

# Conformal Object Detection

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Recent advances in object detectors have led to their adoption for industrial uses. However, their deployment in critical applications is hindered by the inherent lack of reliability of neural networks and the complex structure of object detection models. To address these challenges, we turn to post-hoc procedures like Conformal Prediction, which offer statistical guarantees that are model-agnostic, distribution-free and finite-sample. Our contribution is manifold: first, we formally define the problem of Conformal Object Detection (COD) and introduce a novel method, Sequential Conformal Risk Control (SeqCRC), that extends the statistical guarantees of Conformal Risk Control (CRC) to multiple parameters, as required in the COD setting. Then, we propose some loss functions and prediction sets suited to applying CRC to different applications and certification requirements. Finally, we present a toolkit enabling replication and further exploration of our methods. Using this toolkit, comprehensive experiments have resulted in a benchmark that not only validates the approaches used but is informative on the trade-offs they induce.

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