Modelling language shift in Carinthia, Austria

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Competition between languages is usually described in terms of language shift, i.e. speakers giving up use of one language in favour of another (sometimes with an intermediate bilingual stage). Cases of language shift can be found in many countries. An Austrian example is Slovenian in Carinthia [1, 2, 3]. According to the 2001 census [4], about 3% of the total population in Carinthia use Slovenian as their vernacular. Speaker populations are mostly found in the south and east of Carinthia. Carinthian Slovenes are protected as a minority by the Austrian State Treaty which entitles them (among others) to elementary instruction in the respective language and status as an official language in several municipalities. Yet despite supportive measures to protect minority languages, the use of Slovenian has been steadily declining. To understand this decline which reduces cultural and intellectual diversity, language shift needs to be monitored. One way to accomplish large-scale monitoring are models of physical diffusion which can be used to study language diffusion [5, 6].

We present an agent-based model adapted from an approach developed for ecology [7, 8, 9] to simulate language shift in Carinthia over both time and space. Agent-based models simulate the actions of individual speakers ("agents") and at each interaction the agents change their language with a probability p. The probability of change is dependent on environmental conditions e.g. speaker population size, distance to other settlements where the language is spoken and availability of schooling in the language. Our model is calibrated using fine-grained empirical data on language use from the Austria census (1880–2001).

An important part of this project is the discussion of limitations in applying physical models to linguistic problems. Linguistics operates with many concepts which cannot be readily measured and which resist quantification. Data often cannot be obtained in experiments in a laboratory. Existing data such as a census record is likely to be influenced by social factors and generally underestimates actual minority language use [1, 10]. These limitations must be kept in mind and incorporated into the model. The simulations in this work therefore not only help us monitor language shift, but also test the limits of using mathematical definitions and algorithms on natural language.

References

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