

Assessing Change in Global Forest Cover using Data Mining

Vipin Kumar
University of Minnesota
kumar@cs.umn.edu

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Assessing change in forest cover is of critical importance in studying natural and anthropogenic impacts on natural ecosystems. For example, the contribution of greenhouse gases from deforestation is one of the most uncertain elements of the global carbon cycle. Without information about global deforestation patterns and fluxes, it is difficult to balance the present-day carbon budget and predict the effects of climate change. Recent research suggests that the role forests play in regulating global climate is larger than previously thought and will likely become even more important as alternative carbon sinks become saturated while forests continue to act as sinks throughout a century of climate change. In fact, changes in forests account for as much as 20% emissions in the atmosphere, an amount second only to fossil fuel emissions. Thus, the need to assess the state of forest ecosystems and how they are changing has become increasingly urgent.

Rich amounts of data from remotely sensed images are available for detecting changes in land cover. However, in spite of the importance of this problem and the considerable advances made over the last few years in high-resolution satellite data, data mining, and online mapping tools and services, end users still lack practical tools to help them manage and transform this data into actionable knowledge of changes in forest ecosystems that can be used for decision making and policy planning purposes. Previous change detection studies, while useful, have primarily relied on examining differences between two or more satellite images acquired on different dates. These approaches have a number of limitations; for example, changes that occur outside the image acquisition windows are not mapped, it is difficult to identify when the changes occurred, information about ongoing landscape processes

cannot be derived, and they are inherently unsuited for application at large spatial scales.

This talk presents data mining based techniques for determining forest cover changes that address the limitations of the existing techniques for this problem. Results of the applications of these techniques on regional and global scales to detect changes due to fires and logging will be presented.

Short Biography

Vipin Kumar is currently William Norris Professor and Head of Computer Science and Engineering at the University of Minnesota. His research interests include High Performance computing and data mining. He has authored over 200 research articles, and co-edited or coauthored 10 books including the widely used text book "Introduction to Parallel Computing", and "Introduction to Data Mining" both published by Addison-Wesley. Kumar has served as chair/co-chair for over a dozen conferences/workshops in the area of data mining and parallel computing. In 2001, Kumar co-founded SIAM International Conference on Data Mining and served as its steering committee chair until 2007. Kumar is a founding co-editor-in-chief of Journal of Statistical Analysis and Data Mining, editor-in-chief of IEEE Intelligent Informatics Bulletin, and series editor of Data Mining and Knowledge Discovery Book Series published by CRC Press/Chapman Hall. Kumar is a Fellow of the AAAS, ACM and IEEE. He received the 2009 Distinguished Alumnus Award from the Computer Science Department, University of Maryland College Park, and 2005 IEEE Computer Society's Technical Achievement Award for contributions to the design and analysis of parallel algorithms, graph-partitioning, and data mining.