How can the performance of various object detection AI models be optimized when trained on small amounts of data and applied to analog video streams in conditions of interference?

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Abstract

This paper presents a benchmark of various object detection model architectures on five new small datasets consisting of images from analog video streams with conditions of interference. We provide the observation that live object detection on analog video streams with conditions of interference is possible with commendable performance and accuracy. The model architectures tested are Yolov8, Faster-RCNN, Masked-RCNN, and Retinanet. From these Yolov8 performed the best in terms of inference speed, although Faster-RCNN showed the highest accuracy. The hyperparameters, amount of training, and whether the model was pre-trained where adjusted and tested against.

Introduction

Modern wireless closed-circuit television systems (CCTV) generally use IP cameras and wifi due to wifi's high throughput and IP camera's high resolution. Although these technologies are capable of transmitting high-quality video streams, the wifi standards reliance on the 2.4 GHz and 5.8 GHz bands limits the range of these wireless systems significantly. These high-frequency bands can carry 450 Mbps and over 1 Gbps respectively but make a trade-off with range for this high throughput. For a long-range wireless CCTV application where a single video stream might only require a throughput of ~3 Mbps, this is excessive. The use of analog cameras in combination with lower radio frequencies can increase the range and penetration of the wireless link significantly. The lowest legally available frequency for hobbyist use that meets our new throughput requirement of 6 Mhz is the 900 Mhz band. Unfortunately, the 900 Mhz band is widely used by communication protocols, Internet of Things (IoT) devices, and mobile broadband which makes it susceptible to heavy interference in long-range wireless applications.

It is common practice to analyze the video streams of modern CCTV systems in real-time using object detection artificial intelligence models for security purposes. The present paper will explore how the performance of various object detection AI models can be optimized when trained on small amounts of data and applied to analog video streams in conditions of interference. Literature specifically covering object detection on analog video systems is non-existent. Regardless, the type of noise that analog video introduces is not unique, and literature regarding object detection on degraded and noisy video streams is plentiful. This is the gap in the current literature that the present paper aims to bridge.

The research topic will be explored by training various object detection models on five different analog CCTV cameras. The data for each camera was gathered over the course of 24 hours with an interval of four and a half minutes. The hyperparameters, amount of training, and whether the model was pre-trained will be adjusted and compared using industry-standard evaluation metrics.

Literature Review

Latest developments in object detection

From a high-level overview of the recent literature, it is clear that the state-of-the-art object detection models use either a one-stage or two-stage method. One-stage methods are designed to decrease inference speed as much as possible whereas two-stage methods are designed to increase detection accuracy. Examples of one-stage models include RetinaNet and YOLO. Examples of two-stage models include faster R-CNN and mask R-CNN. COCO is a family of benchmark datasets that are commonly used to evaluate the performance of various models. The Mean Average Precision metric is generally used to compare and contrast models. Contrary to the latest developments in large language models, the use of transformers is limited among top-performing object detection models. As Tu et al. (2022) explain, “the lack of scalability of self-attention mechanisms with respect to image size has limited their (transformers) wide adoption in state-of-the-art vision backbones”. Nonetheless, “the remarkable success of transformers in largescale language models, vision transformers (ViTs), have also swept the computer vision field and are becoming the primary choice for the research and practice of large-scale vision foundation models.” (Wang et al. 2022).

Zong et al. (2022) conducted “extensive experiments to evaluate the effectiveness of the proposed approach on DETR variants”. The results show a detailed benchmark table of the models: Co-DETR (Swin-L), Co-DETR and Co-DETR (single-scale) evaluated using the COCO minival, COCO test-dev, and LVIS v1.0 minival datasets. Using the box Mean Average Precision (mAP) metric it is clear that the co-DETR has the highest accuracy in this comparison. Using this mAP metric we can determine the global ranking of this model and see that it outperforms any existing current model.

Fang et al. (2022) introduce a new model ‘EVA’ which outperforms many modern models and “can efficiently scale up EVA to one billion parameters”. Although EVA’s architecture has a heavy focus on scalability and inference speed over accuracy, the results boast a box mAP value of 64.7 which places it among the top 10 on the global rankings when trained on the COCO test-dev dataset. Furthermore, when evaluated using the COCO-O dataset EVA boasts an Average mAP of 57.8 outperforming all models to date on this dataset.

Ghiasi et al. (2020) use “a systematic study of the Copy-Paste augmentation” where the training pipeline “randomly pastes objects onto an image”. “Furthermore, we show Copy-Paste is additive with semi-supervised methods that leverage extra data through pseudo labeling (e.g. self-training). On COCO instance segmentation, we achieve 49.1 mask AP and 57.3 box AP, an improvement of +0.6 mask AP and +1.5 box AP over the previous state-of-the-art. We further demonstrate that Copy-Paste can lead to significant improvements on the LVIS benchmark. Our baseline model outperforms the LVIS 2020 Challenge winning entry by +3.6 mask AP on rare categories.”. But most notably for our use case, object detection, when evaluated using the PASCAL VOC 2007 dataset, they achieved a MAP of 89.3% outperforming all models on this dataset.

Li et al. (2023) with their release of YOLOv6, which is a model architecture that prioritizes inference speed over accuracy, “achieve better accuracy performance (50.0%/52.8% respectively) than other detectors at a similar inference speed”. According to their published benchmarks, YOLOv6-L6 outperforms all models on the COCO 2017 val dataset. Furthermore, their YOLOX-L model outperforms all models when evaluated using the Waymo 2D detection all_ns f0val and Manga109-s 15test datasets.

MaxViT is the first model to implement the use of Transformers in its architecture. Tu et al’s paper introduces MaxVit, along with its novel architecture. Tu et al’s results “demonstrate the effectiveness of [MaxVit] on a broad spectrum of vision tasks”. Notably for object detection, MaxVit-B outperforms all existing object detection models when evaluated using the COCO 2017 data set.

Wang et al. (2022) present “a new large-scale CNN-based foundation model, termed InternImage”. “Different from the recent CNNs that focus on large dense kernels, InternImage takes deformable convolution as the core operator, so that our model not only has the large effective receptive field required for downstream tasks such as detection and segmentation, but also has the adaptive spatial aggregation conditioned by input and task information”. InternImage takes the approach many modern transformer models take by architecture-level design, scaling-up parameters, and training on massive amounts of data in hopes of increasing accuracy whilst still having the benefits of a CNN architecture. This novel approach demonstrates high levels of accuracy in datasets such as COCO minival, COCO test-dev, and ADE20K. InternImage scored particularly high when evaluated using the CrowdHuman (full body) dataset outperforming all other models.

Dagli, R. and Shaikh, A. (2021) present an interesting dataset made up of medical personal protective equipment. This dataset posed challenging for models such as FasterRCNN, YOLOv3, VarifocalNet, RegNet, Deformable Convolutional Network, and Double Heads. Although the selection of models tested is not up to date, the custom model Dagli, R. and Shaikh, A. designed and trained specifically for this data set, termed TridentNet, outperformed all other models tested.

Table 1. Datasets listed with their best performing model

Dataset	**Best model**
COCO test-dev	Co-DETR
COCO minival	Co-DETR
COCO-O	EVA
PASCAL VOC 2007	Cascade Eff-B7 NAS-FPN (Copy Paste pre-training, single-scale)
COCO 2017 val	YOLOv6-L6(46 fps, V100, bs1)
COCO 2017	MaxViT-B
CrowdHuman (full body)	InternImage-H
CPPE-5	TridentNet
Waymo detection allns f0val	YOLOX-L
Manga109-s 15test	YOLOX-L

This table summarizes the paragraphs above, listing each dataset alongside the model architecture that had the highest normalized score across all reported metrics.

Lastly, Shinya, Y. (2021) further justified the results from the aforementioned studies in the study "USB: Universal-Scale Object Detection Benchmark". This study aims to fairly compare and benchmark various object detection models by mixing popular datasets such as COCO, with newer datasets such as Waymo Open Dataset and Manga109-s. This amalgamated dataset hopes to address some of the issues observed when benchmarking with COCO like datasets.

Types of noise and their impact

There are too many sources of noise present in a CCTV camera transmitting analog video over 900 MHz to list. The nature of the noise is hard to predict due to the medium over which the video signal travels. There are many more variations in air than a standard cable. Perhaps one camera has some foilage in the signal path, other camera systems might have a direct line of sight. Regardless, there are also some constant sources of noise present in this system. The two primary sources of predictable, and constant noise are the analog-to-digital conversion circuit and the de-interlacing process of the analog video. These two components introduce a distinct type of interference which we can discuss and improve. Analog to digital video conversion is known to introduce 'salt-and-pepper' noise. "This kind of noise randomly changes intensities of some pixels to the maximum or minimum values of the intensity range on the image/video" (Veerakumar et al. 2011). Furthermore, analog video has certain characteristics which can also be interpreted as 'noise'. One of which is caused by the de-interlacing process upon which both NTSC and PAL analog video protocols are built, causing analog video to have distinct visible lines going across the image. Lastly, both NTSC and PAL have a limit of transmitting 0.3 Megapixel images which can be interpreted as a 'low resolution' image and hence also 'noise'.

An exhaustive search reveals that only a limited amount of literature exists on the effects of more generally, ‘noise’, on the performance of object detection models. It is important to note that this search did not reveal any sources specifically covering noise induced from analog video transmitted over any radio frequency.

Interestingly, Momeny et al. (2021) discuss the use of noise as a data augmentation method to improve accuracy for image classification CNN models. An increase in training speed and accuracy was observed although the increase in accuracy was primarily observed in noisy images.

Nazaré et al. (2018), aim to “evaluate the generalization of models learned by different networks using noisy images”. The results indicate that if the application’s image quality is prone to noise, training the image classification model on noisy images will generally increase its accuracy. This directly contradicts Paranhos Da Costa et al. (2016) in the study “An empirical study on the effects of different types of noise in image classification tasks”, who speculate “noise makes classification more difficult due to the fact that models trained with a particular noisy/restored training set version – and tested on images with the same noise configuration – usually perform worse than a model trained and tested on the original data”.

Rodríguez et al. (2024) discuss the impact of many different types of noise on object detection models. This paper has a particular focus on Gaussian noise and brightness noise which are both types of noise that are also present in our video. The effects of these two types of noise are tested on various YOLO object detection models, as well as FasterRCNN ResNet50. The results show that “the size of objects to be detected is a factor that, together with noise and brightness factors, has a considerable impact on their performance”.

Veerakumar et al. (2011) propose an algorithm that effectively removes ‘salt-and-pepper’ noise from any given image. The proposed solution uses a 3x3 pixel search grid and determines the median pixel RGB value. This process effectively blurs the image, removing noise but also significantly lowering the resolution. Nonetheless, it is untested how applying this algorithm would impact the performance of object detection models.

Impact of low-resolution video on object detection

As previously discussed, the impact of radio channel interference-induced noise on the performance of object detection models on videos streamed over 900 MHz is not well researched, thus the impact of low resolution is covered in this section in hopes that the strategies covered to increase performance can be used interchangeably between these two contexts. Uzkent et al. (2019) explore an approach to increase the performance of a reinforcement learning object detection agent in high-resolution images. The agent chooses parts of the image to analyze, effectively lowering the resolution and maintaining accuracy while increasing performance. This approach resulted in a 50% increase in runtime without compromising accuracy. Instead, Lu et al. (2015) utilize a deep convolutional neural network to improve object detection on high-resolution images.

Contrarily, Kidwell et al. (2015) directly address the challenge of maintaining detection performance with low-resolution images. Kidwell et al. (2015) investigate object detection in low-resolution overhead imagery presenting a novel detection system that employs a fast sliding-window detector using a histogram of oriented gradient (HOG) and a supervised support vector machine classifier. This approach shows promising accuracy but sacrifices performance. Furthermore, Kidwell et al. (2015) state that this approach shows an increase in accuracy even with less annotated training data compared to their benchmark object detection algorithm. Pava et al. (2011) discuss object detection on low-resolution 3-D model animations. Pava et al. (2011) propose an elaborate system compromising of preprocessing, background modeling, information extraction, and postprocessing stages. Similarly, Kidwell et al. (2015) utilized techniques such as Histogram of Oriented Gradient (HOG) and equalization, background subtraction, and various filtering techniques. Zhang et al. (2007) introduce a novel multi-resolution framework for object detection which is inspired by human visual search patterns. Zhang et al. (2007)'s proposed algorithm artificially lowers the resolution of the image and attempts to detect the object in the image. If the confidence score of the result is low, increase the resolution and try again. This approach allows for an 'early exit' designed for real-time analysis significantly increasing performance while maintaining high detection accuracy. Most notably, Clark et al. (2023) investigate the resolution-performance trade-off of object detection models. Clark et al. (2023) found a linear relationship between resolution and detection accuracy highlighting the crucial role of resolution in object detection. The present paper will use the prior techniques discussed to attempt to increase the performance and accuracy of object detection on video streams that are missing information due to interference on the 900 MHz band.

Methods

Procuring the data

To evaluate the performance of various object detection models on analog video under the condition of significant interference, five live analog camera video streams were selected with varying levels of noise. The five cameras are located at:

Place: Hadji Dimitar Square, Sliven, Bulgaria
Coordinates: 41.940300 / 25.569401

Place: Keskväljak, Paide, Estonia
Coordinates: 59.433899 / 24.728100

Place: Duomo, Noto, Sicily, Italy
Coordinates: 36.890140 / 15.069290

Place: Kielce University of Technology, Kielce, Poland
Coordinates: 50.833302 / 20.666700

Place: Toggenburg Alpaca Ranch, Stein, Switzerland
Coordinates: 47.366699 / 8.550000

Using ffmpeg and bash a frame was captured from each camera at a 4-and-a-half minute interval: `while true; do ffmpeg -i INPUT -frames:v 1 -vcodec mjpeg -f image2 \~/Downloads/frames/image$(date +%Y%m%d%H%M%S).jpg; sleep 270; done`.

Data collection lasted for 24 hours, on all cameras simultaneously, on the 2nd of January 224, resulting in 323 images (frames) captured per camera.

Each frame was labeled by hand, over the course of the next week, using a webapp called roboflow. The resulting dataset for each camera has a 70%/20%/10% split between training, test, and validation data respectively.

No augmentation methods of any kind are applied to the final datasets.

Models

The model architectures that will be compared in the present paper are Faster-RCNN, Masked-RCNN, Retinanet, Yolov8.

Hyper parameters

Before training, hyper parameter tuning was conducted for each dataset using Yolov8 using the AdamW optimization algorithm, for 300 iterations of 50 epochs each.

Training and evaluation

To evaluate the aforementionend model architectures the industry standard metrics: precision, recall, F1-Score, and confidence will be used. To be specific, for each trained model, the graphs: precision over confidence, recall over confidence, F1 over confidence, and precision over recall will be used to evaluate each model. For all models trained using the yolov8 architecture, a normalized and non-normalized confusion matrix will also be used. Each model architecture will be trained on each dataset for 150 epochs. Whether the model has peen pre-trained, and/ or hyperparameter tuned will be varied. Each model will be evaluated every 50 epochs.

Independent variables:
Model Type: Yolov8, Faster-RCNN, Masked-RCNN, Retinanet-RCNN.
Training Epochs: The number of epochs each model will be trained for.
Pre-training: Whether the models are pre-trained or not.
Parameter Tuning: Whether the models will use stock parameters or will be hyperparameter-tuned.

Dependent variables:
Performance Metrics: Precision, recall, F1-score, confidence, confusion matrices.
Resource Utilization: All models will be trained on the same hardware with the same resource utilization.

Results

Explain the metrics

Precision is the ratio of true positives to the sum of true and false positives.

$$Precision = (TruePositives + FalsePositives)/TruePositives$$

Recall is the ratio of true positives to the sum of true positives and false negative.

$$Recall = (TruePositives + FalseNegatives)/TruePositives$$

Using precision we can effectively deduce how many objects were correctly labeled out of all labeled objects. Similarly, using recall we can deduce how many objects were correctly labeled out of all objects whether they were labeled or not.

The F1 score is simply a harmonic mean of precision and recall, allowing us to combine precision and recall into a 'score'.

$$F1 = 2 * ((Precision + Recall)/(Precision * Recall))$$

Before analyzing the results, it is important to note that not all results are shown in the present paper's 'results' section. For a complete breakdown of the results see the supplementary data section. Regardless, a selection of representative results has been assembled and will be reviewed in the interest of brevity instead.

Best performing final model comparison

A comparison of the best models trained on the Doumo dataset.

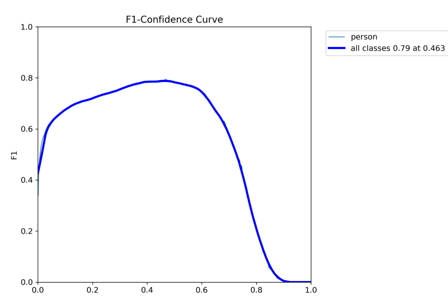


Figure 552.

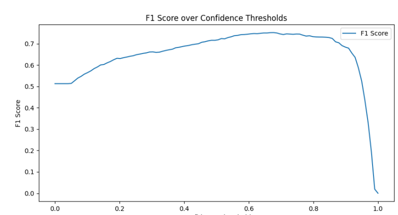


Figure 120.

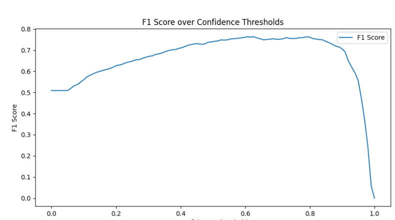


Figure 260.

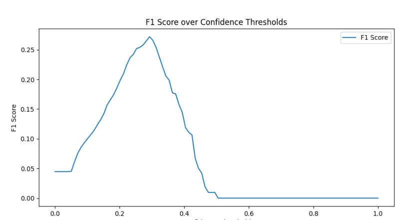


Figure 340.

Figure 552 depicts the F1 over confidence graph for the pre-trained and hyperparameter-tuned yolov8n model trained on the Duomo dataset for 150 epochs. Figure 120 depicts the F1 over confidence graph for the pre-trained Faster-RCNN model trained on the Duomo dataset for 150 epochs. Figure 260 depicts the F1 over confidence graph for the pre-trained Masked-RCNN model trained on the Duomo dataset for 150 epochs. Figure 340 depicts the F1 over confidence graph for the pre-trained Retinanet model trained on the Duomo dataset for 150 epochs.

A comparison of the best models trained on the Hadji Dimitar Square dataset.

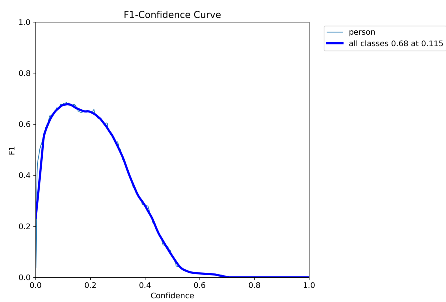


Figure 570.

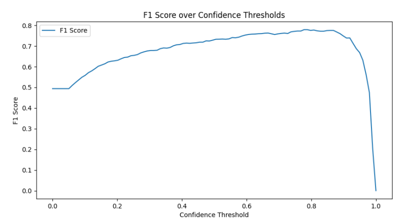


Figure 124.

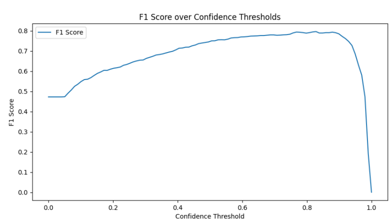


Figure 264.

