TURNSTILE ANALYTICS

Mr. Athumani Obi
Director, Consular Affairs
Borealian Foreign Office
125 Essex Drive
Bytown, Gishimagi K1A 0G2

October 5, 2021

Re: Assessment and Analysis of BFO Consular Data (Phase 1)

Mr. Obi,

Based on discussions held between you (and your team), as representatives of the Borealian Foreign Office (BFO), and Dr. Martin Kerdaniel (and his team) of Turnstile Analytics Analytics, we are pleased to submit this proposal for the analysis of a subset of BFO consular data. A detailed description of Phase 1 of the project, including a timeline and cost estimate, is provided here, along with a more general description of a suggested Phase 2.

Contents

Background

BFO (Consular Affairs) has a mandate to manage resource allocation within Borealian consulates. In order to do this, BFO needs the tools to justify reallocating resources as the work requires. This involves considering what types of activities are done, how long it takes to complete these activities, and the factors that affect consulates' ability to perform this work.

Relevant to this, BFO has a software application (SPACE, produced by OneEarth) that tracks consular case management statistics and notes and is used to enable consulates to provide assistance to their consular clients while at the same time helping to identify where the workload stresses are and to provide basic statistics for requests from journalists and others.

There is a wealth of information in SPACE databases that may potentially be utilized to the advantage of BFO. More specifically, datasets within SPACE (e.g. PIMENTO, ATROSS) may potentially be used to address questions relating to resource allocation of consulates. Such decisions on where to put resources abroad need to be based on a solid understanding of the workload in each location, and how that is affected by local conditions. This will allow for BFO to maintain effective and efficient consulates.

To this end, BFO wishes to use the available SPACE datasets to identify:

- what the available data can and can't reveal about the current consulate operations program and how to manage it;
- possible gaps in the information that could be addressed through modifications to the software, and
- possible sources of data that could enhance and improve on what is currently available.

Project Purpose, Objectives and Questions to be Answered

Project Purpose

There are a number of questions that BFO would like to answer in relation to the operation and management of their consulates. These include questions about how BFO can provide an appropriate level of required services to Borealians given an available operating budget, which regions are most effective, which consulates should continue to exist, and how many people are required to properly conduct consular activities in each region.

In this context, the overarching goal of this project is to determine how current and potential data can be used to provide support to answer these questions in an evidence-based fashion. Even more generally speaking, the broad purpose of this project is to enable BFO to use appropriate data about previous and current consulate operations to make informed, defensible, effective and evidence-based decisions regarding the future operation of their consulates.

Project Objectives

Phase 1 (Data Assessment and Visualization)

By extracting the information contained within the data that is currently being collected by the PIMENTO database, it is possible to create a preliminary understanding of both the operations of specific consulates and, more broadly the operations of the consulate network as a whole. The first objective of Phase 1 will be to assess the validity of the currently available data on consulate operations and, where possible, clean it to improve its analysis capacity. A basic analysis of the data will then determine uses to which the data as it stands may be put, and what additional work is required to make the data usable for the project purpose. Finally, by providing a visual description and narrative of the existing data on consulates within the consular network, some preliminary evidence for the possible effects of future changes to the network will be provided. Meeting these objectives will allow BFO to increase their understanding of the effect that changing consulate

operations will have on the consular network, as well as their understanding of what data is required for informed, evidence-based decision-making in that context.

Phase 2 (Data Analysis)

A key element in predicting the effects of possible changes to the consular network is the understanding of factors influencing the network's functioning. To that end, the main objective of the second phase of the project will be to use data analysis techniques to increase the understanding of the factors that influence resource use across the consular network. Meeting this objective will allow BFO to increase their understanding of the effect of consulate operations changes on the consular network.

The Questions to Answer

In connection to broader questions BFO itself is asking about its consular network, the specific questions that this project will answer are:

Phase 1

- How reliable is the existing data? To what extent is it possible to verify its accuracy?
- Can the existing data address the broad questions (above) that BFO would like to answer?
- Which of the above questions can the existing data address?
- In the case of the questions that existing data can address, what are the answers to these questions as suggested by the data?
- What additional data would need to be gathered to address, or further address, the questions that the current data cannot address?

Phase 2

- What properties of consulates are connected to other properties (clustering)?
- What are some combined metrics that can be developed to measure consulate properties?
- What factors are correlated with these metrics?

Methodology

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Project Overview

Tasks and Suggested Workplan

The project tasks and suggested timelines for both Phases 1 and 2 can be found in Table 1. These are suggested activities which may be further discussed and re-arranged according to BFO requirements. In particular, BFO could elect to only carry out one of the phases, or portions of either.

Deliverables

The primary deliverables for both Phase 1 and Phase 2 will be reports containing a description of results of the data assessment (for Phase 1) and the analyses carried out on the data (for Phases 1 and 2). Any relevant diagrams (e.g. data visualization results) will be included in the reports as well. The revised dataset will also be provided.

