

Nearest neighbor on manycore

Lawrence Cayton

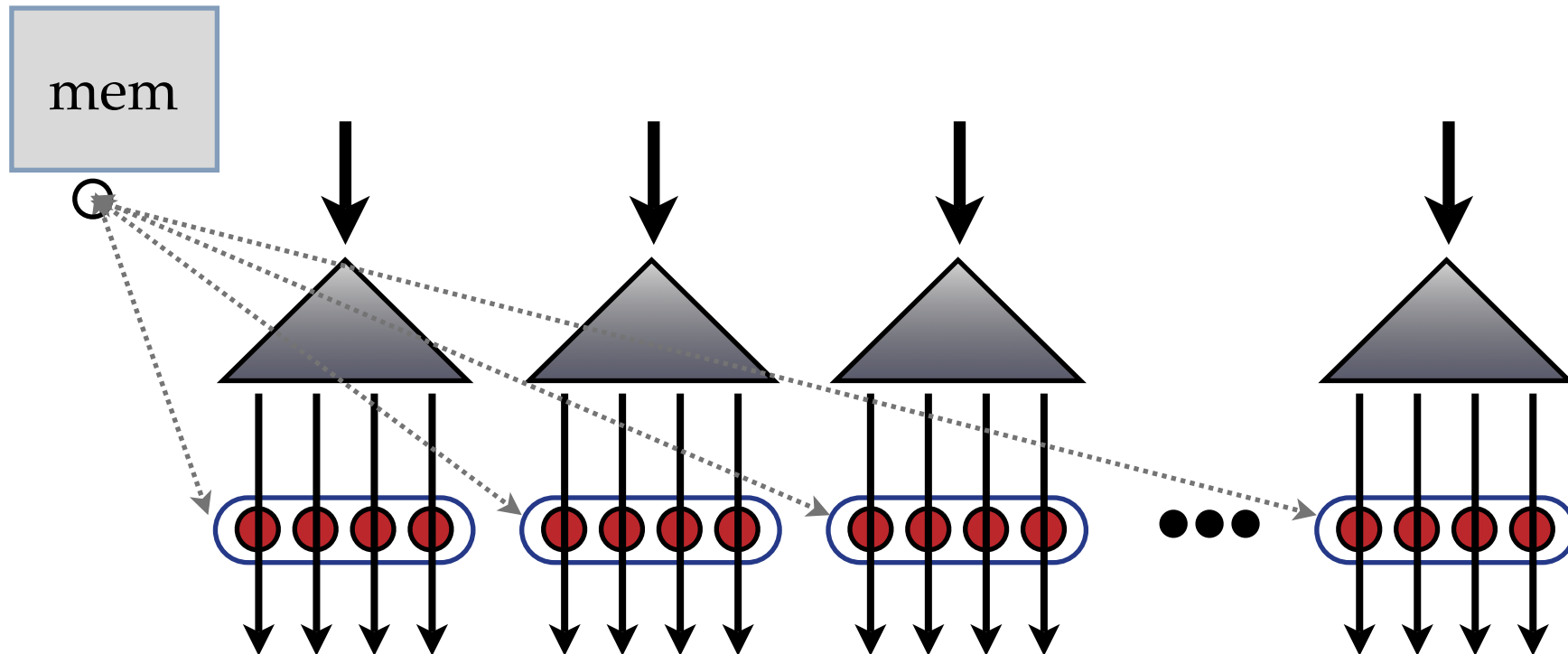
Max Planck Institute, Tübingen

The point of this work

Fast nearest neighbor retrieval in
(intrinsically low-dim) metric spaces....

