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Role: Research Assistant in Center for Applied GIS

DeepHyd Project: a deep learning-based artificial intelligence approach for the automated classification of hydraulic structures

Data Acquisition Algorithms: Structure from Motion (OpenSfM: https://opensfm.readthedocs.io/en/latest/)

Problem: Speed up this process as per the accessibility of high-resolution photo

Current status: share-nothing parallelism on some steps

Data: Approximate 300 images with 5,184*3,888 resolution per bridge

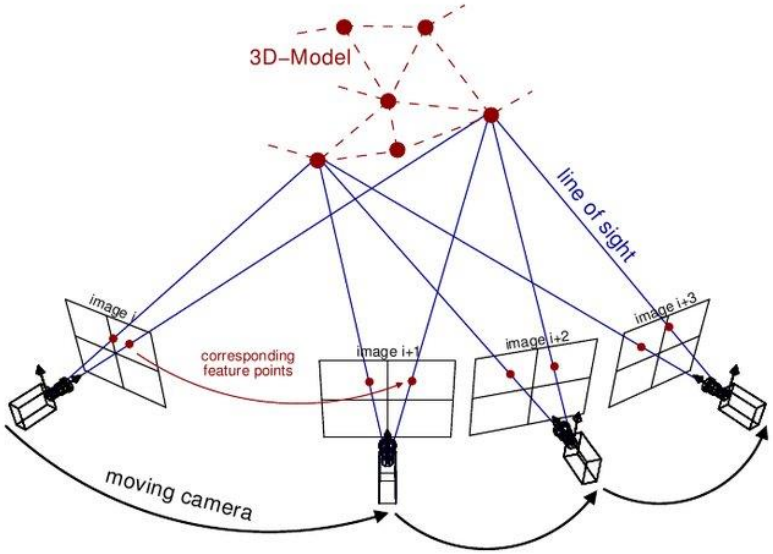

Image source: http://theia-sfm.org/sfm.html

Source: https://cybergis.uncc.edu/deephyd/

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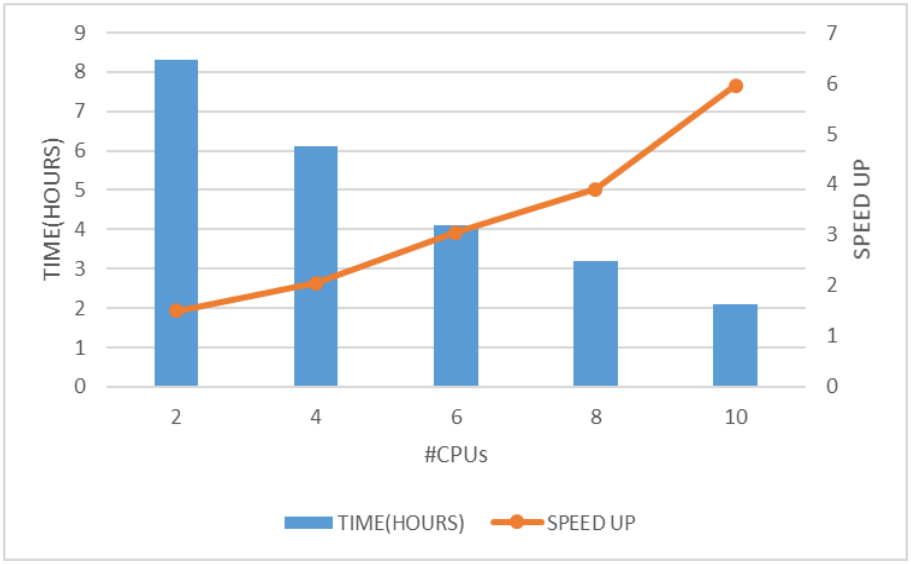
Sequential time:16 hours per bridge



CPU: Intel® Xeon® Processor E5 v3 10cores 3.1GHz

- **Copperhead**: **Linux**-based HPC Cluster
  - 96 compute nodes
  - 2,060 computing cores (CPUs)
  - Total Memory: 18,004 GB
  - Located at University Research Computing at the University of North Carolina at Charlotte (https://urc.uncc.edu/)

Estimated time for all bridges in NC:

18,000 bridges*2 hours ≈ **4 years**

To accelerate: MPI,GPU, and optimization

Bridge info. source: https://www.ncdot.gov/initiatives-policies/Transportation/bridges/Pages/default.aspx