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Intellectual Merits: Results from recent projects were published in 8 peer-reviewed articles [1, 4, 3, 2, 5, 6, 7, 8]. Illustrative examples of results include: **(1)** Spatial decision tree for geographical classification (Preliminary results published at IEEE ICDM [3], extended version accepted with major revision by the IEEE TKDE [2]). **(2)** An inter-disciplinary survey on change footprint patterns and discovery techniques. (Published at the Wiley Interdisciplinary Review: Data Mining and Knowledge Discovery [5]). **(3)** Interesting sub-path discovery. (Initial results published at ACM SIGSPATIAL GIS [7], full results accepted with major revision by IEEE TKDE [6]). Our research results could also contribute to advancing computer science research in a broader range. Examples include the G-DAG representation and the RTCP algorithm [6], which also might be used for pattern discovery in image and video processing, and the interdisciplinary survey [5], which enabled cross-fertilization of techniques from various disciplines.

Broader Impact: This project has supported two Ph.D. students on their thesis research. Doctoral student X. Zhou supported by this project defended his Ph.D. thesis in June 2014. His thesis topic is "Spatiotemporal Big Data Analytics: Change Footprint Pattern Discovery". Another doctoral student Z. Jiang will take his thesis proposal exam in 2014, too. Jiang's thesis explores computational approaches to learning spatial decision trees for geographic classification. Using the results obtained in our project, we contributed towards improving STEM education by enhancing the curriculum of a course titled "Spatial databases (CSci 8715)." Dr. Shekhar also presented several invited lectures and keynotes at major conferences. Finally, the projects have engaged underrepresented students in research and education. In summer 2012, Ms. Rahni Sumler, an undergraduate student from North Carolina A&T University (a HBCU) had a six-week internship on spatiotemporal data analytics for understanding climate change. Ms. Reem Y. Ali joined group in Fall 2012 and is working on cloud computing approach to persistent change window discovery on Earth science data.

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