

Community Planning Tools that Prioritize Place Based Decisions

Tamara Manik-Perlman from Azavea presents "Community Planning Tools that Prioritize Place Based Decisions" at the 2011 GeoDesign Summit.

<http://video.esri.com/watch/196/community-planning-tools-that-prioritize-place-based-decisions>

Video Transcription

00:01 I would like to introduce the first of our Lightning Talk speakers for today.

00:03 It's going to be Tamara Mamik Perlman from Azavea. Hi.

00:10 Hi. I just want to say that it's a pleasure to be here.

00:13 I have a background in anthropology and geography, but I currently work for a software development firm.

00:20 And I didn't actually...I wasn't aware of geodesign as such until we saw the announcement for the summit and agreed to come.

00:27 So what I'm going to be talking about today is a fairly narrow slice of what the geodesign picture is...

00:32 ...which is the importance of web-based applications for collaborative design decisions.

00:41 So I'm just going to back up a bit before I get into the technical details and talk about a classic problem which is...

00:47 ...how do you identify an area that matches your priorities?

00:50 And this is a problem that many planners have faced, but it's also one that we face in our personal lives...

00:55 ...searching for a house, for instance.

00:57 So as an urban resident in Philadelphia, I have a set of priorities that matter to me.

01:02 So going to a grocery store, for instance, I consider to be absolutely vital and being able to walk there is really important.

01:11 Although I like public transit, I tend to bike to work.

01:14 So that's another important factor for me.

01:16 I'm also a big eater so it's pretty important to be close to nice restaurants...

01:20 ...and one of my New Year's resolutions is to buy fewer books on Amazon, so it would be great

to be near a library.

01:27 So these are abstract values that I have, but they can be concretized in the form of a geospatial model.

01:34 So we can take each of those factors that I'm looking at and create a geographical representation of each one...

01:40 ...assign a weight to it corresponding to its importance to me...

01:44 ...and then combine those to form a composite picture that reflects my aggregate priorities.

01:51 So in this case, for instance, the areas in red best match all of my priorities, whereas the areas in orange match them fairly well...

01:58 ...and so on until we get to the blue areas which probably wouldn't really be of interest to me.

02:04 Now this isn't a new idea.

02:05 We've heard over and over again that a lot of what we're talking about here are not new concepts...

02:09 ...and so Ian McHarg, a landscape architect, talked a bit about this process in his book Design with Nature in the '60s...

02:16 ...and he did this in a pretty low-fi way which was with transparencies.

02:20 He was representing things like slope, soil, bedrock...

02:24 ...and he could combine those different transparencies to come up with an image much like the one on the right.

02:31 There's a little formatting problem here.

02:33 But Dana Tomlin in the 1990s, also a landscape architect, pioneered the use of math algebra...

02:38 ...so representing digital data and then being able to add those digital layers together...

02:43 ...to produce the same kinds of composites that we're talking about.

02:47 Now Michael Goodchild referred a bit to small Deed design in one of the opening speeches yesterday.

02:52 And I think a lot of the kind of modeling we're talking about still occurs if you're a GIS analyst or maybe a planner on the desktop.

02:58 And Esri has some great tools for doing this kinds of modeling.

03:02 A lot of you probably are familiar with ModelBuilder...

03:04 ...but ultimately this is something that in many cases is still happening in back rooms and back offices.

03:10 And only the products of that analysis are taken to the public for feedback.

03:14 Now there has been some movement.

03:15 A lot of these tools are now available online.

03:18 So you can publish tasks and models with ArcGIS Server.

03:23 Unfortunately, when we're talking about really actively engaging the public in this kind of process...

03:27 ...we really need to speed things up.

03:29 Time is of the essence.

03:31 So the kinds of calculations we've been talking and have seen typically take 10 to 60 seconds.

03:37 Now, that's great. That seems really fast.

03:40 But, in fact, most of us are probably web users or even mobile web users...

03:45 ...and we know that one second seems like a long time for something to load.

03:49 And so if we're talking about reaching out to the public, they're not going to want to wait 10 seconds or a minute.

03:53 They're going to want to have things in subsecond times.

03:55 If they're performing an analysis, those results need to be returned right to them.

04:00 Additionally, if we're talking about not just modeling with a small group of people in a design charette.

04:05 If we're actually talking about moving this to the web...

04:07 ...we're going to have multiple simultaneous users hitting these kinds of applications...

04:10 ...and they're all going to be impatient, and they're not necessarily going to be familiar with these tools.

04:15 So it's really of the essence to change the way that we're doing this modeling, the way that we're representing it...

04:22 ...both in terms of user interfaces but also technologically in order to support the public running these analyses themselves.

