Multi-Agent Low Range Sensing and the Among Constraint

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We give a new approach for the localization of several autonomous robots equipped with low-range sensors. The approach is developed in the setting of set-membership SLAM. It introduces a generalization of the AMONG global constraint which was used so far in a radically different context (resource allocation in logistics). This constraint allows to capture the combinatorial aspect of simultaneous agents inter-detections. We will give results on the computational complexity of this constraint (which is NP-hard in several dimensions but polynomial in 1D) and show its potential benefits in practice. All the discussion will be illustrated on the example of electric fish-like robots.