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Smart autonomous robotic fish: Challenges and potential solutions

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With advances in smart actuation and sensing materials and devices such as: Piezo and ionic polymer composite material IPMC, there is a growing interest in developing smart sensors with underwater robots that propel and maneuver themselves like real fish do. Such robots, often known as robotic fish, could provide an engineering tool for understanding fish swimming. Equipped with communication capabilities and sensors, they could also serve as economical, dynamic samplers of aquatic environments. This talk discusses some of the major challenges in realizing adaptive, cost-effective, mobile sensor networks that are enabled by resource-constrained robotic fish. Such challenges include maneuvering in the presence of ambient disturbances, localization with adequate precision, sustained operation with minimal human interference, and cooperative control and sensing under communication constraints. It will also present potential solutions and promising research directions for addressing these challenges, some of which are inspired by how fish solve similar problems.

Biography

Ahmad Taha Abdulsadda received BSc degree in Electrical engineering from the Tickrit University, Iraq, in 1997, and MSc degree in Electrical Engineering from Baghdad University, Iraq in 2000. From 2000- 2006 he was a Faculty member at Baghdad University, Iraq and since 2006 at Technical Najaf College, Iraq. He received his PhD degree in Electrical Engineering from the Michigan State University, Michigan, USA. He has published one scientific book and about 30 refereed journal and conference papers. His research interest covers robotics fish, feedback control systems, non-linear estimation techniques, and control theory.

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