

Distributed sensor fusion network communication simulator

Distributed sensor fusion network combines radar sensor/platforms which provide local information together via digital communication data links and is able to produce global information that is much accurate than individual local one. Such a network configuration often appears to be an important part of a large scaled system and applications can be found in defence science, broadcast, air traffic control and many other area. To support fundamental research work that currently undergoing and understand some problems that could occur due to network constraints (such as time delay and bandwidth limitation), there is a need to create a software test-bed for undertaking comparison to various source coding schemes under different network configurations. Basically, the test-bed will possess following properties.

- Matlab GUI environment
- Enable selecting source coding algorithm
- Enable comparing performances between different network configuration
- Enable setting transmission data rate (bandwidth specification)
- Enable setting source coding codeword length
- Support multi-sensor, multi-track and multi-channel
- Real time simulation and analysis

Requirements: Experienced with Matlab GUI programming.

No. students: 2

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Sound source location estimator (SSLE)

Many sensor detection based object localization techniques determine the location of the underlying object using the principle of measuring the time difference of arrival (TDOA) between synchronized signals according to a common time base. This project aims to use a microphone array (or multiple microphones with fixed locations) to obtain sound signal which includes the sounds from objects and background. Some signal processing techniques (e.g., statistical based signal detection) will be deployed to extract the sound signal that come from sound object of interest. The (position) measurements that will be used by the SSLE are then obtained from multiple microphones by applying the standard TDOA technique. Upon applying target tracking techniques, we may be able to track moving sound sources only in certain area.

The key component of this project is to develop a detection module for a particular sound source (e.g., an intermissive one).

The aim of this project is to use a microphone array (or multiple microphones with fixed locations) to generate position measurements for some special sound sources which may be treated as a point target.

Options: chose other type of sensor, e.g., ultrasonic pulse sensor, Infrared sensor, etc.

Requirements: Interesting with electronic circuit design and having some basic DSP knowledge

No. Students: 2

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