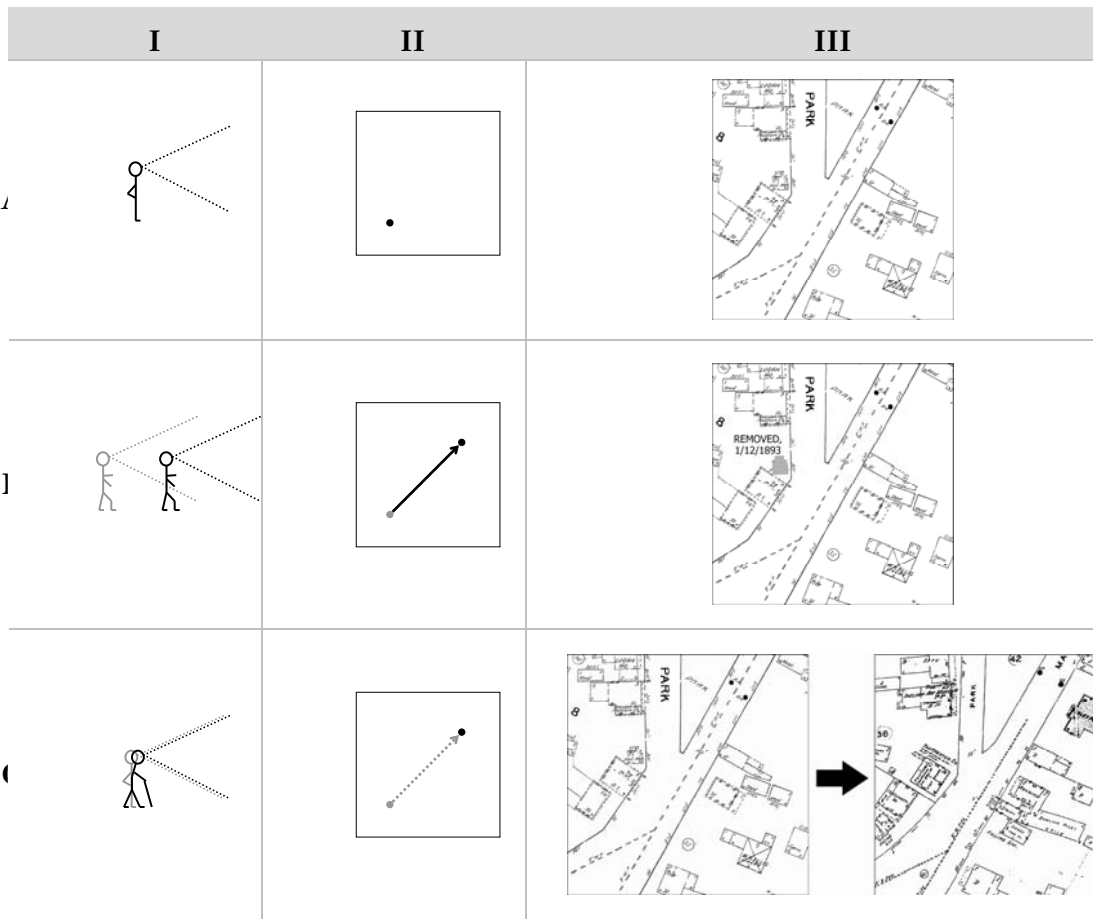


Understanding Purposive Space with GIS

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Fundamental spatial concepts of design can not be divorced from concepts of purpose (what is this for?) and normative logic (how should this be?). In my research, I aim to improve the capacity of spatial databases to handle questions about the purposive and normative qualities of the environment. To this end, my dissertation developed a model that (1) associates human goals to spatial features and (2) associates telic relations between goals, where one goal is a means to another. I showed that this model can bring together information about human activities and spatial configurations in order to support queries about the human environment that traditional spatio-temporal models in GIS can not support.

The figure below briefly outlines the problem domain for my research. The columns represent three general views of space that are commonly used in planning: (I) the perspective a person gains of the environment when they are in (or above) it, (II) a person's position plotted on a map, and (III) the configuration of the built environment also plotted on a map. The rows show three temporal cases: (A) static, (B) when change in the location or attributes of perspective, person, or built environment is observed, and (C) when such change is not known.



For any of the three views, we might want to ask three general questions: (1) Why do the things in this view look like this? (2) Why did the things in this view change as they did? (3) How might things have changed during gaps in our observations?

My research explores ways to answer these questions by using a model of purposive space that facilitates normative reasoning. This model provides an answer to the first question by measuring the “fit” of the given view for a particular purpose. For the second, it identifies functional reasons for observed spatial changes, such as improvement, deterioration, innovation, and obsolescence. For the third, it leverages knowledge about activities to make inferences about spatial changes, or vice versa.

My ongoing research continues to explore how normative reasoning in GIS can expand the kinds of spatial questions that may be investigated with this tool. This includes methods to (1) anticipate changes in patterns of activity that result from proposed spatial changes to a landscape and (2) evaluate the degree to which the actual use of space matches its intended use.