

# IRCC'S USE OF ADVANCED ANALYTICS

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## Overview

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What is Advanced Analytics (AA)?

How AA Is Used at IRCC

How AA is Implemented at IRCC

Monitoring AA Tools

What We Don't Do

Robust Governance

# What Is Advanced Analytics?

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**Advanced analytics** (AA) refers to the use of computing to extract **data driven insights** to inform decision-making and other tasks.

- The computer **learns** based on examples.
- You tell the computer **what** to do (e.g. triage applications) and it figures out **how** to do it most optimally (e.g. it creates the triage criteria by itself).

With **traditional automation**:

- You must tell the computer **what** to do and **how** to do it (e.g. a human provides the triage criteria in the form of business rules). It **doesn't learn**.
- This is still useful for **simple tasks**, that are easy to describe and program.
- It cannot be used for complex tasks (e.g. interpreting the meaning of an email).

OPPB builds AA-based tools **and** traditional automation systems.

## How AA Is Used at IRCC

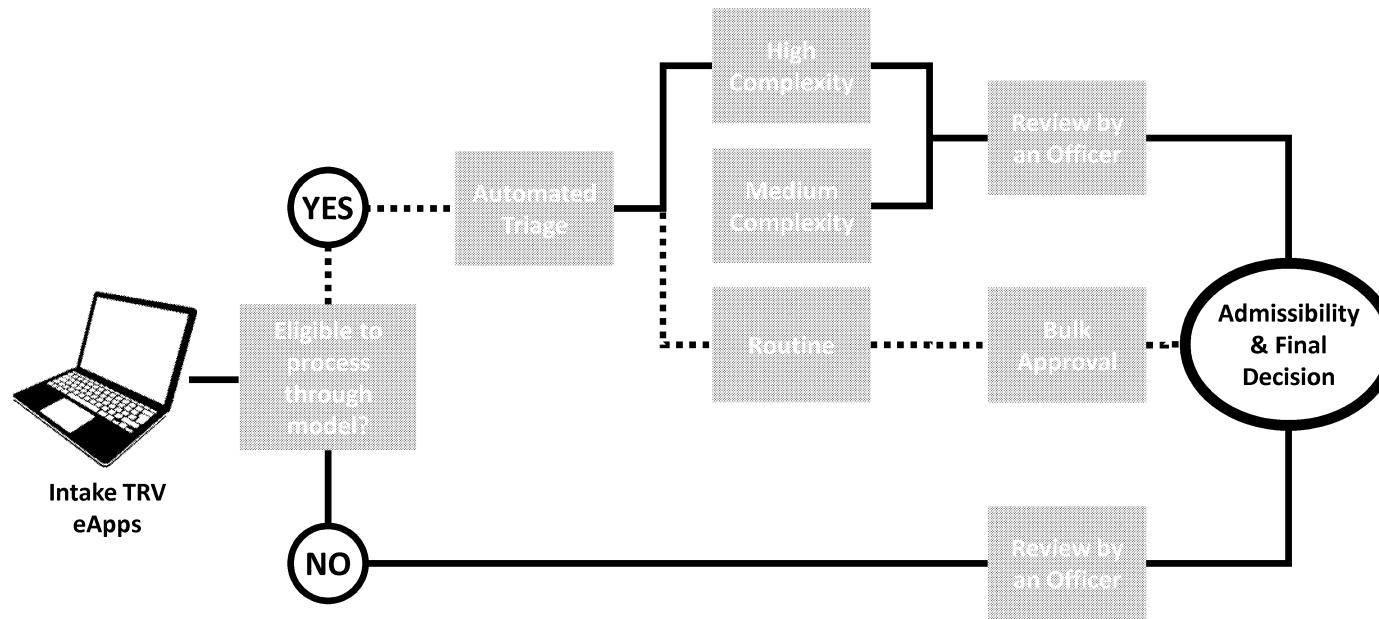
- AA is very useful for grouping similar things, which can help with many tasks:
  - Which applications are very likely to be approved.  
→ *Candidates for automated approvals*
  - Which applications are most complex  
→ Assign to officers with greater expertise
  - Which applications may contain fraudulent supporting documents. → *Verifications*
  - What topic a client is inquiring about.  
→ *Triaging client emails*

