

The True Costs of Manual Image Review in Electronic Toll Collection

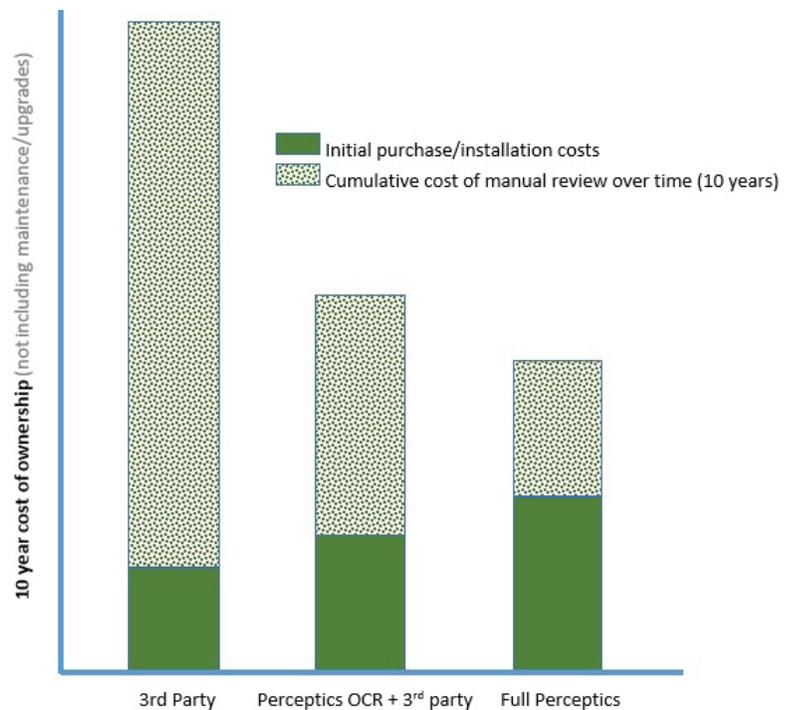
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Manual image reviews in an otherwise automated electronic toll collection (ETC) system may seem to represent an irreducible drain on profitability—an inevitable part of using any ETC solution that incorporates automatic license plate recognition (ALPR) technology.

However, while manual image reviews may remain a necessity in tolling for the foreseeable future, the reality is that manual review costs can vary significantly from one solution to another. And in order to reduce those costs to their lowest practicable levels, you need to understand where the costs are hidden and how they impact your bottom line.

Factors that affect manual image review costs

The initial cost of the system. Buyers of any capital asset often must decide whether to save on the initial purchase and worry about long-term costs later, or to factor in lifetime costs when comparing purchase options. This is true for ALPR systems. For example, high quality imagers may capture readable images from challenging plates when other cameras cannot, thus acquiring more IDs automatically and reducing the number of manual reviews required. Better imaging systems may also permit the use of fewer cameras per site or fewer lighting enhancements to ensure usable reads under all expected conditions. And a more sophisticated optical character recognition (OCR) engine may yield more readable plate images (higher attach rates) with more accurate automated reads from those images, which increases toll revenues and can reduce the overall cost of processing transactions.



The chart at right shows how the cumulative cost of manual review can quickly outpace a system's up-front costs. Using estimated performance metrics and up-front costs of different ALPR systems along with actual labor costs*, the chart shows how utilizing a system which regularly yields higher attach rates, such as a Perceptics system, will dramatically reduce the number of images that need to be reviewed manually, thus decreasing operating costs. The up-front cost of the system would be recovered in just a few years, while the costs associated with a third-party system would continue to exponentially increase.

*Assumes each employee can process 800 images per hour and is paid an hourly rate of \$15 (not including overhead). Assumes the cost of each image is \$0.01875 and each event yields just one image.

Lifetime operational costs. Buyers also must consider the lifetime of the system and the cost of any spares, maintenance, or replacements that might be required. More durable equipment, and features that enable remote or easy maintenance will ultimately lower the overall cost of ownership and potentially improves system uptime.

Percentage of no-reads and low-confidence reads. The more plates the ALPR system can read with high confidence, the more images that can be processed automatically, reducing your dependence on manual reviews.

True yield or “attach rate” from images. A system’s accuracy rates are only relevant to the manual review cost calculation if the system first provides high attach rates—delivering the highest possible percentage of readable plates from vehicles crossing tolling points. Accuracy is moot if you can’t read the plate. Images that cannot be read at all by a given system cannot generate toll revenues. And images that can be read via manual review but not via automation surrender much of their value to overhead costs. Accuracy only becomes relevant once you have a plate ID you can trust, whether from the OCR engine or a human reviewer.

Level of trust in automated image interpretation. If an operator uses manual reviews to validate automated reads from an OCR engine after the OCR performance has proven consistently reliable, the value of automation is diminished and the cost of manual reviews remains consistently high. Automation can only truly pay off in reduced costs when the operator allows high-confidence OCR reads to proceed automatically to ID database lookups and invoicing.

Number of images subject to manual review per event. The chart above assumes only one manual review per event. If business rules require review of more images per event, the cost of manual review increases accordingly.

Single review per image vs double-blind reviews (two reviewers per image). The chart also does not account for business rules that require double-blind or two independent manual reviews of the same image. And if rules require double-blind reviews of multiple images per event, the manual review costs can skyrocket.

Automatic recognition of non-alphanumeric plate features. ALPR technologies that interpret the plate’s region of interest (ROI) from an alternative perspective—digitizing the visual elements in and around the ROI as a kind of fingerprint, for example—can provide an independent and unique vehicle identifier that enhances the OCR engine’s ability to automatically and correctly identify a vehicle even when portions of the plate are damaged or obscured.

Linked databases of vehicle, event, and transaction identifiers. The effectiveness of any alternative means of identification—such as a digital fingerprint or pattern—relies on the system’s ability to store and retrieve that unique pattern, then match it to other occurrences of the same pattern as well as to conventional plate reads (including partial reads) associated with that pattern. It is the robustness and agility of the system’s database of identifiers that makes the combination of alphanumeric and pattern data effective at filling in missing details and reducing the need for manual reviewers to perform that job.

Accuracy of manual vs. automated image data extraction. It may be tempting to assume that a manual interpretation of images is always more accurate than an automated one. However, in some cases, a high quality, fully integrated ALPR system may, in fact, tease ID information from an image that even an expert reviewer cannot.

When weighing ALPR options, it makes good sense to look carefully at the lifetime costs, not just of hardware and software, but of business rules and decisions that will impact your bottom line year after year. Quality ultimately pays for itself over time. Enjoy the benefits of hindsight today.

Contact your Perceptics representative for more information.

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