GIS 540 .:. Final Report .:. Spring 2024

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I. **Title**: Spotted Lanternfly Mapper

II. **Synopsis:** The Spotted Lanternfly (SLF) is considered an invasive species identified in Pennsylvania in September 2014. If left unchecked, the spotted lanternfly can potentially wreak havoc on the grape, orchard and logging industries across United States. Spotted Lanternfly Mapper is an ArcGIS Pro tool that can extract locations of Spotted Lanternfly (SLF) spread and sightings from social media posts and generate state level maps based on the date and location of the SLF sightings. This tool can be used for collecting data about the extent of SLF spread from various online media sources which can then be used in modeling and predicting its spread.

III. **Extended abstract:** The Spotted Lanternfly (SLF), scientifically known as Lycorma delicatula, is native to China and was initially identified in Pennsylvania in September 2014, according to the Animal and Plant Health Inspection Service of the U.S. Department of Agriculture. SLFs are considered invasive and can be transported over significant distances by individuals unknowingly carrying contaminated materials or items containing their egg masses. This pest has a diverse diet, including various fruit trees, ornamental plants, and woody trees, with a particular affinity for the tree-of-heaven. In addition to the trees of heaven, they also consume a wide array of crops and plants, such as grapes, apples, hops, walnuts, and hardwood trees. If left unchecked, the spotted lanternfly can potentially wreak havoc on the grape, orchard, and logging industries across United States. To understand and predict the spread of this insect, a large amount of data is required. Since it is not feasible to collect data of SLF spread from the field, using natural language processing to identify social media posts that mention direct sighting or spread of SLF can help collect large amounts of data. In this project, I developed an ArcGIS Pro tool that takes a file containing twitter posts as input, classifies the posts into two categories – direct sighting/spread and other, counts the number of direct sighting/spread related posts in each of the forty-eight contiguous states of US mainland, and then generates maps of SLF spread/sighting.

IV. **Pseudocode:** Pseudocode for the problem described in the previous step. Use pseudocode keywords and keep the level of detail broad.

```
GET twitter post excel file location
GET year range
GET output file location

FOR each row in twitter excel file
    CALL text cleaner
    CALL text classifier
    CALL location extractor
    CALL date extractor
    PUT classification, date and location in output file
    IF text is classified as spread/sighting THEN
        PUT text, date and location in SLF array
    ENDIF
ENDFOR

CALL ArcGIS Pro project opener
FOR each year in year range
    INIT SLF count in shapefile
    FOR each state in SLF array
        CALL update cursor to update shapefile
    ENDFOR
    CALL map exporter
ENDFOR
```

V. **Acknowledgments:** None

VI. **Keywords:** Spotted Lanternfly, invasive species, Twitter, arcPy, spaCy

VII. **Mapping**: The arcpy mapping module was used to export layouts of maps.

VIII. **GUI**: A screenshot of your graphical user interface and a table with a list of parameters (should have the same columns as in the revised proposal: *Parameter*, *Data Type*, *Type* (Required, optional, or derived), *Direction*, *Filter*. See the extended proposal instructions for an example.)

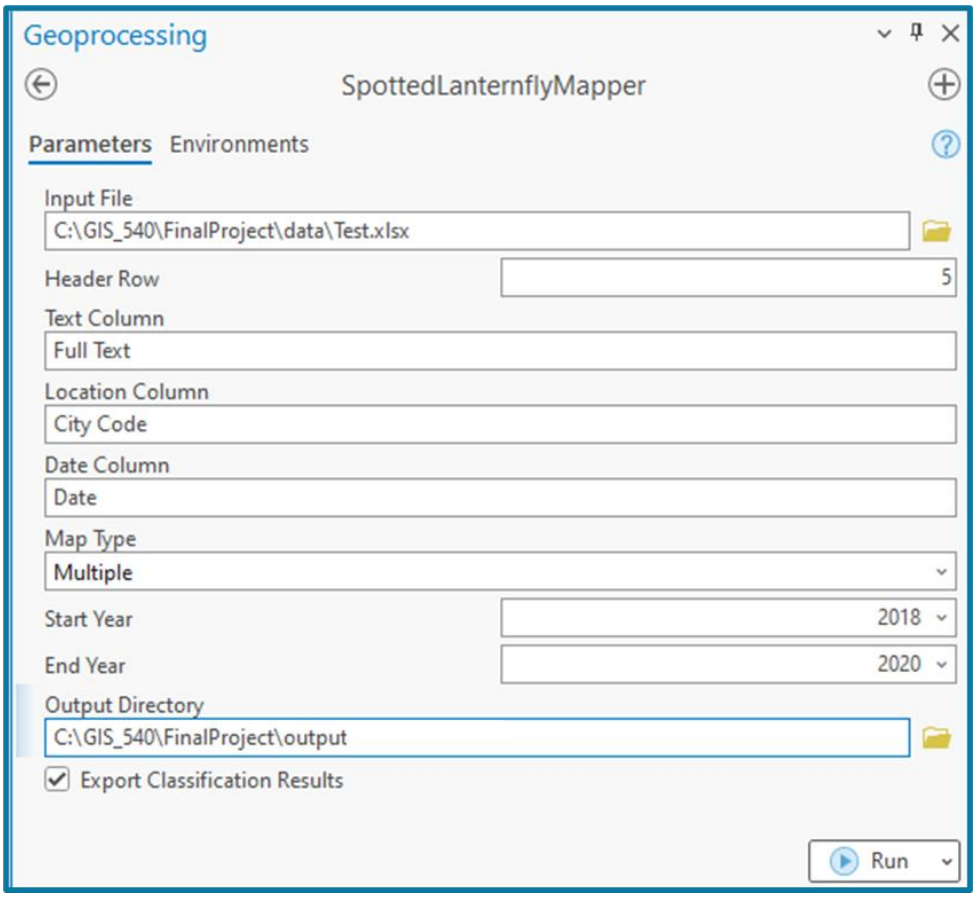

Figure 1 ArcGIS Pro script tool interface for SpottedLanternflyMapper

Parameter	Data type	Type	Direction	Default value	Filter
Input file	File	Required	Input	C:\GIS540\FinalProject\inputfile.xlsx	xls, xlsx
Header Row	Long	Required	Input	5	Range
Text Column	String	Required	Input	Full Text	
Location Column	String	Required	Input	City Code	
Date Column	String	Required	Input	Date	
Map Type	String	Required	Input	Multiple	
Start Year	Long	Required	Input	2018	Value list
End Year	Long	Required	Input	2020	Value list
Output Directory	Folder	Required	Input		
Export Results	Boolean	Optional	Input		

Table 1 Script tool parameters of SpottedLanternflyMapper