Freight Incident Analysis Tool (FIAT) Developer Documentation

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Vision Statement

FOR - Developers and Analysts in Ohio

WHO - have a need for additional GIS toolset.

OUR - Freight Incident Analysis Tool FIAT

IS - a python-based software toolset that analyses National Transportation Safety Board (NTSB) incidents regarding Hazardous Materials Spills during Freight Transportation

THAT - is open-source, developer supported and easy-to-use.

UNLIKE - other tools that do not exist

OUR PRODUCT - performs risk analysis and evacuation zones.

Addressing Limitations

- Due to the complex nature of chemical spills and hazardous we have excluded the affected population by chemical and have left the manual buffer radius for the chemicals in (miles) units.

- Developers are implementing a way to use Python RegEx as an ETL process to cleanse data, this feature will be released on future versions located at: https://github.com/djbosu/RRAnalysis.

Installation & Usage Guide

Workspace: ArcGIS Pro version 3.0.3 or later (earlier versions may work but are not tested)
https://www.esri.com/en-us/arcgis/products/arcgis-pro/

Tested on Python 3.11.2:

1. Download, clone or fork FIAT. Unpack the zipped folder into a directory of your choice.
2. Open ArcGIS Pro and create a new project or use an existing one.
3. Add the FIAT folder to your project directory in the catalog pane.
4. Refresh your catalog pane and then navigate to the RRAnalysis python tool.
5. Open and run the tool. An ArcGIS Pro geoprocessing menu should populate your screen.
6. There are both required and optional parameters in the interface.
    a. Select your workspace: Required
    b. Select your prepped csv file: Required
    c. Select a buffer radius and distance unit: Required
    d. Query a chemical: Optional – Due to standardization issues queries may not produce tangible results, depending on the data in your csv file. For further details visit our GitHub.
    e. An output layer to save to your workspace: Required
7. Run the tool.
8. View your results messages and outputs to the workspace.

Results of the Product

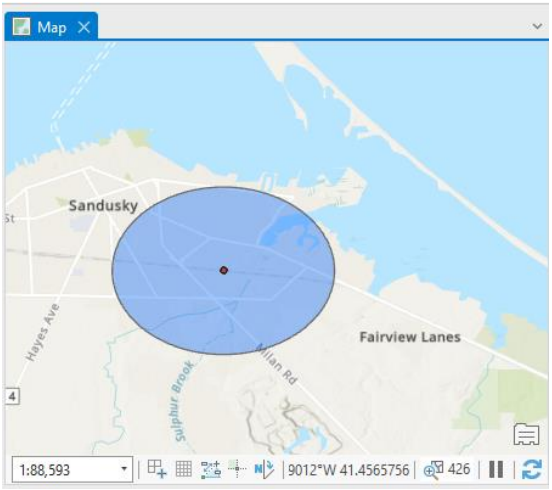

Figure 1 Result of the FIAT tool running succesfully; tool outputs a poitn class feature that inhereits the column headers of the csv file. The buffer layer is for visual representation and contains no useful information.

Discussion of Tool Development

This tool outputs the point data with a buffer of where a railroad accident requiring evacuation occurred. A buffer is put around the point. It is very important to check that the longitude and latitudes are within the range of the tool. The development processes required some extensive research into Python and into the operations of freight companies, their payload and their export data. The general findings for acquiring data are that there are no standards across multiple reporting agencies and companies self-report, this may result in some inaccuracies in the tool as the tool simply manipulates the data, rather than produces it.