U.S. Department of Transportation's Pedestrian Fatality Risk Map Demo
Transcript of Pedestrian Fatality Risk Map Demo Video
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Hello, my name is Kyle Titlow and I am a Geospatial Analyst Fellow at the Bureau of Transportation Statistics the U.S. Department of Transportation. I'll be showing off the Pedestrian Fatality Risk Map, a mapping tool that visualizes the results of a model built to estimate pedestrian safety risk for all neighborhoods and Census tracts in the United States. The app is envisioned as a decision support tool for state and local policymakers, who want to improve pedestrian safety. This tool is built as part of the U.S. DOT's Safety Data Initiative, which uses data and advanced analytics to identify, analyze and solve threats to safety in the transportation system of the United States. Tools like this will help policymakers solve problems related to pedestrian safety by providing them with a tool to visualize some of the problems that are faced by different geographical bodies in the United States.

I'm going to show off seven key elements of the tool, each of which was included with policymakers as the intended audience. We begin first here with the splash screen, this rectangular area shows up when the tools turned on. It reviews a lot of what I'm going to discuss during this demonstration, but just so you're aware, it describes the background of the Safety Data Initiative at the U.S. Department of Transportation. It explains project goals related to modeling neighborhood-level pedestrian safety risk as a factor of socioeconomic variables, elements of the transportation system, and characteristics of the built environment. It lists the specific data sources for this model; it explains the role of the tool for policymaking; describes the symbology and different tool elements that I will discuss; and it also provides a link to the Safety Data Initiative website, which can provide you with more information on the app above me journal article that was written about the model that is being visualized here; and also an email address for users to send any questions that you may have.

So once the app…once you have finished reviewing information, simply hit OK and then we can see the map that's here. The first element of the tool that I will draw your attention to is the symbology/the color scheme that was selected. We can see in the legend clicking here on the left side of the screen will reveal the different layers that are currently visible on the map including our legend, which is here. The legend was selected to accentuate, or the symbology I should say, color scheme accentuates neighborhoods with the greatest risk. So rather than visualize tracts by the raw numeric output of the model, which is a an econometric model that produces results sought to predict (as you can see here) the number of yearly fatalities in each Census tract per 100,000 people; but instead, the color scheme that was selected highlights the percentile of each count/each individual tracts values compared to the rest of the United States. So only those in the highest or higher risk–so those that are the 80th percentile or higher–are shown in either pink or red to really highlight those areas with the greatest…the model identified as having the greatest risk to pedestrian safety. All of the other tracks as you can see are depicted in some degree of grayscale.

The next element that I'll talk about are the supplemental spatial layers that were added to this map. So over here on the left, if we go from the legend tab to the layer list, this you can see that we have a number of other options that are available. And what these are, are geographic areas presenting political bodies or political areas that may be interested in making adjustments to their local pedestrian

environments to help improve pedestrian safety. So we have a couple of options here. I'm going to zoom in to Florida to help show off some of these available layers. So one are metropolitan planning organizations. So by clicking here on the left, metropolitan planning organizations, they appear in green on the map here. And so, each of them are shown and each of these layers, the other three I'll also discuss as well, were each selected with colors that differentiate from the red underneath. So here we can see the MPOs in Florida; you can see which ones are higher or lower scores. Similarly, we can look at congressional districts, which show up in blue outline, for Florida. Urbanized areas are already shown by labels on the map, but those can be turned on and off. And then lastly, we can look at metropolitan areas. In this case, we can/we have the ability to view different metropolitan areas within Florida highlighted. And then…additionally, the states and the counties can also be turned on and off, but those are visible throughout the map. Each of these layers is served out of the U.S. DOT's National Transportation Atlas Database, which is our repository of GIS layers related to transportation and to other geographic areas that are related.

And so, along the lines of this tool is another tool that can be used to help fix or zoom the map to a particular geographic area. So if a user was coming to use the map and they were from a given metropolitan planning organization, congressional district, zip code, any of these; this functionality allows them to zoom or have the map relocate to that part of the country automatically. This tool can be reached on the left side alongside the legend and layers list with this small red icon here. Once it's selected, we see that we can select geographic areas: states, urbanized areas, or Native American lands. And within the states area–in this case also I'll begin by selecting one from California–we are further provided with a list of counties, congressional districts, MPOs, upper/lower state legislatures, and zip codes; and depending on which geographic unit you're looking for, we'll come over here and navigate to them. So, I'll pick one example MPO from California, the Kern COG located around Bakersfield, California. So once this one is selected, the app will be running, you can see it's running here in the bottom right, in the background the tool is querying a list of geographic areas that are stored online and once it's identified the MPO of interest it will refocus the map and the map extends to that geographic area. So in this case, we are now in the Bakersfield area where users can explore the model output at the local or at the larger scale depending on/smaller or larger scale depending on the user of interest. There are plenty of other geographic areas that one could explore, for instance congressional districts. So take a look at one in Texas as an example…similarly let's go through the list. If you were somebody working for a congressman/congresswoman interested in exploring pedestrian fatality issues in your neighborhood this tool could be very useful for you to get a sense of the lay of the land in terms of safety in your area. So in this case, the map is relocated to show us this particular congressional district. The same can be done even down to the zip code level. Since I am in the District of Columbia, we can select a certain zip code and this can bring us down to even the small neighborhood level. And for urban areas, especially where Census tracts are fairly small, this can really provide us with a very large-scale map estimate of pedestrian fatality conditions in a smaller area, especially if that is the user's area of interest. And then lastly, we can also explore Native American areas within…oops…within Native American urbanized areas or Native American lands. Let's go to the Navajo Nation for instance; the map will run and then relocate the map to the Navajo Nation in northeastern Arizona.

