EERI 474 Milestone 0

Path/Elevation Profile Extraction Library

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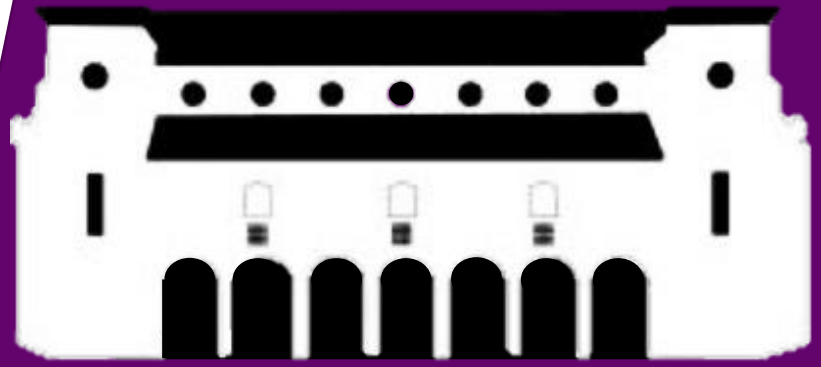


Problem Context

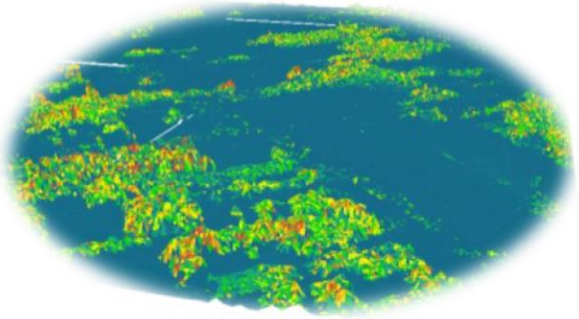
- Path/Elevation Profile Extraction Library

- Context
  - Coding library required
  - High-performance
  - Path/Elevation profile
  - Multiple uses
  - Propagation Loss

- Possible Uses
  - Telecommunications
  - Aviation
  - Construction planning
  - Smart agriculture [1]

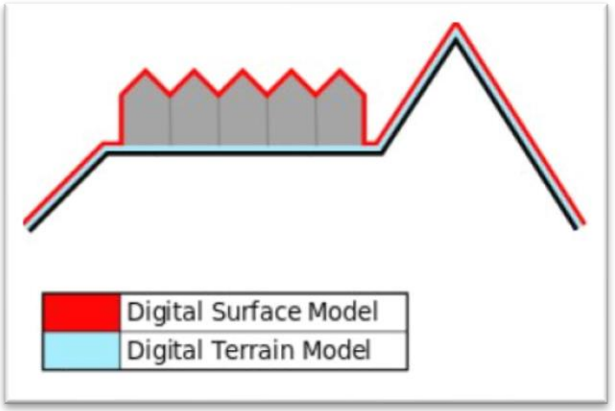
> "Path or elevation profile extraction from a Digital Elevation Model (DEM) is a critical task performed in a multitude of operations. In terrain-aware RF propagation models, the path profile is required to determine the propagation loss over the terrain. The problem is to design and develop a high-performance path profile extraction library."

Problem Analysis



A Digital Surface Model (DSM) [1]

- Path/Elevation Profile
  - Output must be a series of points
  - Visual output feature



DSM versus DTM (Digital Terrain Model) [1]

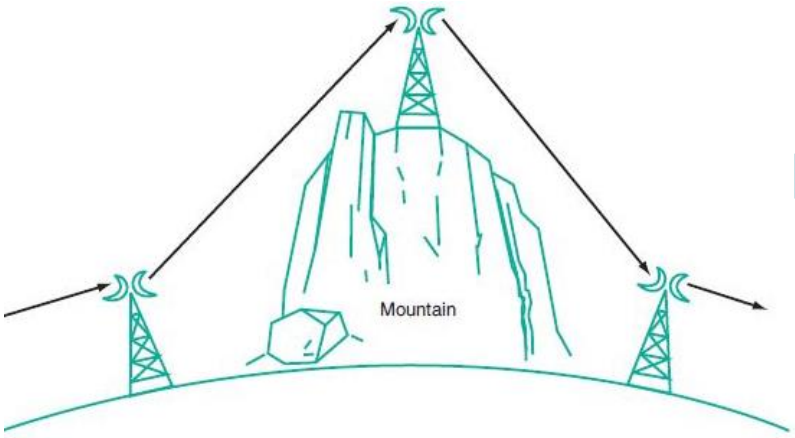
- Extraction
  - From DEM input
  - DSM or DTM?
  - Both?

