

# Automatic Change Detection of Human Activity Through Algorithmic Processing of Remote Sensing Images

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GEOG 596A Peer Review

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# Overview

- \* About me
- \* About the problem
- \* Data
- \* Approach
- \* Expected results and considerations
- \* Timeline
- \* References

# About Me

- \* Husband
- \* Father of 2
- \* BS in Aero/Astro Eng, U of I
- \* Post grad Mech Eng, U of I
- \* MA Military Science, AMU
- \* Retired Air Force Officer and Pilot
- \* Program Manager

**I** ILLINOIS



**APL** JOHNS HOPKINS  
APPLIED PHYSICS LABORATORY

# About the Problem

- \* Human Activity
  - \* Land is cleared
  - \* Residential roads
  - \* Dwellings
  - \* Businesses
  - \* Government structures



Figure. Maple Lawn development, Howard County, MD in 2013 (top) and 2018 (bottom) from Google Earth Engine

# Advances in Enabling Technology

- \* Remote Sensing
  - \* Increased resolution, coverage, frequency
- \* Automated change detection
  - \* Fused image processing
- \* Automated building detection
  - \* Active contour tools and ML



Figure. Abu Dhabi [10]

# Data

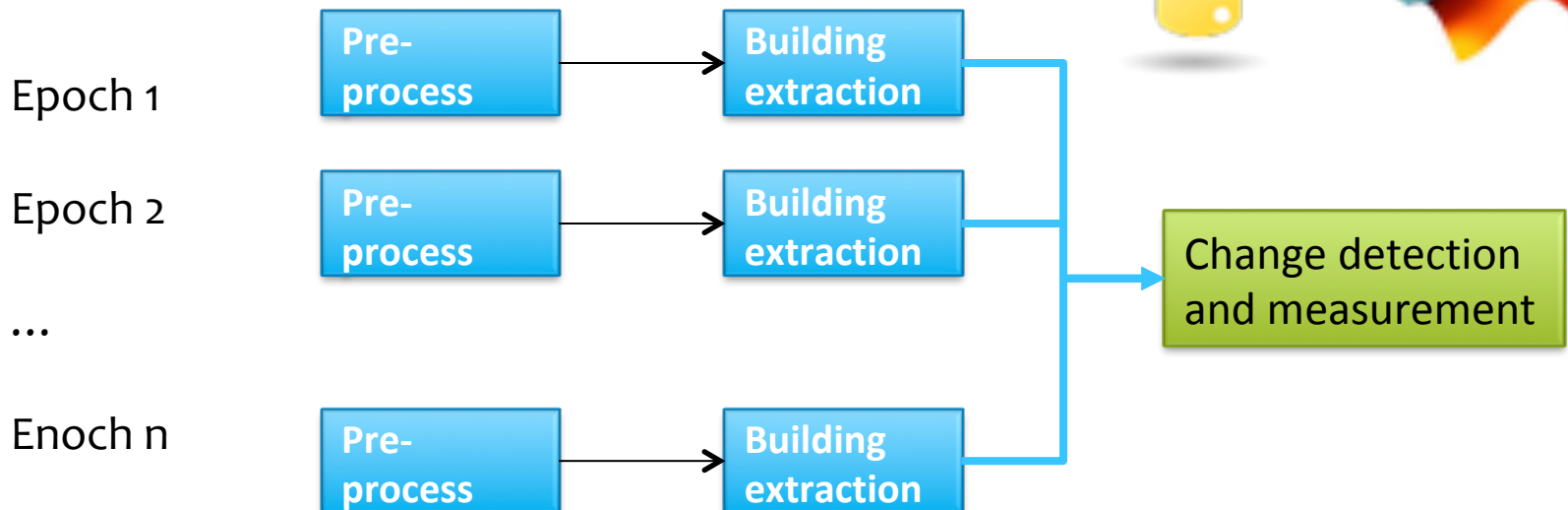
- \* Two cases of recent growth
  - \* Howard County, Maryland
  - \* Suffolk, Virginia
- \* Image Criteria
  - \* Multispectral (exclude LiDAR)
  - \* Recent
  - \* Sub meter resolution
  - \* Public



Figures. Maple Lawn development, Howard County, MD in 2013 (top) and 2018 (top middle) Riverfront development, Suffolk, VA in 2012 (bottom middle) and 2018 (bottom) from Google Earth Engine

# Approach

- \* Apply combined methods of change detection and feature detection



# Expected Results and Considerations

- \* Quantify growth of human activity in a region based on structures
- \* Apply the process to support analysis of urban growth for planning
- \* Risk
  - \* Developing a process that is not scalable to the problems aimed to analyze



# Timeline

- \* Aug 2020: Continued research on processes
- \* Sep 2020: Data gather
- \* Oct – Dec 2020: GEOG 598B – Fall 2 2020
  - \* Oct 2020: Train and test case 1
  - \* Nov 2020: Train and test case 2
  - \* Dec 2020: Compile results
- \* ?? 2021: Present – URISA webinar

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