

NEW HAMPSHIRE UNION LEADER

UNH: Treetop drone image research benefits forest industry

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University of New Hampshire researchers are working on developing better methods for segmenting aerial forest images taken by drones to pinpoint different tree species for more effective forest management.

According to a UNH news release, New Hampshire Agricultural Experiment Station researchers have found that "the spectral (wavelengths of light) information from natural color imagery more accurately identifies individual tree crowns — the branches and leaves/needles extending from the trunk — than the traditional canopy height model."

"The research is important to New Hampshire landowners and forest managers as mapping and monitoring forests is a key component of managing natural resources," the news release states.

While drone technology continues to improve and offers more cost-effective ways for collecting data, choosing the most appropriate data and level of detail has become increasingly important. The UNH research evaluated methods for selecting the best data to distinguish individual trees.

Jianyu Gu, a post-doctoral research associate with the Agricultural Experiment Station, noted that accurately delineating the tree crowns within the digital imagery — a technique called segmentation — is an ongoing challenge.

Additionally, the results for a mixed forest — one not dominated by either deciduous or coniferous trees — were not much different than either a conifer or deciduous forest alone. Most previous work in this area was done on conifer forests because the crown shape is easier to detect. However,

much of the forested land in New England and other parts of the United States contains both types of trees.

Improved accuracy in identifying and measuring tree crown size and shape can reveal much about the ecology and competition in the forest, according to experiment station researcher Russ Congalton, professor of natural resources and the environment.

Since New England forests are both mixed and highly dense, these research findings will benefit researchers and foresters, the news release states. According to the North East State Foresters Association, the annual value of sales of New Hampshire's forest products industry totals nearly \$1.4 billion.

"Improvement in geospatial technologies, including the collection of remotely sensed imagery, has substantially increased our ability to generate effective and efficient information about our forests. Recently, the development of unmanned aerial systems has allowed for very cost-effective and high-resolution imagery. This imagery has the potential to provide information at a level of detail beyond what has historically been possible," Congalton said in the news release.

Going forward, researchers plan to develop additional approaches to delineate individual tree crowns and monitor invasive species. Specifically, they plan to use time-series drone images between years to develop ways to detect invasive species and model their growth in New Hampshire.

This research is published in the journal "Forests." Collaborators include Congalton, postdoctoral research associate Jianyu Gu, and doctoral student Heather Grybas. Undergraduate students Vincent Pagano and Hannah Stewart, along with doctoral student Benjamin Fraser, assisted with the drones and reference data collection.

Source: https://www.unionleader.com/news/environment/unh-treetop-drone-image-research-benefits-forest-industry/article_154df7b1-d1f0-552b-ba70-98e26267c5e6.html