DESIGN AND DEVELOPMENT OF AN OPTIMIZED NUMERICAL ALTITUDE MAPPING ALGORITHM AND PROTOTYPE FOR THE "VISKONAFAD" POST DISASTER MONITORING SYSTEM

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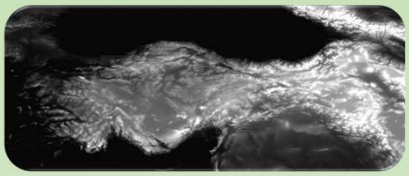
INTRODUCTION

This project aims to improve upon an already existing natural and post war disaster monitoring system developed by TUBITAK named "VISKONAFAD" which was developed to hastily make an assessment of damage occurred on a national scale. The improvements will be done in the manner of graphical mapping of terrain and height data at given satellite locations.

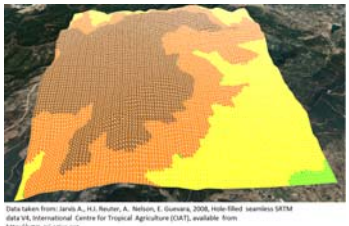


Our goal as a team was to accurately map given data points into a seamless graphical representation with as little data loss and approximation as possible. We also aimed to unite all the data under a web platform to create a seamless environment in which post disaster damage can be easily assessed with little to no latency.

OBJECTIVES COMPLETED

- Research performed on already existing rendering methods and the GDAL library.
- Implementation of simplification within spherical geometry.
- Implementing a triangulation algorithm that would later on be used to render the said data.
- Research and application of a working simplification algorithm utilizing the generated mesh and critical points.
- Converting all the output files into the Google Earth compatible KML file format via a parser.

Data taken from: Jarvis A., H.I. Reuter, A. Nelson, E. Guevara, 2008, Hole-filled seamless SRTM data V4, International Centre for Tropical Agriculture (CIAT), available from http://srtm.csi.cgiar.org.



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In these cluster of images the final result of the project can be observed where data obtained by CIAT of Seamless SRTM is utilized to render a digital elevation model with color to represent certain elevation points.

SOFTWARE AND INTERFACE

Above as can be observed on the left hand side is the unaltered version and on the right is the output of the software being rendered, generating a visual digital elevation model of Turkey given a set of data points. It is clear that both spherical geometry is being taken into account and the rather small filesize allows the user to easily port the results to another machine. Interface wise unfortunately as a team we hit a shortcoming due to the fact that we solely focused on performance metrics rather than developing a GUI, thus the software is console based and not as user friendly as hoped for. Yet such a shortcoming could be easily mended utilizing a library such as Native File Dialogs.

CONCLUSIONS

To conclude we as a team believe that we reached the goals required by developing a lightweight digital elevation model rendering method and KML parser that enables the end user to easily compress and transport generally large and cumbersome elevation model data restricted only by the maximum filesizes of the KML file format. Improvements are always an option and yet the simple basis which utilizes multiple elements from the GDAL library enables flexible altering of the code and roat to future development and usage on the filed.

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