Yuan-Ko Huang, Lien-Fa Lin, 2014. Designing a location update strategy for free-moving and network-constrained objects with varying velocity. *Journal of Zhejiang University-SCIENCE C (Computers & Electronics)*, **15**(8):675-686. [doi:10.1631/jzus.C1300337]

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Designing a location update strategy for free-moving and network-constrained objects with varying velocity

Key words: Spatio-temporal databases, Moving objects, Free-moving objects, Network-constrained objects

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Introduction

- We focus on the issue of managing two important types of moving objects in spatio-temporal databases:
  - free-moving objects (FMOs)
  - network-constrained objects (NCOs)

- Two issues are needed to be addressed:
  - when to update object information
  - how to update of object information

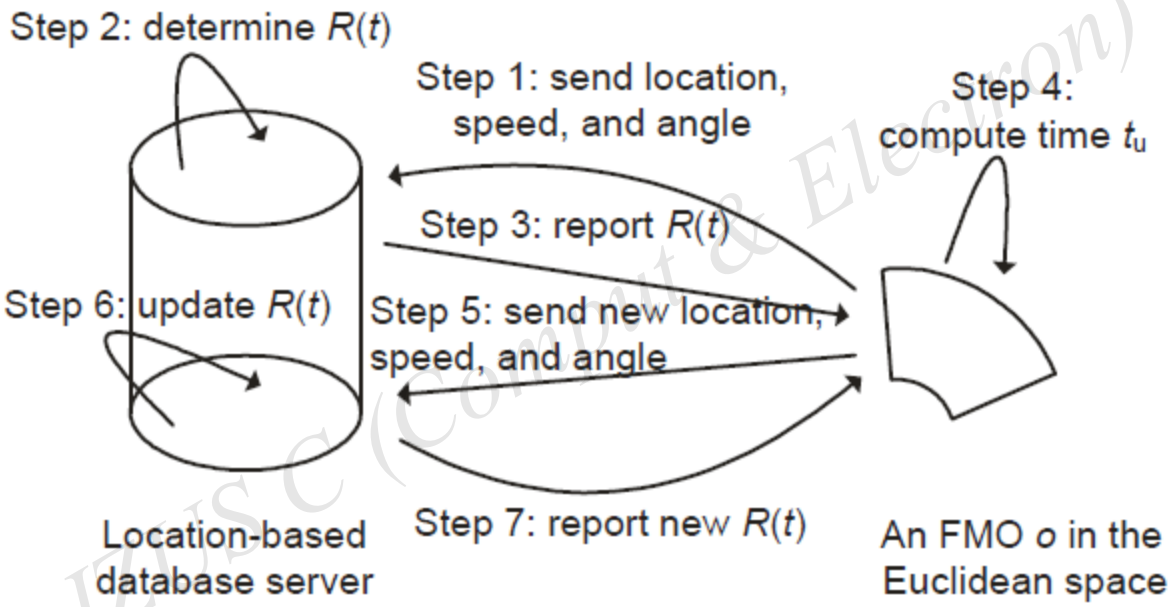
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What we do

- Manage not only free-moving objects but also network-constrained objects
- Design update strategies to give each object a time point at which to update its location
- Develop update procedures to process object location update.
- Conduct extensive experiments to demonstrate the efficiency of the proposed methods.

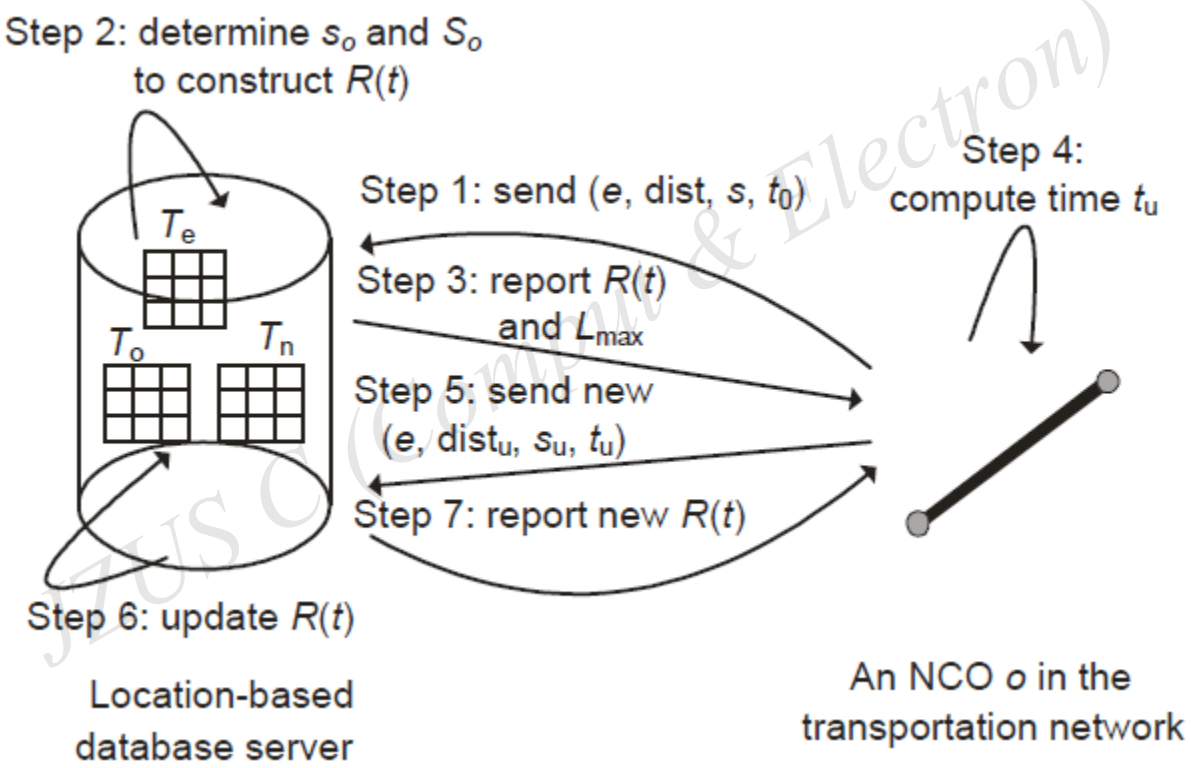
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Update procedure for FMOs



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Update procedure for NCOs



Performance evaluation

- Evaluate the number of object updates and the processing overhead
- Varying P_o and T_o
  - P_o: a percentage of objects changing speed and direction
  - T_o: the time points at which object updates its location
- Competitors:
  - FMOUS
  - NCOUS
  - CRUS
  - FIUS

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Future directions

- Efficiently answer the spatio-temporal queries on FMOs and NCOs.
- Develop a specialized index structure to manage FMOs and NCOs.

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