The next tool I'll talk about are the pop-up boxes, which are available to the user when zoomed in to local levels. So for instance, using the geocoding tool at the top, which is an alternative method of

locating a particular area, but the user can come to the box in the top left corner, select the geographic zone, and the map will also relocate. Slightly different in this case it will move to two previously geocoded point within the Esri database, and this provides us with an alternative method of zooming the map to an area of interest. So if we examine, for instance, Columbia, South Carolina and we click on any individual tract, we can see that a pop-up box appears. In the pop-up box we are able to see…or the pop up box itself will highlight values of both the/related to both the outcome variable of this model, which were predicted fatalities and the risk level, but can also provide us insight into some of the other variables that went into the model that may be also of interest to potential users. So examining this tract for instance, we can see alongside that this is a higher risk tract, where there the predicted fatality rate is 2.68; this number was, as I mentioned before, not shown immediately in the legend but is available to users if they are interested. It also tells us whether a given tract is urban or rural, and then dives into some of the other Census or socioeconomic transportation variables that went into the model and that helped predict that outcome variable. These include percent of people who walk to work in a given tract, the percent of people who take transit to work, intersection density, median household income, average daily population, and as well as the congressional district. These five here were all variables that were included into the model as independent variables and then those at the top focus more on the dependent variables of the model and what the outcome of the model showed.

And so along the lines of this tool, we actually have the last tool…well along the lines of these pop-up boxes we have the last tool, which is the filter. The filter, which can be selected on the funnel here–far right of the four tool options. And this tool is very interesting in that it allows users to turn on or off individual tracts based on their values on these different variables either input or output. So for instance, if you were interested or you were say from South Carolina and interested in fully looking at the highest-risk tracts you would come over here, select the risk level, and turn the filter on with these small green button/gray-green buttons here; and once the filters turned on the only tracts that are available are those that match that condition, in this case the highest risk. This clearly would be something of interest to potential policymakers to really focus in potential areas/solutions to pedestrian related safety concerns. The same can be done with the highest or higher, and when you're finished over here you turn off the tool and close particular filter. The tracts can be filtered on any one of those variables that we saw inside of the pop-up box; whether urban or rural, percent of people who walk to work, transit to work, and so on. If for instance, you are unfamiliar with the variable or the values on a particular variable and are not sure exactly how you want to filter, there are a couple of options to help you; one of which, underneath the box we've listed the range. The range of potential values on that variable; whether it's walking to work or something that maybe is less intuitive in terms of what potential values could be…intersection density to the average user, median income. And additionally, if you needed more information as to potential values in your area of interest, you can simply click on those boxes and get a sense as to what some of the common variables are. If you wanted to see tracts that meant/that had similar values on a certain variable, you would be able to do that here. So in this case, we can see median income is at 53.16/$53,000. So we wanted to see tracts that had…perhaps…within…around…$10,000 median incomes similar to this particular tract, we can come over here, select 50 to 60, and then all of those tracts matching that condition showed. Just to remember, whenever using any of these filters to turn them on with the gray buttons here on the left to right, and turn them off when you're ready to move on to a new variable.

And the final element of the tool that I'm going to highlight, are the adjustable base-maps. So base-maps are the underline/the maps that sit underneath the actual Census tract data. And these/the adjustable nature of these can be very helpful to potential a user to help add additional context to some of the scores that we see, some of the facts. So in an urban environment, having a base-map like the one that's pre-selected, which highlights roads within each area, and in urban area knowing the road network underneath could be very helpful and very informative especially because the road network. This was used/elements of the road network contributed to the model itself. And so, if you were in Memphis, Tennessee for instance, seeing the road network underlying different Census tracts or we see a lot of high-risk pedestrian environments may help inform the user. However, there are other places in rural areas where we also saw high risks. So I'll show an area in North and South Dakota that showed a really high fatality risk according to our model. We're using one of the alternative base-maps, which show things like topography and terrain, might be of more use to a user; understanding why a particular tract scored the way it did, may have other environmental factors as well that could be of use. And those base-maps can be adjusted at the top right corner with the 4-square icon in the top right.

So this is a review of the seven kind of principle tools that were elements of this this visualization web map that were included to help users interact this model. Thank you!

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