



ΠΑΡΟΥΣΙΑΣΗ ΔΙΔΑΚΤΟΡΙΚΗΣ ΔΙΑΤΡΙΒΗΣ

ΗΜΕΡΟΜΗΝΙΑ: Τετάρτη, 18 Σεπτεμβρίου 2024

ΩΡΑ: 17:00 – 18:00

ΑΙΘΟΥΣΑ: Αίθουσα Σεμιναρίων ΤΜΗΥΠ

ΟΜΙΛΗΤΡΙΑ: Δημητρακόπουλος Παναγιώτης

Θ έ μ α

«*Combining Bayesian and Deep Learning Methods in Computer Vision Problems*»

Επταμελής Εξεταστική Επιτροπή:

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Περίληψη:

Neural networks dominate computer vision tasks, yet their predictions often lack reliability. Bayesian Deep Learning (BDL) offers a solution by treating model parameters as random variables. This approach leads to well-calibrated predictions and handles distribution shifts better than deterministic methods. However, computational limitations prevents its widespread applicability. This thesis focuses on developing efficient BDL methods for high-dimensional parameter spaces, which are applied on various computer vision tasks, including image classification, segmentation, and object detection. Specifically we propose lightweight Bayesian modules for robust and probabilistic object detection via efficient stochastic feature fusion. Additionally, we introduce a novel hypernetwork-based method for incorporating Bayesian inference to large vision models. Finally we experimented with a structured posterior distribution, which efficiently captures correlations between weights, leading to improved calibration and uncertainty quantification. This research paves the way for the development of more interpretable and reliable machine learning models.