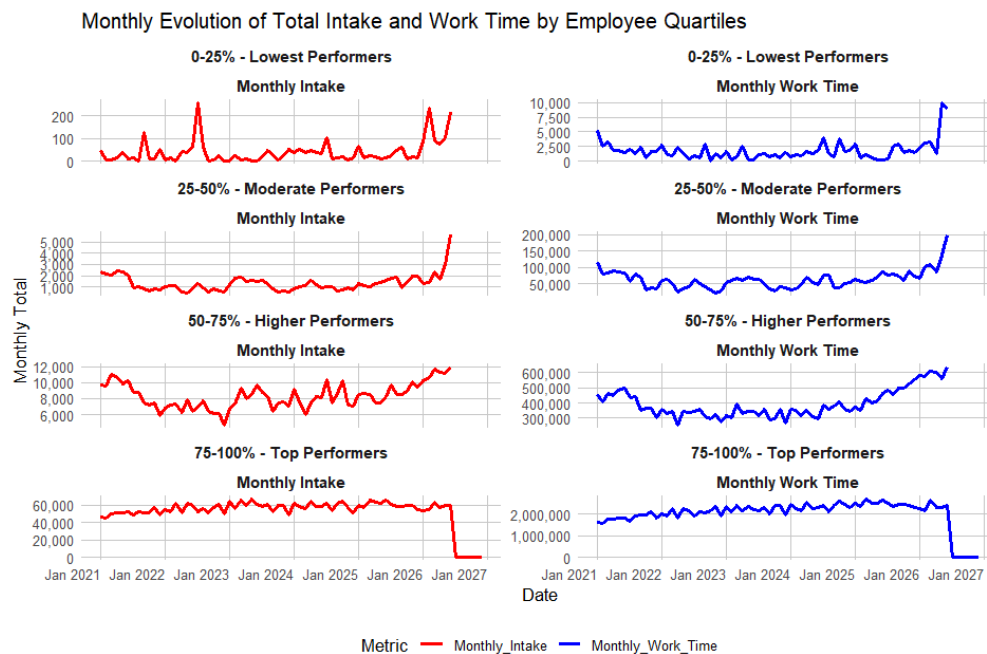


SDS 3786 Lab 4: La grammaire des graphiques et ggplot2.

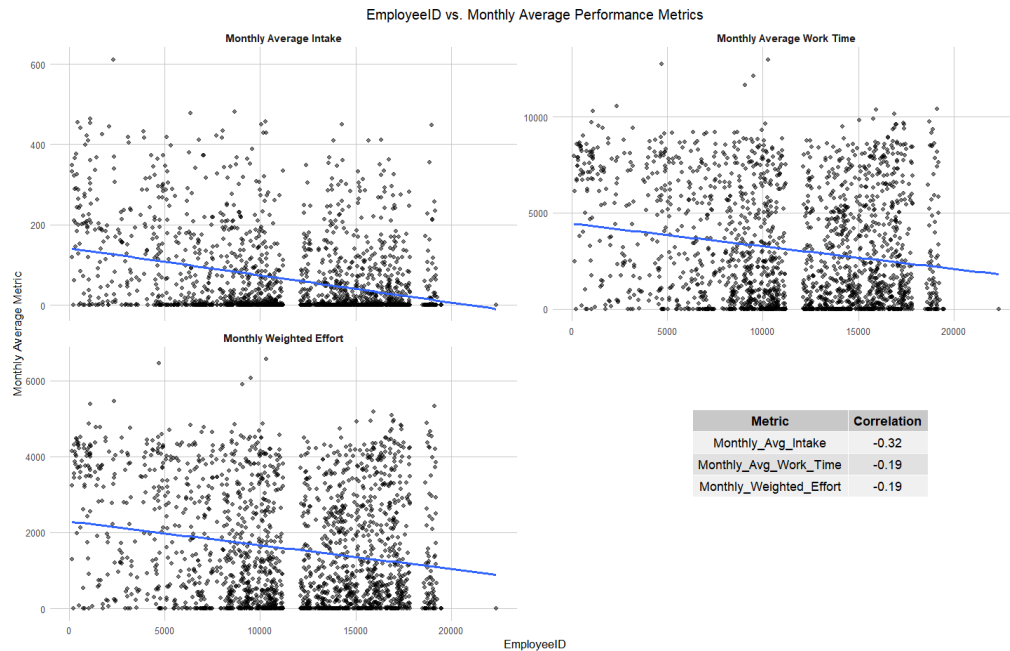
Professor: Patrick Boily
Anthony Le, John Bute, Kelly Gao

Grouped_Employees_Monthly



Observations:

1. Top Performers show the highest levels for both Monthly Intake and Monthly Work Time across the period, maintaining a steady workload.
2. Meanwhile, the 0-75% quartile of employees all seemed to increase their monthly intake and work time, which demonstrates that they seem to be picking up slack, which might indicate a policy change regarding spreading workload, or the closing of several missions. Worth investigating.
3. There is (or was) a clear disparity between top performers and the rest, as on a monthly basis, top performers ranked in a total of around 50,000 cases, in comparison to the next number of around 10,000 cases. This can inform strategic planning around training, resource allocation, and process improvements.
4. It seems that Monthly Intake and Monthly Work Time follow similarish trends, as they seem to be somewhat correlated. It is worth investigating if an employee with a lot of intake correlates to working on cases.



