

Towards Parallel Detection of Moving Flock Patterns in Large Spatiotemporal Datasets

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Agenda

1 Background

2 Flock Patterns

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2 Flock Patterns

Trajectory Datasets

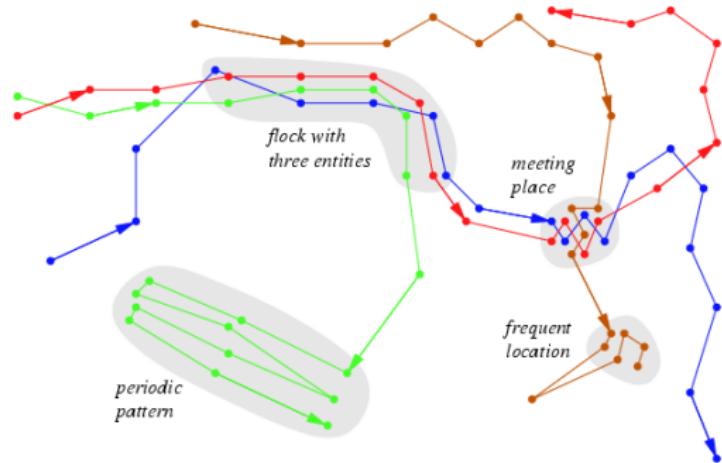
- They know where you are...
 - Smart phones, GPS, RFID, WiFi...



(Jing et al, 2013)

Movement patterns

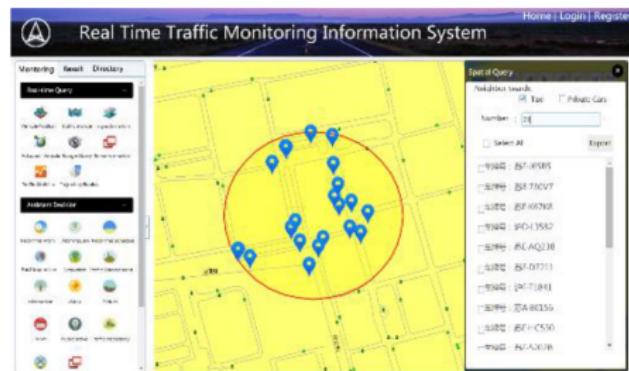
- A new set of rich and interesting movement patterns...



(Gudmundsson et al, 2008)

Applications

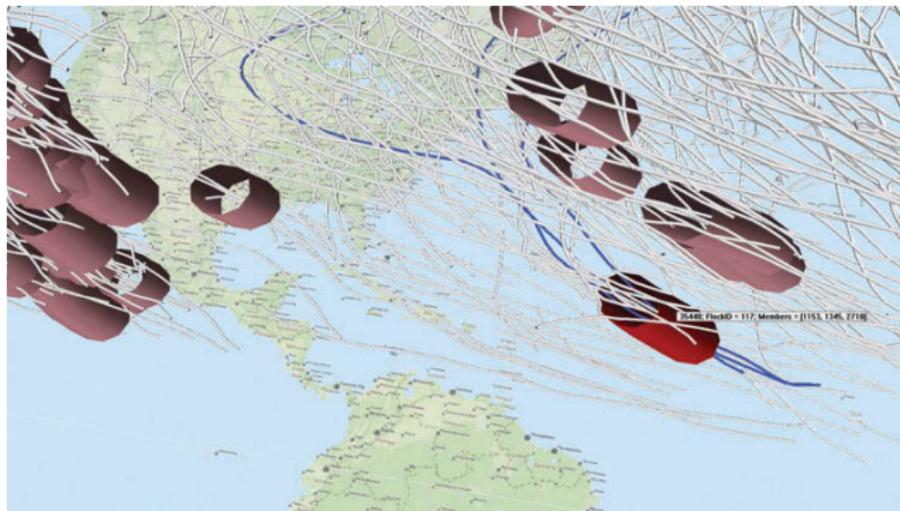
- Transportation...



(Zhang et al, 2016)

Applications

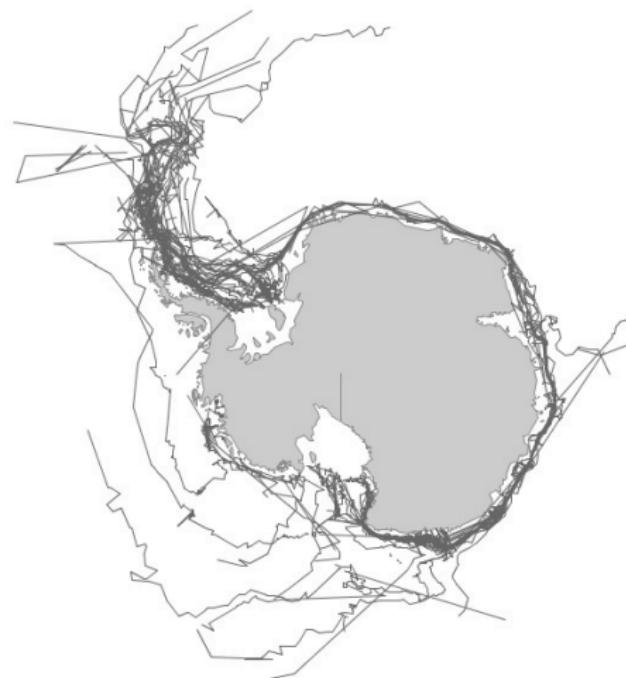
- Weather...



