



## Project Proposal for Digital Engineering Projects

<b>Project Topic:</b>	<b>Object Detection and Fusion in a Camera Network</b>
<b>Project abbreviation:</b>	<i>ODFCN</i>
<b>Institute/ Chair/ Research Group:</b>	<b>Autonomous Multisensor Systems</b>
<b>Advisor(s):</b>	<b>Marko Ristic</b>
<b>Preferred group size:</b>	<i>3-4</i>
<b>Desired project period:</b>	<i>SoSe 2022</i>
<b>Required/Desired knowledge:</b>	Required: <ul style="list-style-type: none"><li>• Skilled programming in Python.</li></ul> Desired: <ul style="list-style-type: none"><li>• Understanding of:<ul style="list-style-type: none"><li>○ Kalman filter,</li><li>○ Basic image processing.</li></ul></li><li>• Experience with embedded hardware.</li></ul>
Is any external affiliation involved (e.g., industrial partner, affiliated institute)?	
yes <input type="checkbox"/> no <input checked="" type="checkbox"/>	
Which one(s)?	
<b><u>Project Description:</u></b>	
<b>General description:</b> <p>Distributed state estimation and localisation methods have become increasingly prevalent in modern networked tracking systems. For example, a vehicle may be tracked by multiple external sensors that different parties operate. To combine these sensor measurements, their data is typically gathered centrally and fused to produce a location estimate more accurate than one obtainable from only a single sensor. This project focuses on the implementation of these distributed localisation schemes.</p> <p>The project involves calibrating and using a small-scale camera network of Raspberry Pi nodes to track a moving object. Each node should process its camera data to detect the object and a distributed state estimation method should be used to compute an estimate of its location using the measurements from all the nodes. Different estimation methods exist and use different models that capture how an object moves; it will be up to the students to choose which of these methods and models they implement and how to evaluate them.</p>	

**Project goals:**

- *Calibration and setup of a camera network*
- *Image processing for the detection of a moving object*
- *Implementation of one or more distributed localisation methods*
- *Evaluation of implemented methods*

**Subtasks:**

- *Design and implementation of the hardware communication network*
- *Choosing and justifying algorithms for object tracking and sensor fusion*
- *Choosing and justifying evaluation techniques of performance and accuracy*
- *Documentation of project*

**Registration and Information:**

<https://www.ams.ovgu.de/Teaching>