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Federated learning in migration forecasting

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Addressing the challenge of data accessibility and privacy requirements

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Migration forecasting is an increasingly important component in the arsenal of solutions developed to anticipate and mitigate the impacts of worldwide migration flows. Practitioners and academics have been exploring ways to improve available insights relevant for migration policy. Principally, they focus on (1) innovative data analysis methodologies, such as those based on machine learning (ML) algorithms; (2) the use of new, non-traditional data sources, for example, mobile phone call detail records, and; (3) data integration or data linkages, that is, the aggregation and inclusion of data from different sources or types [1].
Federated learning is useful in those use cases that require training on multiple datasets originating from multiple organizations, bypassing the need to first centralize the data, with the governance and processing difficulties that it entails. It also enables participants who want to provide their data set for machine learning algorithmic training a possibility to do so without needing to anonymize or pseudonymize their data beforehand while maintaining privacy in a cooperative environment, lowering the effort barrier, thus improving accessibility of the data.
Our research team works on enhancing privacy of FL applications and evaluating their performance in concrete, real-life settings. First, we trained a purpose-built time-series model in a FL architecture based on data from several institutions. Our findings indicate that they can enhance their ability to perform predictive assessments by collaborating and sharing their models [2]. Second, we examined how FL could impact the data sharing challenges faced by public institutions. FL presents a hopeful avenue for governments grappling with the need for extensive data while encountering financial incentives limitations [3].
We are at a crossroad in the realm of migration forecasting: from traditional to non-traditional data, from statistical to ML-enhanced predictions. Advancements such as FL can act as a cornerstone for facilitated collaboration within and between organizations, paving the way for new interoperable models that can be shared across various stakeholders to leverage their data and join in the blooming forecasting effort. Our research contributes to making collaborative forecasting more accessible, more privacy preserving, and ultimately more accurate.

References

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