CCRi
DATA TO KNOWLEDGE
Commonwealth Computer Research, Inc.
Dr. Timothy Emerick

Product 1: VLADE

Input: Full motion video taken from a moving or stationary sensor, potentially with a great deal of noise.

Output: Text descriptions of video content. *May contain novel descriptions of never before seen actions.*

Method: Use deep learning approaches to learn patterns in (Video, Text Description) pairs, and identify the regions videos which best describe these patterns.

*"1 dark vehicle moves along road towards upper left corner of scene" (76.7%)*

"two individuals at frame right center in light shirts and dark pants" (79.2%),
"one individual at frame top left in a white shirt and dark pants" (69.6%)

Product 2: Thor

Input: Multiple sources of raw text, social media, imagery, GIS, and relational data.

Output: Fused vector representations of all "entities" in the data, which can be fed into downstream machine learning algorithms.

Method: Use deep learning approaches to learn to represent as much of the data as possible in a fixed dimensional representation for each entity. Our process can be scaled across multiple machines using Spark or Hadoop.
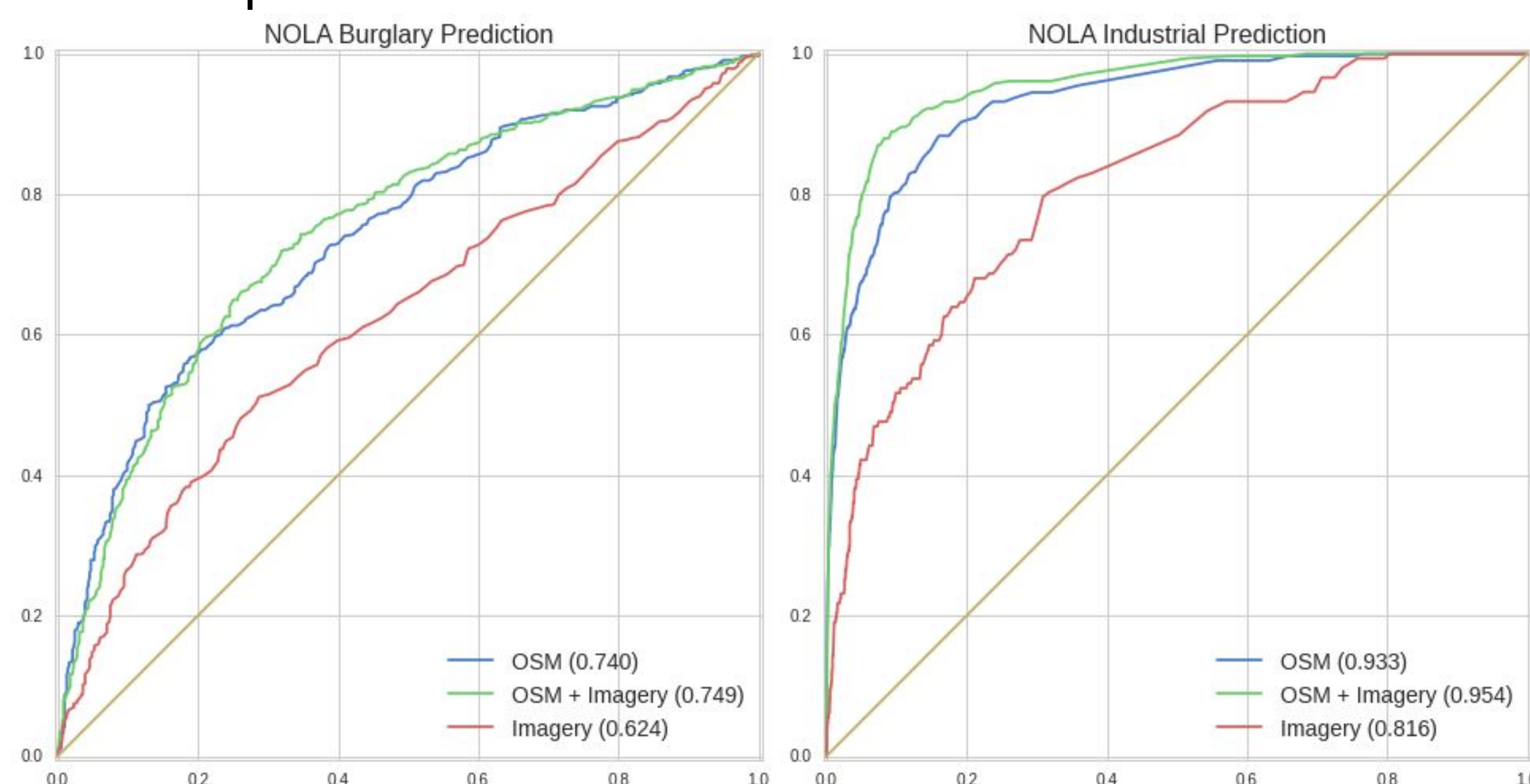
CCRi is looking for an organization to prime this effort, along with academic institutions or companies which have experience working with input from the non-visible light spectrum.

Research Areas of Interest:

- Incorporating more complex actions and interactions between entities.
  - **Currently have:** People getting into and out of cars, shoveling, handing items off, walking, running, entering buildings, etc.
  - **Needed:** Training data containing examples of sorts of activities to be described.

- Incorporate and fuze multi-camera inputs.
  - **Currently have:** Architecture for fusing multiple text, social media, imagery, GIS, and relational data sets into single representations for entities.
  - **Needed:** Extending this architecture to include video sources.
  - **Additional benefit:** Adding video into our fusing architecture allows for text, social media, imagery, GIS, and relational data to be leveraged in video analysis as well.

Dr. Timothy Emerick
Data Scientist
CCRi
tim.emerick@ccri.com
(434) 284-9427
http://www.ccri.com/