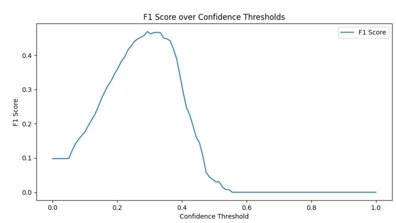
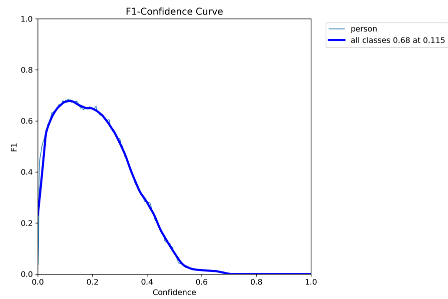


Figure 344.

Figure 570 depicts the F1 over confidence graph for the pre-trained and hyperparameter-tuned yolov8n model trained on the Hadji Dimitar Square dataset for 150 epochs. Figure 124 depicts the F1 over confidence graph for the pre-trained Faster-RCNN model trained on the Hadji Dimitar Square dataset for 150 epochs. Figure 264 depicts the F1 over confidence graph for the pre-trained Masked-RCNN model trained on the Hadji Dimitar Square dataset for 150 epochs. Figure 344 depicts the F1 over confidence graph for the pre-trained Retinanet model trained on the Hadji Dimitar Square dataset for 150 epochs.

Effect of hyper-parameter tuning

A comparison of hyperparameter tuned model against a non-hyperparameter tuned model trained on the Hadji Dimitar Square dataset.



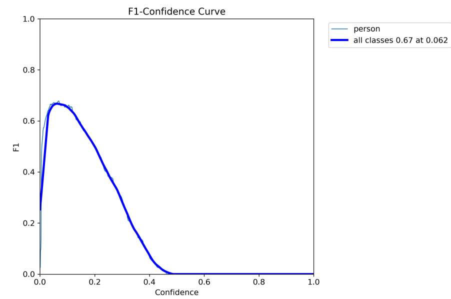
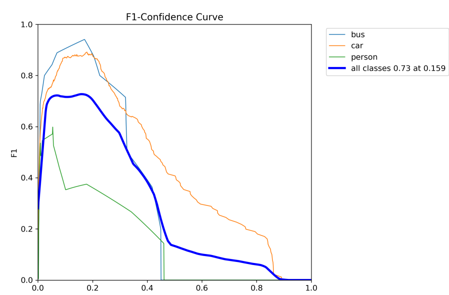


Figure 570. Figure 390.

Figure 570 depicts the F1 over confidence graph for the pre-trained and hyperparameter-tuned yolov8n model trained on the Hadji Dimitar Square dataset for 150 epochs. Instead, Figure 390 depicts the F1 over confidence graph for the pre-trained but not hyperparameter-tuned yolov8n model trained on the Hadji Dimitar Square dataset for 150 epochs.

A comparison of hyperparameter tuned model against a non-hyperparameter tuned model trained on the Keskväljak dataset.



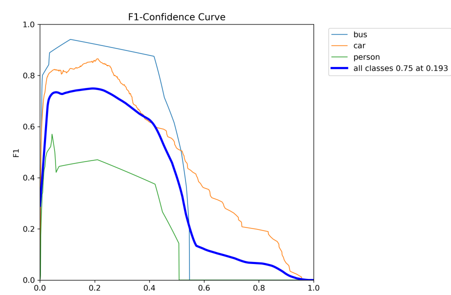
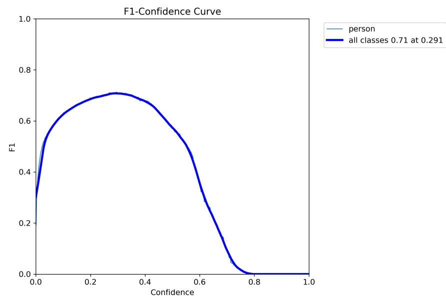


Figure 588. Figure 408.

Figure 588 depicts the F1 over confidence graph for the pre-trained and hyperparameter-tuned yolov8n model trained on the Keskväljak dataset for 150 epochs. Instead, Figure 408 depicts the F1 over confidence graph for the pre-trained but not hyperparameter-tuned yolov8n model trained on the Keskväljak dataset for 150 epochs.

Effect of pre-training

Comparing the peformance of a Yolov8n pre-trained model against a Yolov8n non-pre-trained model that were both trained on the Doumo dataset for 150 epochs.



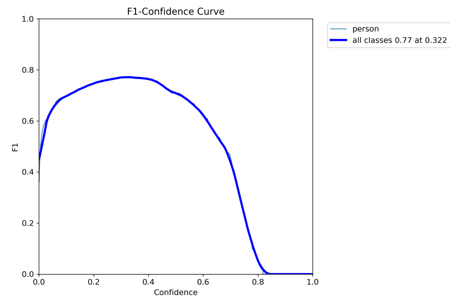
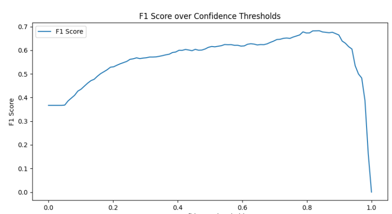


Figure 462. Figure 372.

Figure 372 depicts the F1 over confidence graph for the pre-trained yolov8n model trained on the Doumo dataset for 150 epochs. Instead, Figure 462 depicts the F1 over confidence graph for the non-pre-trained yolov8n model trained on the Doumo dataset for 150 epochs.

Comparing the peformance of a Faster-RCNN pre-trained model against a Faster-RCNN non-pre-trained model that were both trained on the Keskväljak dataset for 150 epochs.



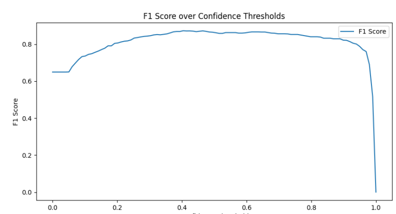
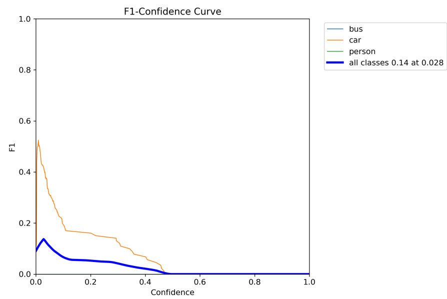


Figure 48. Figure 128.

Figure 128 depicts the f1 over confidence graph for the pre-trained Faster-RCNN model trained on the Keskväljak dataset for 150 epochs. Instead, figure 48 depicts the f1 over confidence graph for the non-pre-trained Faster-RCNN model trained on the Keskväljak dataset for 150 epochs.

Comparing the peformance of a Yolov8n pre-trained model against a Yolov8n non-pre-trained model that were both trained on the Keskväljak dataset for 150 epochs.



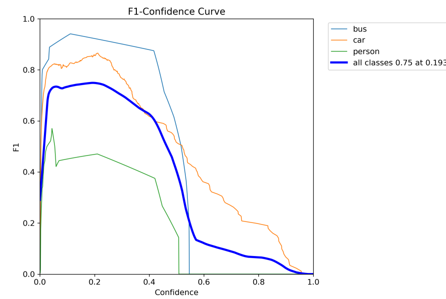
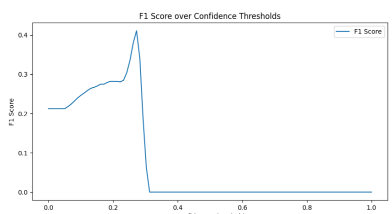


Figure 498. Figure 408.

Figure 408 depicts the f1 over confidence graph for the pre-trained yolov8n model trained on the Keskväljak dataset for 150 epochs. Instead, figure 498 depicts the f1 over confidence graph for the non-pre-trained yolov8n model trained on the Keskväljak dataset for 150 epochs.

Comparing the peformance of a Masked-RCNN pre-trained model against a Masked-RCNN non-pre-trained model that were both trained on the Keskväljak dataset for 150 epochs.



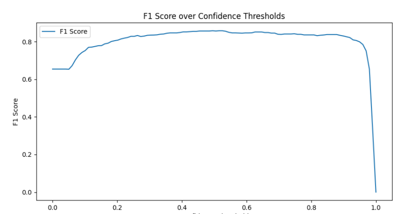


Figure 188. Figure 268.

Figure 268 depicts the f1 over confidence graph for the pre-trained Masked-RCNN model trained on the Keskväljak dataset for 150 epochs. Instead, figure 188 depicts the f1 over confidence graph for the non-pre-trained Masked-RCNN model trained on the Keskväljak dataset for 150 epochs.

Effect of training on specialized data

A comparison of the effectiveness of training on data similar to the evaluation data. The following graphs demonstrate how the evaluation is effected during training. The first sample is an evaluation taken at 0 epochs, the last, at 150 epochs, with an evaluation at an interval of 50 epochs.

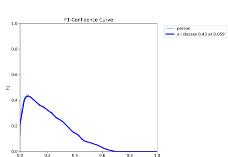
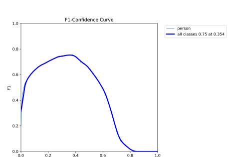
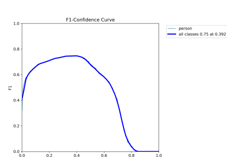
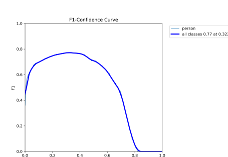





Figure 720. Figure 360. Figure 366. Figure 372.

Figure 720 depicts the F1 over confidence graph for the pre-trained Yolov8n model trained on the Duomo dataset for 0 epochs. The second figure, 360. depicts the F1 over confidence graph for the pre-trained Yolov8n model trained on the Duomo dataset for 50 epochs. The third figure, 366. depicts the F1 over confidence graph for the pre-trained Yolov8n model trained on the Duomo dataset for 100 epochs. Lastly, the fourth figure, 372. depicts the F1 over confidence graph for the pre-trained Yolov8n model trained on the Duomo dataset for 150 epochs.

Discussion

Suprisingly, when trained for 150 epochs, the model architectures: Masked-RCNN, and Faster-RCNN consistently outperformed Yolov8n eventhough Yolov8n was the only model that was hyperparameter tuned for 300 iterations using the AdamW optimization algorithm. Furthermore, both the Masked-RCNN and Faster-RCNN use a Resnet50 backend. This backend is considerably outdated compared to Yolov8 which was released in 2023. Nonetheless, it's important to mention that Yolov8n has a considerably faster inference time than Masked-RCNN and Faster-RCNN and is able to keep up with a 3 fps live stream when Masked-RCNN and Faster-RCNN are only able to infer one frame every two seconds.

The effect of hyper parameter tuning on Yolov8 across all datasets did not give any conclusive results. Depending on the dataset, the accuracy increased or decreased. There was no generalizable result observed.

Similarly, the effect of pre-training, which is also commonly known as transfer learning, also gave inconclusive results. Some data sets benefited greatly from pre-training where as other data sets were affected negatively. Pre-training did seem to generally increase the peformance of each model particularly when only trained for a short amount of time. Regardless, without a statistical analysis its not possible to derive a conclusion.

The observed effect of training on specialized data is doubtlessly positive. There has not been a single case where training the model on any of the datasets decreased the performance when evaluated using a similar evaluation dataset. This aligns directly with the findings of Dagli, R. and Shaikh, A. (2021).

These results are promising for wireless analog CCTV system applications as it has been shown that high accuracy real time object detection is possible with a small dataset of 323 specialized images even under the condition of interference. From the results of the present paper it can be deduced that the type of noise that analog video introduces does not pose challenge for modern object detection model architectures, bridging this gap in the current literature.

The methods used in the present paper has many limitations. Unfortunately, the training and evaluation pipeline written in python for all models created with the Retinanet model architecture failed and produced incomprihensible results. This is a major oversight and could have been easily avoided with more rigorous testing. This is also the reason for Retinanet's exclusion in many of the comparisons in the results. A full breakdown of the results produced by any model trained using the Retinanet architecture can be found in the supplementary data.

Furthermore, another major limitation of the present paper is that not enough model architectures were compared to come to a conclusive answer. The literature review revealed the vast amount of model architectures and benchmarking datasets available. Having only rigorously tested and compared four different model architectures, the present paper would benefit significantly from a wider comparison.

Lastly, all datasets had a significant amount of analog noise. This leads to a question whether the analog noise in the datasets actually had any impact at all. To test this an analog noise generation algorithm would have to be applied to images that do not have any analog noise present. This data augmentation method could be explored as a future research.

Conclusion

The use of modern object detection models on wireless analog CCTV systems is more than feasable. A small dataset of 323 images can be collected and labeled within a day. Without this small dataset of specialized data, the performance of any pre-trained model will be subpar. All five datasets procured in the present paper, with varying levels of analog noise, were able to train a model with sufficient performance for CCTV and security applications. Furthermore, the use of pre-training and hyperparameter tuning can have a positive impact on performance but also showed to have a negative impact depending on the dataset and chosen model architecture.

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Supplementary data

Figure 1. f1_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=duomo

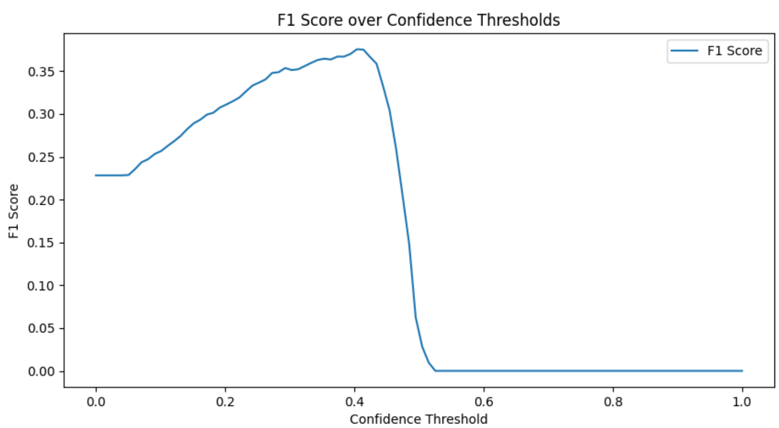

Figure 2. precision_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=duomo

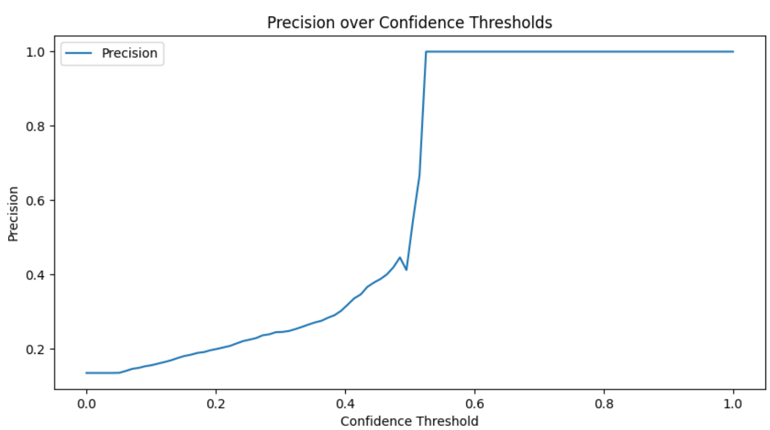

Figure 3. precision_over_recall, fasterrcnn, pre-trained=False, epochs=50, data=duomo

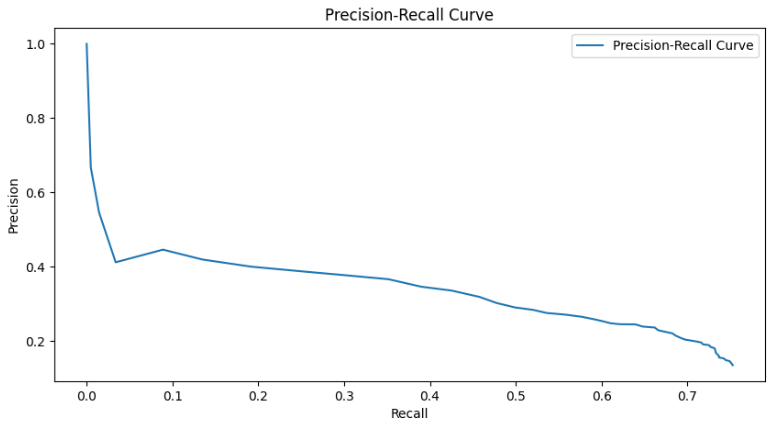

Figure 4. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=duomo

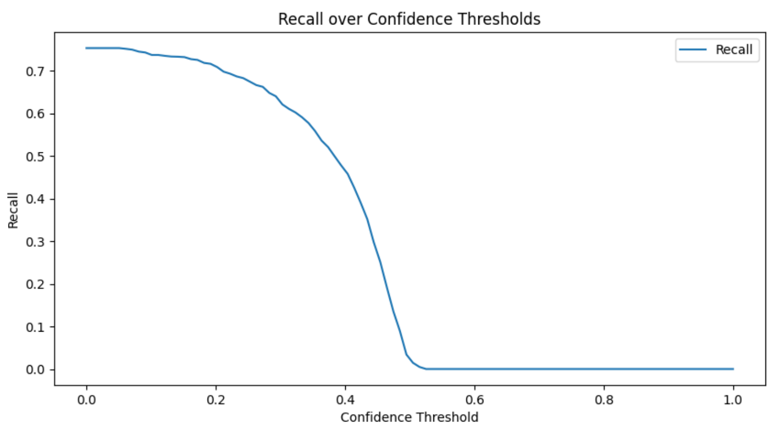

Figure 5. f1_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=hadji_dimitar_square

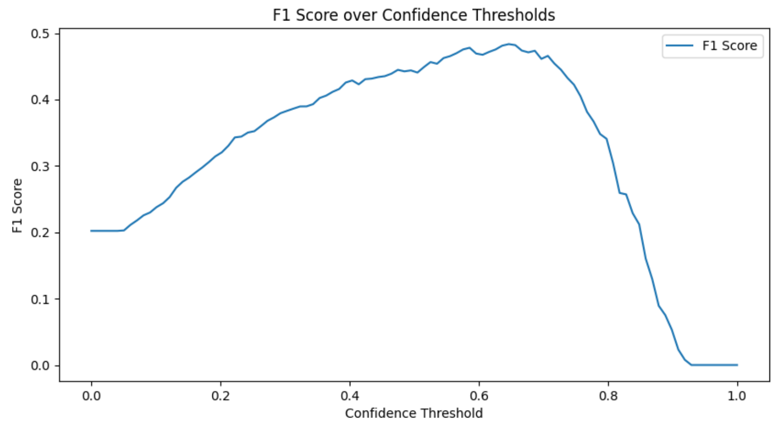

Figure 6. precision_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=hadji_dimitar_square

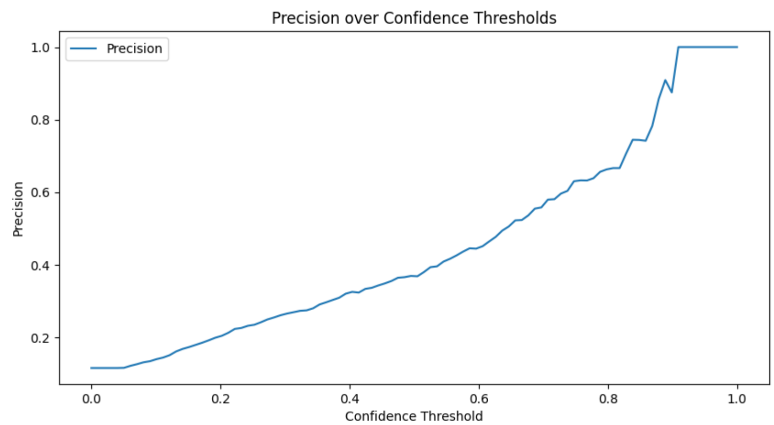

Figure 7. precision_over_recall, fasterrcnn, pre-trained=False, epochs=50, data=hadji_dimitar_square

