CPS: Synergy: Collaborative Research: Extracting Time-Critical Situational Awareness from Resource Constrained Networks

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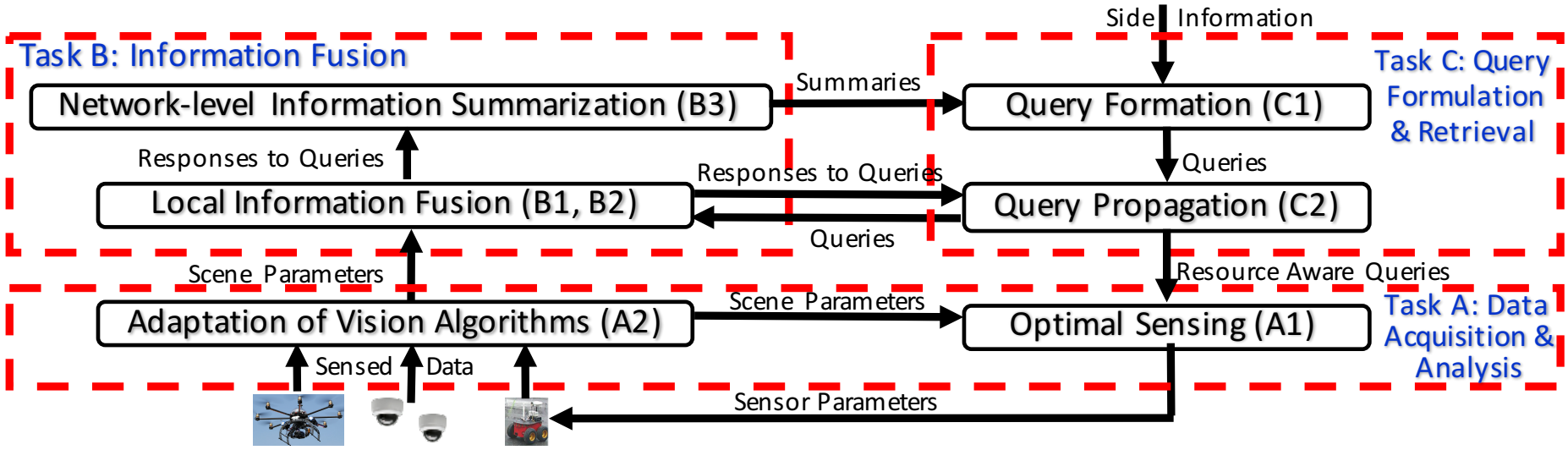
Description

Facilitate timely retrieval of situational awareness information from rich content (e.g., camera networks) generated by field deployed nodes in resource-constrained, uncertain environments.



Overview of research tasks and the flow of information between them

Findings

Accurate and Timely Human Detection in Bandwidth Constrained Wireless Camera Networks

1. Summarize videos obtained from a (possibly uncalibrated) camera network.

2. Introduce new cameras into the scene, as needed, without an extensive training phase.

3. Build a query processing framework, where user/application queries are processed in an efficient and scalable manner in big data settings.

4. Accurately detect the presence of human by leveraging the video feeds captured by multiple cameras.

(Related papers have been published in top-tier conferences and journals in image processing, computer vision, networking, and databases – CVPR, ICCV, MASS, ICDCS, ICDE, VLDB, T-IP, T-Networking, T-KDD. They are available on the project and PI websites.)

Evaluation

TIPPERS Instrumented Building

- 6 Story Building
- **90,000 sq. ft classroom**
- 125 Faculty Offices
- **90 Research Labs**
- Lecture Halls
- **Departmental Offices**

DARPA funded experimental testbed for real-world deployment, testing, and evaluation of a variety of data processing technologies including data management, sensor data processing, and privacy technologies

- **IoT Testbed (TIPPERS)** with capabilities to embed and test various technologies
- **IoT applications and use case scenarios** that expose various privacy & scalability challenges (including privacy technologies), provide context to test validate variety of technologies
- We are currently evaluating our video analysis techniques in the TIPPIERS testbed.