### Benefits:

- **Generate processing efficiencies**
- **Support program integrity**
- **Improve workload distribution**
- **Accelerate email responses**



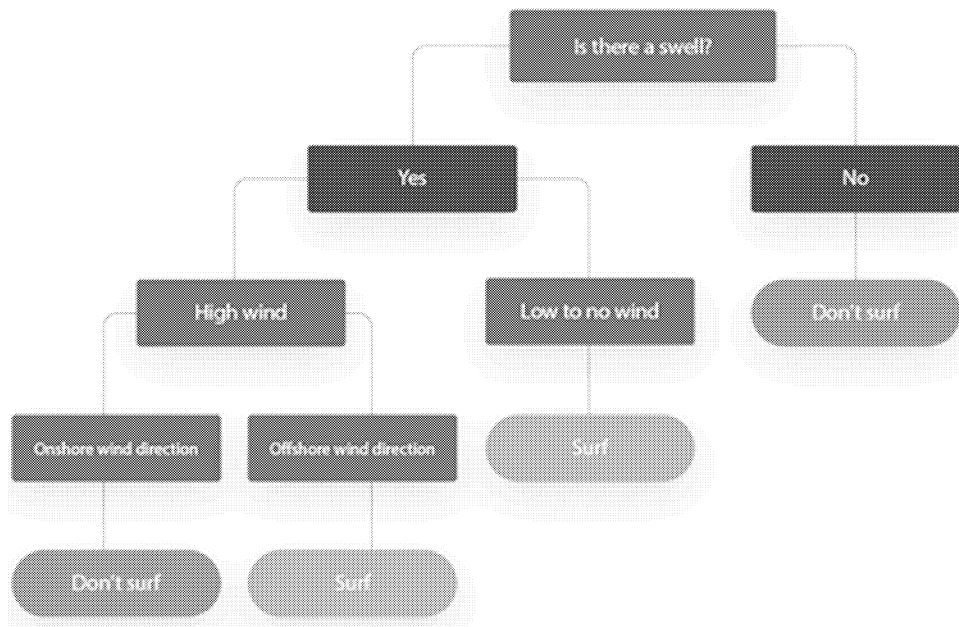
# How AA Is Used at IRCC



*Based on key indicators, complex cases are triaged to officers for manual processing.*

# Generating Insights and Rules from Data

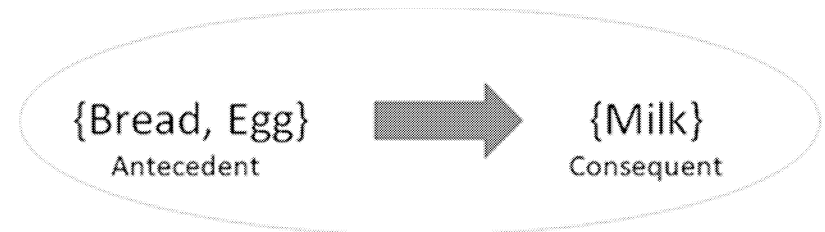
## Decision Trees



<https://www.ibm.com/topics/decision-trees>

## Association Rules

*“ex: 91% of the 4352 clients who purchased bread and egg also purchased milk”*



<https://towardsdatascience.com/association-rules-2-aa9a77241654>

## How AA Is Implemented at IRCC

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- We use machine learning techniques called “decision trees” and “association rules” that **generate rules to group/triage similar applications.**
- Thus far, IRCC only uses models that consist of IF → THEN decision rules because they are easier to understand and scrutinize for **reasonableness and discrimination.**
- Very often, the models also include **rules created by officers (“business rules”)** based on their experience, local intelligence or program criteria.
- **Many models are composed exclusively of business rules.**
  - These models are not AA, but still very useful for generating efficiencies.

IF the client meets all of these criteria:

- ✓ Condition 1
- ✓ Condition 2
- ✓ Condition 3

THEN: automatically approve eligibility

## Vetting Decision Rules to Prevent Discrimination

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In models that support processing, decision rules in each model undergo careful scrutiny by a diverse group of stakeholders to prevent discrimination.