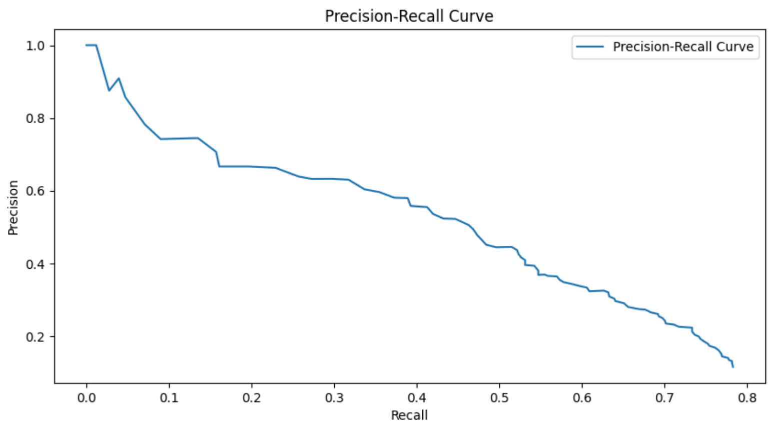

Figure 8. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=hadji_dimitar_square

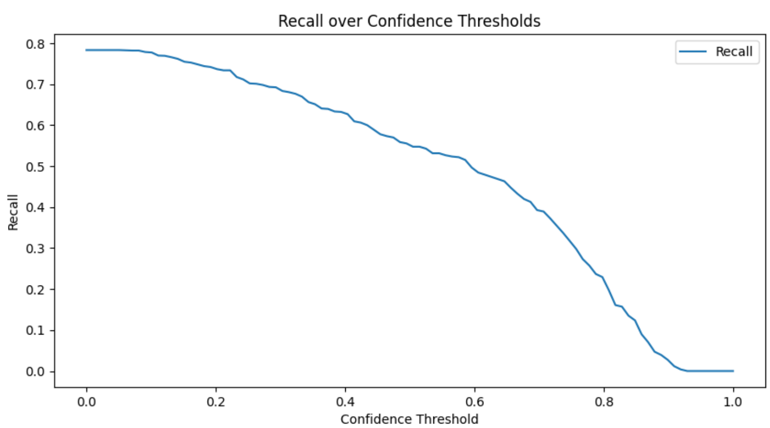

Figure 9. f1_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=keskvaljak

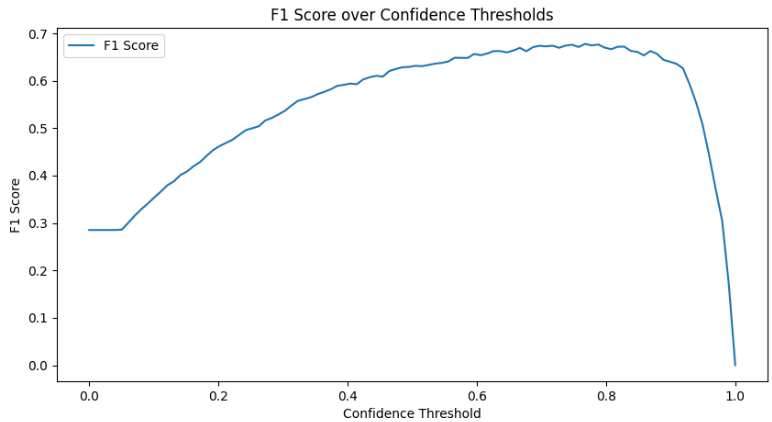

Figure 10. precision_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=keskvaljak

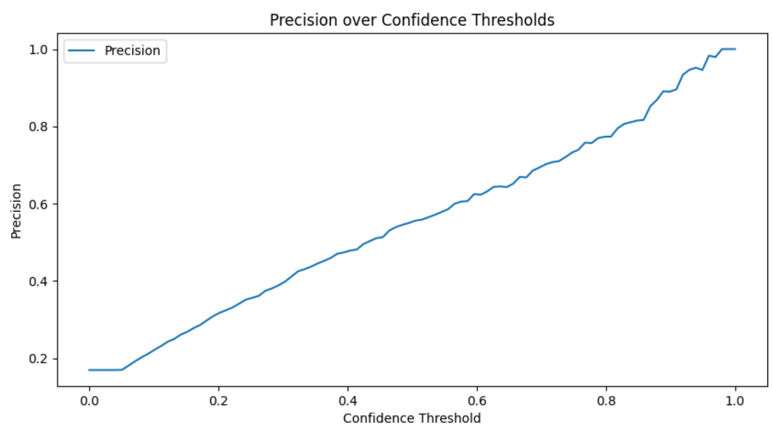

Figure 11. precision_over_recall, fasterrcnn, pre-trained=False, epochs=50, data=keskvaljak

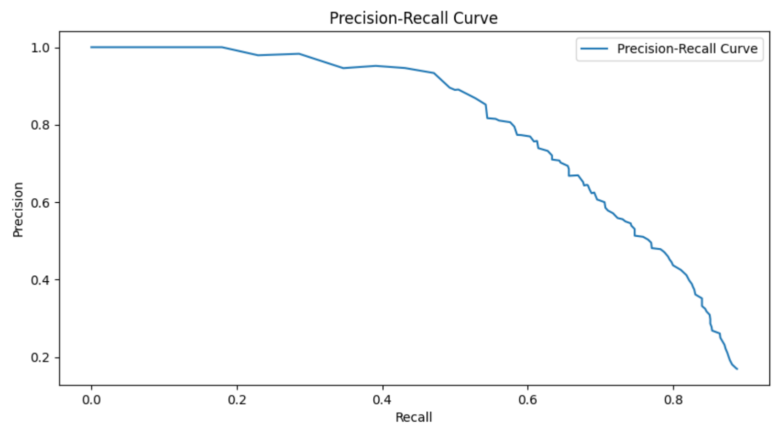

Figure 12. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=keskvaljak

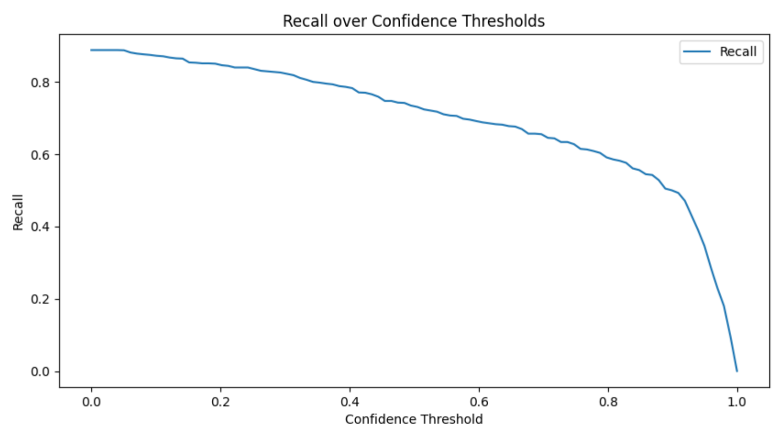

Figure 13. f1_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=kielce_university_of_technology

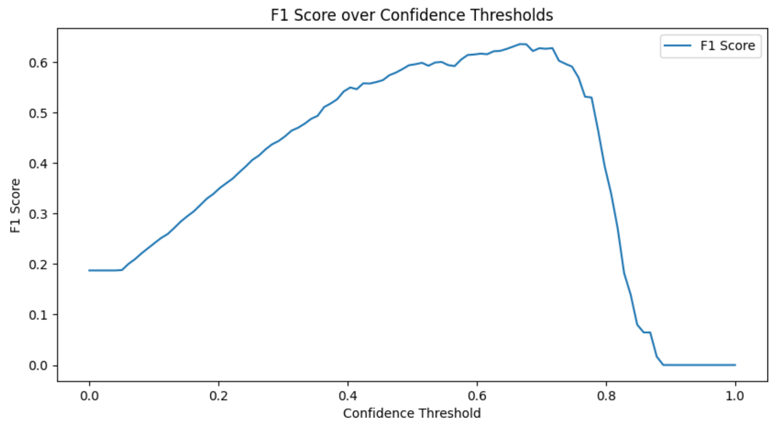

Figure 14. precision_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=kielce_university_of_technology

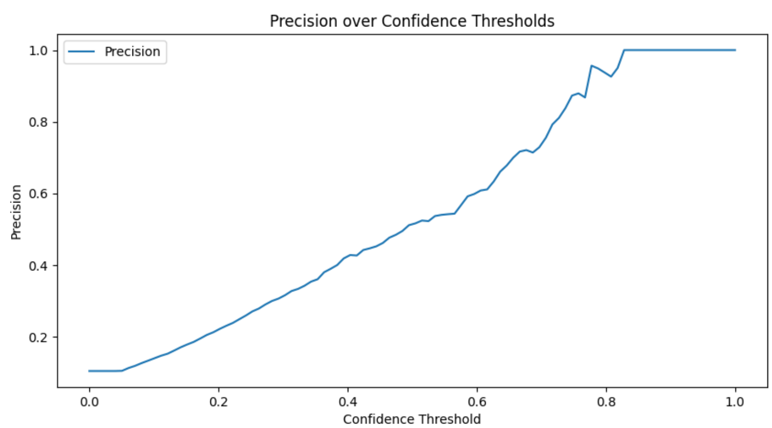

Figure 15. precision_over_recall, fasterrcnn, pre-trained=False, epochs=50, data=kielce_university_of_technology

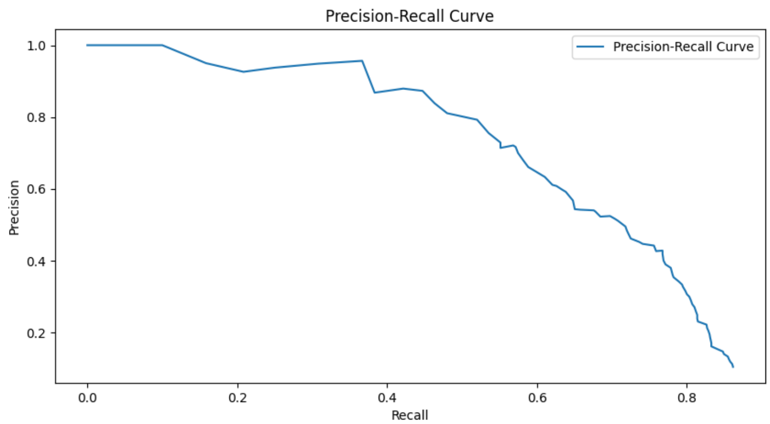

Figure 16. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=kielce_university_of_technology

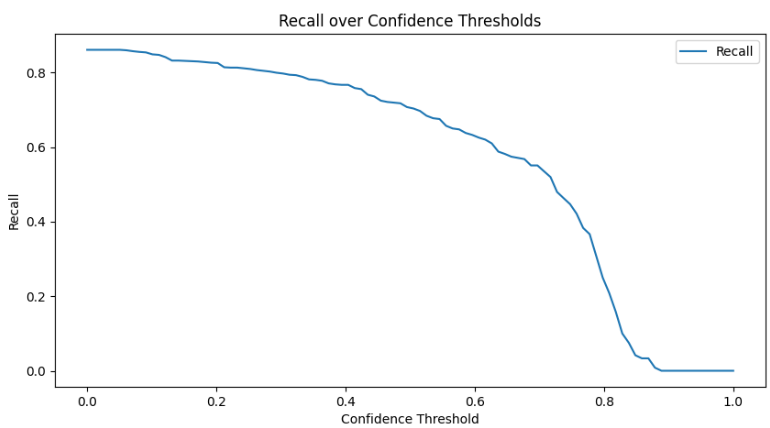

Figure 17. f1_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=toggenburg_alpaca_ranch

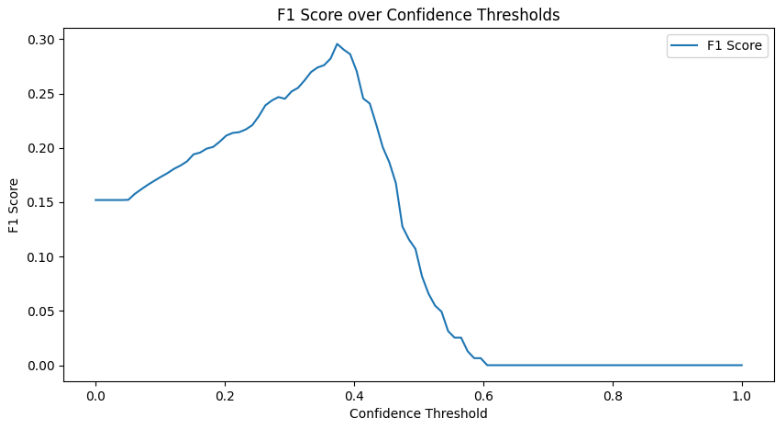

Figure 18. precision_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=toggenburg_alpaca_ranch

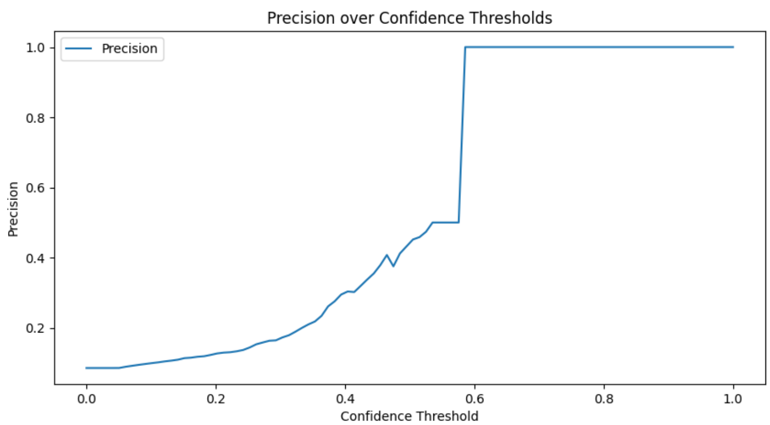

Figure 19. precision_over_recall, fasterrcnn, pre-trained=False, epochs=50, data=toggenburg_alpaca_ranch

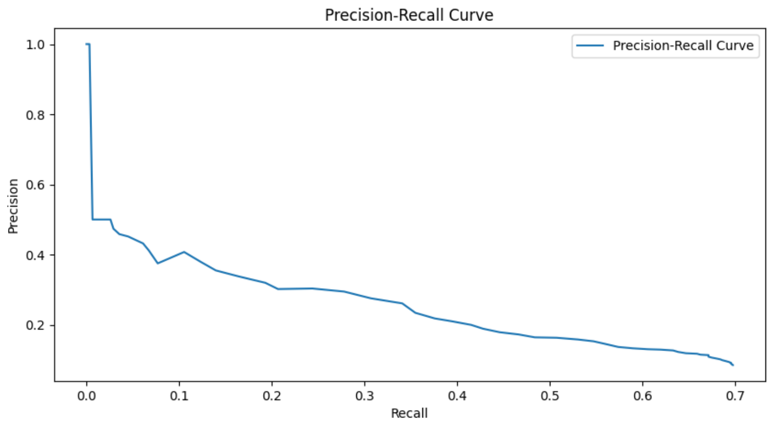

Figure 20. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=50, data=toggenburg_alpaca_ranch

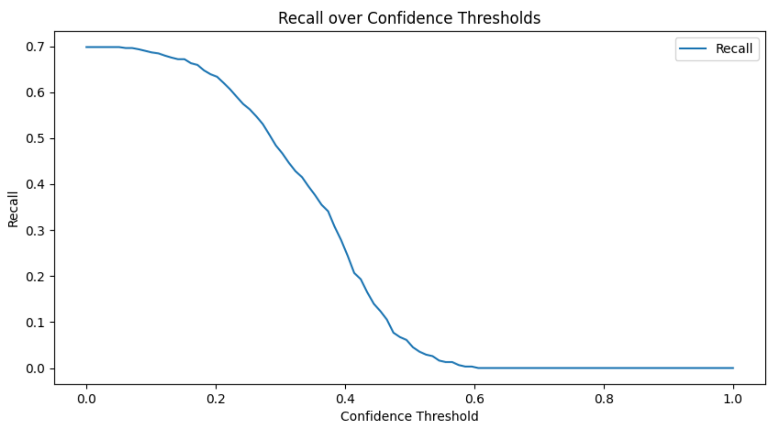

Figure 21. f1_over_confidence, fasterrcnn, pre-trained=False, epochs=100, data=duomo

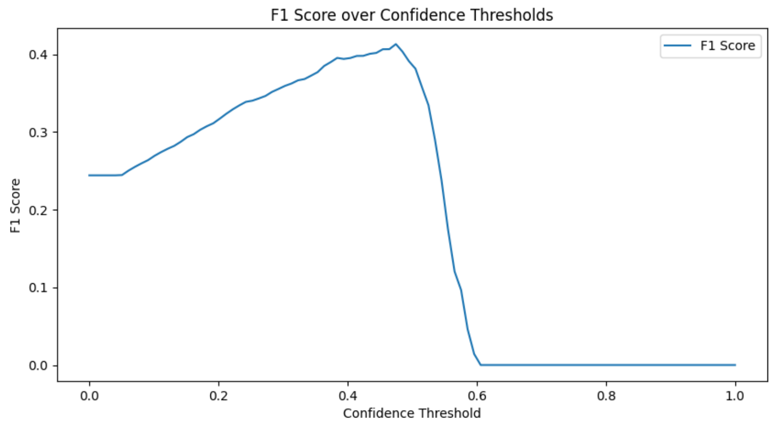

Figure 22. precision_over_confidence, fasterrcnn, pre-trained=False, epochs=100, data=duomo

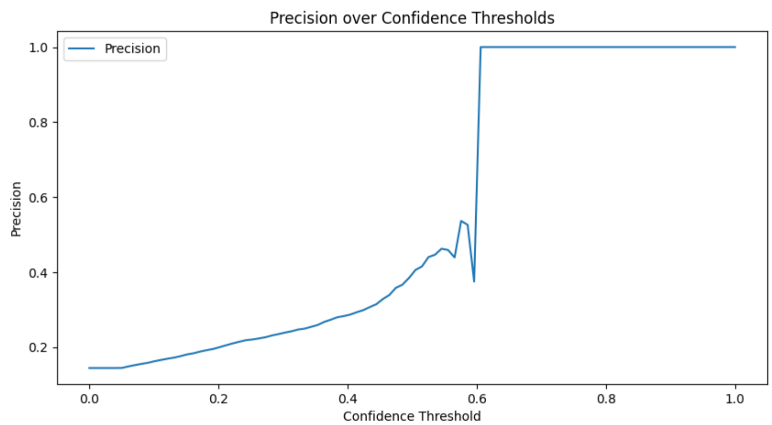

Figure 23. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=100, data=duomo

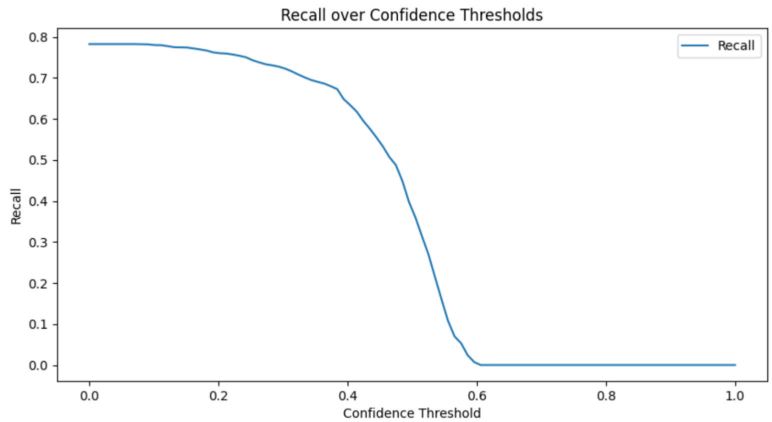

Figure 24. f1_over_confidence, fasterrcnn, pre-trained=False, epochs=100, data=hadji_dimitar_square

