Emerging & Innovative Technologies


# ELP Intelligence Automation

Initial Rollout with ML – Oct'22

Robotics Introduced – Jul'23

LLM Augmented– Aug'23

Bot Enhanced – Jan'24

STATE OF CALIFORNIA
DMV
Department of Motor Vehicles

California Department of Motor Vehicles

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# Executive Summary

DMV Specialized License Plate business process, producing around 1.5 million personalized plates annually, has been transformed from a primarily manual and paper intensive process to an automated digital process via the principles of Human Centered AI and Business/robotic Process Automation The system uses Large Language Model and robotic process automation to reduce processing times for our customers. It allows for automated rejection letter generation and self-service tracking of requests to reduce contact center calls. in the last year the system has eliminated paper processing of over 150K specialized plate applications and reduced the processing time from over 6 months to 6 weeks (including manufacturing time). This entire endeavor has resulted in prescreened of around 20% requests upfront to eliminates manual review and refunds for those ineligible requests using machine learning automating detection and explain-ability of decisions for profanities, bad words and reserved words in multiple languages.

The California Department of Motor Vehicles is enhancing its processes through technology by introducing Machine Learning (ML) large language models to its Environmental License Plate (ELP) program, which is commonly known as personalized plates.

With advances in technology, new partnerships, and dedication of our employees, the California DMV is streamlining its processes with the utilization of AI to do pre-screening and a secondary review all ELP applications received via online, field offices and mail.

## Project Description

The California DMV has implemented AI and ML technologies to assist in determining whether a requested configuration for a personalized plate is acceptable. This ensures consistency in the decision-making process of personalized plates, reducing tedious manual research in a process that has caused inconsistencies and resulted in lawsuits.

The AI ensures configurations are not representing inappropriate language (in global languages), illegal activity, violence, or resemble an existing plate configuration used by the state for regular issued plates. The AI is augmented with substitution rules that determines if a number was substituted for a letter and analyzes order reversal and mirror images.

As a word’s meaning changes over time, especially trending slangs, AI is machine learning, from data and experience, allowing it to recognize if a configuration is unacceptable and provides explainable rejection reasons with AI capabilities.

# The IDEA

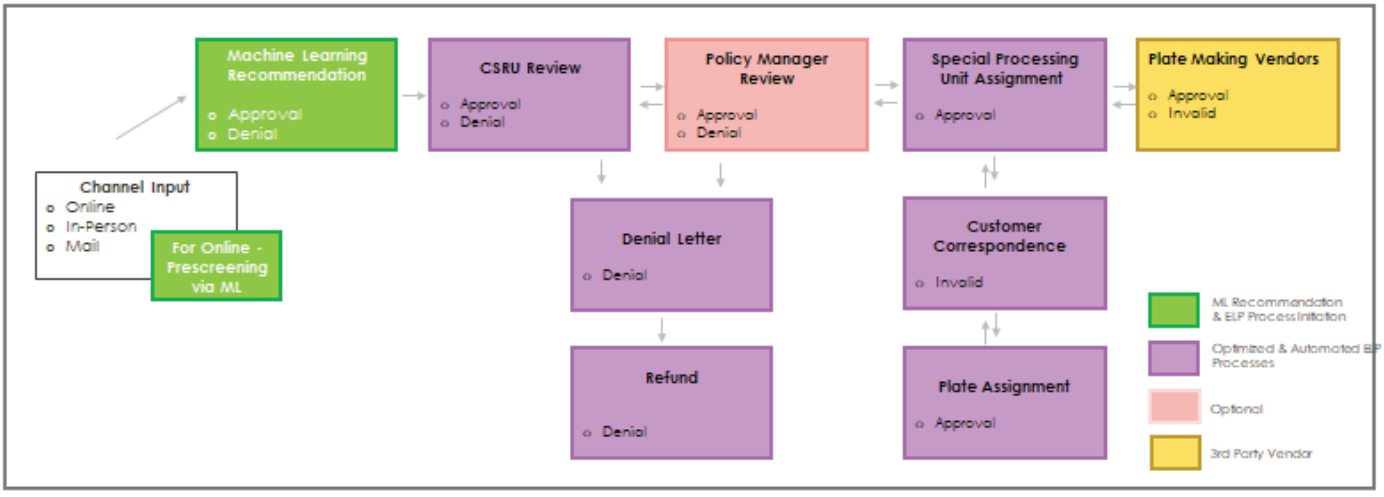
## A HUMAN-CENTERED APPROACH TO AI:

