



Global Affairs  
Canada

Affaires mondiales  
Canada

Canada



# ENABLING DATA-DRIVEN DIPLOMACY

Data Science at Global Affairs Canada

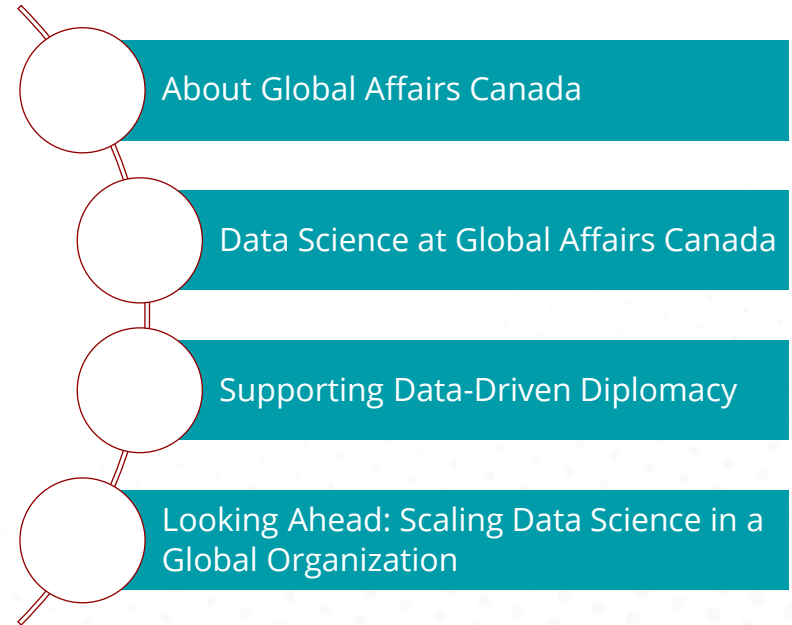
Jordan Hovdebo, Deputy Director – Data Science

# ENABLING DATA-DRIVEN DIPLOMACY

## Data Science at Global Affairs Canada

Global Affairs Canada defines, shapes and advances Canada's interests and values in a complex global environment. The increasing fluidity with which we can access data presents a significant opportunity to improve the way we do so. However, the sheer volume of information available can be overwhelming, making it difficult to extract and structure the relevant information to make it actionable. In this presentation we will discuss the evolution of data science at Global Affairs Canada. In particular, through concrete examples we will demonstrate how data science, and especially generative artificial intelligence, is being used to help the department more efficiently derive insights from its data and how we will scale these technologies for a global organization.

## Outline





# GLOBAL AFFAIRS CANADA

**Global Affairs Canada, under the leadership of the Minister of Foreign Affairs; the Minister of Export Promotion, International Trade and Economic Development; and the Minister of International Development, is responsible for advancing Canada's international relations**

**13,500 employees\***

- **7,500 Canada-based**
- **6,000 Locally-engaged**

**182 Missions: 112 Countries, 21 Government Departments, 3 Crown corporations, 6 Provincial Governments**



# SUPPORTING DATA-DRIVEN DIPLOMACY



## International Advocacy and Diplomacy

Promote our interests and values through policy development, diplomacy, advocacy, and effective engagement.



## Help for Canadians Abroad

Provide timely and appropriate consular services, contributing to safety and security.



## Trade and Investment

Support trade and investment to raise the standard of living for all Canadians and to enable Canadian businesses to grow and to create opportunities.



## Development, Peace and Security Programming

Contribute to reducing poverty, increasing opportunity for people around the world, alleviating suffering in humanitarian crises, and fostering peace and security.

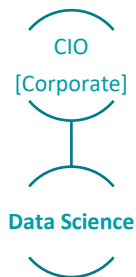
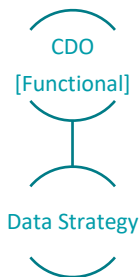


## Supporting Canada's Presence Abroad

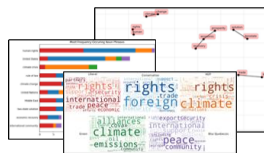
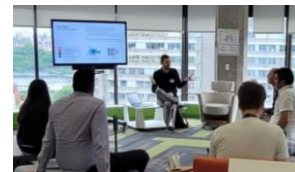
Manage and deliver resources, infrastructure and services enabling Canada's presence abroad.



# HOW WE WORK



**Guiding and Consulting:** Support programs and the data analysis community to maximize the value of data and data-driven technologies.



**Deriving Insights from Data:** Answer complex real-world questions with data-driven insights that enable evidence-based decision-making.

