Tutorial on
Multi-Sensor, Multi-Source Information Fusion

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This tutorial offers a state-of-the-art overview of multi-sensor, and multi-source information fusion field from the three perspectives: architectures, algorithms, and applications. The course essentially accomplishes this by addressing the questions of what, why, when, and how in this context.

The course is intended to provide an understanding of the fundamental aspects of the field of multi-sensor, multi-source information fusion including the need for this technology, help identify the key concepts underlying the developments in the field, acquire familiarity with the basic architectures and algorithms that have been employed successfully in this field, and be able to compare the different architectures from the view point of its potential applicability to a specific problem.

The course starts with an introduction to the terminology, motivation for the study of information fusion, followed by a delineation of the various taxonomies discernible in the field. This is followed by a discussion of some basic architecture design options. A sample of algorithms conceived for fusion in different modes is presented next. The course emphasizes fusion at feature and decision levels since this is less directly driven by sensor and application specific considerations and hence amenable to a discussion that is independent of any specific application. These algorithmic developments are illustrated with applications from personal real world experience. In closing, the presentation briefly reviews information fusion application areas, spanning industrial/Robotics, bio-medical, and other civilian fields.