REPUBLIC OF MACEDONIA
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Final project proposal

Type	Master
Title	***Improving probability of detection of a target by data fusion from network sensors***
Supervisor	Ljupco Kocarev
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Topic(s)	
network science	
Project can start from	Any period between 01.04.2014 – 01.03.2015
Project duration	4 months
Short description	
Objective: To develop algorithms for target detection Work description: First, a decentralized version of the Probability Hypothesis Density (PHD) filter will be used to track multiple targets. The PHD filter eliminates the hard measurement-to-track association problem as well as it has been shown to be an effective way of tracking time-varying multiple number of targets that avoids model-data association problems. Sequential Monte Carlo (SMC) implementation of the PHD filter will be used to handle the nonlinear measurements. There are two options available to perform distributed tracking with a SMC-PHD filter in a sensor network. The first option is to send all the particles that represent the posterior density of targets. The second option is to send the most relevant measurements after eliminating the false alarms to update the global estimates of the targets. Next, among the various methods to quantify the performance, verifying the closeness of the estimates mean square error matrix to the lower bound is a commonly known method in target tracking applications. The Posterior Cramer-Rao Lower Bound (PCRLB) is defined to be inverse of the Fisher Information Matrix (FIM) for random vector and provides lower bound on the performance of unbiased estimators of the unknown target state. The PCRLB calculation with quantized measurement will be extended to incorporate measurement origin uncertainty for bearing only tracking.	
Results and assessment	
Journal/conference paper	
Other (additional) information	
http://www.cs.manu.edu.mk/people/faculty/ljupco-kocarev	