**Developing data-driven solutions:** Solve complex business problems by operationalizing data-driven approaches.



**AI Policy development:** Support setting policy for responsible use of AI and data science at GAC

# TEXT ANALYTICS, TEXT MINING, NATURAL LANGUAGE PROCESSING, ...



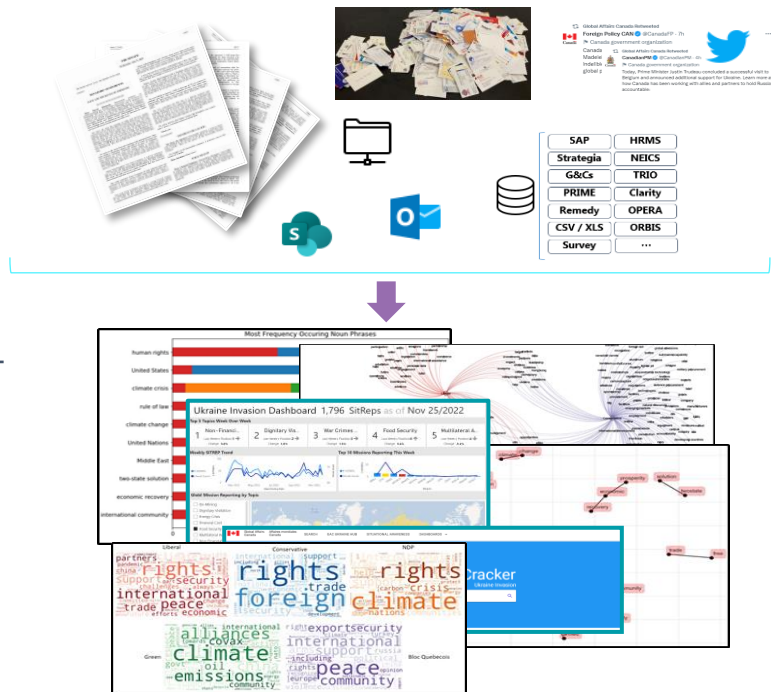
Global Affairs produces, and consumes, volumes of unstructured and semi-structured text in its daily operations.

This is one of the largest opportunities to use data science to:

- Reduce labor spent on low-level tasks
- Accelerate analysis
- Generate new insights

The Data Science team use traditional and modern (*e.g.*, generative AI) techniques for text analysis in areas such as:

- Summarization
- Topic extraction
- Entity extraction
- Sentiment analysis
- Classification
- ...





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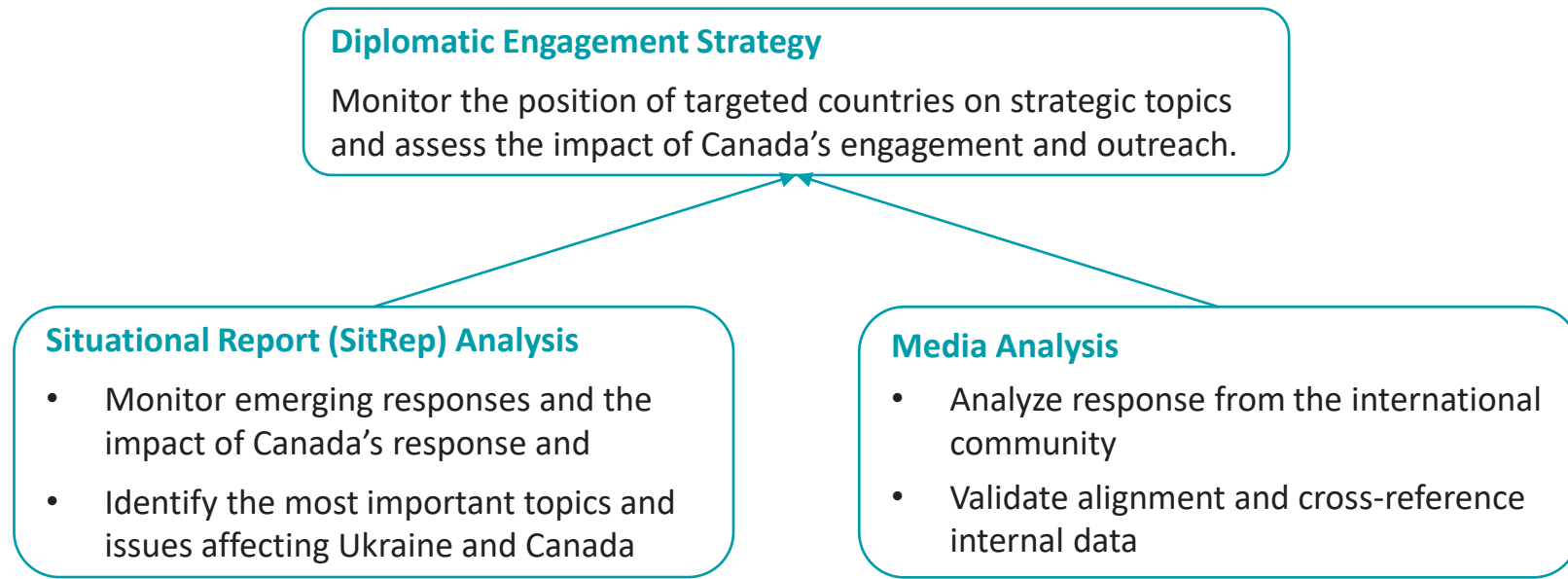
Manage and deliver resources, infrastructure and services enabling Canada's presence abroad.