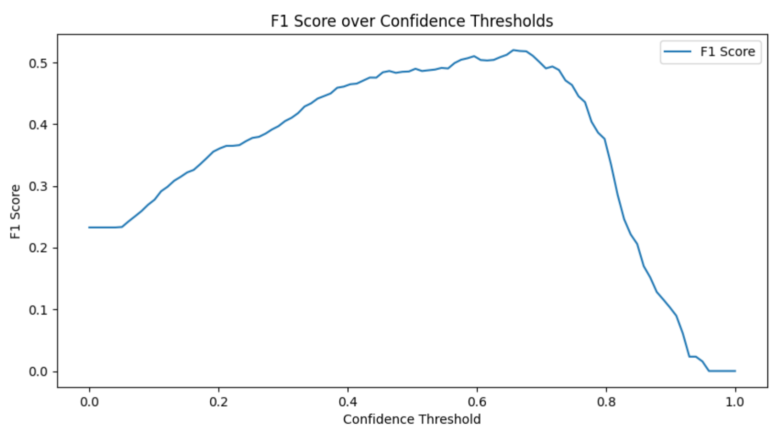

Figure 25. precision_over_confidence, fasterrcnn, pre-trained=False, epochs=100, data=hadji_dimitar_square

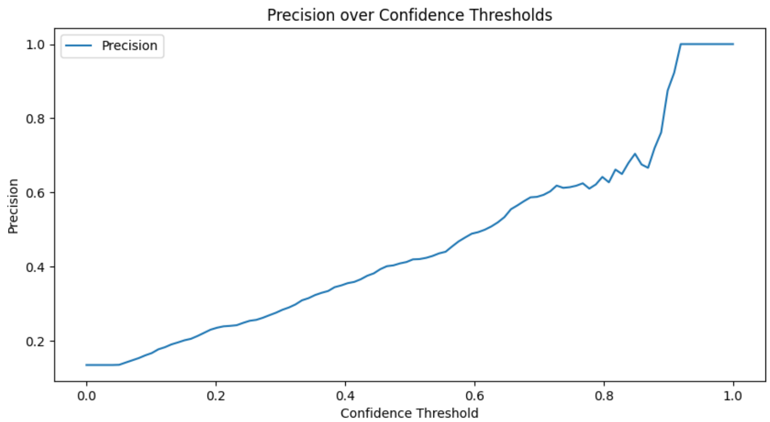

Figure 26. precision_over_recall, fasterrcnn, pre-trained=False, epochs=100, data=hadji_dimitar_square

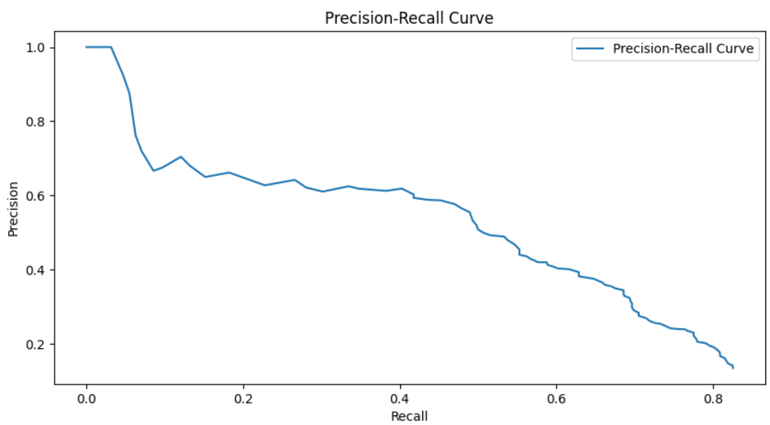

Figure 27. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=100, data=hadji_dimitar_square

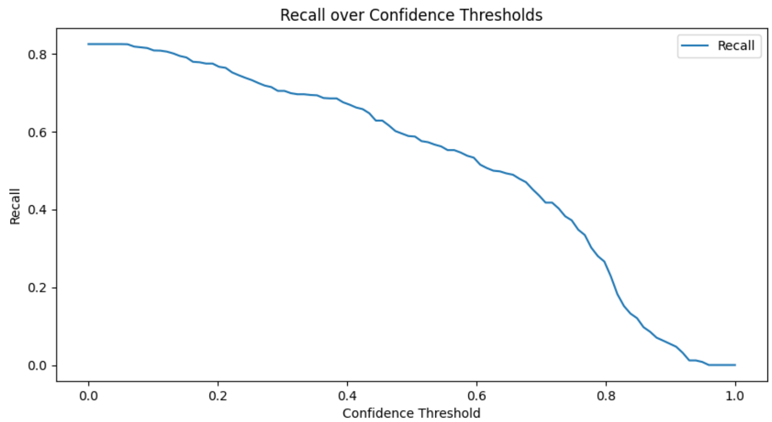

Figure 28. f1_over_confidence, fasterrcnn, pre-trained=False, epochs=100, data=keskvaljak

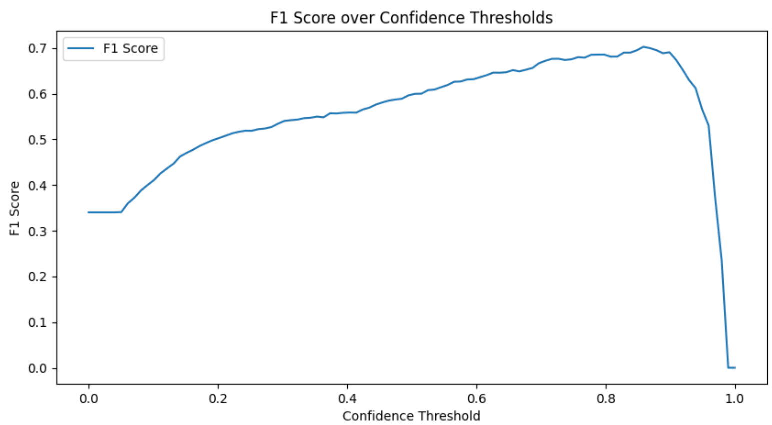

Figure 29. precision_over_confidence, fasterrcnn, pre-trained=False, epochs=100, data=keskvaljak

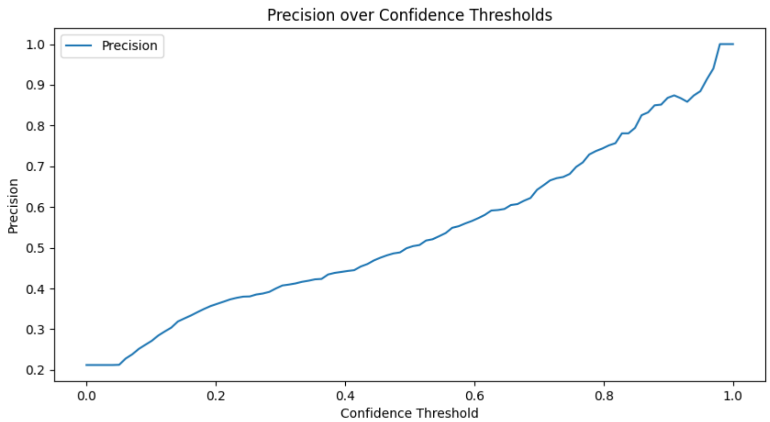

Figure 30. precision_over_recall, fasterrcnn, pre-trained=False, epochs=100, data=keskvaljak

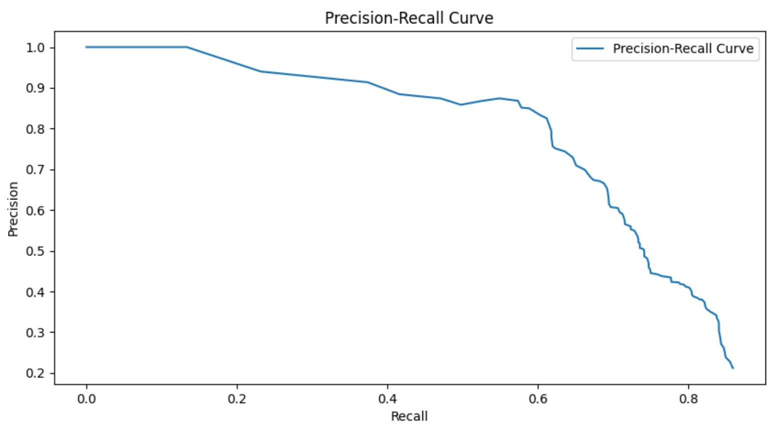

Figure 31. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=100, data=keskvaljak

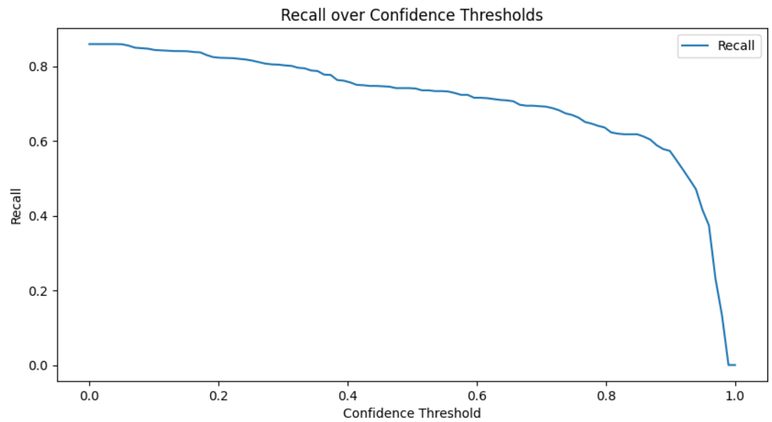

Figure 32. f1_over_confidence, fasterrcnn, pre-trained=False, epochs=100, data=kielce_university_of_technology

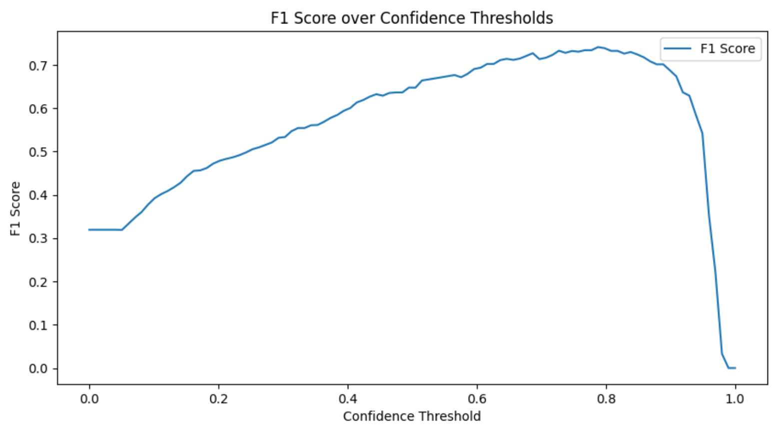

Figure 33. precision_over_confidence, fasterrcnn, pre-trained=False, epochs=100, data=kielce_university_of_technology

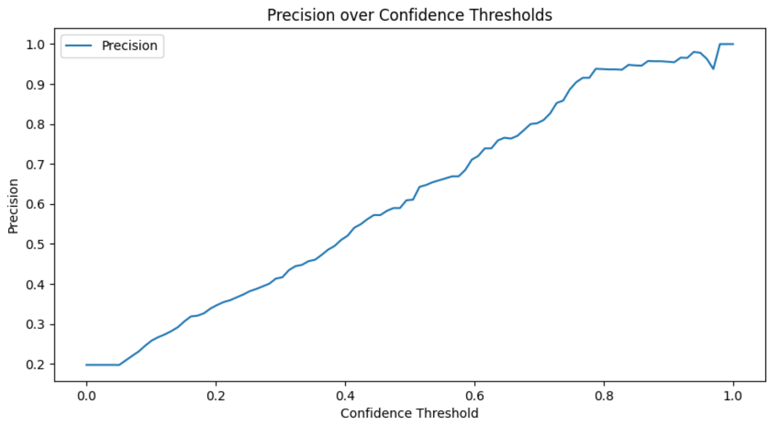

Figure 34. precision_over_recall, fasterrcnn, pre-trained=False, epochs=100, data=kielce_university_of_technology

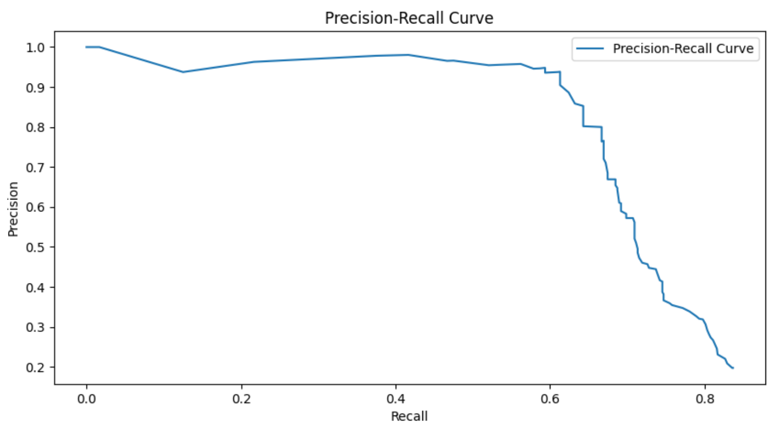

Figure 35. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=100, data=kielce_university_of_technology

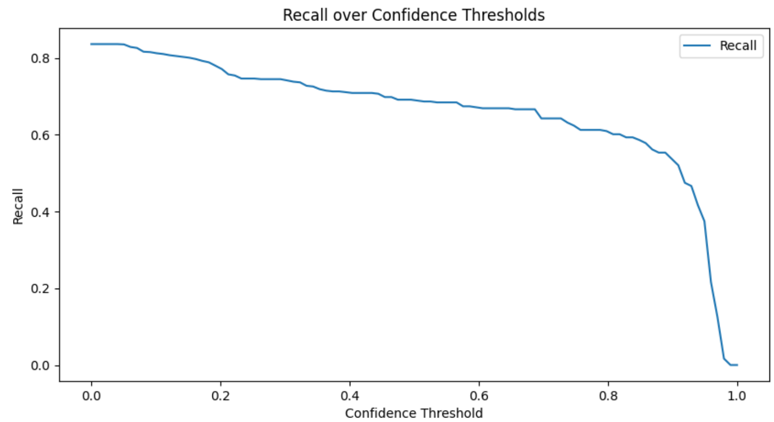

Figure 36. f1__over__confidence, fasterrcnn, pre-trained=False, epochs=100, data=toggenburg__alpaca__ranch

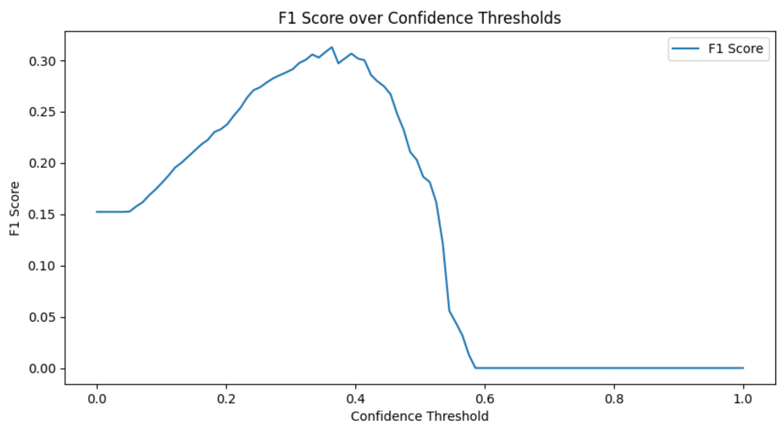

Figure 37. precision__over__confidence, fasterrcnn, pre-trained=False, epochs=100, data=toggenburg__alpaca__ranch

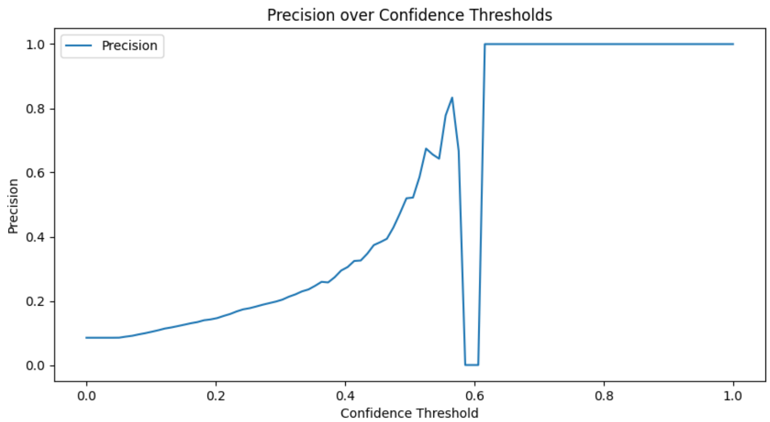

Figure 38. precision_over_recall, fasterrcnn, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch

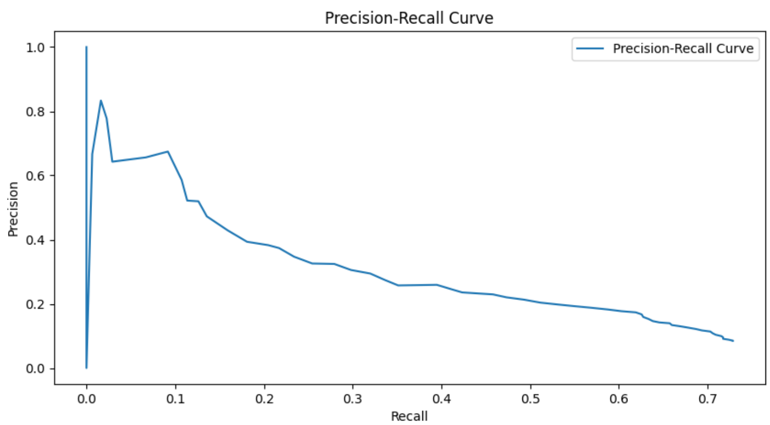

Figure 39. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch

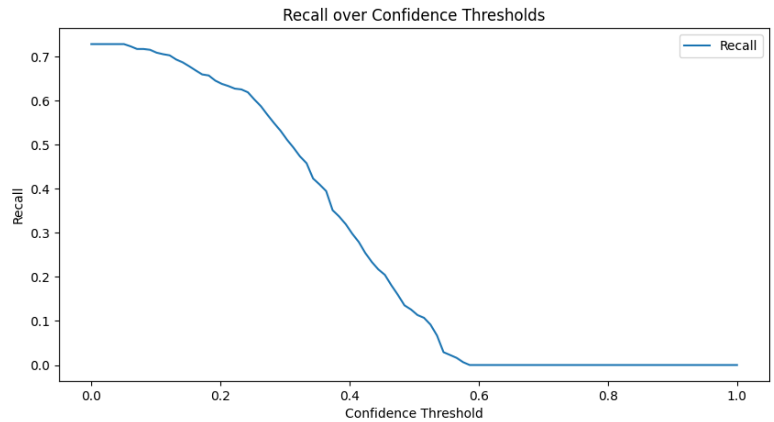

Figure 40. f1_over_confidence, fasterrcnn, pre-trained=False, epochs=150, data=duomo