(Turdukulov et al, 2014)

Applications

- Climate change...



(Calderon, 2011)

Applications

- Ecology...



(Majka, 2016)

Applications

- Ecology...

(Fink et al, 2014)

Agenda

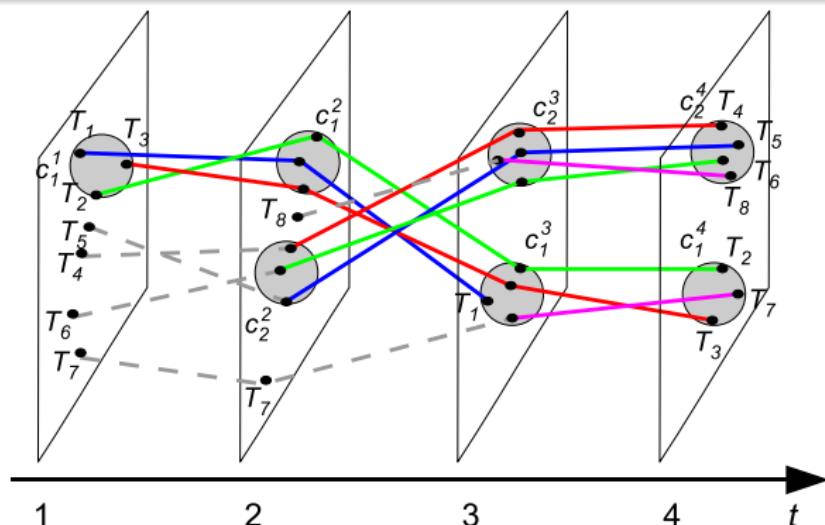
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Flock Patterns

Definition $((\mu, \varepsilon, \delta) - flock)$

Sets of at least μ objects moving close enough (ε) for at least δ time intervals (Benkert et al, 2008).



(Vieira et al, 2009)

BFE algorithm

- Two steps algorithm:

- ① Find sets of disks at each time interval.
- ② Join consecutive time intervals detecting disks with same objects.

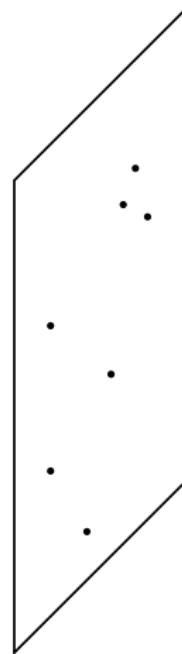
BFE algorithm

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 - ➊ Find sets of disks at each time interval.
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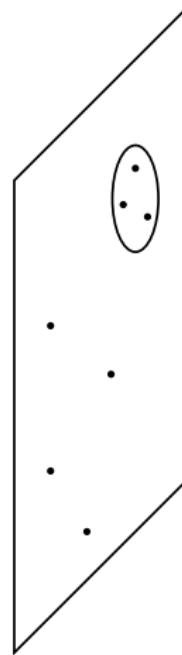
BFE algorithm

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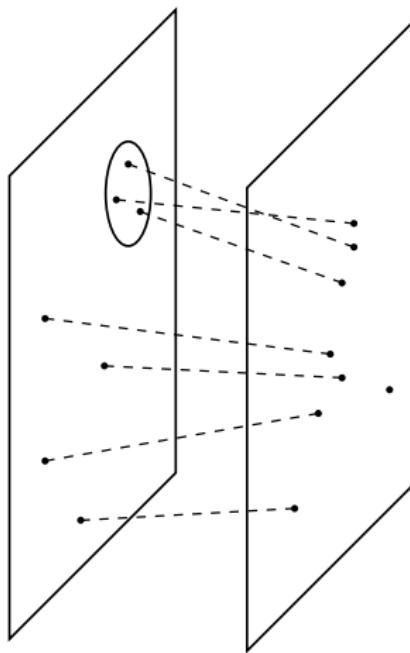
BFE algorithm