# HELPING INFORM THE RESPONSE TO THE INVASION OF UKRAINE

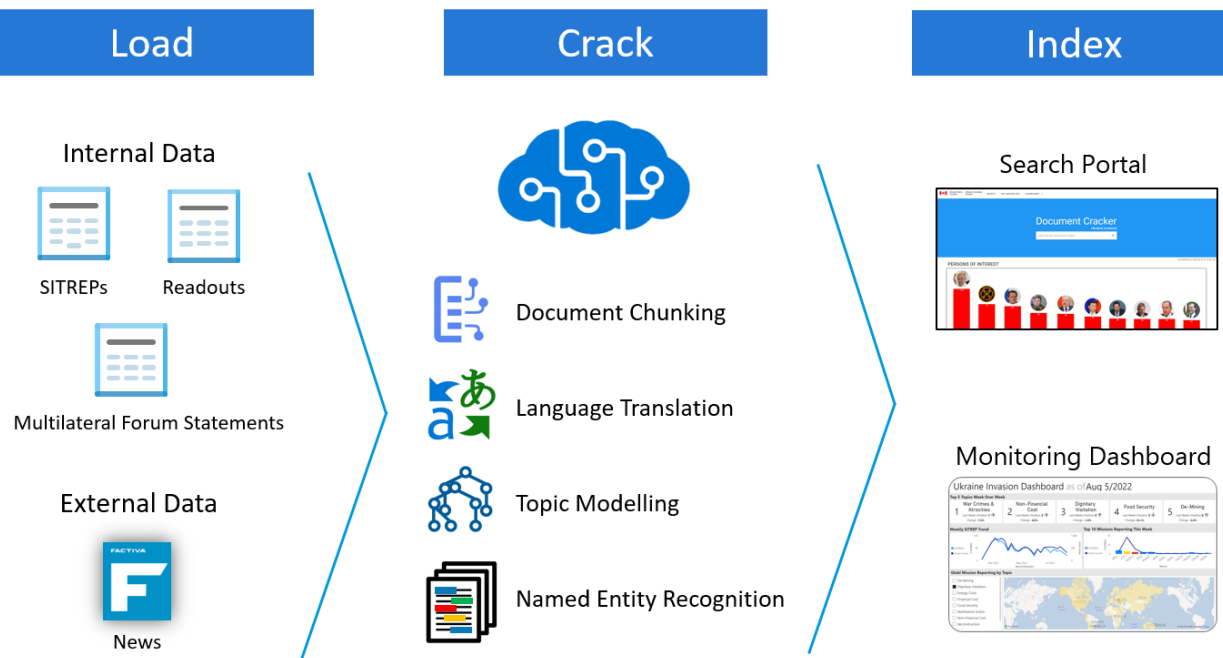
## Document Cracker





# HELPING INFORM THE RESPONSE TO THE INVASION OF UKRAINE

## Document Cracker





# STANCE MODELLING

## Understanding Perceptions of Canada (w/UK FCDO)

Inter-government collaboration: Going beyond summarizing, to deriving insight

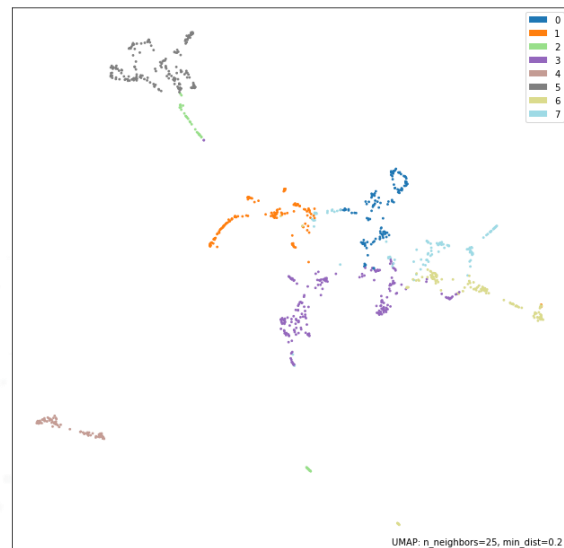
- Identifying common emerging topics among articles
- Identifying the perception of Canada