- Library
  - Coding library for program development
  - Development environment currently unknown
  - Static or dynamic
  - Independent of “main” code

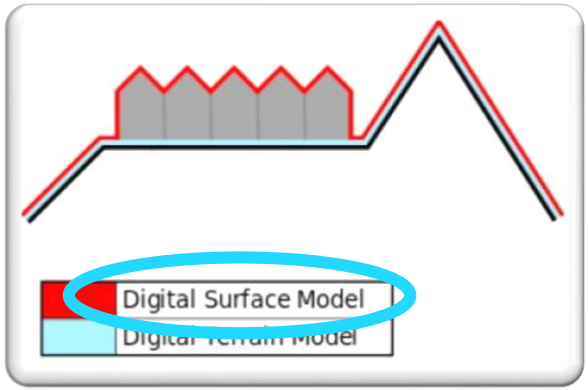
.h & .cpp

Problem Analysis (continued)

- Terrain-aware RF Propagation
  - Main use?
  - Line-of-sight [2]
  - Extraction from DSM (Digital Surface Model)



Line-of-sight network [2]

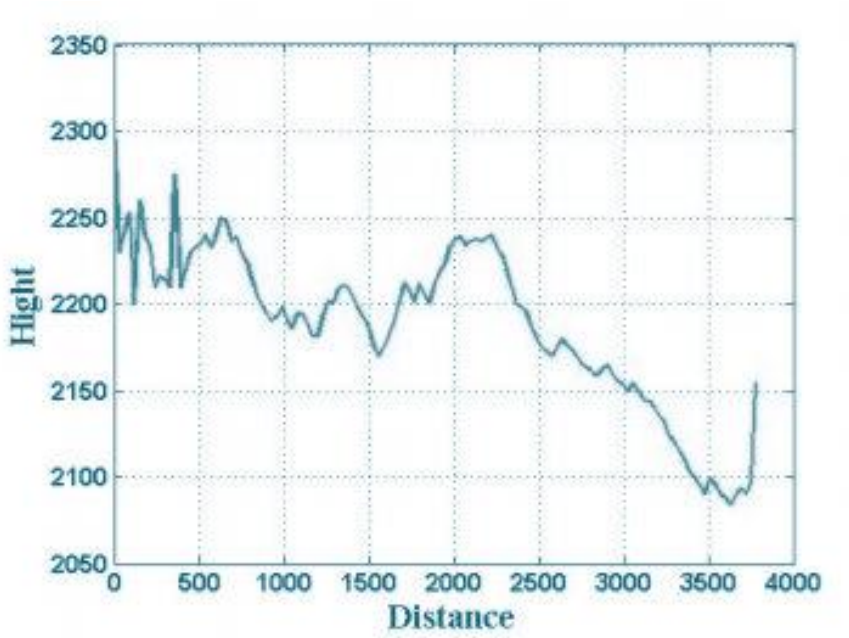


Requires DSM input

DSM

Problem Definition

- A high-performance coding library is required to extract the path/elevation profile from a DEM (Digital Elevation Model)

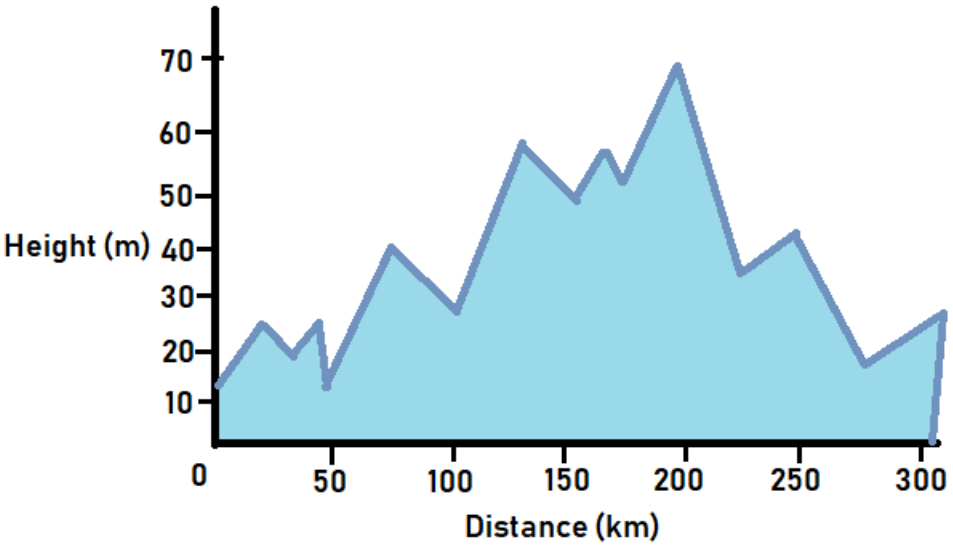


An example of a path profile [3]

Project Objective

- A high-performance coding library must be designed and developed for the purpose of extracting a path/elevation profile from a DEM

libprofile.a



A theoretical path profile

References

1. GISGeography, "DEM, DSM & DTM Differences - A Look at Elevation Models in GIS - GIS Geography", *GIS Geography*, 2018. [Online]. Available: https://gisgeography.com/dem-dsm-dtm-differences/. [Accessed: 02- Feb- 2019].
2. L. Frenzel, *Principles of Electronic Communication*, 4th ed. New York: McGraw-Hill, 2016.
3. J. Aziz and S. Hamada, "Path Profile Analysis of a LOS System Using 3-D Digital Map", *The 1st Regional Conference of Eng. Sci. NUCEJ Spatial ISSUE*, vol. 11, no. 1, 2008. [Accessed 3 February 2019].

Questions