- **Immigration officers** review them for reasonableness: do they make sense in light of the program requirements?
- **Legal Services** highlights those that make reference to Charter-protected characteristics (e.g. age, gender, citizenship, etc.). In response, the project team produces a rationale and analysis to demonstrate that such rules are grounded in program criteria and are not the result of discrimination.
- **Strategic Policy and Planning** verifies that the rules comply with IRCC's Policy Playbook on Automated Decision Support and the TBS Directive on Automated Decision Systems.
- **Data scientists** verify that the rules represent statistically relevant trends and are not biased by outliers.
- **A Director General** formally approves the rules to ensure that accountability always rests with a human.

Upon review, if a rule raises any concerns, it gets discarded from the model.

**This scrutiny is in addition to Gender-Based Analysis Plus assessments**



## Monitoring that We Approve the Right Applications

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Quality assurance monitoring ensures that tools granting automated positive approvals are targeting appropriate cases.

- On an ongoing basis, officers review a random sample of applications chosen for automated eligibility approval, to determine if they agree that it should be approved.
- We have achieved **agreement of 98%-100%**.
- This confirms that **integrity has been preserved** and that **no bias has been introduced by the analytics**.

The team also monitors outcomes such as removal orders, asylum claims, etc. The incidence among automated approvals is much lower than the average for the TRV program. This difference illustrates how the model identifies and deals with the routine cases, leaving the more complex cases for officers.



## What We Don't Do

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### WE ARE NOT:

- × Automating refusals – all refusals are made by officers
- × Recommending refusals
- × Using AA to scrape online information about clients, such as social media
- × Using “black box” technology (systems that use unknowable or unexplainable internal logic) to make or recommend decisions on client applications

# Robust Governance

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Since the beginning, IRCC has been very diligent about using AA and Automation **responsibly**.

## Advanced Analytics Governance Framework

Given efforts expand the use technology in decision making, IRCC developed a framework to formalize approval procedures and ensure rigorous oversight of all projects.

1. Checkpoints at key project phases.
2. Comprehensive assessment of risks, possible bias, and mitigations.
3. Documentation of decisions (e.g. DG and ADM approval memos).

## Director General Steering Committee (DGSC)

The DGSC is the decision-making body for AA and automation governance, including bulk processing. It consists of 30 DGs to ensure that all **policy, operational, data and corporate enablers** are considered when implementing a new solution.

Aligned to the governance framework, DGSC approval is required to:

1. Begin work on a new initiative, after demonstrating that the work plan includes all due diligence steps.
2. Implement a new solution, once all major risks have been identified and mitigated.

## Robust Governance

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**There are many angles for us to consider when developing and operationalizing decision support tools.**

- Administrative law
- Charter rights
- Bias and racism prevention
- GBA Plus
- Privacy
- Information management
- Litigation Risks
- Electronic evidence
- TBS policies and directives
- IT security
- Data quality
- Officer training
- User manuals
- Human resources impacts, if any
- Union briefings
- Communications strategy
- Program integrity risks
- Quality assurance and monitoring
- Change management
- Technical documentation about the tool
- Peer review

**All of these considerations are addressed by the governance framework**



# Questions



# Annex

## Why AA and automation

AA and automation initiatives have shown concrete benefits, including:



### Increased Productivity

- Client inquiries automatically triaged for faster response (e.g. triage of email)
- Help decision-makers review key information more easily (e.g. annotations)
- Resources shifted to higher value-added activities, such as program integrity exercises and decisions on more complex files
- Distribute files according to processing capacity



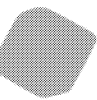
### Reduced time spent on certain steps

- Reduction of 'active processing time' on certain decision steps for a range of client applications (e.g. post-graduation work permits, spousal sponsorship applications)



### Enhanced Risk Detection

- Detection of fraudulent documents significantly increased with the introduction of an integrity trends analysis tool



## Selecting use cases

In considering whether to develop an automated decision support tool for a line of business, the Department looks at several factors.

- **Need** (application volumes, inventories)
- **Stakes** (benefits and impacts on clients, program integrity, safety & security)
- **Public perception** (what clients and stakeholders are saying)
- **Complexity of processing** (are decisions largely routine or highly discretionary?)
- **Quality of the data available**



## Responsible use

Ensuring the responsible use of AA and automation requires asking the right questions, connecting the right people, and taking the right steps.

