Decentralized Estimation and Control for Multisensor Systems

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Decentralized Estimation and Control forMultisensor Systems explores the problem of developing scalable, decentralized estimation and control algorithms for linear and nonlinear multisensor systems.The text discusses:Generalizing the linear Information filter to the issue of estimation for nonlinear systemsDeveloping a decentralized type of the algorithmSolving the problem of fully connected topologies by using generalized model distribution where the nodal system involves only locally relevant statesReducing computational requirements through the use of smaller local model sizesDefining internodal communicationDeveloping estimation algorithms for different modelsApplying the decentralized algorithms to the problem of decentralized controlDemonstrating the theory to a modular wheeled mobile robot, a car system with nonlinear kinematics and distributed means of acquiring informationExtending the applications to other robotic systems and large scale systemsDecentralized Estimation and Control forMultisensor Systems addresses how decentralized estimation and control systems are rapidly getting indispensable tools in a different selection of applications - such as for example process control systems, aerospace, and mobile robotics - providing a self-contained, dynamic resource concerning electrical and mechanical engineering. However, these algorithms are limited, indicating that existing decentralized data fusion algorithms possess limited scalability and are wasteful of communications and computation resources. In contrast, in a completely decentralized system, all details is prepared locally. A decentralized data fusion system includes a network of sensor nodes - each using its own processing facility, which together do not require any central digesting or central communication facility. Only node-to-node communication and local system knowledge are permitted.Algorithms for decentralized data fusion systems predicated on the linear info filter have already been developed, obtaining decentrally the equal results seeing that those in a conventional centralized data fusion system.Many existing algorithms use some form of hierarchical or centralized structure for data gathering and processing.Decentralized Estimation and Control forMultisensor Systems aims to remove current limitations in decentralized data fusion algorithms and to lengthen the decentralized theory to problems concerning local control and actuation. Such algorithms have intensive applications in modular robotics and complex or large scale systems, like the Mars Rover, the Mir station, and Space Shuttle Columbia.