Project Scope

The project will analyze existing data using the described methodological techniques. A substantive representative sample of existing PIMENTO data between the years of 1995 and 2015 will be analyzed. It is possible that a subset of data from the ATROSS database will be analyzed in Phase 2 of the project.

Figure 1: Suggested project tasks and workplan. Phase 2 is optional – a high-level description is provided here solely for future reference.

Schedule, Assumptions, Liability and Force Majeure

Turnstile Analytics understands that Mr. Athumani Obi will act as the Borealian Foreign Office Project Authority (PA) and Turnstile Analytics will rely on him for assistance throughout this assignment, in particular to receive, review and approve (or obtain approval of) the deliverables. The suggested timeline is provided in a previous section: assuming that there are no significant delays in gathering the data, we expect Phase 1 to be completed approximately 5 months after its start. Prior to the start of each phase, BFO will approve the work of the preceding phase.

In estimating our time and resource requirements, we have assumed that the PA will identify appropriate contacts, stakeholders and subject matter experts, and that these contacts will provide Turnstile Analytics with the necessary information pertaining to their management systems, database and data, in a timely manner.

The overall project cost and timing is based on the estimated level of effort identified to date for this assignment. Due to the long-term nature of this project (and due to the possibility of unforeseen events taking place throughout), Turnstile Analytics, and BFO will jointly and periodically (at 6 month intervals) re-visit the progress to determine its continued feasibility.

Unexpected circumstances may require adjustments to the schedule and/or predicted costs: no additional funds will be required for delays for which Turnstile Analytics is responsible; should there be a BFO-mandated change in scope or level of effort required, costs and/or timelines would be

modified accordingly through a contractual amendment adjusting time and charges, subject to BFO approval. Should Turnstile Analytics find itself unable to complete a task by the deadline, we will inform BFO as soon as possible in order to re-organize the project's priorities.

Turnstile Analytics further reserves the right to review the use of the analysis results in any external publication to ensure that conclusions are not misrepresented or selectively omitted. Unless otherwise specified, all information and documents made available to Turnstile Analytics during the course of this project are deemed proprietary, and shall be returned to BFO upon completion.

Turnstile Analytics warrants to BFO that its services will be provided using reasonable care and skill. Notwithstanding any provision to the contrary, any dates, periods or times specified by Turnstile Analytics in the proposal are estimates only and time shall not be of the essence for the performance by Turnstile Analytics of its obligations under an eventual contract.

Except in respect of death or personal injury caused by Turnstile Analytics negligence, or as expressly provided in any subsequent conditions agreed upon by Turnstile Analytics and BFO, Turnstile Analytics shall not be liable to BFO by reason of any representation (unless fraudulent), or any implied warranty, condition or other term, or any duty at common law, or under the express terms of an eventual agreement, for any loss of anticipated savings, business revenues, or profits (direct or indirect) or any indirect, special or consequential loss (including losses arising from business interruption, wasted management time, loss of goodwill, data and all other such loss whether or not arising in the normal course of business, damages, costs, expenses or other claims) whether caused by the negligence of Turnstile Analytics, its agents or otherwise, arising out of or in connection with the provision of the services or their use by BFO.

The entire liability of Turnstile Analytics and the project team members to BFO under or in connection with an eventual contract shall not in any event exceed the amount of the charges paid by BFO for the provision of the services.

BFO will agree to indemnify and keep Turnstile Analytics and the project team members fully indemnified from and against any loss, claim or liability whatsoever incurred or suffered by Turnstile Analytics as a result of negligence or any default by BFO or its employees, agents or representatives of its obligations however arising in connection with the Services, together with expense, claim, loss or damage which Turnstile Analytics or any of its employees, agents, sub-contractors and other BFO s may suffer due to the negligence or breach of BFO or its employees, agents or subcontractors. BFO further agrees and acknowledges that the allocation of risk in the preceding clauses is fair and reasonable in the circumstances, having been taken into account in setting the level of the charges.

Finally, Turnstile Analytics and the project team members shall not be liable to BFO or be deemed to be in breach of an enventual agreement by reason of any delay in performing or any failure to perform any of Turnstile Analytics's obligations under an eventual contract if the delay or failure was due to any circumstances or cause beyond Turnstile Analytics's reasonable control.

Without prejudice to the generality of the foregoing, circumstances beyond Turnstile Analytics's reasonable control shall include: acts of God, pandemics, server crashes, virus attacks, fire or accident, war or threat of war, sabotage, insurrection, civil disturbance or requisition, acts, restrictions, regulations, bylaws, prohibitions or measures on the part of any governmental, parliamentary or local authority, damage, bad weather, equipment failure, strikes, lockouts or other industrial actions or trade disputes whether involving Turnstile Analytics's employees or of a third party.

Resources and Costs

Dr. Martin Kerdaniel, Turnstile Analytics principal, will be the Lead Investigator assigned to this project. Other resources may also be assigned to the project as needed; BFO will be informed of any new resource joining the project. The team members' CVs are provided in Appendix B.

