When investigating the functionality of spatial databases the issue of non-interoperability consistently arises. When such databases are designed, the concepts of semantics and ontology are oft discussed, as is their role in information sharing.

According to Hunter (2002), the issue with semantics is that words have different meanings under different circumstances and when applied by different individuals. Sometimes these variations correlate with each other but often there are divergencies ranging from subtle to absolute. The point of contention with semantic deviation in a spatial database is that there needs to be a formalized manner of describing the differences in order for databases to be used effectively by more than one individual. Hunter goes on to state that ontologies are the “formal means for achieving a clear and concise description of the terms and concepts that we employ in such a way that others can interpret them as we do.” In other words, ontologies are a manner of regulating semantic differences between differing spatial databases. If regulation occurs, then it will be possible for information to be shared more effectively; for interoperability to become a reality. If we design spatial databases that are part of a formalized system, then a larger audience will be able to use the information within much more efficiently. As Schuurman (2006) quips, “does ‘range’ refer to a woodland habitat for deer or the top of a stove?” reiterating the need for formalization of terminology.

When we look at spatial data within the realm of access to and distribution of resources within a community, there are a number of distinct “information communities” which approach the existing issues from different perspectives. Depending on the goods and services being provided, groups involved may include area residents, business owners, the city in question, and utility providers. Each of these groups may organize and define items within the project area in a unique way as each group experiences the cityscape with an eye for details relating to their own particular needs and vision for the urban area. Residents would be more likely to view spatial data in terms of elements of livability; distances to public transportation, food access, recreation, and other elements which increase neighborhood desirability. Business owners may pay greater attention to parking location and availability as well as proximity to transportation hubs or the other types of commercial uses in the area. The city may take a more practical view regarding development in order to promote options that are fiscally viable or that have political backing. Finally, a utilities provider would tend to have a primary focus on access to and placement of equipment related to the service in question. The variances in these perspectives can lead to drastically different spatial arrangements of the same cityscape.

Schuurman (2006) refers to research done by Harvey and Chrisman in 1998 to illustrate how spatial objects, such as wetlands, are classified in alternative ways by various groups. Three “spatial objects” that can be found when investigating community resources are community centers, open space, and bike paths. Depending on which of the previously discussed groups, these objects may be understood and visualized in varying ways. When looking at community centers, they may be conceptualized as a lone physical building with space set aside for community functions or as a space more akin to a
recreation center that includes land for outdoor activities and sports as well. A community center may also be viewed as a market area or civic center depending on the party in question. A business owner may consider the same space to be the epicenter of commercial activity in the neighborhood.

When looking at open space, one only has to look at the area of Silver Lake in Los Angeles to find an incidence of difference in spatial portrayal. The cities land use map indicates that Silver Lake Reservoir is open space; however, this land actually encompasses a recreational center as well as the reservoir—which is not accessible to the public. The general public would likely classify the multiple uses as a community center, open space, utility, etc rather than under one umbrella term as possibly highlight the pedestrian pathway that has been built around the exterior than focus on the plot as a whole. Furthermore, from the utilities perspective, the spatial object would most likely lean towards the prominence of the top section of the reservoir which is still being used to provide water to South LA rather than include publicly accessible areas.

Finally, bike paths can take many forms ranging from paths carved from automobile traffic lanes and denoted by striping to pathways separated from all other forms of traffic, including pedestrian, and buffered from roadways by plantings. While these options and all in between are considered bike paths, their physical form is quite disparate. How bike paths are conceptualized may largely be determined by prior experience and the ultimate aim of those involved. As illustrated by Pundt and Bishr (2002), some of the same elements may appear in multiple information communities. Using the example of a bike path, one would assume some type of signage would appear in all information communities as would a form of pathway.

Mutability in perception likely stems from alternative agendas in use of the entities in question and often come down to design elements within the cityscape. While we often use a single term to describe an object, it can take a number of forms that are determined by the concepts those visualizing the object are familiar with. This susceptibility to alternative definitions reinforces the need for a formalized vocabulary that connects to specific spatial objects in order to provide a more effective spatial database, such as the structure ontologies provide.
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