Inspira Crea Transforma

UNIVERSIDAD EAFIT®

Robotic bees:
Data structures and algorithms for collision detection and prevention.

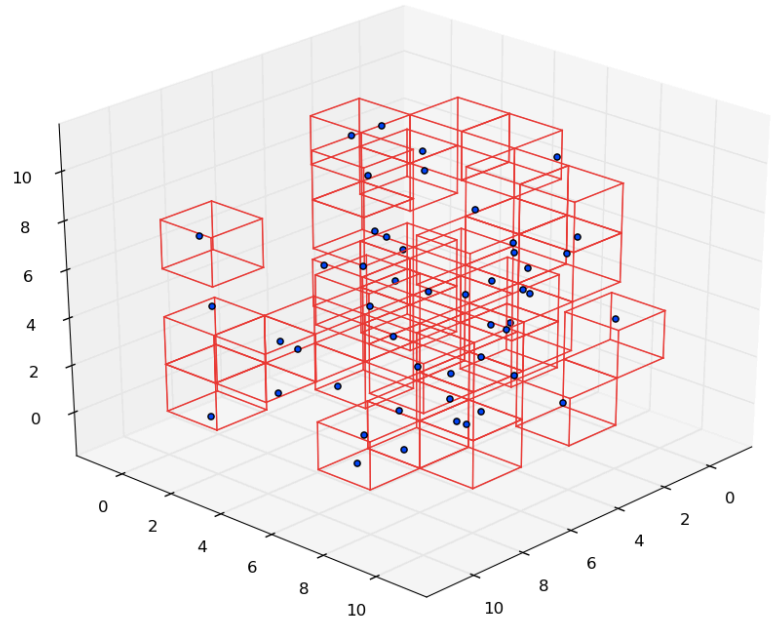
Vincent Alejandro Arcila
Universidad EAFIT
Colombia
vaarcilal@eafit.edu.co

Isabel Piedrahita
Universidad EAFIT
Colombia
ipiedrahiv@eafit.edu.co

Mauricio Toro
Universidad EAFIT
Colombia
mtorobe@eafit.edu.co

Spatial Hashes

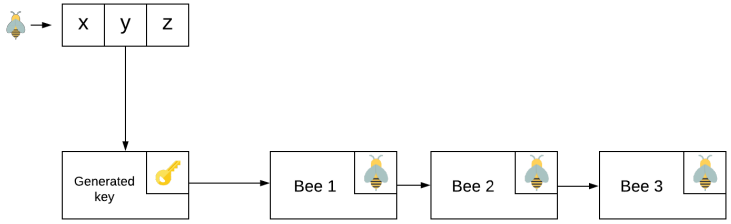
Hash tables in which each key corresponds to a 3D coordinate and the value is a vector of objects, in this particular case bees, that are located in said space.



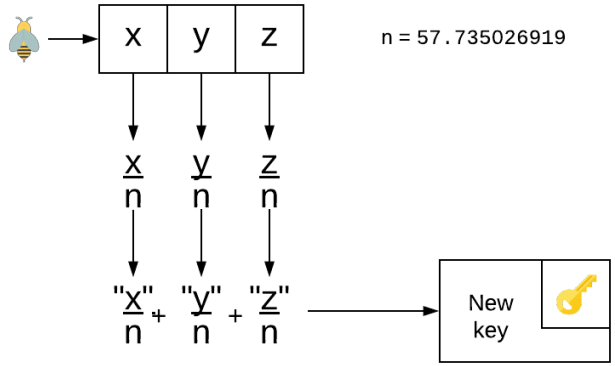
Carl. (2016). Spatial Hashing in C++
Retrieved from http://www.sgh1.net/posts/spatial-hashing-1.md

Operations

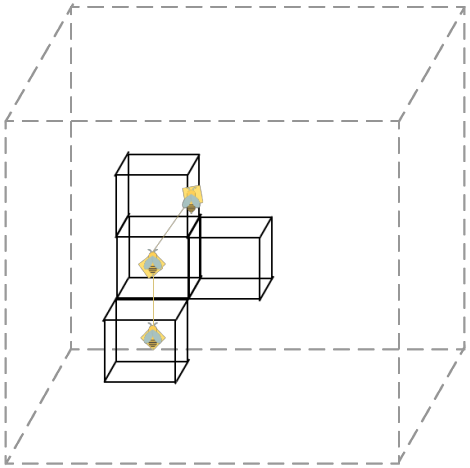
Parse file



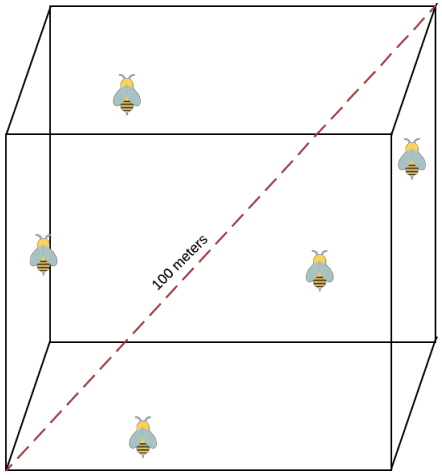
Generate key



Find for unique bee



Find for bees in cube



Why use spatial hashing?

-Intuitive.

-Memory efficient in regards of generating new boxes.

-Fast.

-Key / real space concordance.

Execution time and memory

Parse file	Memory	Time
10		222µs 386µs 188µs
1500		13 ms 24ms 11ms
15000		1368ms 1679ms 1260ms
1000000		1276ms 1394ms 1231ms

Find collision	Memory	Time
10		10µs 4µs
1500		714µs 1243µs 630µs
15000		220ms 223ms 215ms
1000000		219ms 222ms 213ms