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Perspective

The Future Prospects of GIS Applications

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DESCRIPTION

Geographical Information System (GIS) has been seen as the key to implementing methods of spatial analysis, making them more accessible to a broader range of users and hopefully more widely used in making effective decisions and in supporting scientific research. Much has been written about the need to extend the range of spatial analytic functions available in GIS and about the competition for the attention of GIS developers between spatial analysis and other GIS uses, many of which are more powerful and better able to command funding. Specialized GIS packages directed specifically at spatial analysis have emerged. To explore new directions that emerged recently, or are currently emerging, in the general area of GIS and spatial analysis, and to take a broad perspective on their practical implications for GIS-based spatial analysis.

In the next section, we argue that in the past the interaction between GIS and spatial analysis has followed a very clearly and narrowly defined path, one that has more to do with the world of spatial analysis prior to the advent of GIS than with making the most of both fields the path is, in other words, a legacy of prior conditions and an earlier era.

The following section expands on some of the themes of the introduction to this volume by identifying a number of trends, some related to GIS but some more broadly based, that have changed the context of GIS and spatial analysis over the past few years, and continue to do so at an increasing rate. The third section identifies some of the consequences of these trends and the problems that are arising in the development of a new approach to spatial analysis. The chapter concludes with some comments about the complexity of the interactions between analysis, data and tools and speculation on what the future may hold and what forms of spatial analysis it is likely to favour.

Some decisions must be made, some question of scientific or social concern must be resolved by resorting to experiment or real-world evidence. A research design is developed to resolve the problem, data are collected, analyses are performed and the results are interpreted and reported. Although this implies a strictly linear sequence of events, the most robust research designs also include feedbacks and checks in order to ensure that the principles of good scientific research are not overly compromised in practical implementation. This simple, essentially linear, structure with recursive feedbacks underlies generations of student dissertations, government reports and research papers. The sequential events in this design together constitute a holistic research project and the feedbacks are all internal to the research design. Thus once the project has been initiated, the availability of existing data has no further influence upon problem definition methods of analysis that are consistent with the type, quality and amount of data to be collected are identified at the design stage, the sample design is not guided by considerations and priorities that lie outside the remit of the research and so on.

CONCLUSION

In this simple, sequential world, the selection of methods of analysis can be reduced to a few simple rules in the context of statistical analysis. Choice of analytic method depends on the type of inference to be drawn. Whether two samples are drawn from the same, unknown population, or whether two variables are correlated, and on the characteristics of the available data (e.g. scale of measurement – nominal, ordinal, interval or ratio). Inference about and exploration of, the research problem will take place in what is loosely described as the confirmatory hypothesis testing and inference seeking and exploratory pattern or anomaly seeking stages of the research.

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