Scalable LiDAR-assisted Multiple Endmember Spectral Mixture Analysis

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***Abstract*—As remote sensing takes momentum for monitoring ecological data, we have to deal with loads of high precision, high dimensional data, the processing of which is beyond any conventional computer. In this paper we introduce a scalable architecture for computing Multiple Endmember Spectral Mixture Analysis facilitating LiDAR canopy height information. We propose to use SciDB for storing hyperspectral and LiDAR data as a parallel array data-store, and the computation engine will be performed by in-memory map-reduce using Spark. This architecture enables the use of multiple conventional computation engines and allows us to process data on-demand.**

***Keywords*-Multiple Endmember Spectral Mixture Analysis; LiDAR; Distribtued Computing; Scalable Architecture**

I. Introduction

A very important aspect of remote sensing is the vast amount of data being generated by satellite or airborne sensors. As remote sensing technologies become cheaper and more affordable we can collected data more often and over large observatory areas. This raises the issue of scalable data storage, maintenance and computation. Airborne remote sensing is typically composed of hyperspectral and LiDAR sensors. AVIRIS which is a common hyperspectral sensor collects surface reflectance values at 224 bands and when considered at sub-meter percision this can lead to millions of data points across several flight lines just for a single observatory site. When considered at contiental scale which is the target of organizations like National Ecological Observatoy Network (NEON) it can be beyond any conventional system architecture to store and process such huge data.

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II. Type style and Fonts

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III. Conclusion

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References

[1] H. Kopka and P. W. Daly, *A Guide to LaTeX*, 3rd ed. Harlow, England: Addison-Wesley, 1999.