EUREKATHON
Challenging Data for Sustainable Cities

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Team Blind Data

Challenge 1 – Boosting Matosinhos Micromobility For Greater Environmental Benefits

Executive Summary

Challenge Description

After an initial data briefing and conceptual contextualization, we decided to focus on the potential of micromobility given the amount of information we had to investigate, evaluate and validate problems or solutions (namely terrain characterization, usage characteristics, demographic and regional details, etc.), which is reflected in a good balance between specificity and impact (in terms of CO_2) of problems (when compared with broader and less impactful themes like pedestrian mobility). Moreover, there is more creativity potential/novelty in possible solutions in comparison with more studied themes that have vast literature available such as public transportation design.

Approach to the Problem

We started by asking the question: "Why would people refrain from transitioning to micromobility?" and from the many answers one can give, we chose to drill down on: lack of awareness/ convenience; lack of availability; cost and external conditions (time of year, geographic conditions, etc.).

Therefore, we aimed at creating ways of:

- Distinguishing zones with low vs. high probability of adopting scooters or bikes for their mobility based on its characteristics and its residents' mobility patterns;

- Providing a reliable incentive strategy for using micromobility;
- Effectively targeting marketing efforts towards zones with higher usage potential;
- Defining better resources distribution zones and ambitious (but achievable goals) in terms of total usages of micromobility transportation.

Main Recommendations

Our recommendations to the City Hall are based on applying the tools created towards:

- **User Engagement** (to improve experience, retention and acquisition): integrating cashback strategy based on a % of the CO_2 avoided (using our Emissions Predictive Model), and recommend the usage of a specific type of mobility according to the trips the user makes or wants to make (Recommendation Predictive Model);
- **Zone Stratification** (to improve effectiveness of allocation and communication strategies and set realistic goals per zone): categorizing zones according to a balance of their potential CO2 impact vs. their predisposition towards transitioning to micromobility (Prescriptive Model), taking into account demographic, topographic and flux data;
- **Zone Targeting** (to establish a prioritization plan): identify and target zones with the highest discrepancy between predisposition for transitioning and actual usage of micromobility. At the moment, these zones are 130801003, 130808004 and 130807007 but these values can be updated frequently using our Predisposition Predictive Model based on demographic data.

Main Conclusions

Based on the predisposition score given by our models, choosing the maximum penetration from the pilot (5%), we estimate that Matosinhos could be **saving 199kg/day of CO_2** , 73 Tons/year, with micromobility (**3.5x** more than the impact generated in the pilot), if all flows with high probability of transitioning did in fact transition. The City Hall would need to serve 660 bike rides and 660 scooter rides per day in total in the city. Nevertheless, even if restricted by the current resources (27 bikes, 1475 scooters), we can expect an overall CO_2 reduction of **145kg/day** (**2.3x** pilot impact) during summer time, simply by optimizing the fleet (positioning of scooters and bike distribution centers) and better targeting communication.

Our classification models have a general accuracy between 60% and 70%, while the regression model has few notable errors, being reliable tools for our analysis. However, there are a lot of improvement opportunities, namely by populating our models with micromobility user profile data, or including more types of data for our Predisposition Predictive Model (besides demographic). We could also improve the granularity of topographical information and balance the flows by arrivals and departures.

Finally, we're aware that micromobility is not an endgame solution, so we would like to add public transportation usage to our analysis to optimize routes and stations to be aligned with micromobility tools. Therefore, creating an integrated system that embraces all sustainable solutions (for example, adding micromobility options to Andante) is paramount to achieve Matosinhos commitment towards carbon neutrality and the UN goals.