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Cooperative Estimation of 3D Target Motion via Networked Visual Motion Observer

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This paper investigates cooperative estimation of 3D target object motion for visual sensor networks. In particular, we consider the situation where multiple smart vision cameras see a group of target objects. The objective here is to meet two requirements simultaneously: averaging for static objects and tracking to moving target objects. For this purpose, we present a cooperative estimation mechanism called networked visual motion observer. We then derive an upper bound of the ultimate error between the actual average and the estimates produced by the present networked estimation mechanism. Moreover, we also analyze the tracking performance of the estimates to moving target objects. Finally the effectiveness of the networked visual motion observer is demonstrated through simulation.

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