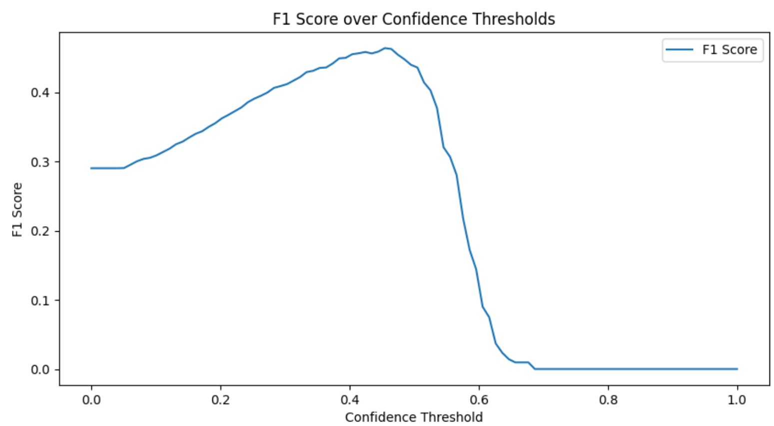

Figure 41. precision_over_confidence, fasterrcnn, pre-trained=False, epochs=150, data=duomo

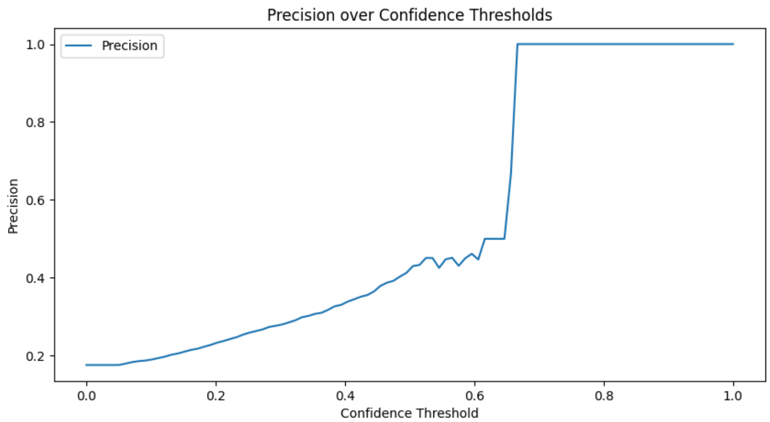

Figure 42. precision_over_recall, fasterrcnn, pre-trained=False, epochs=150, data=duomo

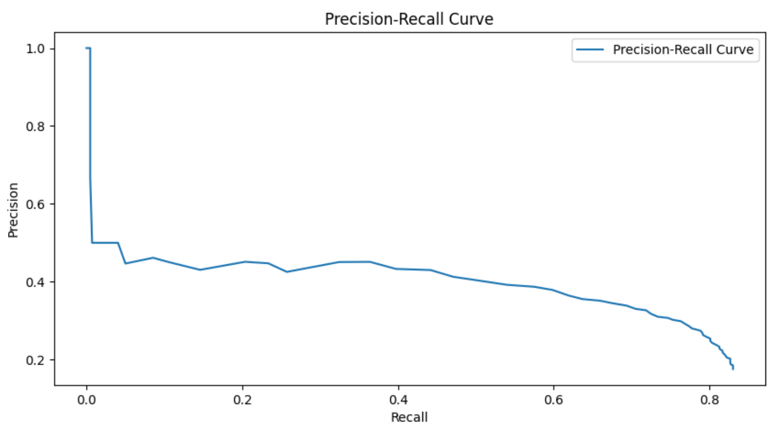

Figure 43. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=150, data=duomo

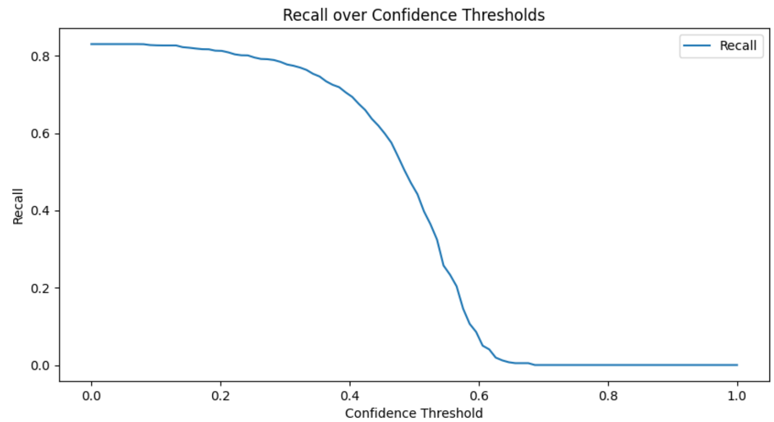

Figure 44. f1__over__confidence, fasterrcnn, pre-trained=False, epochs=150, data=hadji__dimitar__square

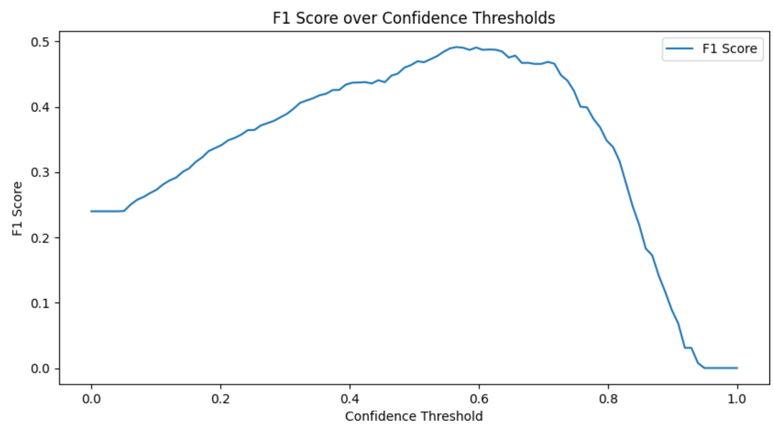

Figure 45. precision__over__confidence, fasterrcnn, pre-trained=False, epochs=150, data=hadji__dimitar__square

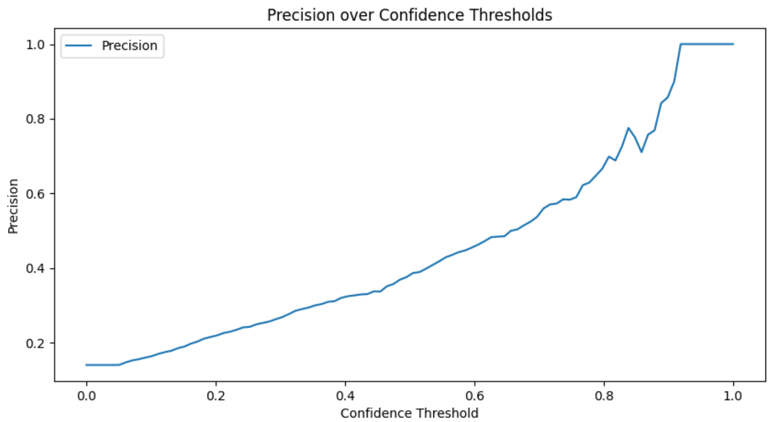

Figure 46. precision_over_recall, fasterrcnn, pre-trained=False, epochs=150, data=hadji_dimitar_square

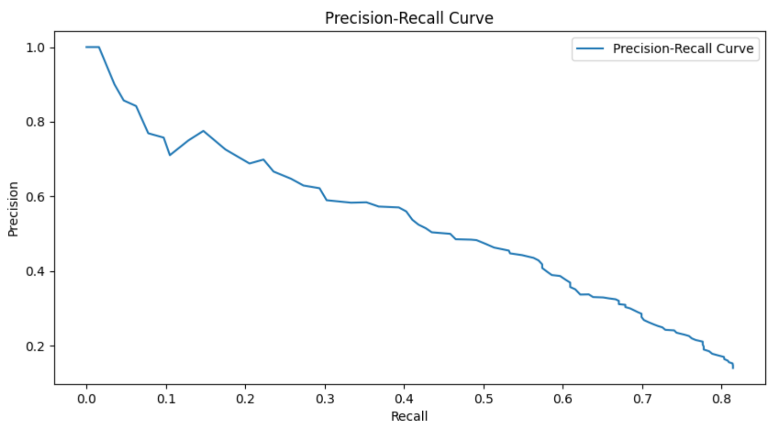

Figure 47. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=150, data=hadji_dimitar_square

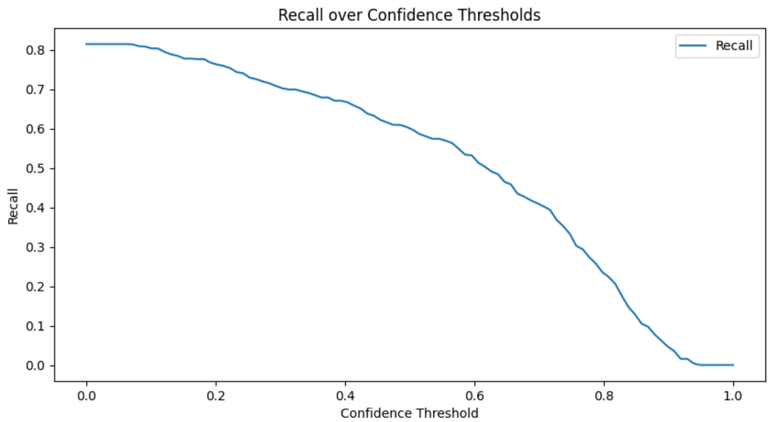

Figure 48. f1__over__confidence, fasterrcnn, pre-trained=False, epochs=150, data=keskvaljak

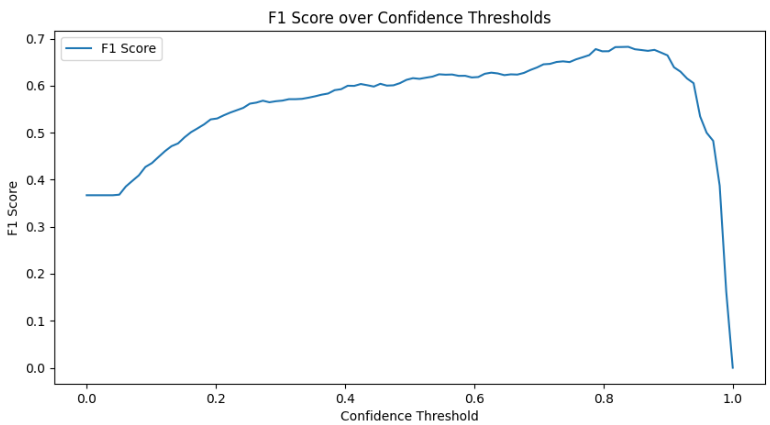

Figure 49. precision__over__confidence, fasterrcnn, pre-trained=False, epochs=150, data=keskvaljak

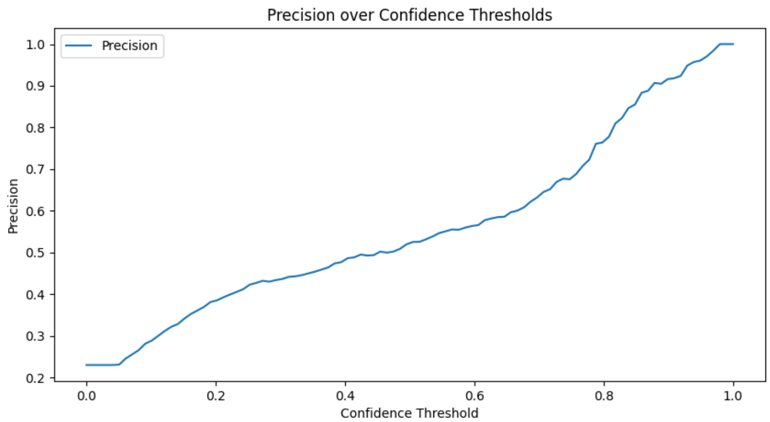

Figure 50. precision_over_recall, fasterrcnn, pre-trained=False, epochs=150, data=keskvaljak

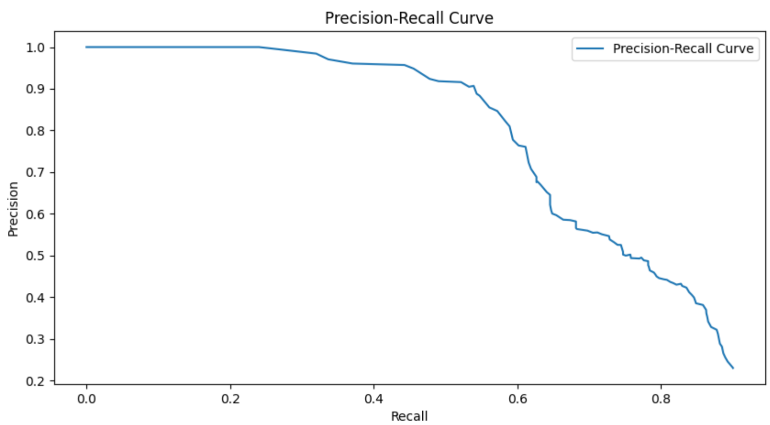

Figure 51. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=150, data=keskvaljak

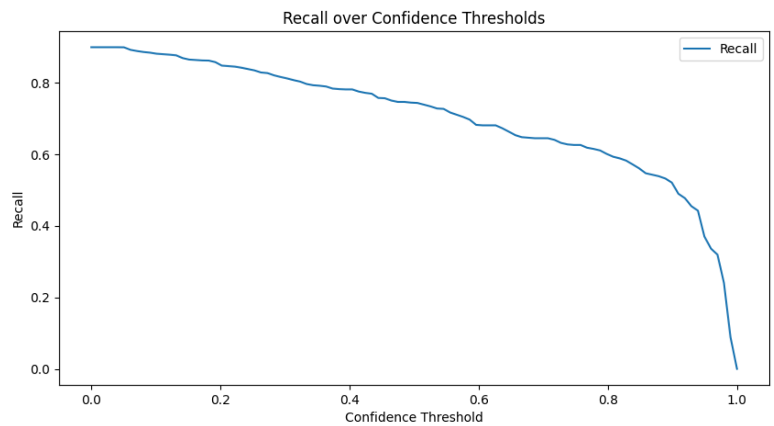

Figure 52. f1__over__confidence, fasterrcnn, pre-trained=False, epochs=150, data=kielce__university__of__technology

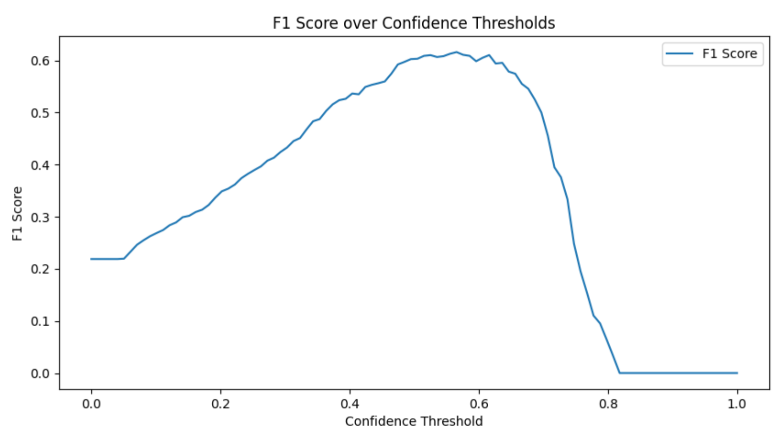

Figure 53. precision__over__confidence, fasterrcnn, pre-trained=False, epochs=150, data=kielce__university__of__technology

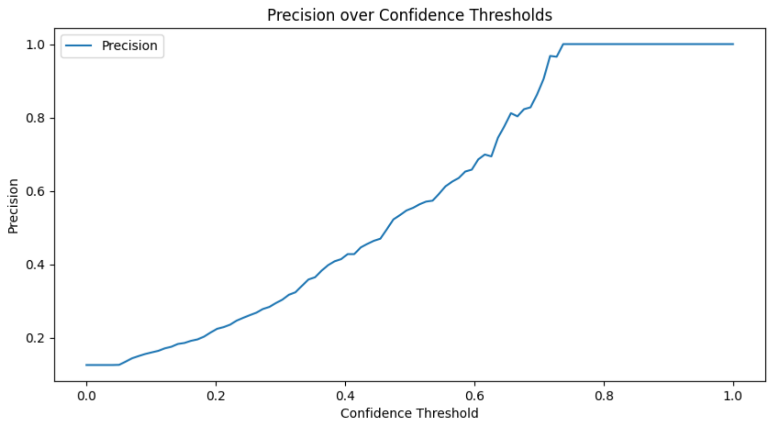

Figure 54. precision_over_recall, fasterrcnn, pre-trained=False, epochs=150, data=kielce_university_of_technology

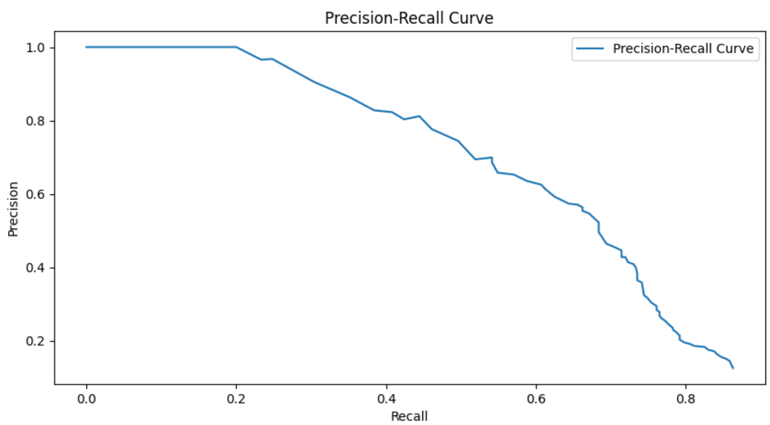

Figure 55. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=150, data=kielce_university_of_technology

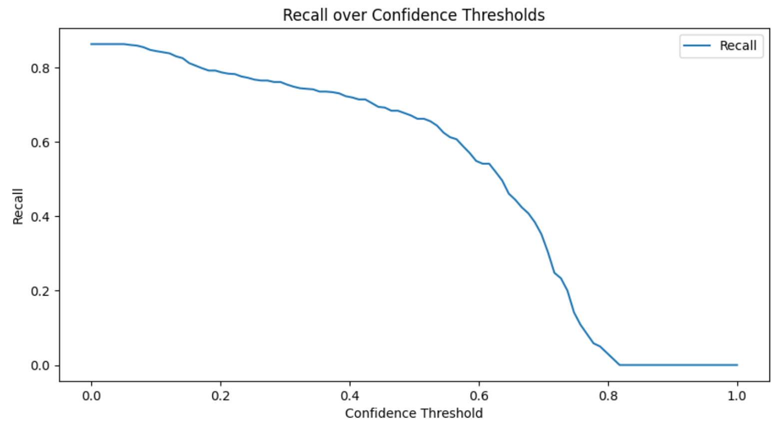

Figure 56. over_confidence, fasterrcnn, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch

