Nearest Neighbour Search in 3D Visualization

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Try it online: https://morsakabi.com/nns/

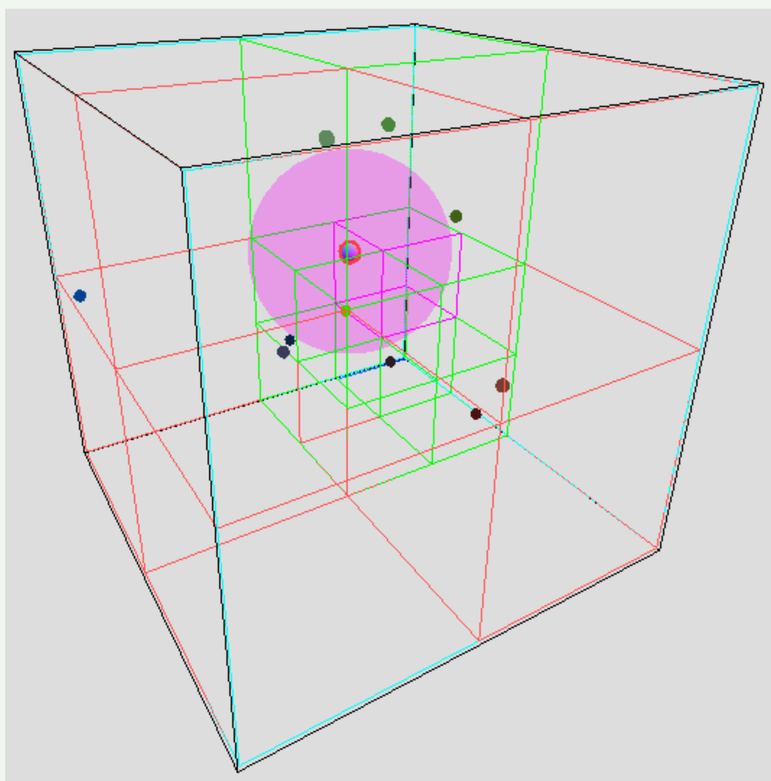
Introduction

To people unaccustomed to spatial data, understanding nearest neighbour search (NNS) algorithms in higher dimensions can provide difficult. As such, we have developed an easy to use in-browser application to be a visual aid for understanding nearest neighbour searches in 3 dimensional space. This project was developed for the Advanced Algorithmics course in fall 2016/17 in the University of Tartu. The application requires a modern browser with WebGL support.

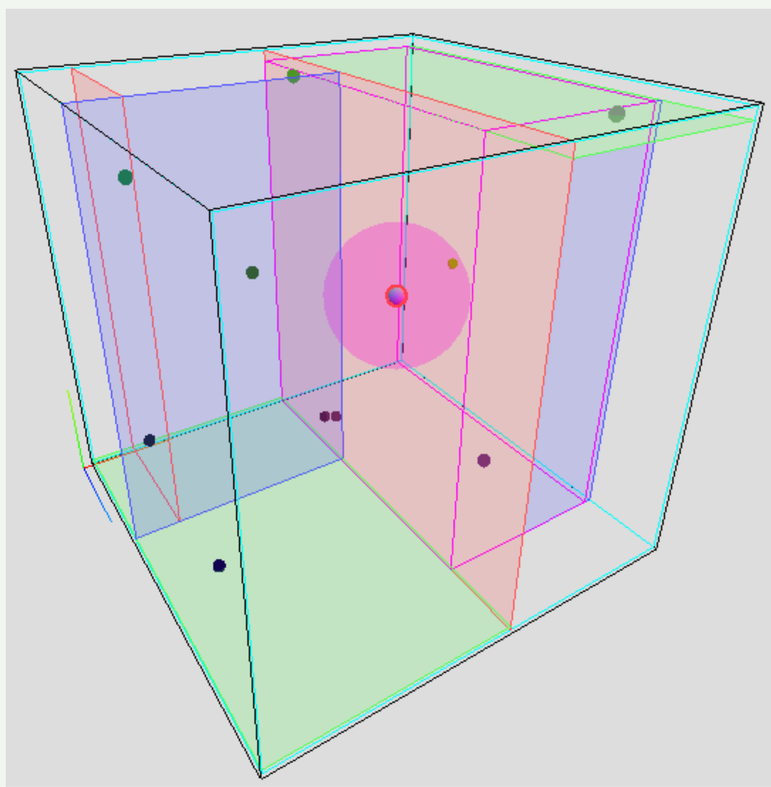
Features

- Generating a select size set of 3D points
- Interactive view of the 3D points
- **Building** KD-, random projection and octrees
- **Searching** for the nearest neighbour of any point in space using radius search
- **Visualizing** the NNS algorithm one step at a time

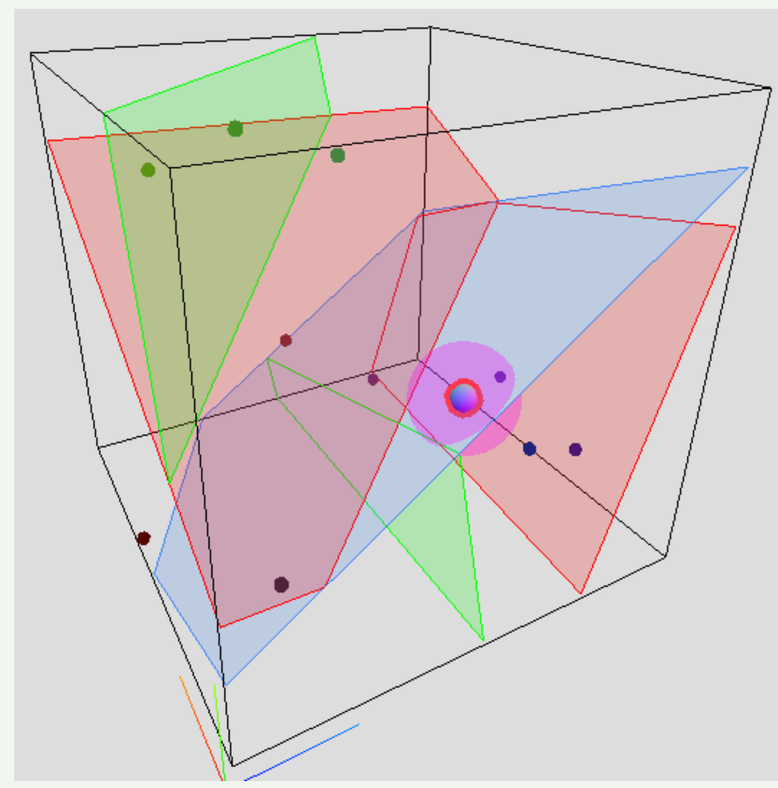
Octrees



KD-trees



Random Projection Trees



Conclusions

While the regular implementations of these algorithms are more straightforward, disecting them in such a way that they can be executed on a per step basis and finding the required polygons for rendering were not. We hope the application will be of use for future algorithmics students and alike.

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The project's source code is freely available at https://github.com/AndreasGP/NearestNeighborsWebGL3D.