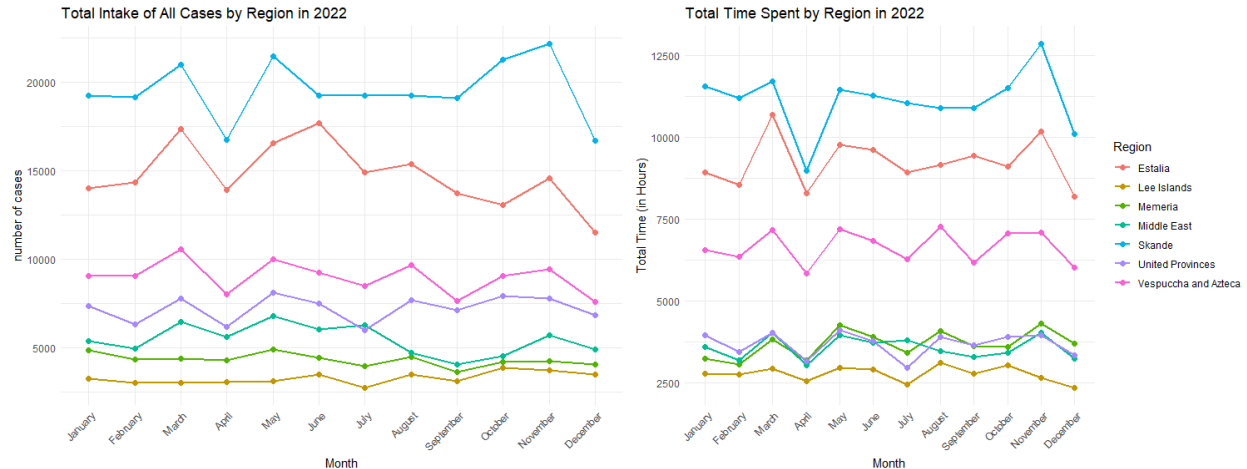
Observations:

1. We have reason to believe that employees with higher value IDs have less experience (or are starting) compared to previous employees
2. However, we notice that newer employees are slightly likely to not perform as well as senior employees, which is to be expected. But an interesting detail is that when we compare the monthly average intake correlation versus monthly average time work time correlations we see intake is lower than time, which might suggest that they were not getting enough exposure with intakes and are rather start working on programs and cases first before transitioning to intake duty..

Key Observations:

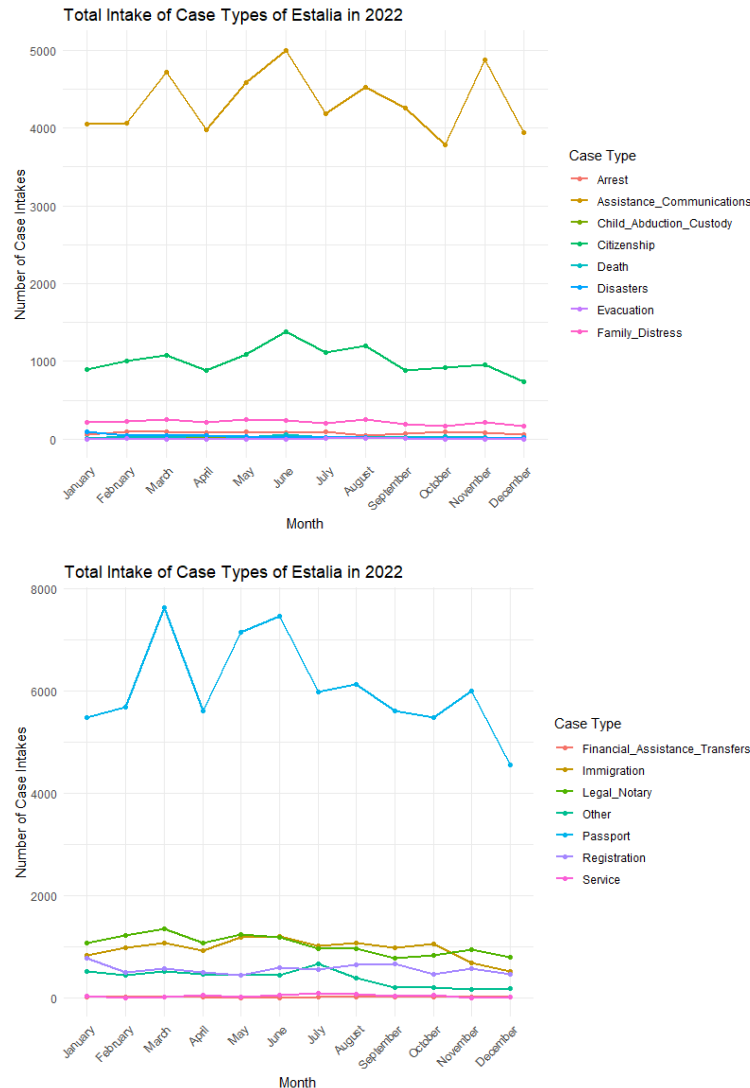
1. The main surge for Employees classified as Moderate Performers (25-50 quartile) is Assistance and Communications intakes, Passport intakes, and time worked on these two.
2. Passport Intake and Passport time share similar lines, thus might be evidence of a positive correlation between the two.