04:29 Azavea was very fortunate to get some funding from US Department of Agriculture to work on rural agricultural development...

04:37 ...rural economic development.

04:39 And we had the opportunity to create a solution that we called DecisionTree.

04:44 And it does a couple things for the techies in the audience.

04:46 Those of you whose eyes are glazing over, this will be over soon.

04:49 Basically, a user with a web browser will construct their model or will weight their preferences.

04:55 That set of preferences will be sent by a REST API which sends it to a calculation engine.

05:02 That calculation engine is going to break that up into lots of tiny pieces and send those out to distributed worker agents.

05:08 They're each going to do their own piece, reassemble them, and then send them back to the user.

05:14 And that analytical layer is going to be combined with a visualization layer, a basemap or something of that sort...

05:19 ...so that they understand the context via analysis that they've just done.

05:24 Now you are very fortunate also to have a great client early on in the process in Asheville, North Carolina.

05:31 And they had a big store of planning and economic development data that they had...

05:37 ...and they wanted to leverage and make available to the public.

05:40 And so they worked with us.

05:41 They saw a little piece about Decision Maps, which was an early incarnation in the city of Philadelphia...

05:46 ...and approached us about building an application for them.

05:53 ...and the workflow was pretty similar to what we just talked about, but it runs on the web.

05:57 So the first step is for a user to select a set of decision factors.

06:02 Now you may not be able to see those, but they're grouped into types.

06:04 So there may be proximity to amenities like rivers or interstate exits.

06:09 There may be tax incentives, so while an individual business might prioritize something like proximity to an interstate exit...

06:16 ...Asheville and the state of North Carolina generally also have priorities and opportunities that they'd like people to be aware of.

06:22 So state development incentive areas or low tax value areas needing investment...

06:28 ...are also put in the model to encourage people to take those into consideration in their analysis.

06:33 So this is really...this definitely represents a convergence of values.

06:38 Asheville also, there's a tab up there that says Scenarios.

06:41 Some users might find this interface a bit daunting, you know, picking all these different factors...

06:45 ...what do I care about, what don't I.

06:47 So they've prepackaged some scenarios of selected factors with selected weights so users can just hit Go...

06:53 ...and then play around and proceed from there.

06:55 But any other case, once a set of factors is selected, users will assign relative weights.

07:01 So these could be positive if it's a factor that they care about a lot, or it could be negative.

07:07 So, for instance, if there's like an environmental hazard or if you're, you know...

07:11 ...if you're engaging in a form of industry that requires you to be at a certain distance from rivers...

07:15 ...perhaps you'd weight that negatively in your analysis.

07:20 And then finally, user simply hits Create Priority Map...

07:24 ...and they're returned to a result pretty similar to what we were looking at before.

07:26 And this is all on the web.

07:27 This is all in a map in seconds.

07:29 And this is an interactive map.

07:31 So not only are users able to see this visualization, but they're actually able to zoom in, zoom in even farther...

07:41 ...and up at the top you can see that they're able to change the appearance of the map as well.

07:45 So there are different sets of class breaks, different color schemes.

07:49 They can adjust the opacity of this decision layer.

07:51 They also have the opportunity to add additional layers like zoning information.

07:56 And then they can export that map or print it so that they can share it with others.

08:03 Additionally, because this is a map that's linked to the City of Asheville's database...

08:07 ...you can get additional information by clicking on a particular parcel...

08:10 ...and that's going to retrieve information about that specific location...

08:13 ...and that's linked up both to Asheville's Development Mapper and Crime Mapper.

08:18 So what you see is the integration of multiple different kinds of spatial data in order to inform decision making.

08:24 And they've also chosen to integrate that with Esri's Business Analyst Online...

08:29 ...so they can create a demographic report for the location that they've selected...

08:32 ...and say, okay, you know, according to my selected criteria, this looks like a great location...

08:38 ...but let's take a look at the market profile or the housing profile.

08:40 So this is really geographic information informing an individual decision-making process.

08:45 But it's really in the service of the City of Asheville's overall goals for economic development in the region.

08:51 Now Asheville is just one case in which this has been implemented.

08:55 In Philadelphia, there's actually an organization we worked with called the Sustainable Business Network.

09:00 And we heard a little bit about the triple bottom line yesterday.

09:03 They're an organization that's oriented specifically toward people, planet, and profit.

09:08 And so they wanted to provide a service for their members that would allow them to make siting decisions as well...

09:13 ...and in their case, the factors that they were taking into account were a bit different...

09:16 ...and they reflected these alternate priorities so things like, you know, recycling participation that we had data for...

09:23 ...served as a proxy for things like interest in the environment.

09:26 They might be interested in commercial corridor health which was data that is available for the Philadelphia area...