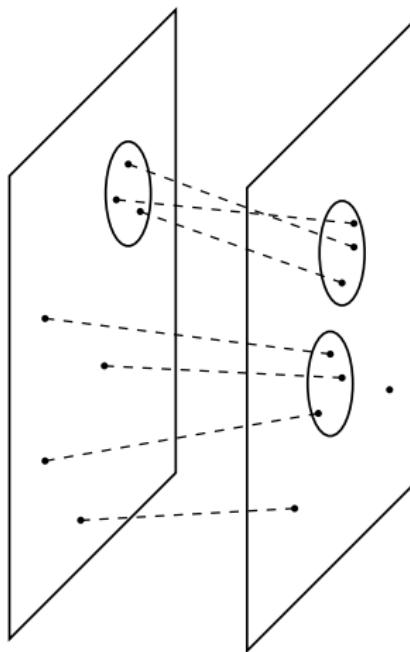
BFE algorithm



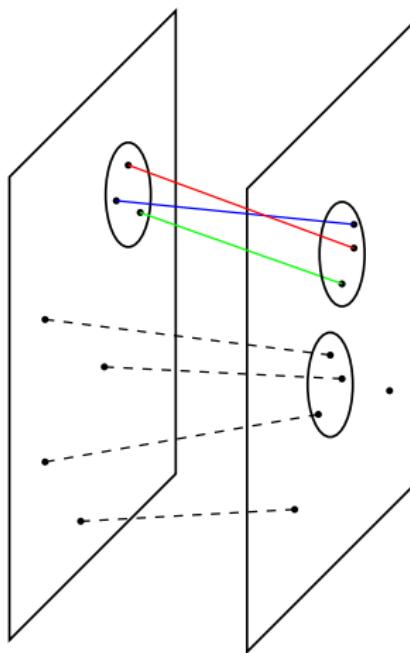
BFE algorithm



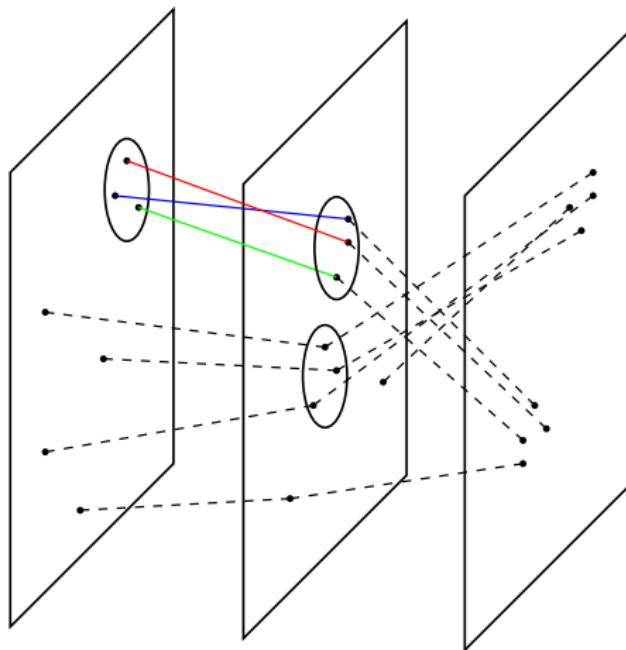
BFE algorithm



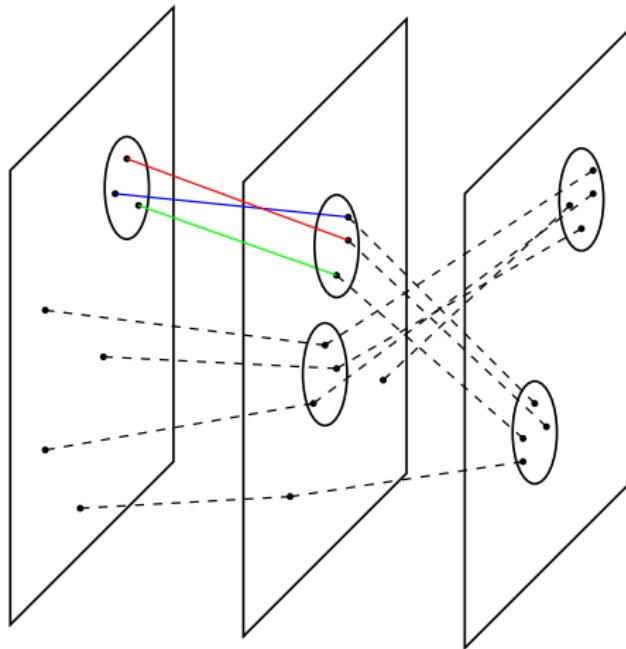
BFE algorithm



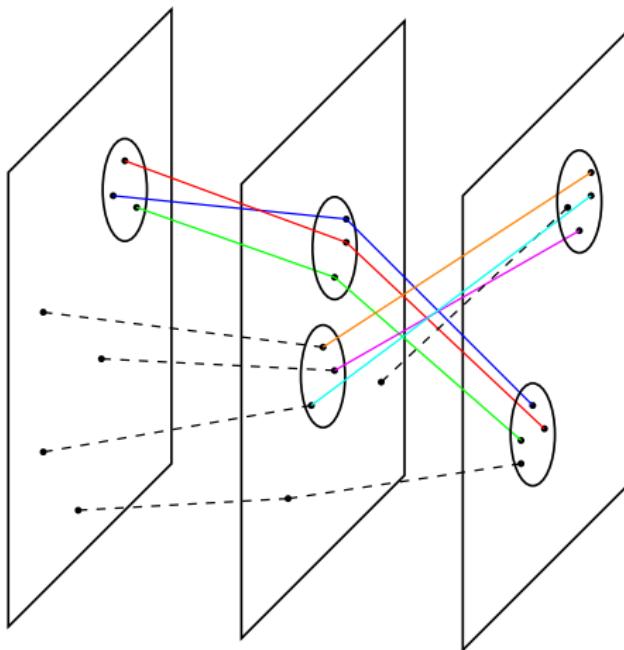
BFE algorithm



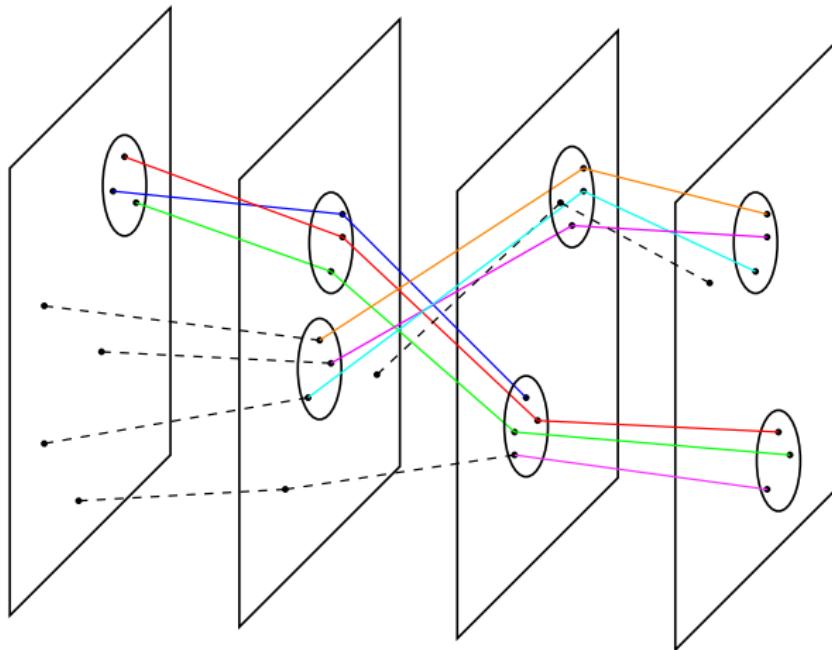