Grouped_Regions_Monthly



Observations:

- Observing the regions and their overall intake and time spent, we can observe three main regions that are more active than the other regions, specifically Estalia, Skande and Vespuccha and Azteca.
 - This observation relates to the region's overall embassy activity and the geopolitical situations occurring in the respective regions.
- We additionally notice a drastic dip in case intake in April for five of the seven regions, which could indicate a correlated event between the five regions which has caused a decrease in cases (e.g. a conflict between these regions, with a potential ceasefire being in place in April, etc.)
- Additionally, we see the same dip in the total activity time in the same month, supporting the idea of a potential geopolitical event occurring that correlates these regions. However, this dip also occurs for all regions, meaning it could be related to all regions instead of a select few.
- Apart from the three regions (Estalia, Skande and Vespuccha and Azteca) which have a substantially higher amount of cases and activity time, regions such as Lee Islands, Middle East, United Provinces, and Memeria have a substantially lower count of cases and time spent on those cases, which could be due to factors such as the regions' respective sizes or political state.
- Finally, it is observed that the total intake of cases and time worked of all regions will dramatically dip in December of 2022, which could speculatively be due to the holidays.



Observations:

1. Observing the two graphs depicting the different types of cases and their intakes throughout 2022, we can observe three major case types that has the highest amount of intakes throughout the year:
 - a. The three biggest intakes are the following: Assistance Communications, Passport, and Citizenship.
2. Because of this, we can speculate that the embassies throughout the region of Estalia are mainly focused on communications and citizenship processing, or that the region of Estalia is a more geographically and politically sound region compared to the other areas.
3. Additionally, some of the case intakes are seen to have a low or zero amount, indicating a lack of work, or a less of a focus around those activities, such as financial assistance transfers, evacuation and death cases, additionally supporting our belief of Estalia's overall peaceful nature.

Grouped_Missions_Monthly

Observations:



1. The Legal and Administrative Services and Assistance and Communication categories consistently show the highest average daily hours per employee across all years, with minor seasonal fluctuations. Embassies maintain a steady focus on core tasks like documentation and communication, so they're most likely foundational services that require consistent attention regardless of external factors.
2. Some categories, especially Legal and Administrative Services, see noticeable drops in December across multiple years, with a sharper dip in 2022. This most likely is due to the holiday season.
3. Safety and Emergency Services consistently have lower average hours, indicating minimal routine work under normal conditions. It follows that these services are primarily reactive, becoming active only during crises.
4. The instant and complete decline in average daily hours across all categories after June 2026 indicates the data only exists for 2026 up until July.
5. Other Services and Trade and Economic Affairs have consistently low activity levels, suggesting these aren't primary embassy focuses. This could imply that economic matters are managed by specialized agencies or at a provincial/municipal level.
6. Immigration and Citizenship Services shows moderate but variable activity, likely reflecting seasonal migration patterns, policy changes, or regional socio-economic shifts.
7. Assistance and Communication and Legal and Administrative Services have parallel trends, suggesting a correlation where assistance cases may often require legal support.



1. There is a fairly balanced distribution across all activity categories, with Legal and Administrative Services, Assistance and Communication, and Immigration Services being the majority.
2. Assistance and Communication services have a slight decline in utilization from 2024 onwards. This may be caused operational shifts or an increasing efficiency in handling these cases, thanks to process improvements or automation of certain tasks.
3. Legal and Administrative Services consistently maintain high utilization across monthly cycles, unlike the more variable patterns of other categories. This stability suggests these tasks are vital to embassy operations that don't follow seasonal fluctuations.
4. From 2021 to 2026, category peaks (particularly in Safety and Emergency Services) appear to smooth out, indicating possible improvement in resource allocation and task management. Embassies might have adapted over time, distributing workloads more evenly across months, reflecting increased efficiency or improved employee allocation strategies.