

The potential of monitoring traffic conditions up to 15 times a day using sub-meter resolution EO Images

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Method

Research goal: detect moving vehicles in sub-meter spatial resolution EO (satellite) multispectral imagery

Practical goal: monitor traffic condition on a city-wide scale semi-continuously and in near-real time

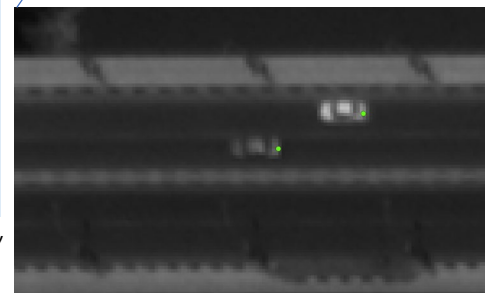
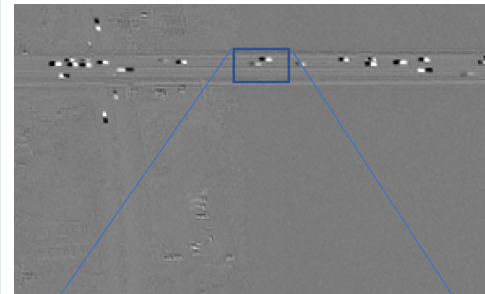
Method:

- detect vehicle at two positions in a short time span (movement!)
- exploit short time lags (0.3s) between imaging in 8 bands available from WorldView satellites
- apply Principal Component Analysis to highlight moving vehicle signatures (bright-dark pairs)
- apply thresholding and simple math to extract:
 - Location
 - Direction
 - Speed

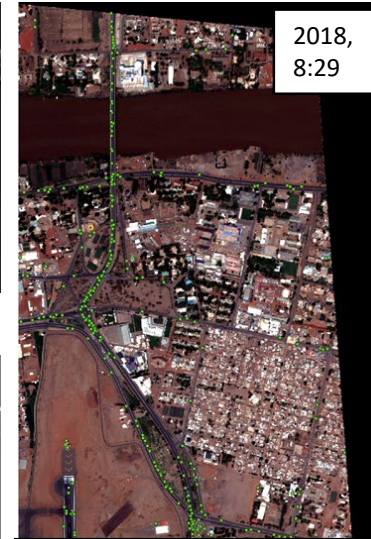
Data*:

- WorldView-3 Earth Observation imagery
- 8 multispectral and 1 panchromatic band
- Spatial resolution: 0.3 pan and 1.2 multispectral
- 2 observations from 2018 and 2020
- Location: Khartoum, Sudan

* Data used are not the ones announced in the EGU21 abstract due to lower scenery quality. The research results of the methodology, however, remain the same.



Result



With 15 images per day arriving with EO constellations (WorldView-Legion), a city-wide, near continuous traffic monitoring of moving vehicles (in green) is potentially possible.



Challenges



Bottleneck: time from observation to analysis-ready image (challenge on the image providers' side)