

Introduction

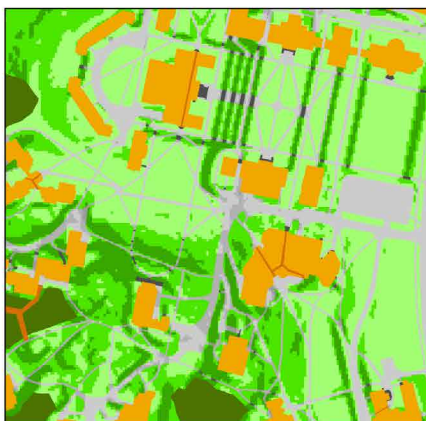
Our project sought to create the first geographically accurate map of campus. Prior to our project, Colby lacked a map of the campus that displayed the precise coordinate locations of buildings, structures, fields and paths on campus. The closest Colby had was Computer-aided Design data (CAD), a 2D image that is irrespective of the subjects location on the Earth and does not account for the curvature of the Earth.

The intent of our project was to build a foundation of GIS data to both benefit the Physical Plant Department and enable future research opportunities for GIS students. PPD requested an updated map of campus, as well as analyses of bike infrastructure, light infrastructure, handicap accessibility and optimal walking path placement. We intended to produce a series of recommendations to PPD, detailed in our other posters.

Methods

We utilized ArcGIS to make our map. We had an initial CAD map of campus to work off of, which was already projected to Maine's most common projection, NAD 1983 UTM Zone 19N. NAD83 is a datum originating in North America, while UTM is a regionalized Mercator projection, which is both widely used and highly accurate. This map was significantly out of date and riddled with inaccuracies; specifically, it was missing many campus paths and building expansions, in addition to other absences. We fixed these errors through digitizing, or manually tracing, missing aspects from satellite imagery (Maine Office of GIS), Google Earth images, additional updated CAD maps from PPD and floor plans of all buildings, available through PPD.

To create a raster layer of campus, we had to convert our polygon layers into static pixels. In order to do this, we had to rasterize each polygon layer individually, and combine them by adding each respective pixel value together. Utilizing satellite lidar sensing, we were able to create a raster layer showing the slope of the campus grounds, which we merged with the campus lawn and paths. In process, we had to keep the pixel origin and size constant in order to avoid any mismatching inaccuracies. The result was a raster map of campus, with each pixel corresponding to a specific value. Our reclassification model is then able to translate these values into roads, buildings, etc. for the purposes of further analysis.



The raster map of campus is pictured here, including slope data. Buildings are shown in orange, paths and roads are shown in gray with darkness varying with slope and grass is shown in green with darkness varying with slope.

Colby Campus Vector Map



Discussion

Our campus map will enable two major benefits to Colby: (1) the development of new visual representations of campus and (2) GIS analysis of campus.

Having a geographically accurate map of campus opens up new a visual frontier for the presentation of campus. As of now, the main, publicised maps of campus are artistic renderings. As such, there was no accurate top-down map to aid in the navigation or visualization of campus. In contrast, of available single resources, our map best shows the areas, distances, shapes and locations of all structures on campus. Our new campus map could be easily printed for use by the Office of Admissions or during other symposiums, conferences or orientations that take place on campus. One of the many such uses for our campus basemap was the creation of a new trails map, which could replace the current outdated map from 2002.

The geographically accurate map of campus we produced will serve as the foundation for future GIS analyses. From our map, we were able to conduct subsequent analyses on the campus's light, path, bike and accessibility infrastructure. The possibility for future analyses is limitless, now that the base data is in place. Future projects could include GIS analysis of Colby's planned athletic and arts buildings, evaluations of parking availability, assessment of campus traffic, as well as any other project with spatial considerations.

Pictured here is a snippet of the updated Trails Map. The southeast part of campus is pictured, showing a portion of trails in the lower and upper Arboretum. Topographic lines are shown in light purple, while trails are shown in various colors.