- Our AI-powered solution for processing special license plate orders is based on six (6) design principles. It empowers users in their order review process, significantly increasing daily productivity by eliminating backlogs and meeting review goals.
- Empower and engage technicians.
- Reliability and safety
- Privacy and security
- Understandable-Transparency
- Fairness - Treats every business user fairly.
- Explanation

# IMPLEMENTATION

## Workflow: High-Level

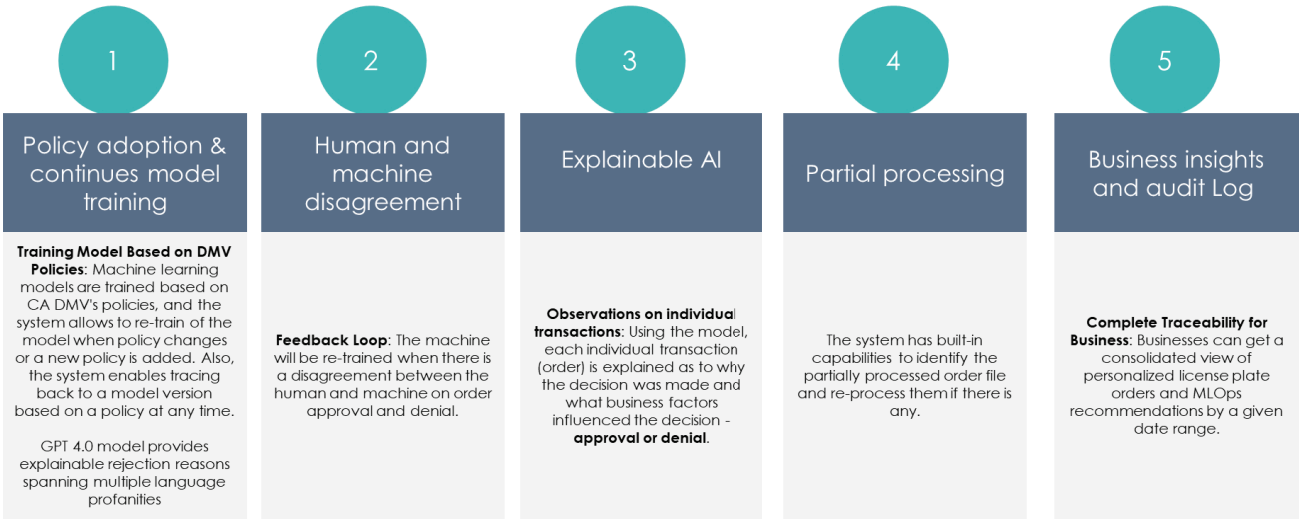
- At a high level, the personalized plate review process starts with an ML recommendation followed by a CSRU review. In select cases, a policy manager may also review an item. All approved orders go to the SPU units for plate assignments and customer correspondence, if any. If a configuration is denied, a letter is sent along with a refund.




The solution is complete with the use of workflow automation engine for workload distribution of manual workloads and robotic process automation (RPA) to update the legacy systems and generate the plate requests and rejection letters.

## Value Proposition: **ML for decision augmentation**

- Use of ML (BERT, LLM) to reduce analysis time for specialized license plates




### REDUCTIONS IN REFUND PROCESSING:

A machine learning-powered order pre-validation feature on the DMV website allows customers to interact with the machine learning (ML) model in real-time to determine whether a potential special license plate meets DMV guidelines. When they are met, the machine learning model passes the order, and the customer can complete the order after payment. A significant 23% reduction in refund efforts is obtained as a result of this pre-validation procedure.

### RAPID ASSESSMENT:

With AI-powered order review, the business process is seamlessly integrated. The technician, a crucial part of the process, is fully empowered by the explanation of the model results. This not only accelerates order review, approval, and other supporting processes but also values and utilizes their expertise in verifying that the order meets MDV policies and guidelines and checking for profanity.

### ELIMINATION OF MANUAL LEGACY TASKS:

Numerous repetitive tasks are involved in the process, such as plate assignment, ownership validation, ownership transfer checks, customer correspondence, and many others. We eliminated most redundant processes and print jobs by using intelligent automation to automate RPA (robotic process automation). This resulted in significant productivity gains and a reduction in processing time.