BFE algorithm



BFE algorithm

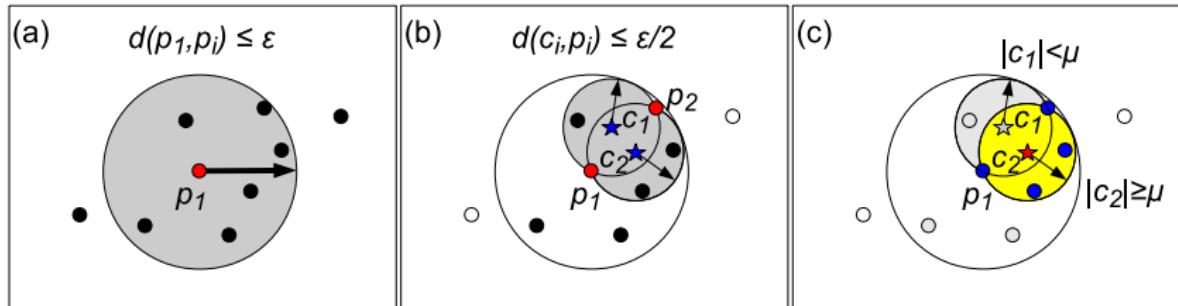
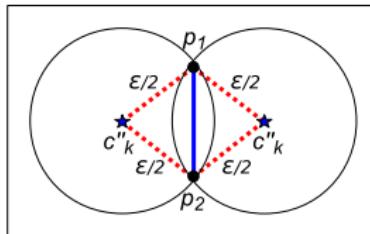


BFE algorithm



Finding the disks...

- Finding the set of disks is no trivial.
- Vieira et al. (2009) proposed a polynomial solution ($O(2n^2)$).



Finding the disks...

Thank you!!!

Do you have any question?