Due to the ongoing nature of the project, we estimate that Phase 1 will be completed within a five-month period (assuming no BFO-imposed excessive delays) and that it will take no more than 270 hours to complete (with the possible exception of overtime due to a BFO-mandated change in scope and/or objectives). As an initial discount, the hourly rate for Phase 1 will be set at $\mathrm{B\$80.00/hour}$. Under these assumptions, BFO would not be billed in excess of $\mathrm{C\$21{,}600.00}$ (excluding the 13% Harmonized Sales Tax).

More details concerning Phase 2 will become available upon completion of Phase 1. Should BFO chose to further avail itself of our services at that time, the regular hourly rate will apply: $\mathrm{B\$100.00/hour}$. Please consult the Workplan on p. 5 for possible tasks and timelines.

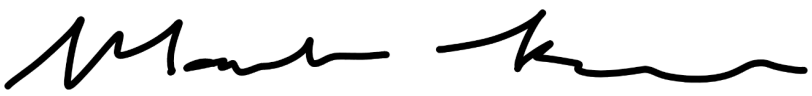
Travel and Invoicing

Travel is undertaken only with your specific pre-authorization and charges are based on rates previously agreed to and billed separately, at cost. We do not anticipate the necessity of travelling for this project.

Our invoices will be sent to you upon completion of all tasks associated with a particular deliverable of the project. The first invoice will be sent once Deliverable 1: Cleaned Data Set has been delivered (around Jan 15, for an approximated 140 hours of work; cf. Table 1 for details). The final invoice will cover the rest of Phase 1 and will be sent once Deliverables 2 and 3 have been delivered. All questions regarding our invoices should be directed to the contact whose name and phone number appear on each invoice.

Thank you for contacting Turnstile Analytics on this matter. We look forward to working with the Borealian Foreign Office on this intriguing project.

Regards,



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Appendix A — List of Relevant Former Projects

Turnstile Analytics was founded in 2012 by Dr. Martin Kerdaniel, with the goal of facilitating effective decision-making through the use of data analysis, machine learning, and predictive simulations.

Former and current clients of Turnstile Analytics include:

Client:	Atomic Waste Management Group
Project:	Atomic Waste Repository System Probability Failure Model
Dates:	Phase 1: May 2017 – Apr 2018 Phase 2: May 2018 – Dec 2020
Reference:	Murtaugh Abrahamson Manager, Repository Engineering Design AWMG

Client:	Children's Hospital of Eastern Gishimagi
Project:	Experience Based Co-Design Pilot Project Data Analysis
Dates:	Mar 2015 – ongoing
Reference:	Mélanie Jodoin Project Manager Patient Engagement Programs CHEG

Client:	Nature Borealia
Project:	Species at Risk Protection Process Analysis
Dates:	Phase 1: Sep 2017 – Dec 2018 Phase 2: Sep 2019 – Nov 2020
Reference:	Bai Wanran Recovery Biologist National Species at Risk Protection Nature Borealia

Client:	Farrell Lab, Carleton College
Project:	A Simulation of Differentiation in Fish
Dates:	Phase 1: May 2015 – Dec 2016 Phase 2: May 2016 – May 2017
Reference:	Jane Farrell Biology Department Carleton College (Redacted)

Client:	United Way of Borealia
Project:	Analysis of United Way of Borealia Historical Fundraising Data
Dates:	January 24, 2013 – October 31, 2014
Reference:	Hubert McGeough VP, Research and Planning UWB

Client:	Bytown Integrative Cancer Centre
Project:	Covariance Analysis of Irritable Bowel Syndrome Study Data
Dates:	March 21, 2013 – August 15, 2014
Reference:	Gwillem Brys Associate Director, Research Borealian College of Natural Medicine

Client:	Transport Borealia
Project:	Index for Container Transit Times in a Multi-Modal Supply Chain Network
Dates:	May 9, 2013 – July 1, 2013
Reference:	Louis-Paul Fafard-Allard Policy/Economic Officer Transport Borealia

Client:	Borealian Aeronautics Security Agency
Project:	Modeling of Wait Time at Pre-Board Screening Checkpoints at Borealian Airports
Dates:	June 14, 2013 – June 20, 2015
Reference:	April Larivière Manager, Operations Reporting and Analytics BASA

Appendix B — Team Composition

Dr. Martin Kerdaniel is a graduate from the University of Bytown. He obtained his Ph.D. in Mathematics in 2006. He has taught over 50 courses at Bytwon-area universities since 1999 to 2009, and worked on a number of projects as a federal public servant from 2008 to 2012, including the award-winning Borealian Vehicle Use Survey. He joined Carleton College in 2012 to start and manage the Centre for Statistical Analysis before rejoining is alma mater as a Professor in the Department of Mathematics in 2019.

Martin's academic interests reside in the application of mathematics and statistics to evidence-based decision support. He has provided consulting services to numerous entities over the years, including the United Way, the Public Health Agency of Borealia, the Borealian Aeronautics Security Agency, the Royal Borealian Air Force, Transport Borealia, and Little Brother River Cree Nation.

One of his role is to provide students with opportunities to apply their mathematical and quantitative knowledge to real-world and industrial problems.