Example topic: "The South China Sea dispute"

Perception score: 0.68

Explanation (AI-generated):

Canada is being seen as a strong ally of the Philippines in the South China Sea dispute, as they are part of the G7 group of industrialized nations that issued a joint communiqué calling for the implementation of a ruling by a UN-backed arbitral court invalidating China's expansive claims in the South China Sea. (2017)



Clustering of Articles



# TRADE AND INVESTMENT



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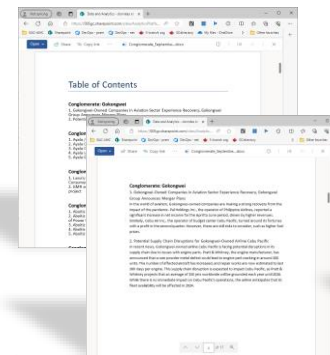
Manage and deliver resources, infrastructure and services enabling Canada's presence abroad.



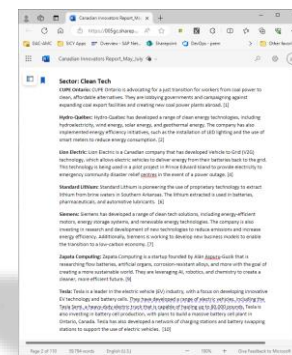
# MEDIA MONITORING FOR THE TRADE COMMISSIONER SERVICE

News-feed relating to industrial sectors and conglomerates to inform trade commissioners, ambassadors and other program managers.

- Too many articles produced daily to be adequately digested by staff



Philippines Conglomerate Report  
(September 11-17)



Canadian Innovators Report  
(September 11-17)



Azure  
Cloud



Azure OpenAI  
Service



Sharepoint



# DEVELOPMENT, PEACE AND SECURITY PROGRAMMING



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# PROGRAMMING ALIGNMENT WITH HIGH-IMPACT INTERVENTIONS

w/ U. Notre Dame

Priority for the department to deliver an effective, evidence-based response to food crises

➤ Goal: Identifying activities that align to Ceres 2030 high-impact interventions

## ON THE FARM

1. R&D with extension services
2. Incentives for ecological practices

...

## FOOD ON THE MOVE

6. Reduce post-harvest losses
7. Infrastructure, regulations and services for SMEs

## EMPOWER THE EXCLUDED

8. Social protection
9. Farmer's organizations
10. Education through vocational training

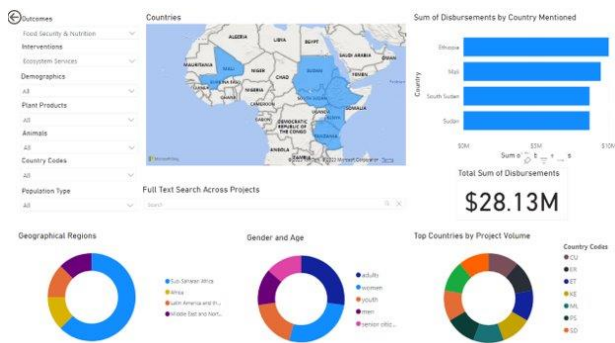
Not feasible to systematically analyze activities in project reports:

- Significant amount of information
- Relies on specialists

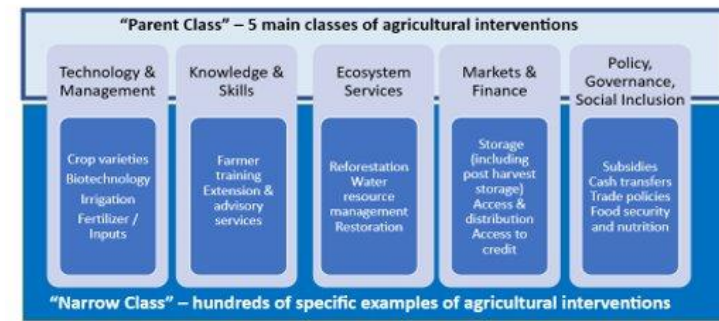
Objective: Use AI to identify outcomes and activities that align to Ceres 2030 high-impact interventions

