
A neural system approach for modelling and forecasting European youth mobility

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Abstract

The application of modern approaches of machine learning to social sciences is still challenging. Nevertheless, the social domain has been identified as one of the fields whose complexity plays a fundamental role in spatial and temporal outcomes. The dynamics ruling a generic social system then may be associated to nonlinear domains where the measurements of the global state are restricted to the subclass of the social, economic and environmental variables. This hypothesis makes necessary the implementation of specific tools which may catch the complex aspects of such behavior and whose analytic structure is nonlinear.

In the present communication, the application of feed-forward neural networks to a specific social domain is presented. In particular, the neural modelling has been applied to the quantitative and qualitative data collected for the European Project Horizon 2020 "YMOBILITY" concerning the evolution of youth mobility in nine European countries. The YMOBILITY database is composed by primary data gathered by an Online Panel Survey for a total of 30,000 young European interviews describing the individual mobility experience, and by secondary data collected from the main institutional sources as Eurostat. The aim of the present approach was to discriminate the different attitudes of young Europeans towards mobility within the European community, considering both staying abroad and returning home. This led to the determination of a general nonlinear artificial system able to give a global description of the youth mobility phenomenon for individuals and migration flows.

Actually, the application of neural modelling allowed the description both of the inclination to move abroad of young Europeans basing on individual and global environmental aspects, and the mobility flows between territories identified by the secondary variables. In particular, the neural model has been built by means of a dataset composed of mixed primary and secondary data organized in such a way as to discriminate the behavior of young migrants from non-migrants and returned migrants from people still living abroad. The neural system ability to generalize the space of data and therefore to give an effective description of the overall relationships between independent and dependent variables, offers the opportunity to explore the state space in order to characterize the general system behavior not included into the case studies. In this context, the evaluation of scenarios related to the application of flanking policies has been conducted by perturbing the economic and social conditions in the territories and analyzing the neural model outcomes. Therefore, the application of the neural model on socio-economic data that may be defined as a consequence of the alternative policy, may allow the evaluation of the amount and the quality of the resulting youth mobility, in terms of gender, education, job and psychosocial factors.

Keywords: youth mobility, neural networks, machine learning, migration

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