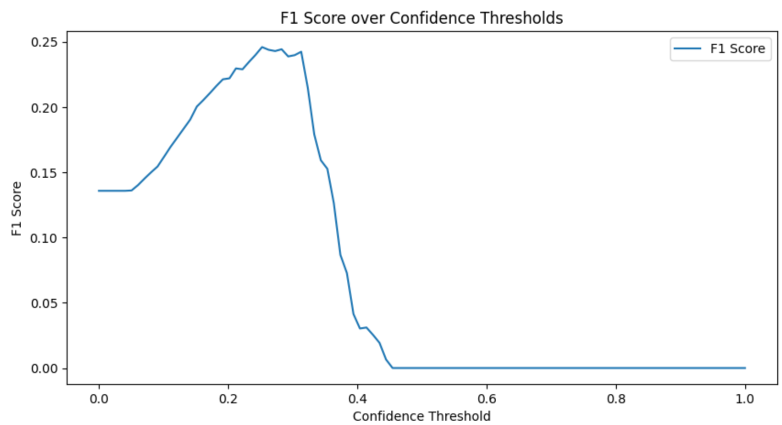

Figure 57. precision_over_confidence, fasterrcnn, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch

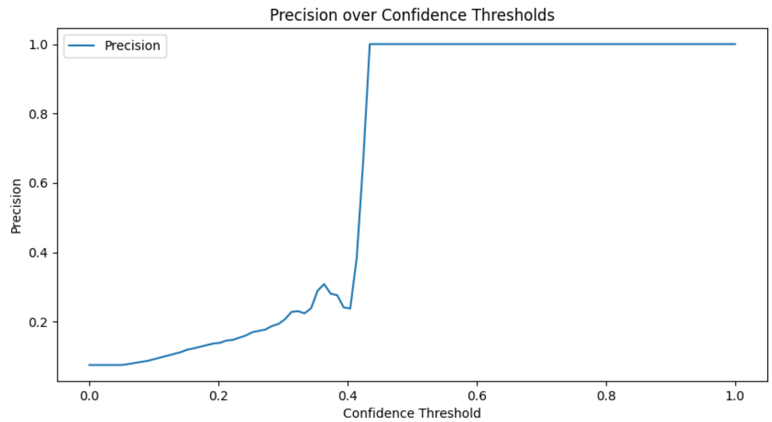

Figure 58. precision_over_recall, fasterrcnn, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch

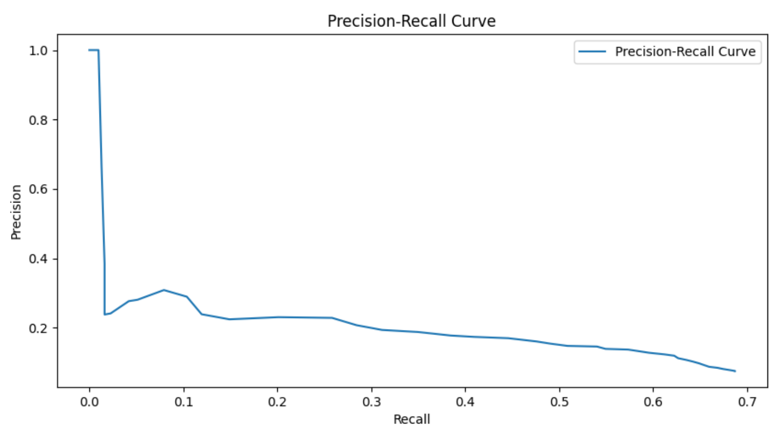

Figure 59. recall_over_confidence, fasterrcnn, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch

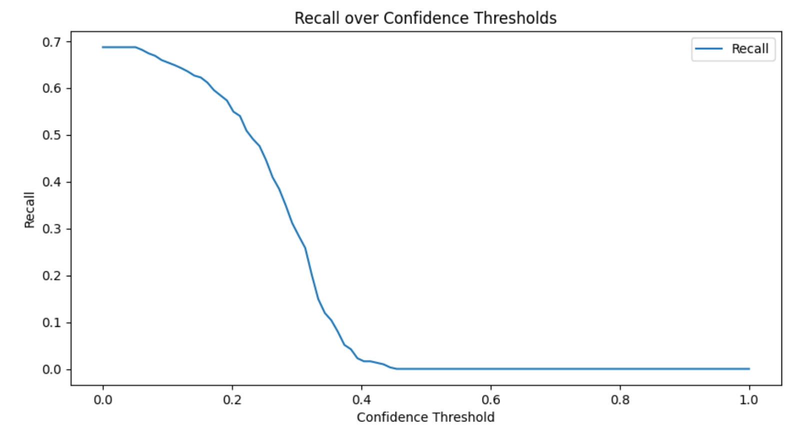

Figure 60. confidence, fasterrcnn, pre-trained=True, epochs=0, data=duomo

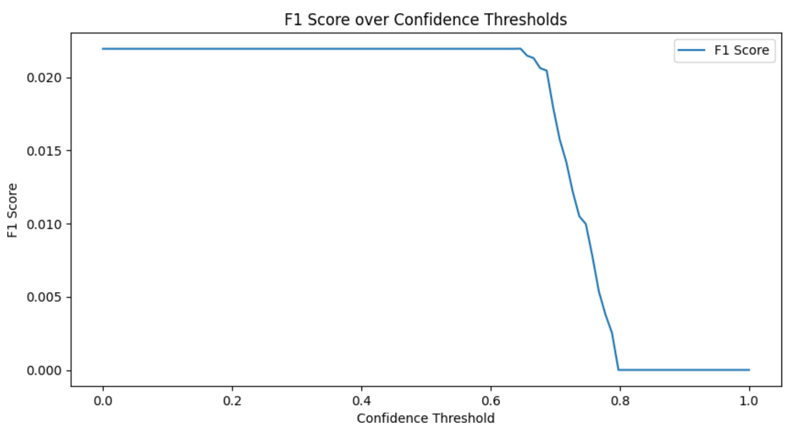

Figure 61. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=0, data=duomo

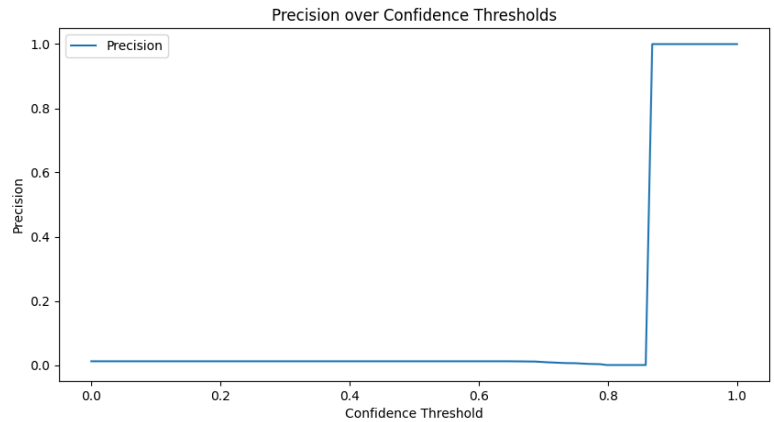

Figure 62. precision_over_recall, fasterrcnn, pre-trained=True, epochs=0, data=duomo

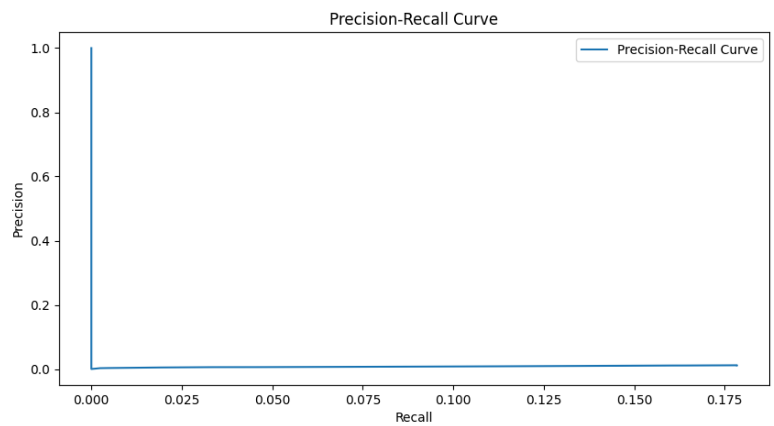

Figure 63. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=0, data=duomo

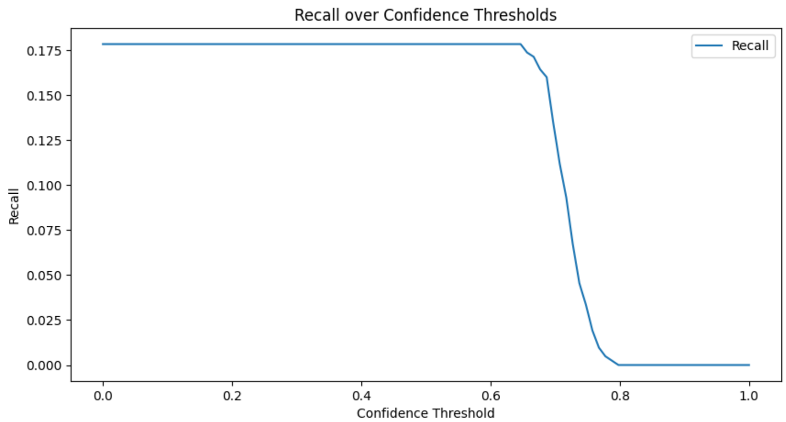

Figure 64. f1__over__confidence, fasterrcnn, pre-trained=True, epochs=0, data=hadji__dimitar__square

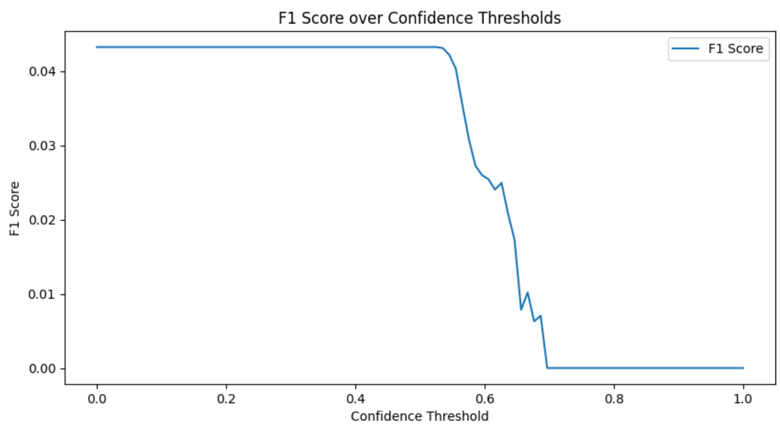

Figure 65. precision__over__confidence, fasterrcnn, pre-trained=True, epochs=0, data=hadji__dimitar__square

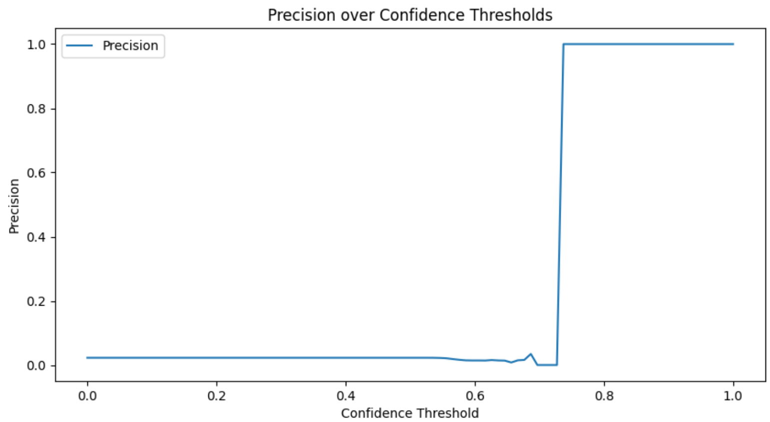

Figure 66. precision_over_recall, fasterrcnn, pre-trained=True, epochs=0, data=hadji_dimitar_square

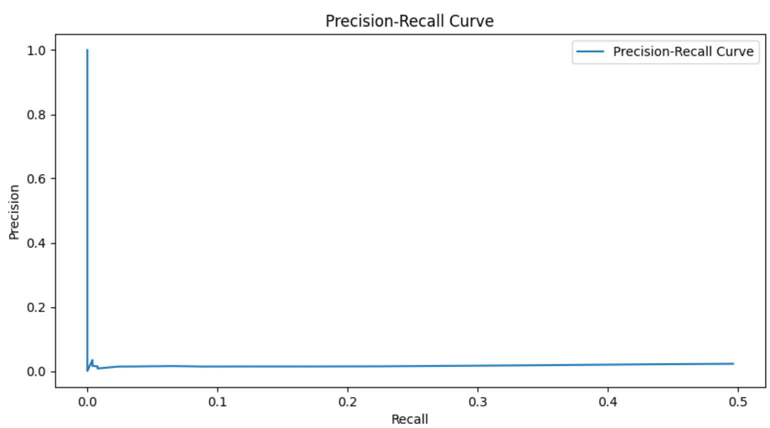

Figure 67. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=0, data=hadji_dimitar_square

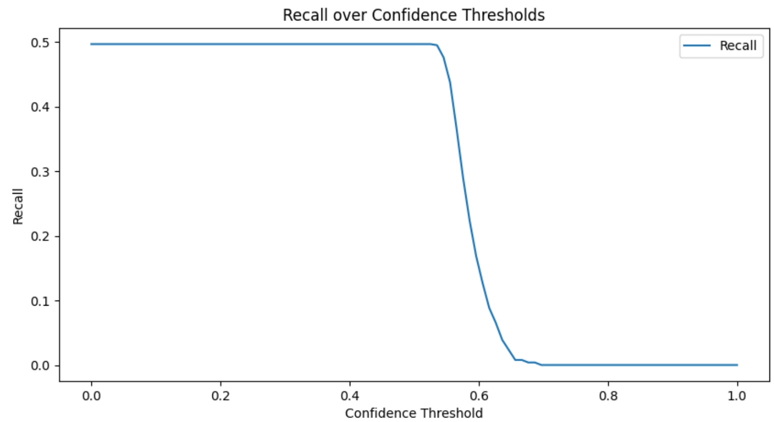

Figure 68. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=0, data=keskvaljak

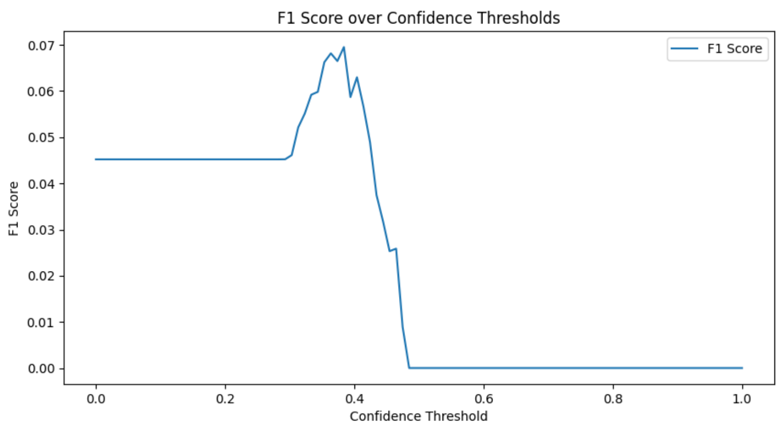

Figure 69. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=0, data=keskvaljak

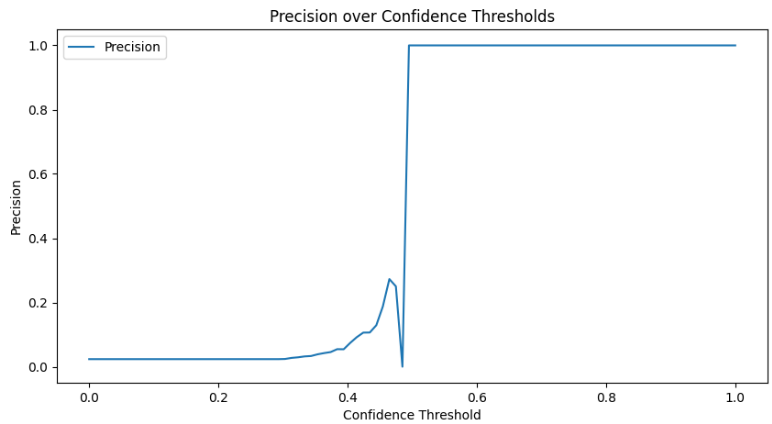

Figure 70. precision_over_recall, fasterrcnn, pre-trained=True, epochs=0, data=keskvaljak

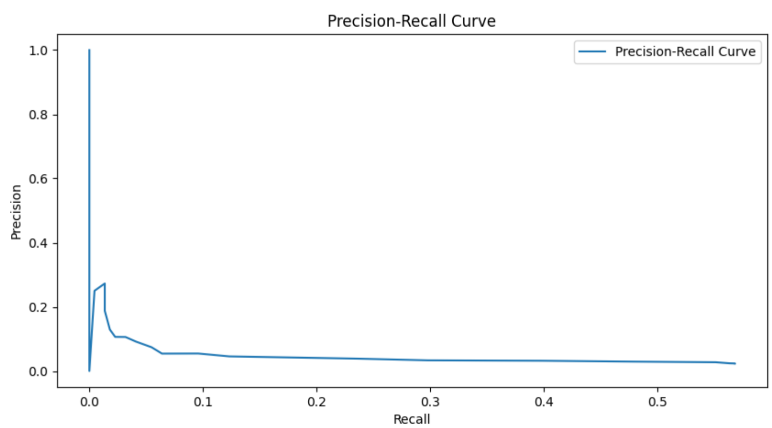

Figure 71. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=0, data=keskvaljak

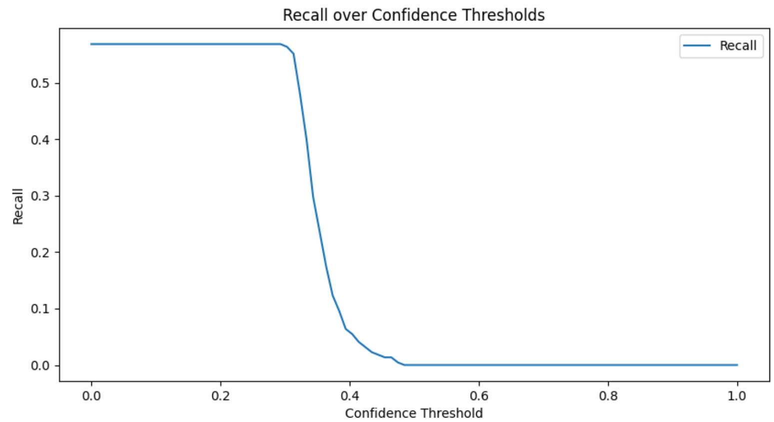

Figure 72. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=0, data=kielce_university_of_technology