# PROGRAMMING ALIGNMENT WITH HIGH-IMPACT INTERVENTIONS

1. Create consensus on definitions
2. Label data and train machine learning models
3. Visualize (knowledge generation)



## Agricultural Intervention Typology



This project aims to enhance the resilience and socioeconomic well-being of low-income, underserved and marginalized populations, particularly women and girls, in Official Development Assistance (ODA) eligible countries in the Caribbean, Latin America and Sub-Saharan Africa. The facility adopts a whole of Canada approach to help address COVID-19 economic recovery in ODA-eligible countries. It uses a **regional contribution** **new** to help mobilize additional **public and private** **investment** **new** in support of the facility's expected outcomes. Project activities include: (1) providing **training to financial intermediaries** **new** including banks, financial cooperatives, and private equity funds, that actively direct impact towards women's economic empowerment; (2) providing **comprehensive technical assistance** **new** to improve the financial performance and development impact of investors and ultimate beneficiaries; and (3) **strengthening data and metrics** **new** **assess** **new** to increase the scale of investments made using a gender lens. The facility supports women as entrepreneurs, employees and consumers of essential goods and services in target geographies.

The project supports the 4th Global Symposium on Health Systems Research, hosted by Canada in Vancouver B.C. on November 14-16, 2019. The Symposium aims to build capacity in health in developing countries and the world by bringing together global health experts in **health and practice** **new** and **systems trained** **new** to strengthen health systems. The theme for the 2019 Symposium is "Building Resilient and Responsive Health Systems for a Changing World". The Symposium will consist of primary sessions and seminars that will highlight innovative approaches to strengthening health systems using health systems research to **generate evidence for decision-making** **new**, **and practice** **new** and **capacity building** **new** to inform health policies and programming. Other key issues of focus will include reproductive, maternal, newborn, child and adolescent health, infectious diseases including Ebola and HIV/AIDS, determinants of health, health information systems, and **essential health** **new**.

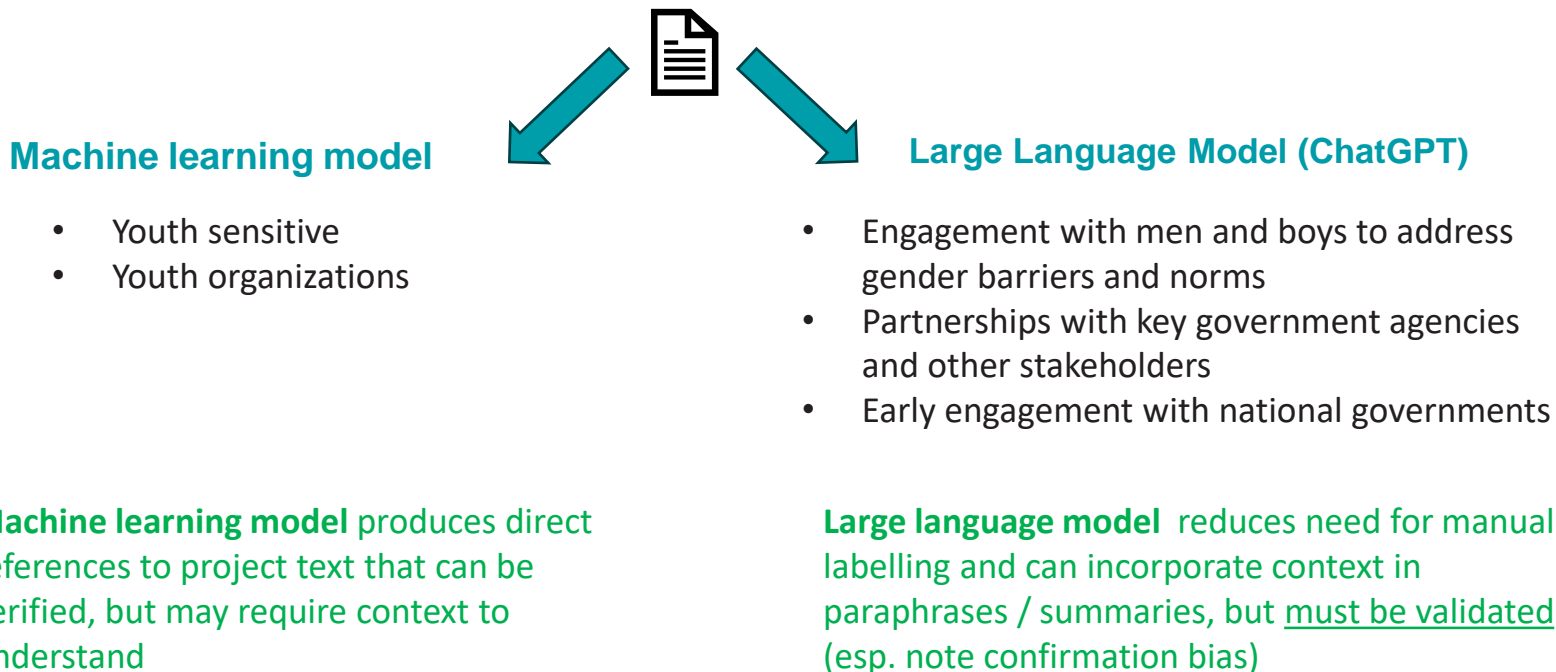
The project aims to empower conflict-affected youth to become more economically productive, and more engaged in their communities. **Map Child Canada** is partnering with the **Upper-Nile Youth Development Agency** to reach youth in the highly vulnerable agro-pastoralist farming and cattle herding. Activities include: (1) **identifying and delivering life skills training** **new** to facilitate greater security and recreational activities (2) **supporting youth groups** **new** to deliver outreach activities on issues central to youth (3) working with local education representatives and teachers to develop and **deliver training** **new** in functional financial literacy and accelerated learning programs (4) **identifying opportunities to promote value chain** **new** for youth, especially girls (5) **forming alliances** **new** to design, adopt and deliver livelihoods and recreational skills training (6) **supporting women to youth** **new** in identifying employment and market opportunities and (7) **establishing and** **training youth confidence groups** **new** in business development and group savings. The project aims to provide over 5,000 youth with **life skills training** **new** over 200 youth and 500 adults with functional literacy/numeracy education or basic primary education, over 450 youth with **livelihoods training** **new** while **training** **new** over 60 youth and adults as teachers and facilitators.





