UNIVERSITY OF SOUTH FLORIDA

Defense of a Doctoral Dissertation

Efficient Viewshed Computation Algorithms on GPUs and CPUs

by

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For the Ph.D. degree in Computer Science and Engineering

Viewshed computing and visibility analysis is the problem of finding visible areas on the map to a certain point-of-interest. Viewshed algorithms are widely used in GIS applications, games development, and in creating communication networks. However, current viewshed algorithms with high accuracy are suffering from poor performance compared to other algorithms that approximate the visibility results. Based on the necessity for having an accurate and time-efficient algorithm. This work presents a parallel radial-sweep algorithm on GPUs, and an optimized CPU-based algorithm for an efficient viewshed computing on both platforms.

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THE PUBLIC IS INVITED

Publications

1) **Qarah, Faisal F**., and Yi-Cheng Tu. "A Fast Exact Viewshed Algorithm on GPU." In *2019 IEEE International Conference on Big Data (Big Data)*, pp. 3397-3405. IEEE, 2019.
2) Courtney Buck, Joni Downs, **Faisal Qarah**, Yujie Hu. "Spatial Analysis of Potential Nesting Habitat for Florida Sandhill Cranes". In Journal of Fish and Wildlife Management, 2020. (Accepted)
3) **Qarah, Faisal F**., and Yi-Cheng Tu. "A Memory Optimized Radial-Sweep Algorithm for Computing Viewshed on CPU and GPU" in IEEE Access, 2020. (Submitted)

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