### Policy guidance tailored to IRCC's operating context

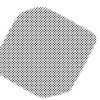
- Comprehensive advice and recommendations to developers and users of automated decision support tools on responsible development and deployment. In many cases, going beyond what is required under the *TBS Directive on Automated Decision-making*.

### Multidisciplinary teams that bring together diverse skills and considerations

- Cross-functional groups (e.g. data science, privacy, legal, policy) and people from diverse backgrounds all working together from the outset.

### Governance framework that drives innovation while still exercising caution

- Ensuring thorough and proportionate oversight from project to project.



## Addressing Bias

IRCC has several mechanisms in place to help identify and mitigate bias, and help ensure automation and AA models are used responsibly.

- Detailed Policy Playbook and governance framework
- Peer reviews as required by the *TBS Directive on Automated Decision-Making*
- Following data science best practices to detect and mitigate bias
- Gender-based Analysis Plus assessments of models that support decision-making
- Several layers of human review of model rules
- Model data and rules are closely linked to established legislative and regulatory criteria
- Robust ongoing quality assurance practices
- Benefits and impacts for clients are a primary consideration in the overall design

# Policy requirements and guidance

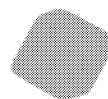
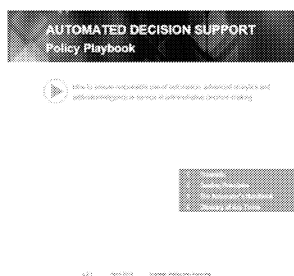
## TBS Directive on Automated Decision-Making

- A GoC-wide policy instrument, the Directive enumerates several requirements for tools within its scope, most notably the publishing of an Algorithmic Impact Assessment
- Aims to ensure that automated decision-making tools are developed and deployed in a manner that is compatible with core administrative law principles such as transparency, accountability, legality, and procedural fairness.



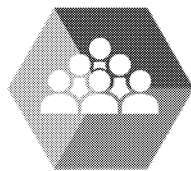
## IRCC Policy Playbook on Automated Support for Decision-making

- Complementing the TBS policy, a piece of internal policy guidance tailored to our unique operating context
- Contains comprehensive advice and recommendations to developers and users of automated decision (support) tools to ensure responsible development and deployment
- Much of the content is geared toward building and maintaining public trust in IRCC's use of technology

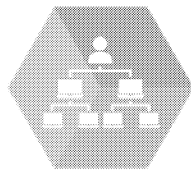


# Guiding Principles

Guiding principles give IRCC a coherent basis for strategic choices about whether and how to make use of new tools and technologies.



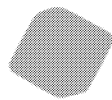
1. The use of new tools should deliver a clear public benefit. IRCC should use automated decision support wherever it can do so responsibly, effectively and efficiently – in that order.



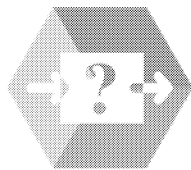
2. Administrative decisions are about people, and they are made by people, even when we use AI. Humans, not computer systems, are accountable for decisions.



3. Because IRCC's decisions have significant impacts on the lives of clients and Canadians, the Department should prioritize approaches that carry the least risk.



## Guiding Principles



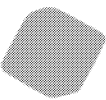
**4. “Black box” algorithms can be useful, but cannot be the sole determinant of final decisions on client applications.**



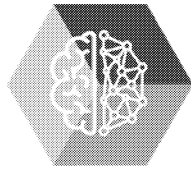
**5. IRCC must recognize the limitations of data-driven technologies and take all reasonable steps to minimize unintended bias.**



**6. Officers should be informed, not led to conclusions.**



## Guiding Principles



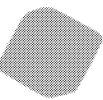
- 7. Humans and algorithmic systems play complementary roles. IRCC should continually strive to optimize these roles and find the right balance, in order to get the best out of each.**



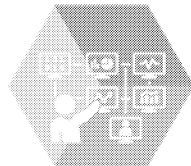
- 8. On top of respecting Canada's current privacy protection framework, IRCC should continually adopt emerging privacy-related best practices in a rapidly evolving field.**



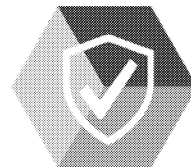
- 9. IRCC should subject all systems to ongoing oversight, to ensure they are technically sound, consistent with legal and policy authorities, fair and functioning as intended.**



