ArcGIS Interface Aids in Proactive Resource Deployment

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Predictive Analytics

*Use Predictive Analytics to predict the risk of serious crashes across the state*

- Increase visibility and place resources in the right places at the right times
- Optimize resource and manpower allocation by THP and our local law enforcement partners
- Create safer roads for citizens across the State of Tennessee
Predictive Analytics

The practice of extracting information from existing data sets in order to determine patterns and predict future outcomes and trends.
Methods

- ArcGIS
- 0.1° latitude by 0.1° longitude
  - Define unique identifier (3 digits of Lat + 3 digits of Lon)
- Organize input and output data (crashes/weather/events)
Methods

• SPSS Modeler
Model Results

- Tabular output - spreadsheet form (not user-friendly!)
- Propensity calculated @ 4-hr intervals over 7-d period
Model Results

• Present results based on THP district boundaries
Criteria for Presenting Output

- Viewable
- Accessible to Troopers/Supervisors/Staff
- Efficient to Update
- Flexible – ability to add supplemental data
- Map Interface
- *ArcGIS!*
Publish Results

- Output transferred via Excel spreadsheets
- Classification using Quantile method w/graduated colors
- Maps cover entire state
- Present results based on THP District Boundaries
Publish Results

• Pop-up box to display risk values for each 4-hour period through each day
Publish Results

- Provide supplemental crash information
  - Location, date/time, severity, investigating agency
- Variety of base maps available
Model Accuracy

Actual Fatal and Incapacitating Injury Crashes by Calculated Risk
March 10th through May 11th (9 Weeks)
Issues/Details

- Date/Time
  - GMT

- Naming conventions
  - RISK_YYYYMMDD*.xls
Automate Process

- ArcGIS Model Builder for transformation into Web Mercator
Automate Process

Python for:

- Updating MXDs
- Doing web displays
- Creating new set of web services

```python
aPeriod = "2015_0413_0419"
import arcpy, datetime
theweek = "RISK_" + aPeriod + "_AllBy4Hrs"
PCA_Table = "d:\MXDs\Dashboards\PCA\GDBs\PCA_RISK_Tables_" + theweek[5:12] + ".gdb/" + theweek
mxd = arcpy.mapping.MapDocument(r"CURRENT")
df = arcpy.mapping.ListDataFrames(mxd, "Layers")
for aDist in [1,2,3,4,5,6,7,8]:
    arcpy.RemoveJoin_management("PCA_Dist" + str(aDist))
for aDist in [1,2,3,4,5,6,7,8]:
    arcpy.AddJoin_management("PCA_Dist" + str(aDist),"DEGREE_ID", PCA_Table,"DEGREE_ID","KEEP_COMMON")
```
ArcGIS Application

- Web-based access for Smart Data
- Enhance data-driven deployment
THANK YOU