



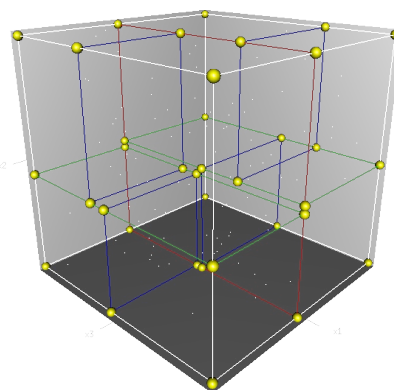
Generalized Exposure

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Topic

Generating user profiles based on location data is currently researched in a lot of different companies, such as Sense Networks, based in New York City, NY, USA. These profiles can be useful to several domains of our daily life, for example in the public health sector, marketing or crime prevention.

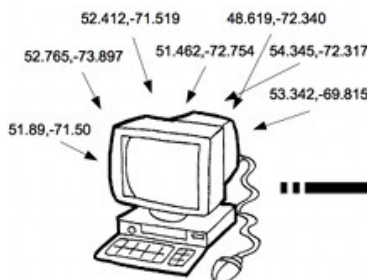
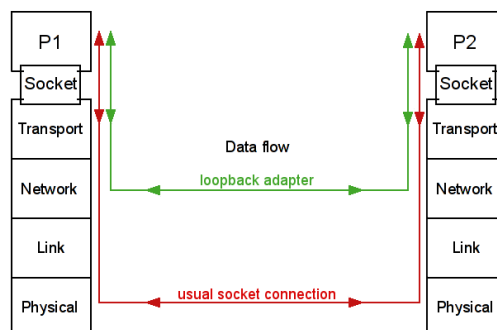


Goal

For the generation of user profiles based on location and movement data, a possible approach is to calculate the spatial proximity of so called "Points of Interest" and use special statistical algorithms to compute a corresponding profile. Therefore, an underlying infrastructure has to be created, which allows to distinctly handle millions of users and billions of locations simultaneously and calculate their spatial proximity. Thereby it generates the data needed for the profile computation, within a minimal amount of time.

Realization

First, existing theoretical approaches to calculate spatial proximity, such as spatial databases and specialized binary trees, were researched and compared. Using the approach that offers the best overall performance and stability, a generic and optimized distributed software infrastructure was created. Secondly, the developed software was integrated into Sense Networks' existing system, named "Macrosense", and different interfaces were implemented to offer simpler access. In a final step, parts of the existing system were adapted in order to use the new infrastructure.



Profile	
Gender:	male
Age:	20-29
Income:	\$20k-25k
Occupation:	Student
....	

Results

The developed infrastructure, based on highly optimized binary trees and socket communication, is able to handle millions of users and billions of locations within minutes. Thereby it generates the necessary data that improves the quality and speed of Macrosense significantly. On top it is used as a basis for many newly developed software features, such as home finding algorithms or social graph creation. This opens brand new possibilities to Sense Networks' clients and their various purposes.

Betreuer/ Betreuerin

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