

Year 10 - Proposed Project

► 10a.002.TAU_WP5: Confidence estimation in neural network for illumination estimation

Project Team

Role	Name	Email	University or Company
PI	Moncef Gabbouj	Moncef.gabbouj@tuni.fi	Tampere University
Co-PIs	Alexandros Iosifidis Jenni Raitoharju	Alexandros.iosifidis@tuni.fi jenni.raitoariju@tuni.fi	Tampere University Tampere University
Researcher	Firas Laakom	firas.laakom@tuni.fi	Tampere University
Mentor	Jarno Nikkanen	jarnon@xiaomi.com	Xiaomi

Project Goals & Novelty of Approach

In this work package, we explore two research directions:

- ▶ 1- We propose novel generic methods for confidence estimation for a regression task in deep learning.
- ▶ 2- We test the proposed solutions on the color constancy problem.

Project Accomplishments

- ▶ We propose a novel channel-wise CNN, which solves the illumination estimation problem.
- ▶ The proposed method substantially reduces the number of parameters needed to solve the task by up to 90% while achieving competitive experimental results compared to state-of-the-art methods.
- ▶ In addition, we proposed a novel efficient color constancy uncertainty estimation approach that augments the trained model with an auxiliary branch that learns to predict the error based on the feature representation.

Project Results



Visual results on four samples of INTEL-TAU. From left to right: Input image, our approach output, and ground truth image.

Publications

- ▶ Laakom, F., Raitoharju, J., Iosifidis, A., Nikkanen, J. and Gabbouj, M. Robust channel-wise illumination estimation (BMVC 2021)
- ▶ Laakom, F., Raitoharju, J., Iosifidis, A., Nikkanen, J. and Gabbouj, M., Monte Carlo Dropout Ensembles for Robust Illumination Estimation. In IJCNN, 2021

Deliverables/Steps & Timeline

Deliverables/Steps	Start Date	Completion Date
Mathematical Formulation of novel confidence estimation technique	September 2021	complete
Extensive experimental testing of the proposed approach in the color constancy context	October 2021	complete
Developing an approach for measuring similarity between a test sample and the training data	November 2021	August 2022

Questions?