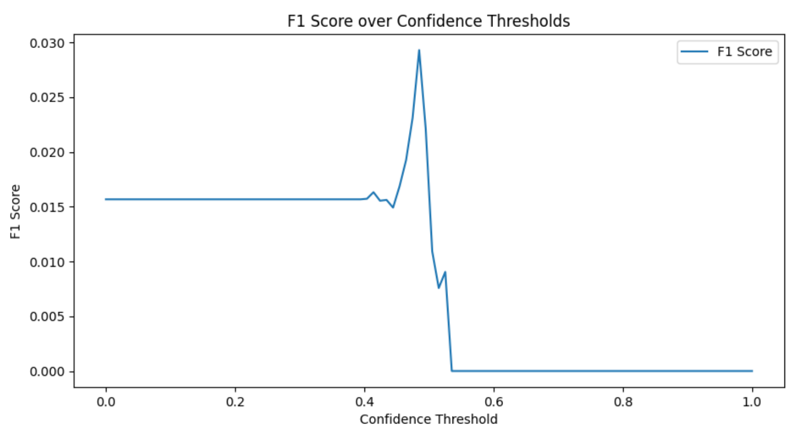

Figure 73. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=0, data=kielce_university_of_technology

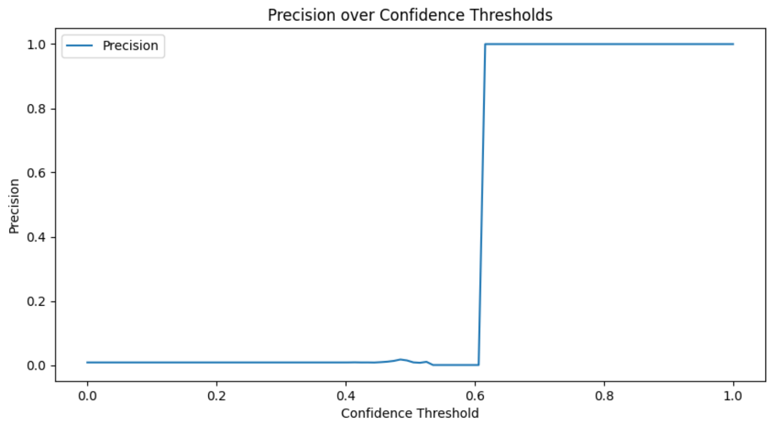

Figure 74. precision_over_recall, fasterrcnn, pre-trained=True, epochs=0, data=kielce_university_of_technology

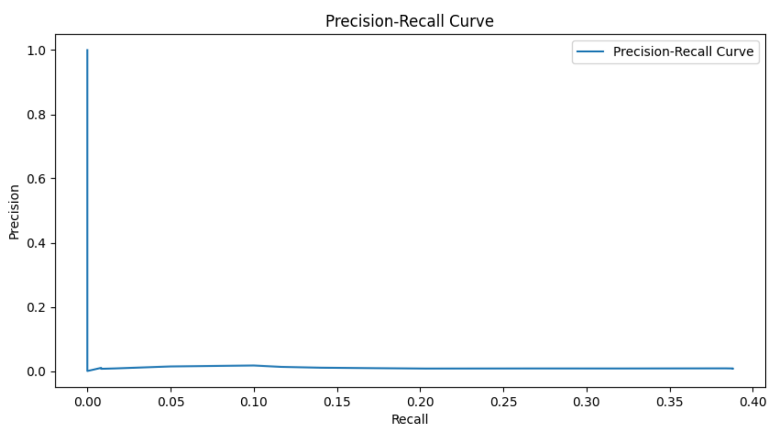

Figure 75. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=0, data=kielce_university_of_technology

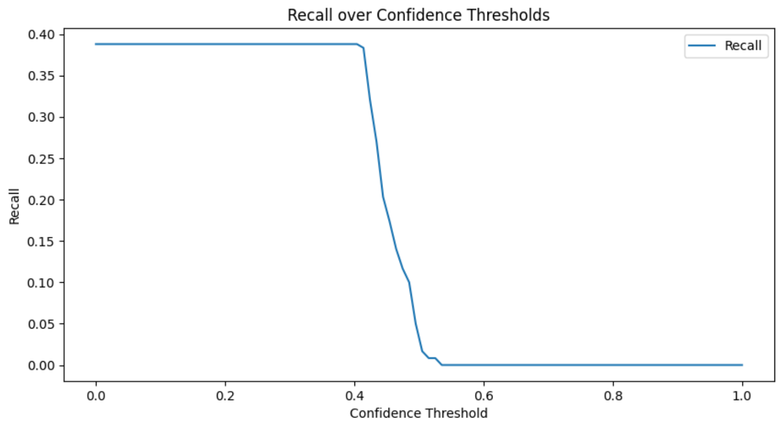

Figure 76. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch

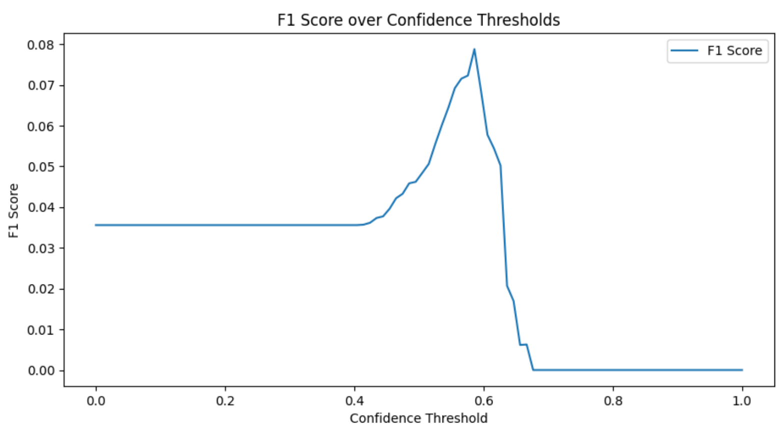

Figure 77. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch

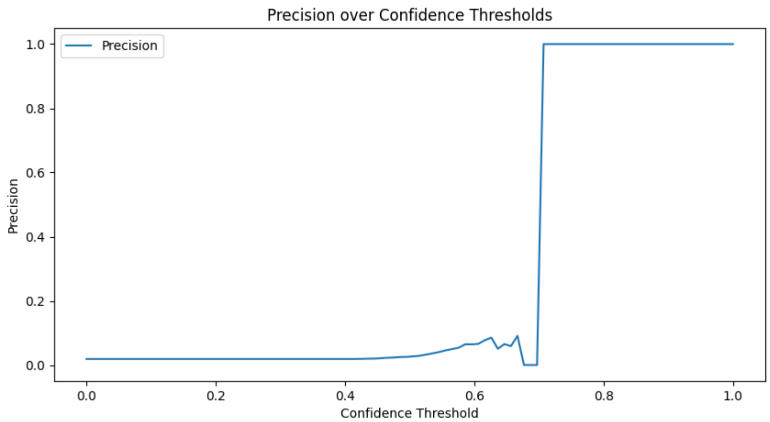

Figure 78. precision_over_recall, fasterrcnn, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch

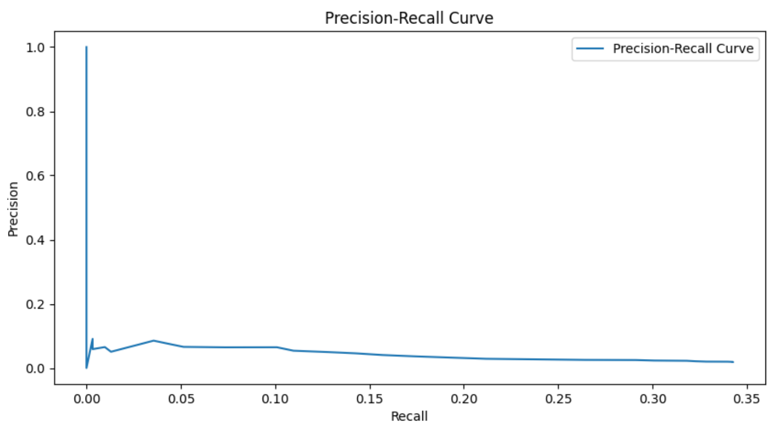

Figure 79. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch

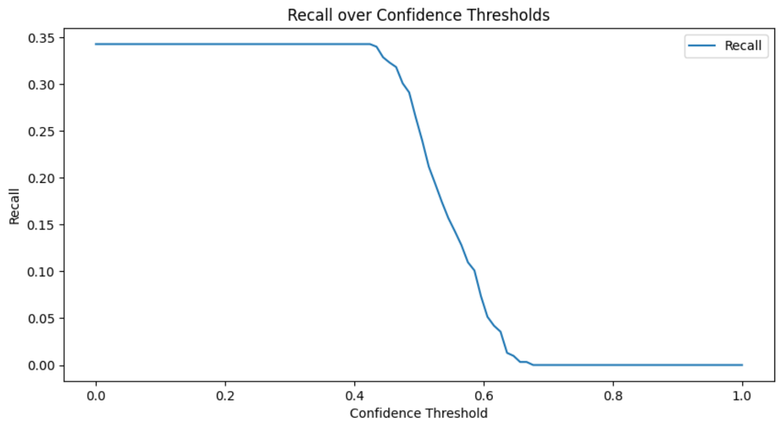

Figure 80. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=duomo

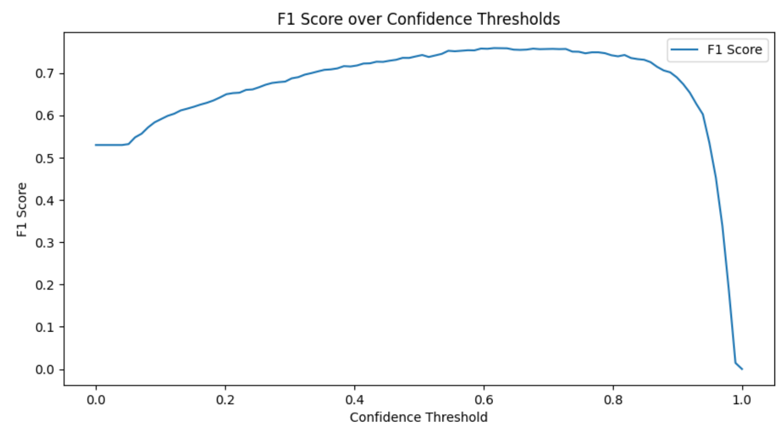

Figure 81. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=duomo

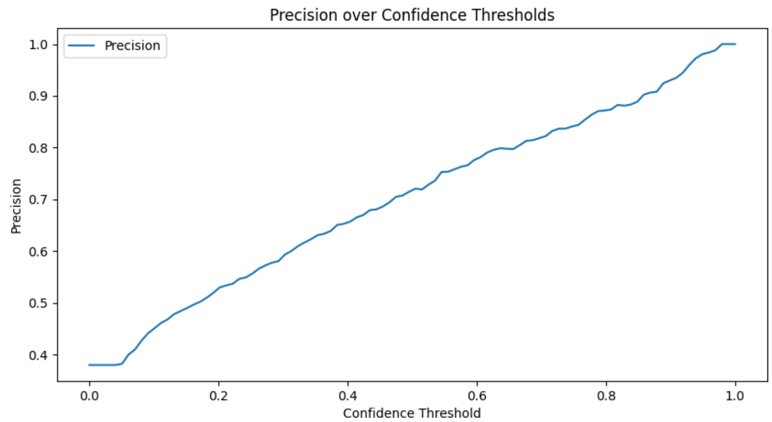

Figure 82. precision_over_recall, fasterrcnn, pre-trained=True, epochs=50, data=duomo

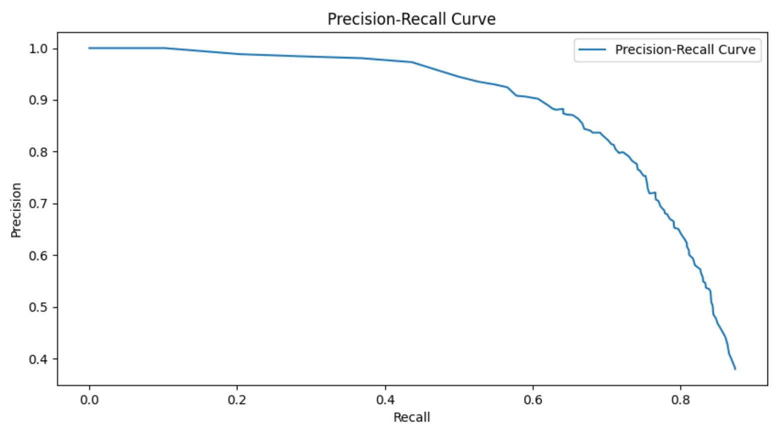

Figure 83. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=duomo

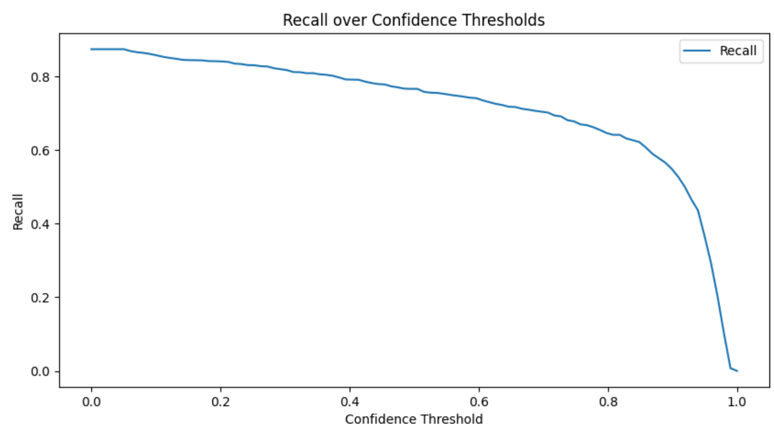

Figure 84. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=hadji_dimitar_square

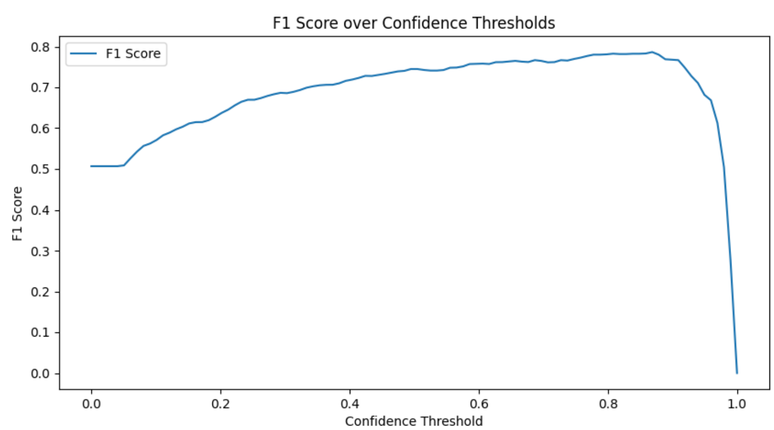

Figure 85. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=hadji_dimitar_square

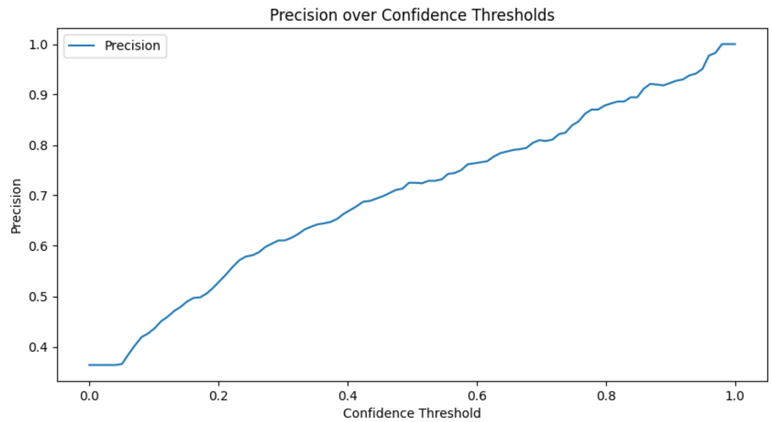

Figure 86. precision_over_recall, fasterrcnn, pre-trained=True, epochs=50, data=hadji_dimitar_square

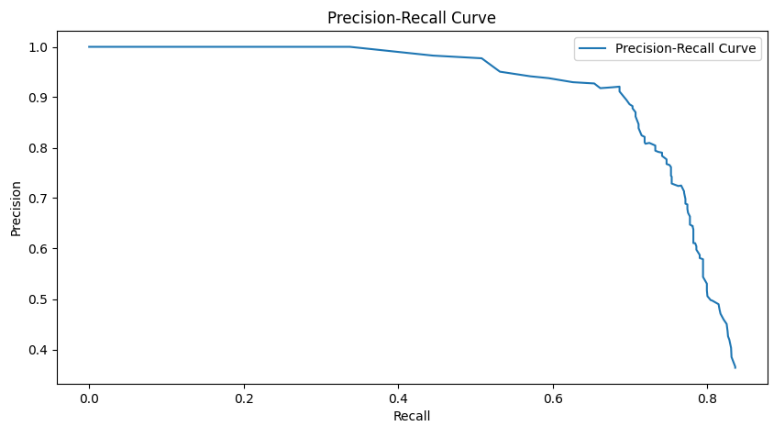

Figure 87. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=hadji_dimitar_square

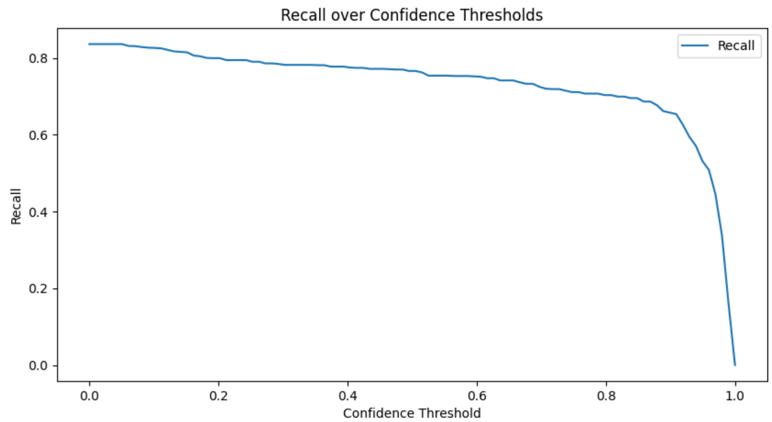

Figure 88. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=keskvaljak

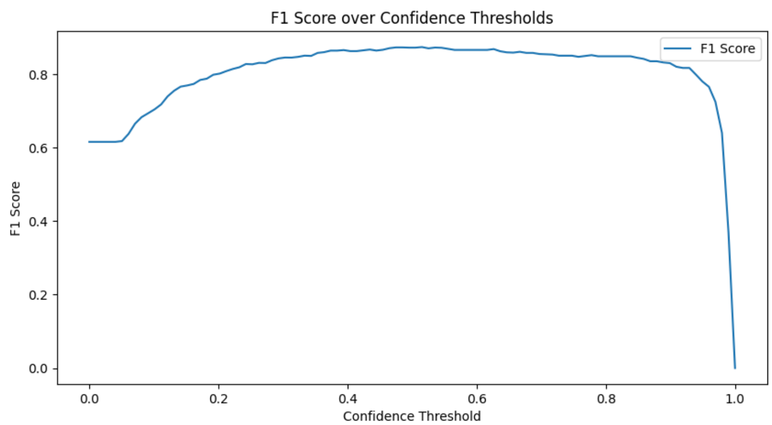

Figure 89. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=keskvaljak

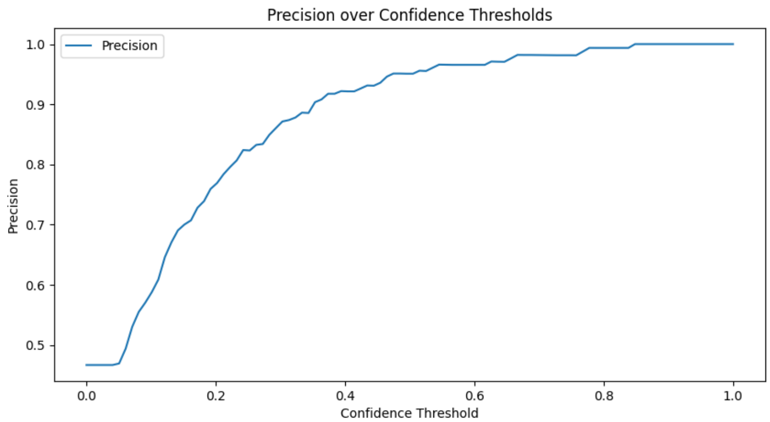

Figure 90. precision_over_recall, fasterrcnn, pre-trained=True, epochs=50, data=keskvaljak