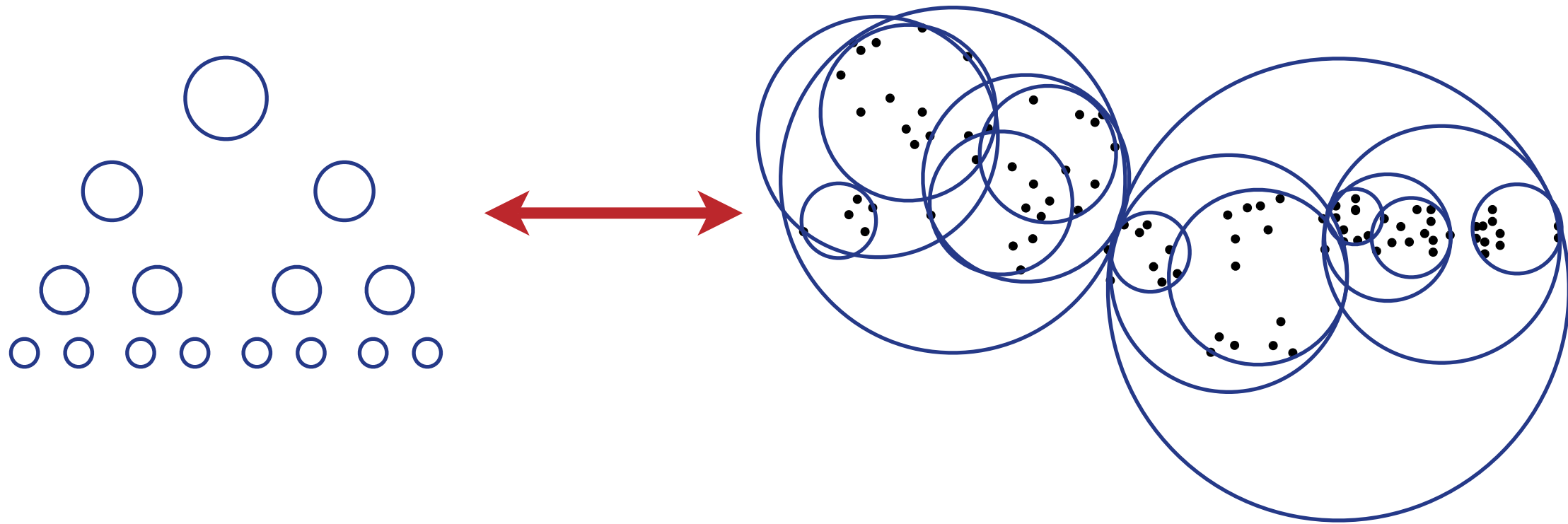
Want:

Effective (and easy to implement) on
modern many-core CPUs and GPUs.