# PROGRAMMING ALIGNMENT WITH HIGH-IMPACT INTERVENTIONS

## Incorporating large language models





# STRUCTURED PROJECT EVALUATION

Projects often must be meticulously evaluated against criteria to determine if they contribute to specific goals (e.g. UN Sustainable development goals)

Challenging on many levels, requires:

- Considerable time
- Subject matter expertise
- Judgement

Goal: Use AI to support the evaluator by predicting the evaluation they may make from the same input data

- Rely on the model when the decision is easy or low-risk
- Preserve evaluator's time for most challenging evaluations

Objective: Evaluate different approaches in the context of applying the SUN methodology for determining nutrition sensitivity.

SWS provided a data set of ~1700 previous evaluations as a reference (project descriptions and evaluations)



<https://scalingupnutrition.org/>



# DETERMINING NUTRITION SENSITIVITY

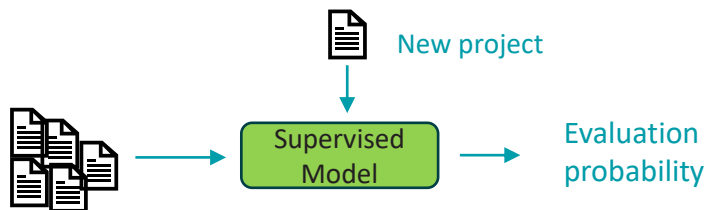
Mimicking the behavior of an evaluator requires incorporating their domain knowledge, we use two models

## Supervised

**Learns from reference data**

“Teach computer how to reproduce previous human outputs”

Typically: more work, more accurate, and can produce a confidence value for when we should trust output



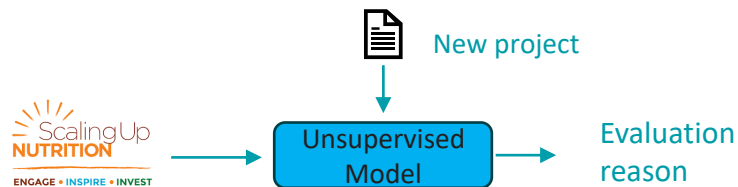
Reference data

## Unsupervised

**Incorporates methodology**

“Teach computer how to act like a human”

Typically: less work, less accurate, and can produce an output to explain why we received output



