REPORT

TO: House Committee on Energy and Technology

Senate Committee on Finance

FROM: Shawn Nailor, Interim State CIO & Secretary

DATE: December 1, 2022

SUBJECT: Report regarding Inventory of Artificial Intelligence Usage, pursuant to 3 V.S.A. § 3305

I. Background

In May of 2022 the Legislature passed H410/Act 132, an Act relating to the use and oversight of Artificial Intelligence in State Government. Section 3 created an inventory of "automated decision systems being developed, employed, or procured by State Government." Section 4 describes a report including "recommendations for any changes to the inventory, including how it should be maintained, the frequency of updates, and remediation measures needed to address systems deemed problematic." While the inventory itself will be maintained on an ongoing basis, this report documents initial findings and makes recommendations for the questions described above.

Artificial Intelligence systems (AI) in use by the State of Vermont are considered as a component of the human system and processes they enable. Artificial Intelligences must be designed, developed, implemented, and used as a part of human processes. They must be monitored to ensure the process as a whole is meeting standards and expectations.

The goal of this inventory as it is being collected by the Agency of Digital Services Division of Artificial Intelligence is to identify the systems and processes that use artificial intelligence, especially where such usage could have impacts on Vermonters.

II. Recommendations

A. Inventory Maintenance

The Inventory of Artificial Intelligence Usage should be maintained by the Division of Artificial Intelligence within the Agency of Digital Services.

The Agency of Digital Services (ADS) recommends that this inventory be updated as new systems and capabilities are implemented and reviewed for completeness and accuracy annually.

B. Remediation Measures

Act 132 requires the identification of problematic systems based on 3rd party bias testing. As documented by the National Institute of Standards and Technologies (NIST) and other policy-making bodies, AI systems can behave problematically in ways other than biased outputs, and those issues can stem not only from the AI itself but also from its implementation and usage. ADS recommends a suite of possible remediation measures depending on the nature and impact of the issue identified. The most appropriate type of remediation will vary depending on the complexity of the process the AI supports, the impact of the issue, and the frequency with which the issue occurs. In some cases, multiple remediation measures may be required for a single issue.

1. Process changes upstream of the AI System

Some issues can be remediated by injecting controls into the process the AI system supports before the steps performed by the AI system. These could include adjustments to data input into the system or diversion of cases with certain characteristics to a different system.

Example: If an AI is showing unexpected behavior based on counties with small populations, set the county to "Rest of Vermont" for cases where the county is not Chittenden.

Example: If an AI is showing unexpected behavior on cases for families with more than 4 children, divert those cases to a manual review system.

2. Process changes downstream of the AI System

Some issues can be remediated by adding controls downstream of the AI system. Generally, issues that appear sporadically are better suited to downstream process changes. Depending on the nature of the impact, automated review to detect known problematic patterns could be sufficient. In other cases, selecting cases known to be at higher risk of issues for additional employee review could be a good option. Other times creating an easy appeal process might be the most appropriate solution.

Example: If an AI is showing infrequent unexpected behavior on cases for families with more than 4 children, have an employee review those determinations before providing the information to the case worker.

Example: If an AI is showing infrequent unexpected behavior on cases for families with more than 4 children, have a low-friction appeal process for the caseworker to flag cases where the reason for the determination does not align with the case history.

3. Changes to the AI System

In some cases, the AI may need to be retrained. This is especially likely if the input or process has evolved from the original design. In some cases, adding some training examples may be sufficient, in other cases the model may need more extensive redesign.

In cases where continued use of the AI system would have significant adverse effects or erode trust in government institutions, the most appropriate course may be to decommission all or part of the AI system.

C. Inventory Changes

1. Scope

The definition of Artificial Intelligence System in 3 V.S.A. § 3305 is narrower than that of "Automated Decision System" in this report. We recommend using the narrower Artificial Intelligence System definition in this inventory as Automated Decision Systems, as defined, include numerous apps, algorithms, spreadsheets, and personal productivity tools that present minimal risk to the state.

Some AI tools are essentially "commodity" products that pose little or no risk to the state. Examples are smart assistants on smart phones, text predictions that have become ubiquitous, and spam filters. ADS recommends scoping this inventory to products the state procures, develops, maintains, influences, or oversees, as well as any systems that are deemed to pose a potential risk to the state or Vermonters.

2. Elements collected

Bias Testing: 3 V.S.A. § 3305 b 4 "whether the automated decision system has been tested for bias by an independent third party, has a known bias, or is untested for bias." Bias testing is one component of ensuring AI systems behave as expected, but it is not relevant in all cases. Instead of focusing solely on 3rd party Bias Testing, NIST recommends continuous monitoring of system outcomes, as an AI which passes bias testing may behave in biased was depending on implementation details. ADS recommends adding elements on outcome monitoring, specifically:
Monitoring In Place: Yes/No
Monitoring Results: No Issues Detected/Issues Detected/Issues Remediated
Remediation Applied: Narrative summary of remediation approach.

