

Project Goal

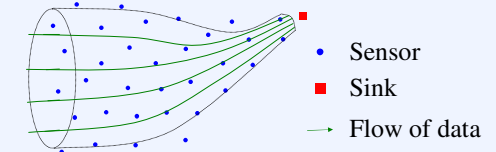
- Support fire-fighters in the rescue mission by providing real-time information, like fire size, spreading speed, chemical concentration, etc., collected from the fire scene.

Telescopic Data Compression Scheme

- To save transmission power and prolong network lifetime, we propose a compression scheme that removes redundancy in sensor data based on sampling theory. Advantages include:
 - Compression ratio close to the theoretic optimum value.
 - Allow users to get a crude overall signal profile efficiently and then "zoom into" particular regions of interest.
 - Local interpolation filters out data noise.

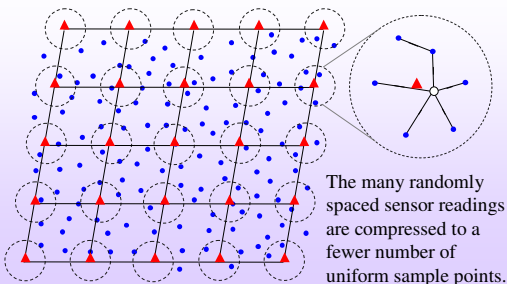
Technical Challenges of Deploying Smart-Dust Type of Sensor Networks

- Large number of randomly spaced sensors
- Severe energy constraint
- Limited computational power
- Data "funneled" to a small number of sinks
- Compression algorithm must be distributed

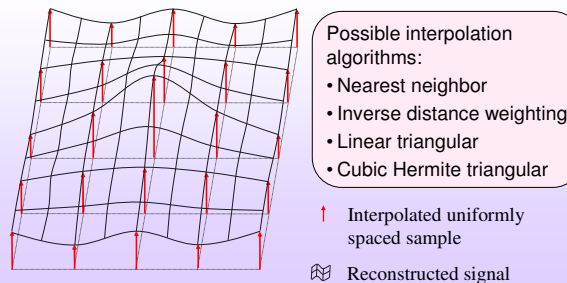


Data from sensors is "funneled" to a collection point

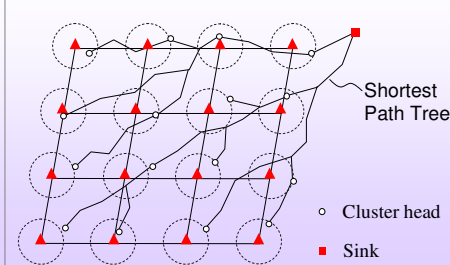
Step 1A: Formation of Sample Points



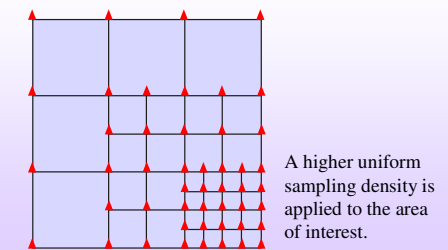
Step 1B: Calculating Sample Points



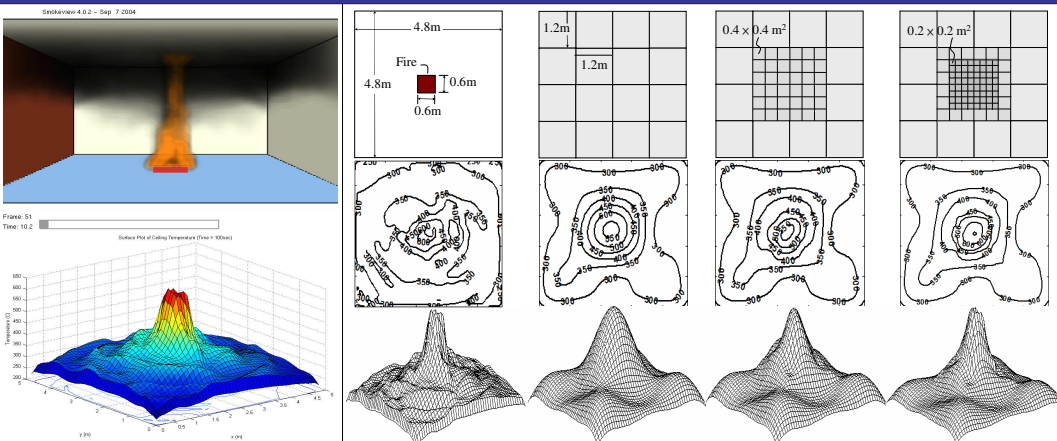
Step 2: Collecting Sample Points



Different Resolutions in Different Areas



Fire Scene Temperature Distribution Reconstructed from Uniform Samples of Varying Densities



Compression Performance Based on an Ideal Bandlimited Signal