09:31 ...or they might be interested in, you know, farmer's markets or street network density if they're [unintelligible] something like walkability.

09:40 However, those are both applications that are at the local and the regional scale.

09:45 The thing with DecisionTree and this calculation engine is it's really just a technology in a tool.

09:50 And so there's a site that's going to be launching in February actually that we've collaborated with OMB Watch and Esri...

09:57 ...to develop which is a site that allows users to explore Recovery Act funding expenditures.

10:03 And this is a national-scale application.

10:06 So in this case, users are looking at a different set of things.

10:08 They're not actually, you know, weighing a personal decision.

10:11 What they're doing is assigning a set of criteria weights.

10:15 So they say, okay, you know, where do I consider need to be, and they can weigh each of those factors.

10:20 And then what they would do is incorporate spending and then they would be returned a map that shows...

10:27 ...listen, you know, given the priorities that you've set...

10:30 ...these places are receiving a disproportionately high amount of funding, these places are not.

10:34 So this is something...it's really a technology, not simply an interface.

10:39 And finally, a developer in our office is really interested in walkability so he created an application called Walkshed...

10:46 ...which enables users to visualize walkability to different amenities.

10:49 I'm not going to talk about that too much, but I encourage you to visit.

10:53 We've also been working increasingly on collaborative applications.

10:56 So common spaces, our most recent effort using the same calculation engine, users are able to define a starting point...

11:03 ...to find a transit method and the amount of time they're willing to travel, not necessarily a distance.

11:08 And then in real time, they're able to play with this transit shed, so as they change the amount of time on the slider...

11:13 ...it grows and shrinks.

11:15 They can add additional destinations.

11:17 They can add people that they want to be meeting.

11:20 So if you have a friend, you know, using a different mode of transit and starting at a different spot...

11:24 ...you'll see the areas that are common to both of you, and you can search for points within those areas.

11:29 This is definitely individually oriented, but it really emphasizes collaboration and speed.

11:37 So what's the relationship of the technologies I've talked about to geodesign?

11:42 Well, geodesign as a concept is clearly far, far larger than anything we've said...

11:47 ...and I know that speed is not necessarily always the best thing.

11:52 But in terms of engaging a public that is very much oriented toward web and mobile devices...

11:58 ...it's one way of reaching people who aren't necessarily in a position to show up for a design charette...

12:03 ...or who're constrained by their work schedules who can't necessarily come to public meetings.

12:07 It's a way for people to do modeling on their own and to solicit feedback and be returning that feedback.

12:12 So there are two major implications.

12:14 One, it's really important to design for the web, to make sure that these technologies aren't constrained to the desktop.

12:21 And the requirements of that, in terms of technology, are performance breakthroughs.

12:26 And that's something that we've been spending a lot of time researching.

12:29 Secondly, people are increasingly using mobile technologies.

12:33 They want to either collect data or even submit data from the place that they are in the field.

12:38 And the implication of that is actually a change in the way that we design our user interfaces.

12:42 So a lot of us who've used desktop tools think very much like analysts...

12:48 ...but thinking about mobile devices and designing for mobile devices forces us to think of it in a very different way...

12:54 ...and think not about the names of the tools or the processes as we conceive of them...

12:59 ...but the ways that might more intuitive to the public.

13:01 And that lesson can actually be applied to the web and anything else.

13:05 So I'm going to finish up by talking a little bit about what we do in these two areas.

13:09 Currently we're rebuilding DecisionTree from the ground up.

13:11 So right now, it's just able to do weighted overlay, but we're actually going to enable it to do a full array of map algebra operations.

13:19 So the kinds of models that Carl Steinitz was talking about can actually be built.

13:24 It's just a series of tools, and you can assemble the models that you need, create them on your site...

13:30 ...provide the tools to the public, and allow people to do modeling...

13:32 ...and it can be technology that's appropriate to your model and your data and your situation.

13:38 We've also sped it up so that we're down to 40 milliseconds from what was about a minute just a few years ago.

13:45 So it allows this to happen a lot more quickly.

13:48 And finally, we're experimenting with GPUs.

13:51 So if there are any gamers in the audience, you're probably aware that GPUs are what allow you...

13:56 ...to play those first-person shooter games, which are not something I'm into, but they render graphics really quickly.

14:00 Well actually using that technology to do raster processing because images like raster data are simply raster forms.

14:09 You can actually speed things up 10 to 20 times faster than on a CPU.

14:12 So increasingly, the technology is there to bring these tools to the public...

14:16 ...provided that there's the political will...

14:18 ...and it would create the social structures that can mediate the use of these tools appropriately.

14:23 Thanks very much.