Independent Decision Making: 3 V.S.A. § 3305 b 2B "whether the automated decision system is used or may be used for independent decision-making powers." In general, the goal of AI systems is to make some level of decision, so this answer is always "yes." ADS recommends changing this element to focus on the autonomy of the system:
Capable of taking independent action: Yes/No
Independent Decisions: Description

Note that the inventory already has a Supported Decisions elements to describe situations where an AI functions as a support for a human to decide.

Agencies using the system: ADS recommends identifying the agencies directly using the system.

III. Inventory

This inventory does not include commodity systems like intelligent assistants that come standard on mobile devices, spell checkers, spam filters, etc.

Name	Vendor	State Entity	Purpose, Proposed Use	Intended Benefits	Capabilities in use	Capabilities not in use	Makes independent decisions	Decision impact type	Decision impact description	Supported Decisions	Decision Type	Types of data inputs	Data source process	Types of data generated	3rd party bias test result	Data storage	Data sharing	Lifecycle cost	Cost savings	Funding sources
Automotive Repository of Traffic Signs (ARTS)	UVM	AOT	Identify traffic signs and geolocate them for an inventory	Providing an up-to-date inventory of VTrans' roadside assets	Classify signs, track objects across monocular low frame rate imagery, estimate object distance and bearing from camera	Could be trained for other roadside assets, like guardrail or pavement markings.	Yes	Direct	None	Project sign replacement, inventory management	Support	Forward facing road imagery	Images captured during annual surveys	Geolocated sign data	Not tested	Secure state database	Yes, UVM to continue development			
Pavement Condition Classification	Fugro	AOT	Classify pavement quality	Providing up-to-date detailed pavement condition	Detect pavement quality from downward facing imagery		Yes	Direct	None	Project prioritization and selection, funding requests	Support	Downward facing road imagery	Images captured during annual surveys	Pavement segment condition rating	Not tested	Secure state database	Yes, in aggregates, with partners and the public.			
Crowdstrike Falcon	Crowdstrike	ADS	Identify security compromise on State computers	Improve the security posture of the state's IT infrastructure.	Detect indicators of compromise on workstations		Yes	Indirect	Can disable impacted workstations, quarantine files	Information Security activities	Final	Computer usage data	Monitored in real time on machines	Anomalous event reports	Not tested	Secure state database		$780K		ADS Allocation
vRealize Operations	VMWare	ADS	Optimize performance and cost of State network and infrastructure	improve efficiency and lower cost	Monitor network health, recommend improvements in configuration	Automatically make improvements in configuration	Yes	Indirect	Can adjust specs on servers and network components	Incident response, device configuration	Support	Computer usage data	Monitored in real time on machines	Recommendations for better configurations	Not tested	Vendor stored				
CloudHealth	VMWare	ADS	Optimize performance and cost of State network and infrastructure	improve efficiency and lower cost	Monitor network health, recommend improvements in configuration	Automatically make improvements in configuration	Yes	Indirect	Can adjust specs on servers and network components	Incident response, device configuration	Support	Computer usage data	Monitored in real time on machines	Recommendations for better configurations	Not tested	Vendor stored				
Cloudability	Apptio	ADS	Optimize performance and cost of State network and infrastructure	improve efficiency and lower cost (will replace CloudHealth this year)	Monitor network health, recommend improvements in configuration	Automatically make improvements in configuration	Yes	Indirect	Can adjust specs on servers and network components	Incident response, device configuration	Support	Computer usage data	Monitored in real time on machines	Recommendations for better configurations	Not tested	Vendor stored				
SecureState	VMWare	ADS	Identify misconfigurations of cloud components	Improve the security posture of the state's IT infrastructure.	Monitor cloud service configurations		Yes	None	None	Cloud resource configuration	Support	Configuration files	Extracted from connected resources	Recommendations for better configurations	Not tested	Vendor stored				

Brainware	Hyland	ADS	Detect document types and extract data from them	Improve efficiency of document management	Not yet in use		Yes	Indirect	Can classify and route documents	Document classification	Final	Documents routed to Brainware queues	Scanned or digital documents are routed to Brainware based on expected type	Structured document content	Not tested	Secure state database	None	$250K Annually		Agency License SLA consumption
OnBase OCR	Hyland	ADS, AOT, AHS	Digitize scanned documents	Improve efficiency of document management	Optical Character Recognition		Yes	Indirect	Converts images of documents into searchable, indexable documents	Document classification	Support	Scanned documents queued for OCR	Documents like project design "magic boxes" are scanned and routed for OCR	Searchable document content	Not tested	Secure state database	None	included in Tier 2 licensing per user.		Agency License SLA consumption
Okta Adaptive Authentication / Multifactor Authentication	Okta	ADS	Provide secure identity and access management	Make robust authentication mechanisms less cumbersome for users	Adaptive Security, Bot detection		Yes	Direct	Prompts for MFA less frequently if the user is following known patterns.	MFA prompt	Final	User interactions	Authentication workflows	None	Not tested	Vendor stored				
Land Cover Change Detection	UVM	VCGI	Identifies locations where land usage changes between surveys	Track changes in impervious surface and land use	Image processing, feature detection		Yes	Direct	None	Production of maps and land use statistics, policy making	Final	Aerial Imagery	Images are collected through annual surveys and processed	Spatial data representing land areas	Not tested	Secure state database				