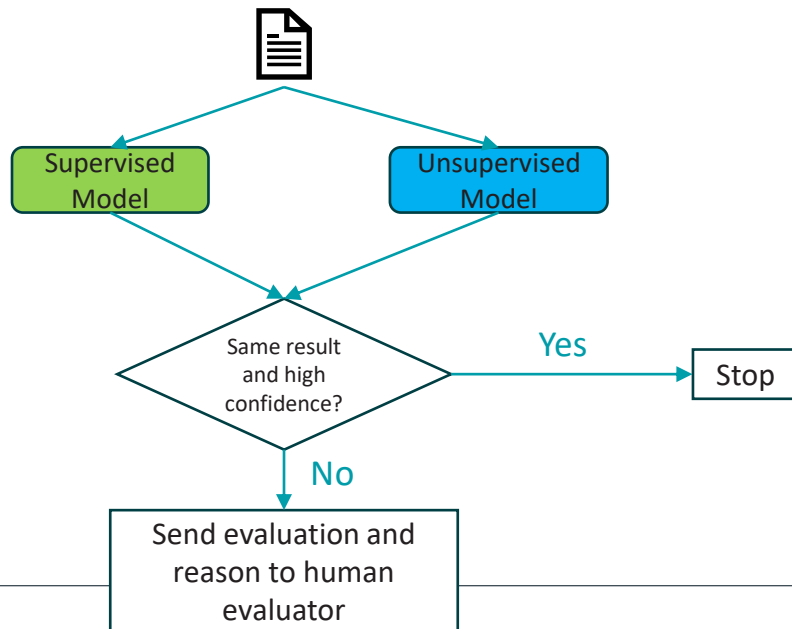
Methodology



# DETERMINING NUTRITION SENSITIVITY

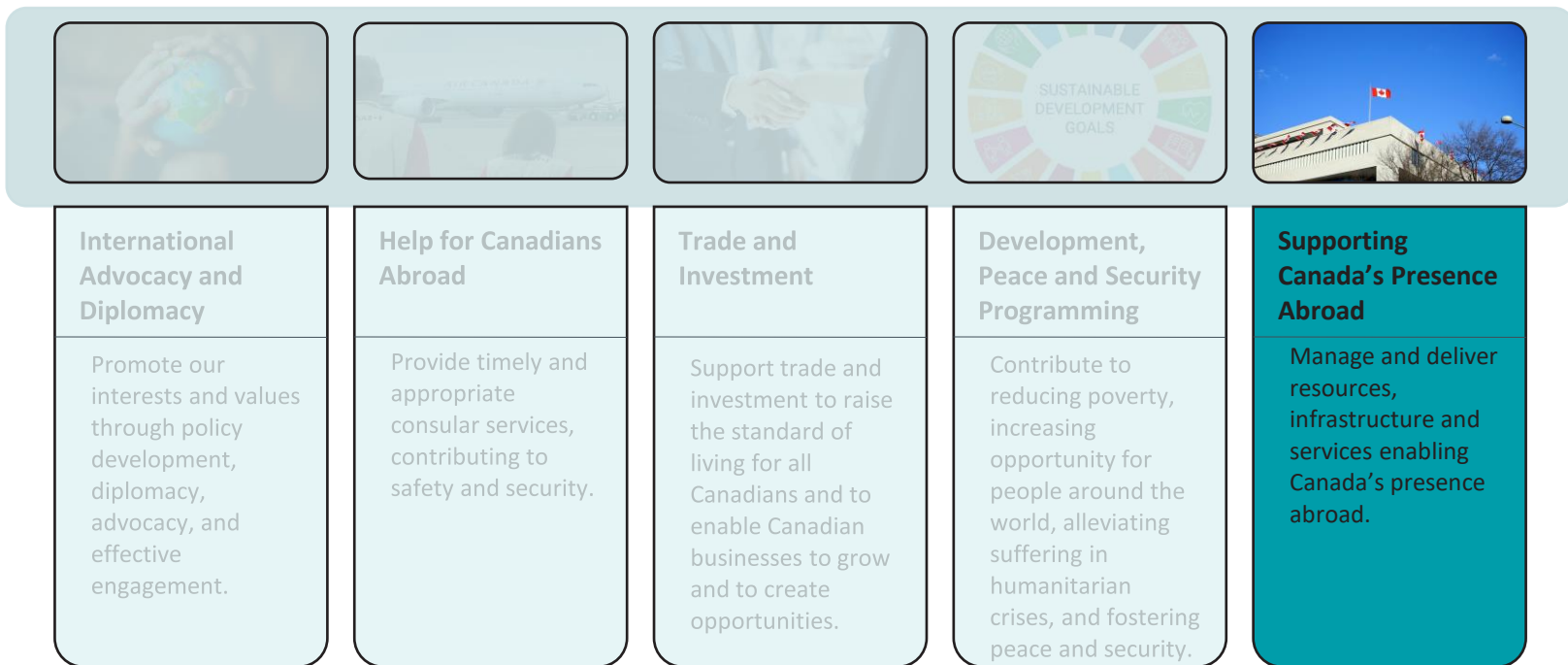
Our results show that we can reproduce the evaluations of a human about 75% of the time with either model

Without perfect accuracy, we can still significantly reduce evaluator workload by leveraging benefits of each model





