# Distortion estimation with CNNs

**Szabolcs Pável**

Faculty of Mathematics and Computer Science, Babeş-Bolyai University
Robert Bosch SRL

pszabolcs@cs.ubbcluj.ro

The accurate estimation and correction of image distortion is an important step in computer vision pipelines, having a large influence over the accuracy of a wide variety of algorithms. Most of the literature focuses on simple forms of distortions, like radial distortions, where models like Browns model [1] are sufficient. These models may fail however in more complex applications like driver assistance systems and autonomous driving, where the model capacity is not enough to describe the more exotic distortions that appear in these kind of situations.

We present a deep learning approach to the distortion estimation problem. We expect our model to be able to estimate unconstrained image distortions due to the high capacity of CNNs. Because collecting ground truth distortion measurements is infeasible, we have to rely on unsupervised learning or have to use known scene geometry as supervision. We can leverage recent advancements in differentiable image sampling [2] to formulate loss functions based on geometric constraints, allowing the end-to-end training of the network without requiring large labeled datasets.

## References

[1] Brown DC. Decentering distortion of lenses. Photogrammetric Engineering and Remote Sensing. 1966.

[2] Jaderberg M, Simonyan K, Zisserman A. Spatial transformer networks. InAdvances in neural information processing systems 2015 (pp. 2017-2025).