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Depopulation of Portugal's interior

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The depopulation of Portugal's interior presents a crucial socio-demographic challenge, manifesting in widening disparities between major cities and inland regions. This study examines factors influencing depopulation in Portuguese municipalities, using data from PORDATA (2022). Through Linear Discriminant Analysis on twenty quantitative variables spanning education, demographics, health, and employment, municipalities are categorised by population density. The analysis reveals significant differences between groups across all variables, reinforcing the differentiation by population density. The model achieves a 71.2% correct classification rate, highlighting education and health variables as pivotal contributors to group discrimination.

Keywords: discriminant analysis, Portuguese municipalities, depopulation

The depopulation of the interior is one of the most important socio-demographic issues in Portugal [3]. The discrepancies between cities on the coast and the interior are becoming more and more profound, with an impact on the entire territory. This phenomenon has serious social and environmental consequences. On the one hand, in rural areas there is an aging of the resident population, the closure of educational establishments and healthcare centres. On the other hand, large cities are becoming overpopulated, leading to environmental and social problems, such as a lack of decent or affordable housing.

The purpose of this study is to analyse the factors that trigger depopulation in certain Portuguese municipalities. The methodology adopted analyses data retrieved from PORDATA [2] for the year 2022, using Linear Discriminant Analysis (LDA) techniques. Twenty quantitative variables were analysed, covering the areas of education, demographics, health and employment for 278 municipalities in mainland Portugal. The dependent variable used was "Population density per km^2 ", which categorises municipalities into four distinct groups: Very low density (74), Low density (67), High density (69) and Very high density (68).

The use of LDA aims to obtain a linear combination of the 20 variables allowing to classify the municipalities according to their population density. The F-test produced a p-value $< 0.001 < 0.05$, so the null hypothesis, that assumes equality of variables' means between the groups, is rejected. Thus, with 5% of significance, we can conclude that there are

significant differences between the means of the 4 groups, for all the variables of interest. Thus, the variables differentiate the groups defined by population density. Although the Box's M test led to the rejection of the null hypothesis (equality of the variance-covariance matrices of the groups), the analysis proceeded since the size of the smallest group is greater than the number of variables under study [1]. Wilks' Lambda test lead to two discriminant functions which enabled the differentiation of the groups. In figure 1, the territorial map illustrates the well-defined boundaries between the four groups. The model correctly classifies 71.2% of the cases considering the size of

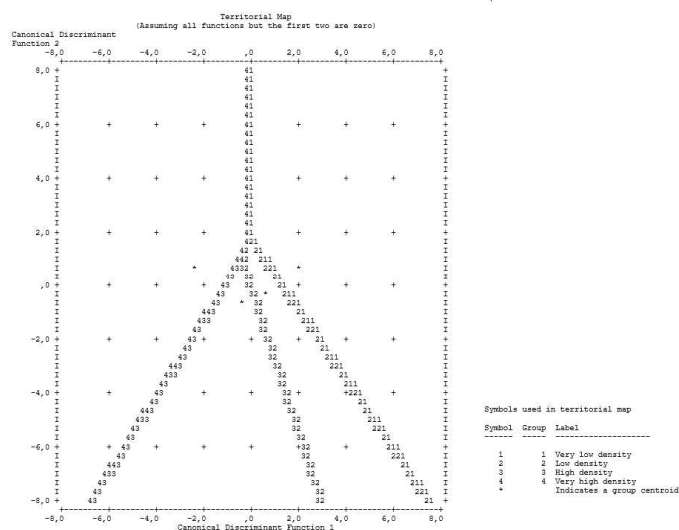


Figure 1: Territorial map of first and second canonical discriminant functions in population density

the groups in the a priori probabilities. Educational and health-related variables were the most significant contributors to discriminating between the groups.

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References

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