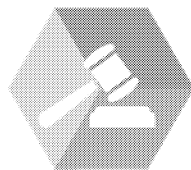
## Guiding Principles



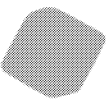
**10. IRCC must always be able to provide a meaningful explanation of decisions made on client applications.**



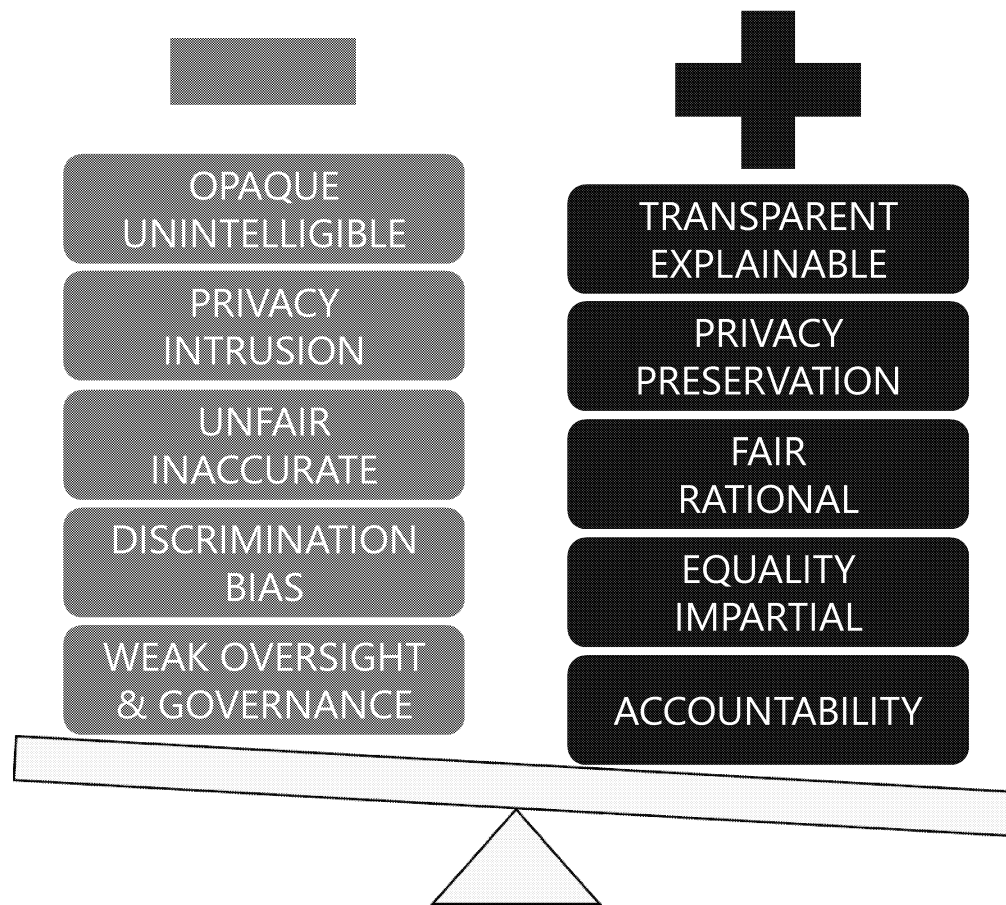
**11. IRCC must balance transparency with the need to protect the safety and security of Canadians.**



**12. Clients will continue to have access to the same recourse mechanisms, and IRCC's use of automated systems should not diminish a person's ability to pursue these avenues.**

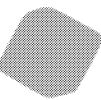


# Key Considerations



## ***Some Key Drivers:***

- » Trust is key
- » Lack of transparency fuelling misperception of legal and ethical issues
- » Choice of technology
- » Implementation choices





## Considerations underpinning legal frameworks

### **ADMINISTRATIVE LAW**

- » procedural fairness (knowing the case to be met, opportunity to respond)
- » unbiased decision-maker
- » intelligible, justified decisions

### **PRIVACY LAW**

- » minimal collection, use and disclosure
- » notice to the individual

### **HUMAN RIGHTS LAW**

- » equality and protection against discrimination