Problem

- Environmental issues have grown in interest and it is important to have persistent data measurements.
- Monitoring with fixed equipment can be costly and inefficient:
  - A fixed infrastructure is needed, such as a protected location, power and communication lines
  - The coverage area is very limited

Our proposal

- Use cars moving on an area for monitoring environmental parameters
- Mobile agents collect data and transfer them to a monitoring center
- Communication is achieved using cars as nodes in a mobile ad-hoc network (VANET)

Advantages

- Wide coverage area
- No need of infrastructure for monitoring and communications
- Many monitoring tasks can be performed at the same time

Elements on board monitoring cars:

- One or more sensors for reading the environmental data
- A wireless communication device (e.g. Wi-Fi or UWB)
- A GPS receiver
- A laptop or PDA capable of executing a mobile agent platform and accessing the rest of the elements

Steps of the monitoring process (see picture)

1. The monitoring scope is defined: The environmental parameters to measure, the location of the monitored area, and the time limit of the entire process
2. In the Monitoring Center, a number of monitoring agents are created and they jump to moving cars as they pass near enough
3. The monitoring agents travel on the car towards the monitored area. At any moment, they can jump to any nearby car if it follows a more promising path
4. Agents in the monitored area read data from car sensors. They jump to other cars and clone themselves to stay within the area and improve the monitoring
5. When the planned monitoring time expires, agents must return the measured data to the Monitoring Center for later processing

Legend

- Car path
- Monitoring mobile agent
- Monitoring agent jump

Monitoring Process Overview

Monitoring Center

Monitored area

Steps of the monitoring process (see below)

Related references


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