# LOOKING AHEAD: SCALING DATA SCIENCE IN A GLOBAL ORGANIZATION



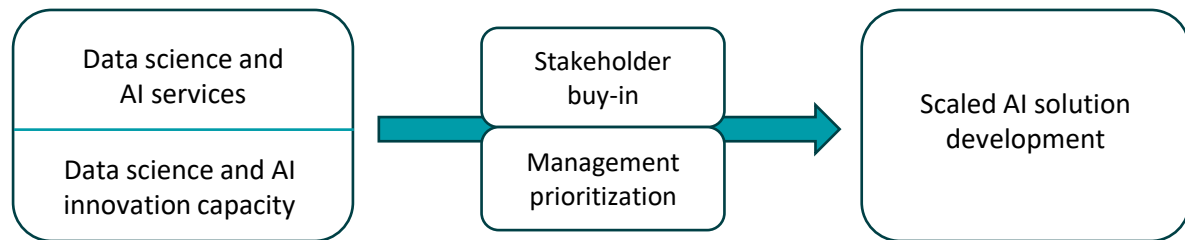


# LOOKING AHEAD: SCALING DATA SCIENCE IN A GLOBAL ORGANIZATION

## Mission Consortium

Scaling solutions requires stakeholder buy-in and management prioritization to identify and enable technologies to transition out of pathfinding activities

To address the challenge of buy-in and prioritization, a consortium of stakeholders is forming to exploring common needs and solutions relevant to mission business challenges.



Media summarization



GAC GPT



Document Cracker



# MISSION CONSORTIUM

## Sub-Goals

### Business Need Exploration

Understand common business needs and potential solutions through agile exploration with stakeholder-members as product owners

### Inter-mission Collaboration

Support a concrete innovation ecosystem among stakeholders by increasing the sharing of information and expertise in the use of tools and techniques

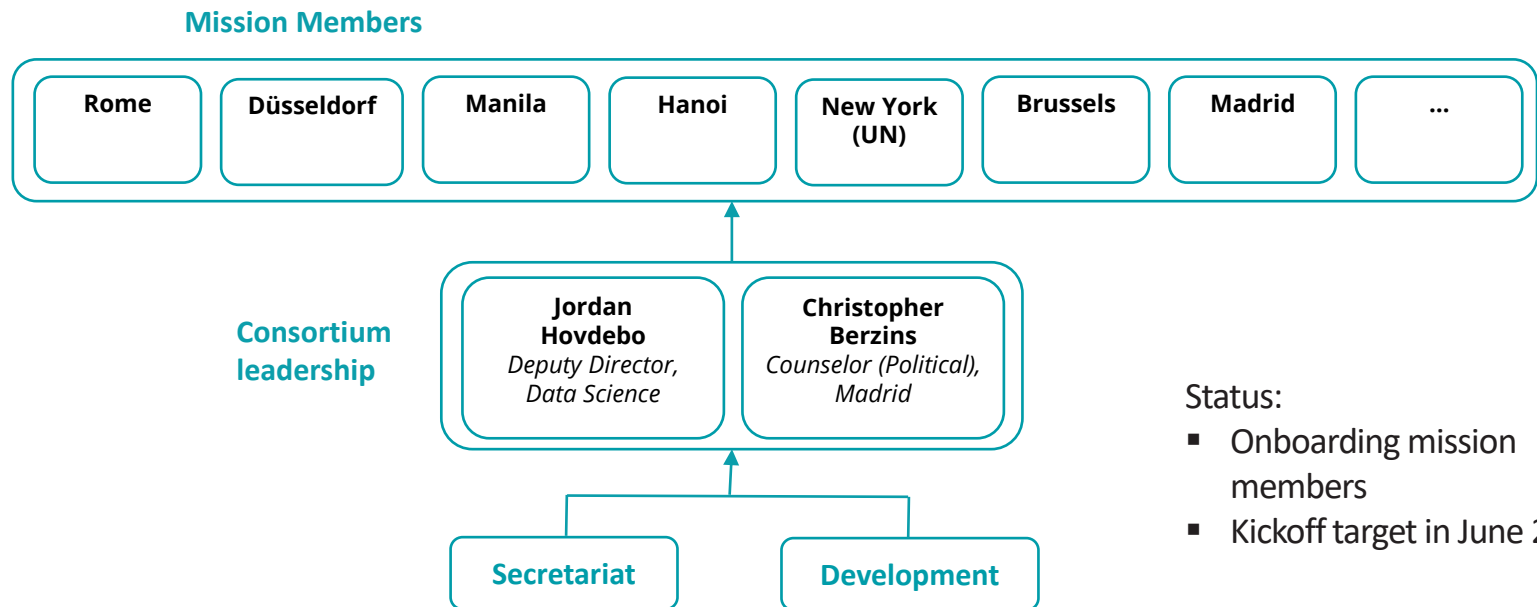
### Expertise Diffusion

Guide the ideation of use cases, while maintaining relevance and awareness, by ensuring ongoing knowledge of the state-of-the-art in data science and the data science team's work



# MISSION CONSORTIUM

## Structure and next steps



### Status:

- Onboarding mission members
- Kickoff target in June 2024





**THANK YOU**