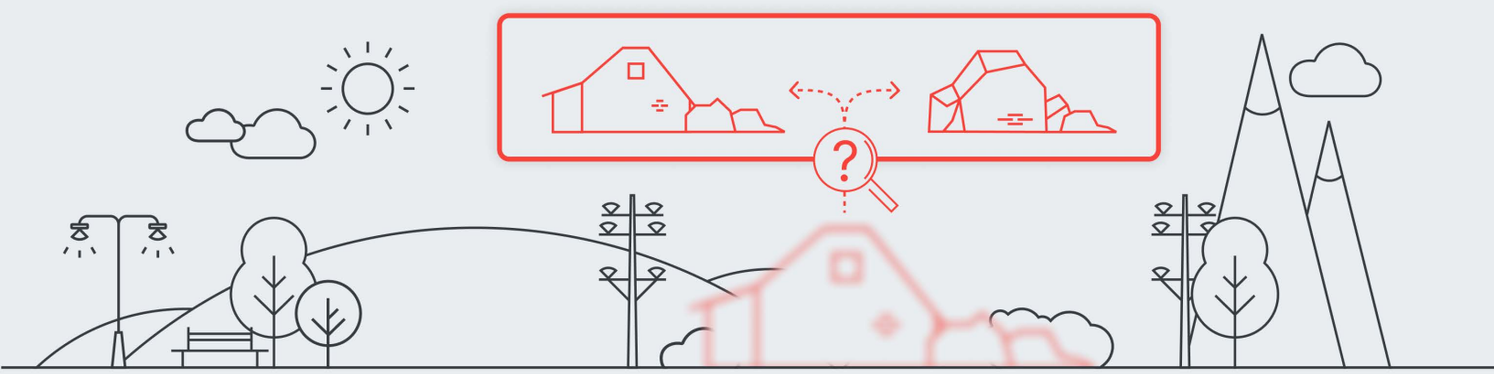
Clean, accurately classified LiDAR scans that geospatial teams can stand behind and utilities can trust.

Here are 3 common errors of manual LiDAR classification and the resultant advantages from automation:

Objects get classified inconsistently

1. Geospatial teams classify LiDAR across large swaths of territory, sometimes hundreds of thousands of miles. **Considering that a single linear mile can take six to 10 hours to classify manually, it would take far too long to put a single individual in charge of classifying a single project.** As a result, geospatial teams can have multiple people working on a project at any given time.

While more hands on deck can speed things up, it can significantly reduce the accuracy of the output.



Why? Even the most well-trained human eye is fundamentally subjective. A wide, low-scale object may be a boulder to one set of eyes. To another set of eyes, that same wide, low-scale object may be a man-made structure.
In summary, mixing multiple sets of human judgment muddies the waters by combining different sets of logic, leading to inconsistency and, as a result, inaccuracy.

So how can AI/ML automation help solve for more consistent classification? Rather than mixing several versions of disparate logic, AI/ML-driven classification applies a single logic across the entire territory simultaneously. Even when the AI/ML logic contains errors, automation errors are significantly easier to correct than manual errors because they are consistent, too — **correcting automation errors often amounts to simple "find and replace" instead of starting all over again.**

2. Disparate objects easily get conflated in dense areas

Imagine an urban area of a utility network. Any given block might feature many buildings squashed together, multi-purpose wires, trees, streetlights, public transportation awnings, scaffolding, a tall monument, or even an overhead pedestrian bridge — raw LiDAR scans of such areas are likely to be noisy. As a result, it's difficult to clearly delineate each object from the next with a manual approach.

When geospatial teams manually classify LiDAR, they typically define an object by it's perimeter. In dense areas where objects are layered atop one another, they blend together and are easily misclassified. As a result, it's hard to distinguish a tree from a distribution pole from a streetlight, and so on. **While the human eye can often use the light head to distinguish streetlights from distribution poles, that ability suffers when overlapping objects obscure the tell-tale light head.**

Sometimes, a solution to correcting poorly classified data is a recapture exercise in hopes of a cleaner scan. **However, not only are recapture exercises time-consuming and expensive, but they are also unlikely to meaningfully improve how effectively a human can classify the scan elements.**

Fortunately, automatic LiDAR classification can cross-reference vast, similarly crowded urban swaths to confidently identify discrete objects and their relative positioning with great accuracy.

3. Assets missing from GIS records remain undetected

Utility networks are large and extremely complex, so **it's not uncommon for even the most well-kept GIS records to miss something or to fall out of date.** A primary advantage of using LiDAR is that it can validate as well as correct discrepancies in utilities' GIS records.

LiDAR scans can pick up where a utility's GIS record left off and often capture found assets, which are assets that a utility's GIS record has not registered. So what happens when a geospatial team manually classifies a LiDAR scan that includes found assets?

Unfortunately, with a manual classification approach, those found assets won't be found after all. **Geospatial analysts rely on GIS records to cross-reference assets they know to exist against the assets that they identify in LiDAR scans — but if they don't know those assets exist, they can't classify them accurately, and they fly under the radar as noise.**

Automatic LiDAR classification can tell the difference between noise and utility assets — even if those assets are absent from GIS records. Identifying found assets is one way geospatial teams deliver significant differentiated value to utilities. When utilities don't know that certain assets exist, those missing assets can become massive liabilities because there is little chance that the utility can identify and address related risks. Even the best-laid plans are no match for poor data.

Conclusion

Fortunately, the AI/ML that powers automatic LiDAR classification has improved by leaps and bounds in recent years as utilities increasingly demand higher-quality, timely data at scale, and as they expand their LiDAR usage. Automatic LiDAR classification has clear benefits for increasing the speed and accuracy of geospatial projects.

up to **30x faster**

up to **99% accurate**

For geospatial companies, automatic LiDAR classification offers another advantage — the increased efficiency means they can bid on more projects to grow their businesses, and invest more time differentiating their work by generating value-added insights for utilities.

Ultimately, automatic LiDAR classification offers significant benefits for both geospatial teams and utilities, but also to the communities that utilities serve — automation makes LiDAR more affordable and encourages greater adoption among utilities, which means more utilities can level up their risk reduction efforts, which will help ensure a safer future for communities all over the world.

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