Standard approaches to NN

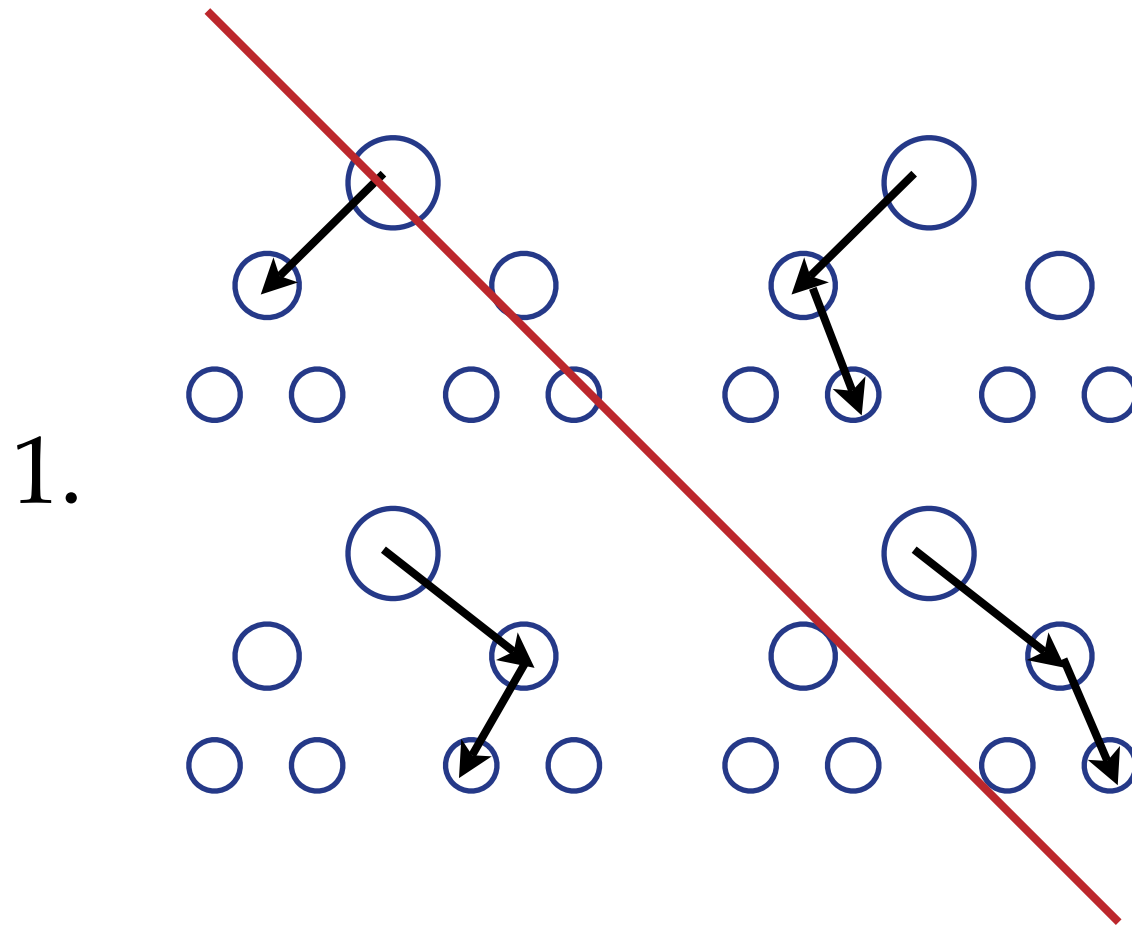
Decompose space; hopefully will only have to look at a small part



Explore tree in conditional way.

recent results: [Beygelzimer *et al.*, 2006, Ram *et al.*, 2009]