### COLLABORATION WITH OTHER STATES AND CO-DEVELOPMENT:

The California DMV may be the first state agency to integrate AI-powered intelligent automation solutions into its processes for special license plate order processing. This

solution processes approximately 550 orders daily, reducing the order backlog to a third in staff time. As a result of this generative AI innovation and technological advancement, California DMV is better equipped to collaborate and co-develop the solution with other DMVs around the country. As part of a national effort to reduce costs and improve productivity, the California DMV discusses unified solutions with Alaska and Nevada DMVs.

### AWARD-WINNING INNOVATIVE DESIGN:

At the regional and international levels, the American Association of Motor Vehicle Administrators (AAMVA) recently recognized our solution. AAMVA recognized that the California DMV has not only integrated artificial intelligence and intelligent automation technologies into its technology portfolio but also realized the public's benefits of simplification and automation. Through advanced technologies such as machine learning, intelligent automation, and cloud the California DMV provides measurable and quantifiable benefits to the California public.

## Impact

Since its implementation in Nov 2022, AI has reviewed over 200K personalized license plate configurations, in addition to reducing 20% upfront workload with prescreening of the requests. Decisions made by Human Centered AI implementation augmented combined with the robotic process automation has reduced the backlog and processing wait times considerable. In terms of the AI performance as reviewed by California DMV staff, less than 5 percent of the decisions made by AI were reversed. Over time, this number continues to lower as AI learns from the decisions that were reversed.

We anticipate that this Human Centered AI model will continue to augment the human decision process in the long term with RPA continuing to reduce the processing times.

The California DMV has expanded this technology and added it to the online ordering process for personalized plates. It will further enhance the customer experience by informing customers in real time if their configuration is acceptable, instead of today's current process of mailing a denial letter and refund 30 days or later from the date the plate was ordered.

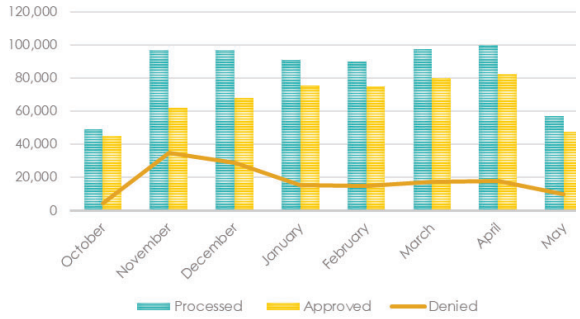



*Figure 1 - Pre-screening of online requests*

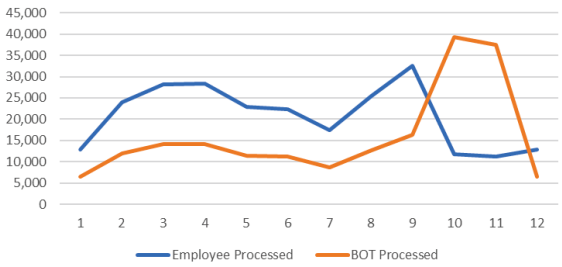



*Figure 2 - Human vs Bot workloads over months*

These automations result in over 12K hours saved annually for the DMV staff. This is an overall improvement in customer experience and backoffice staff experience for this product.

As for improving the AI output, our use of AI as augmentation gurantees a safe and non-biased use of the models and we continue to improve on the output based on human feedback and human review as demonstrated below.

| | | KPI | | |
|---|---|---|---|---|
| 1 | Overall Review | • Total Orders Reviewed by DMV Technician | **212,873** | |
| 2 | | • Total Orders Approved | **198,754** | **93.4%** |
| 3 | | • Total Orders Denied | **14,119** | **6.6%** |
| 4 | | | | |
| 5 | ML vs. Human Review | • **Approved Orders**: ML Approved / Technician Approved | **188,753** | **88.7%** |
| 6 | | • **Approved Orders**: ML Approved / Technician Denied | **13,164** | **6.2%** |
| 7 | | • **Denied Orders**: ML Denied / Technician Denied | **955** | **0.4%** |
| 8 | | • **Denied Orders**: ML Denied / Technician Approved | **10,001** | **4.7%** |

There are many innovations and optimizations in this solution that are generic to public sector (AI augmented business process implementing human centered AI, robotics for legacy integrations and process leaning to reduce waste) that may be used as a reference architecture in omni channel back-office processing scenarios. California is happy to share this with interested parties anywhere.