The Rise of Multimodal Geospatial Interface Research

Nick Hedley[1]

[1] Dept. of Geography & Spatial Interface Research Lab, Simon Fraser University, hedley@sfu.ca

Abstract

I will discuss how emerging geospatial interface technologies support new informational, educational and communication experiences in real, virtual and hybrid spaces, and why this requires new research methodologies and commensurate conceptual frameworks to accomplish. Addressing these challenges may allow geographers to better position themselves in the new geographic information society that seems to be emerging.

Relevance

Developments in enabling technologies both within and outside of conventional geographic territory have significant implications for Geography and Geographic Information Science. Increasingly, industrial and societal trends in geographic technology use are escaping the inertia of conventional geospatial information communities, and suggest a disciplinary shift from static, sedentary geographic tools, to ones that are mobile, multimodal, and more transparently interwoven into everyday practice.

Emerging interface technologies are one of the core drivers of this trend. They provide powerful new capabilities for people to interact with spatial information and each other in real, virtual and hybrid spaces. These capabilities are more than novel technological components - they deliver powerful new ways to explore, perceive and understand complex geographic phenomena. They also support new ways for individuals, groups and networks of people to collaborate and share geographic information explorations.

In geography to date, interactions with geographic information and enabling tools have been engaged most frequently by research communities of GIScience, geographic visualization, geovisualization, and 'cyber-cartography', to name a few. While there have been many useful contributions made, it is becoming increasingly apparent that an updated or new conceptual framework is needed to accommodate fundamentally new ways of interacting with geospatial information.

Most geographic conceptual frameworks conflate significant and subtle properties of interfaces into homogenized tools, when in fact they are composed of complex combinations of geographic data representations, visual and other forms of display, mediated by various interface technologies, accessed via a range of interaction designs, and engaged through multiple modalities.

Now that geographic information is increasingly being delivered in interactive 3D tools and adopted by large groups of non-experts, geographers must evaluate and

consider how well positioned we are to inform and contribute to these new directions in geospatial information delivery and use. The fields of human-computer interaction, interface research, and computer science have been aware of these human-computer interface factors for several decades, and it therefore comes as no surprise that the majority of contributors to spatial tools such as Google Earth are computer scientists, and not geographers. This should be of great concern to us. This paper presents examples from my past and ongoing research in geospatial interfaces in industry and academia (including applications of virtual environments, augmented reality and multimodal interfaces). The presentation will identify key interface technologies that have emerged in the past 5 years. We will explore their properties, consider their significance, and discuss concepts and principles that geographers must integrate into contemporary GIScience - if they are to be a major player in the emerging geospatial interface technology economy.

Methods

I will use several examples of current applied geospatial interface research projects at the Spatial Interface Research Lab (at Simon Fraser University). Using these examples I will illustrate and explore how emerging interface technologies deliver powerful new opportunities for understanding complex geographic phenomena (such as volumetric natural hazards, public education and emergency planning). This will include addressing how we represent, explore and interact with geographic information, and the methods we are using to pursue this path of research.

I will discuss how emerging geospatial interface technologies support new informational, educational and communication experiences in real, virtual and hybrid spaces, and why this requires new research methodologies and commensurate conceptual frameworks to accomplish. Addressing these challenges may allow geographers to better position themselves in the new geographic information society that seems to be emerging.