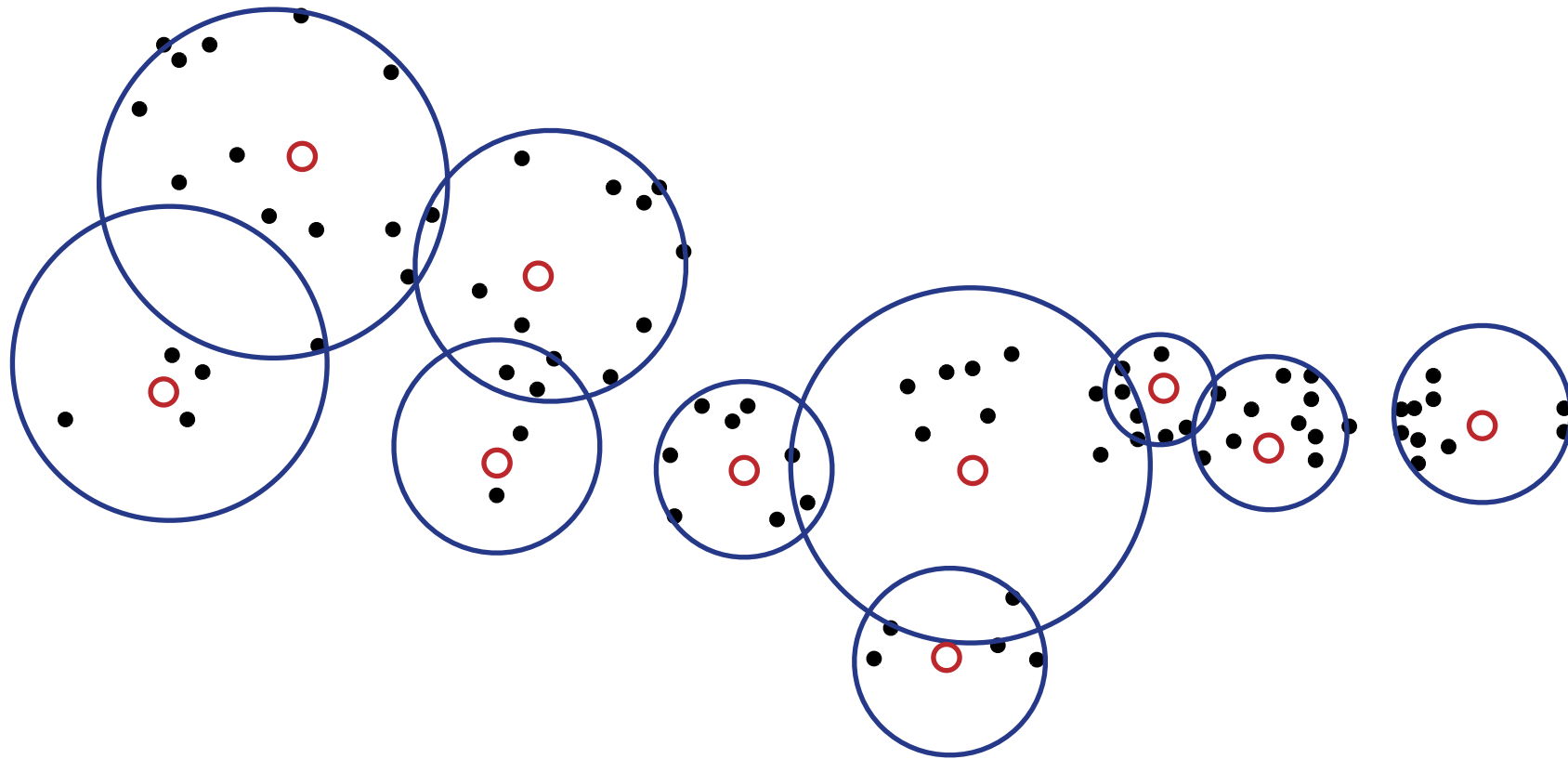
Challenges for parallelism



Complex
conditional
computation
seems difficult
to distribute

2. Memory issues, practical and theoretical.
3. Trees explored in a data-dependent way.

Random ball cover

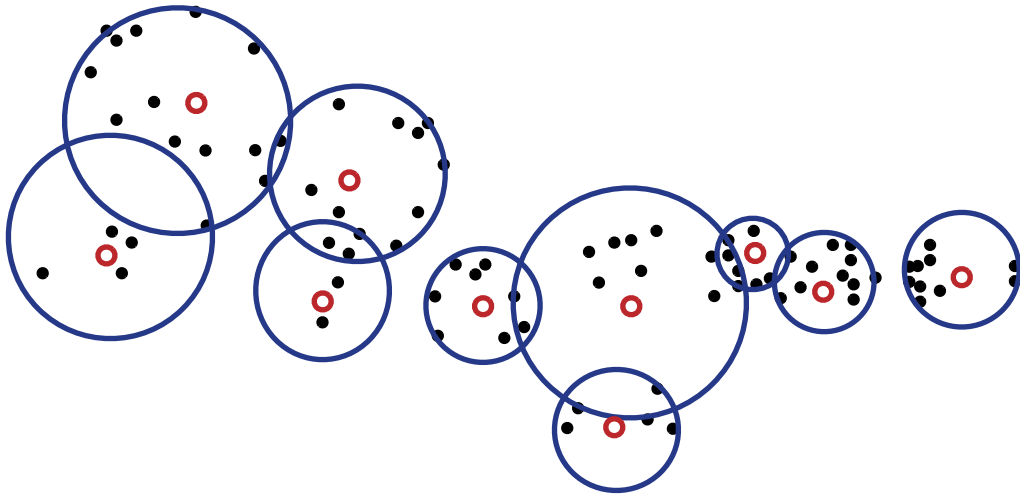


○ r random representatives

○ ball around representatives containing s points

Search algorithm

3 brute force searches; but only between subsets of the DB



e.g. all **representatives**
to all DB points

1. Reduces **work** required for NN search,
2. but still **parallelizes effectively** (like brute force).
3. Simple to implement.

Code available for download.