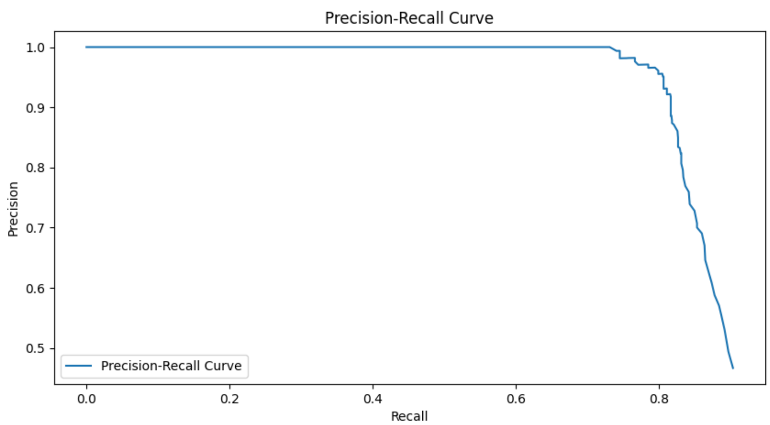

Figure 91. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=keskvaljak

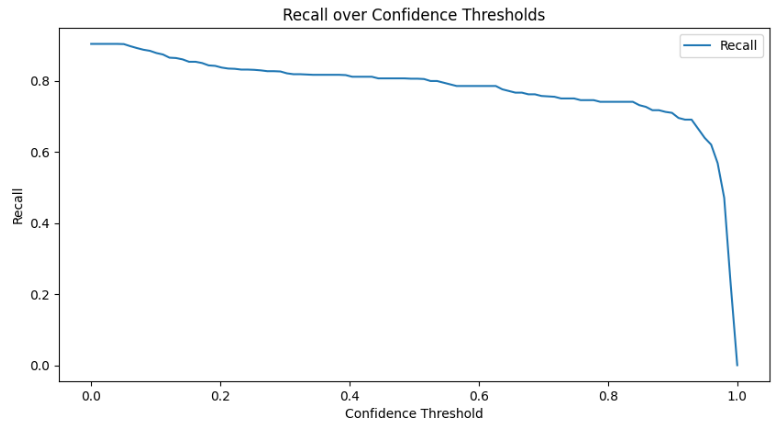

Figure 92. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=kielce_university_of_technology

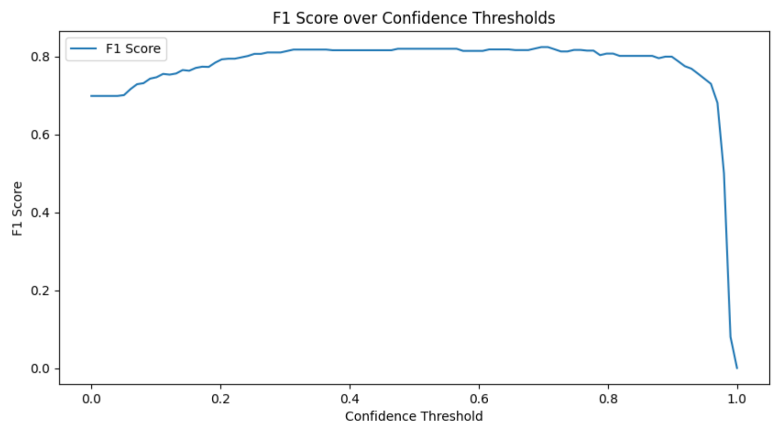

Figure 93. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=kielce_university_of_technology

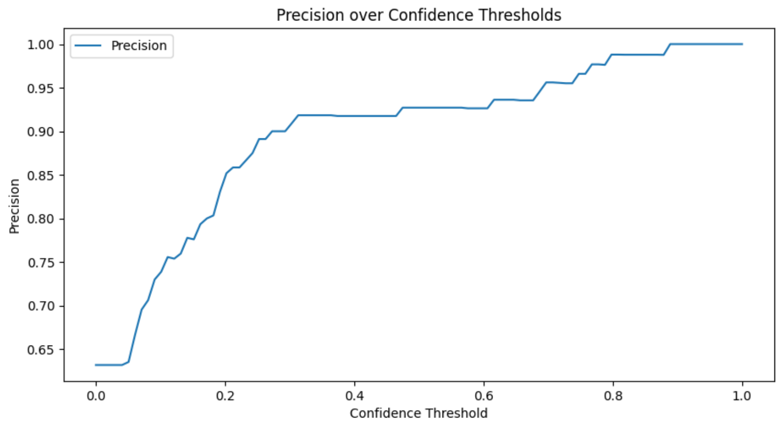

Figure 94. precision_over_recall, fasterrcnn, pre-trained=True, epochs=50, data=kielce_university_of_technology

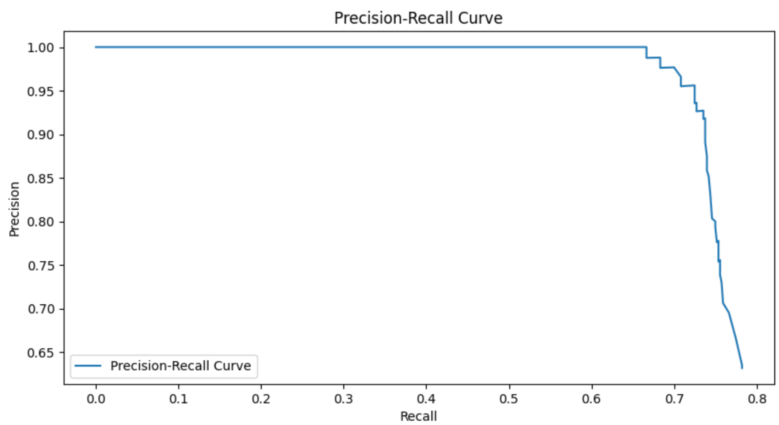

Figure 95. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=kielce_university_of_technology

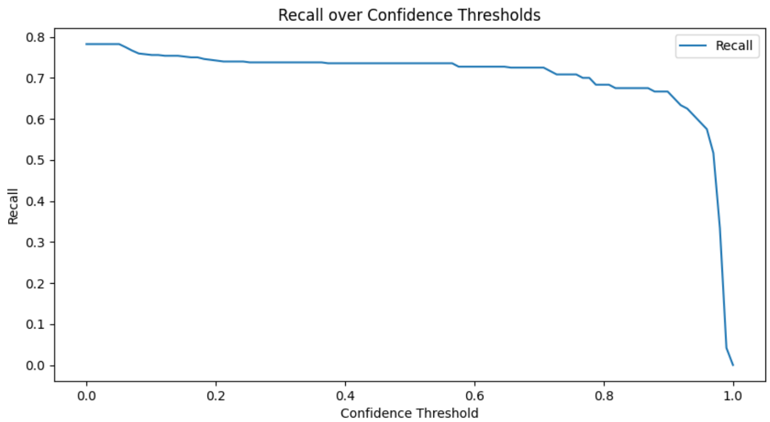

Figure 96. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch

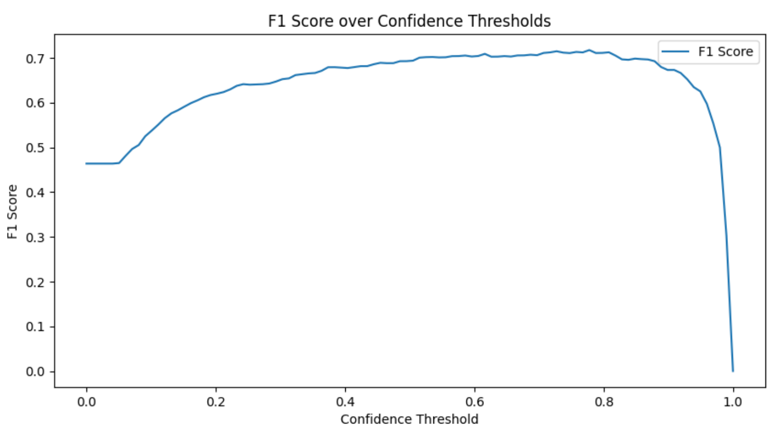

Figure 97. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch

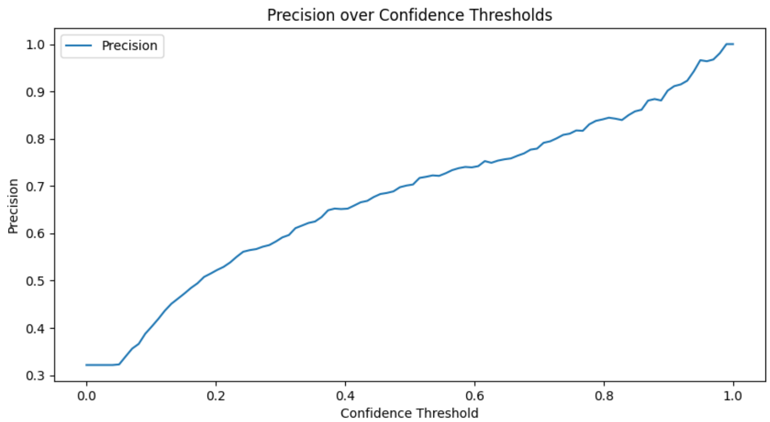

Figure 98. precision_over_recall, fasterrcnn, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch

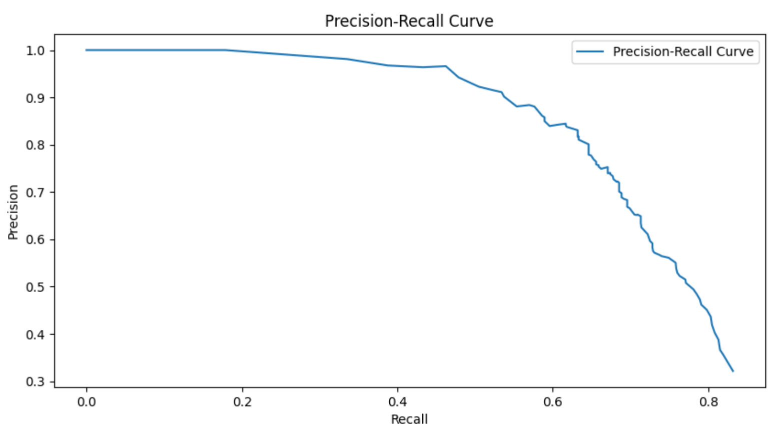

Figure 99. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch

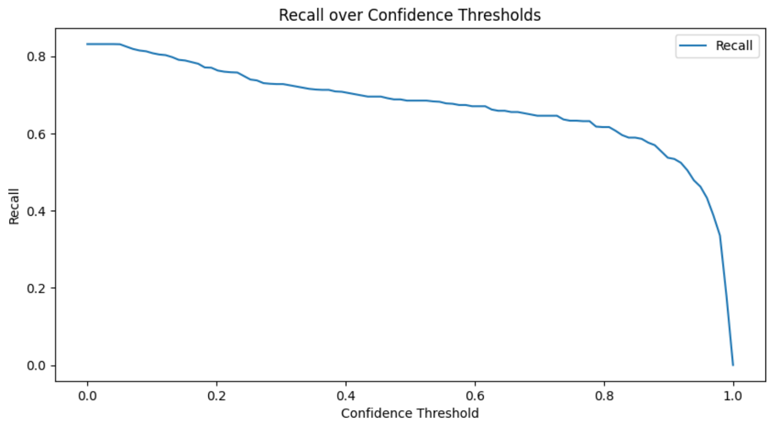

Figure 100. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=duomo

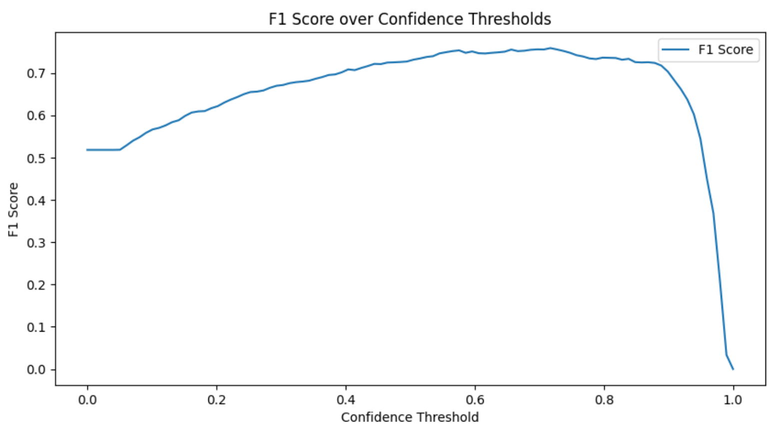

Figure 101. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=duomo

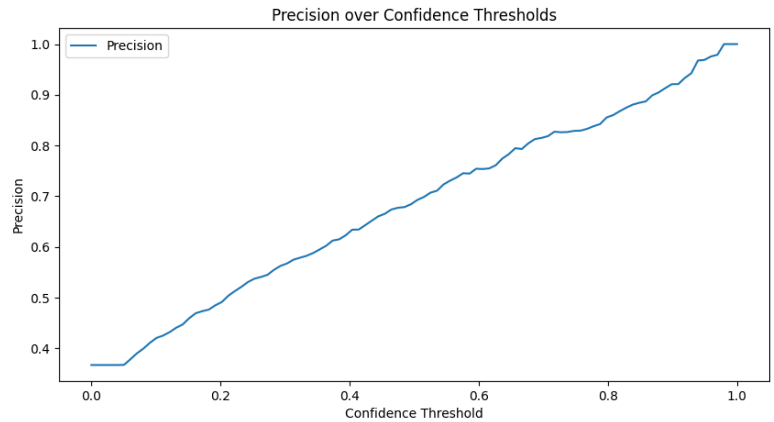

Figure 102. precision_over_recall, fasterrcnn, pre-trained=True, epochs=100, data=duomo

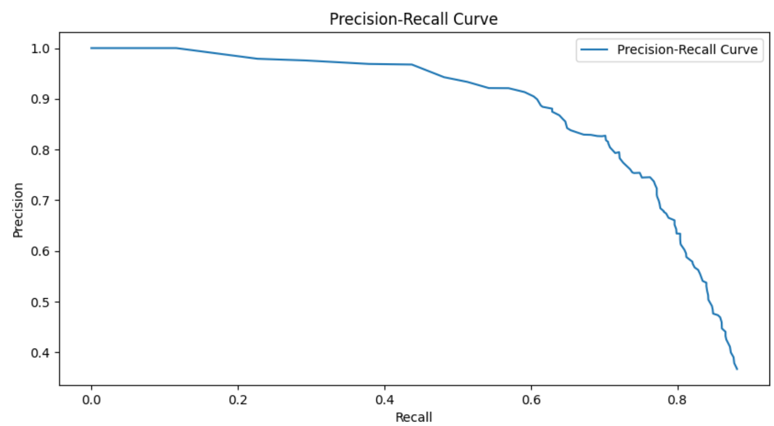

Figure 103. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=duomo

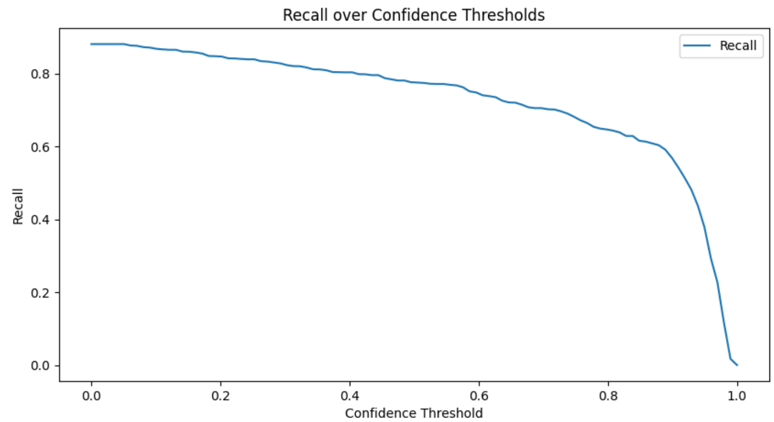

Figure 104. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=hadji_dimitar_square

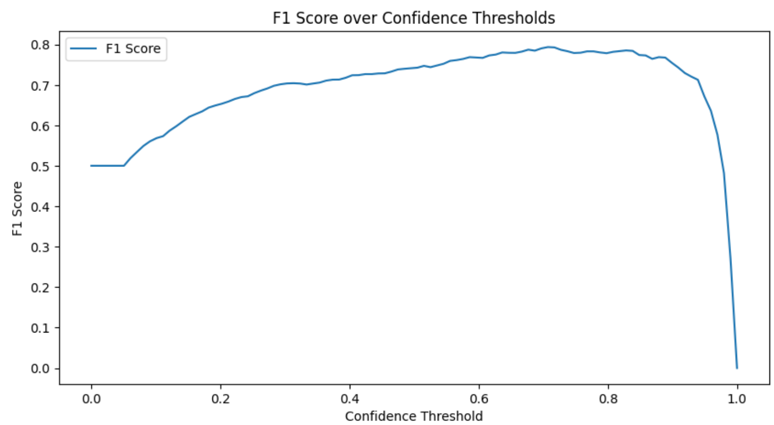

Figure 105. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=hadji_dimitar_square

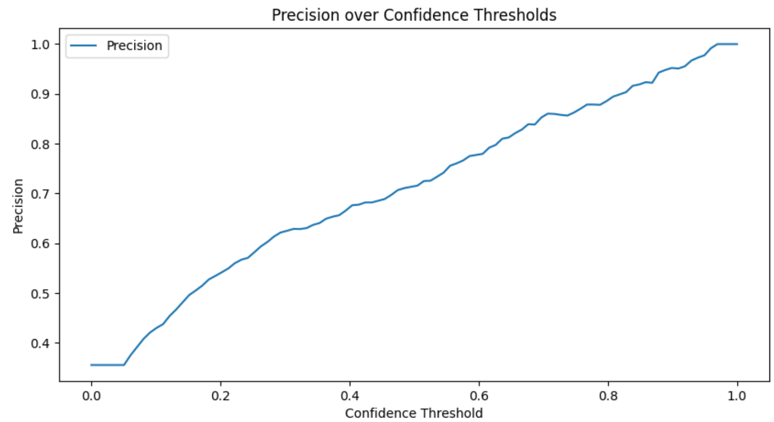

Figure 106. precision_over_recall, fasterrcnn, pre-trained=True, epochs=100, data=hadji_dimitar_square

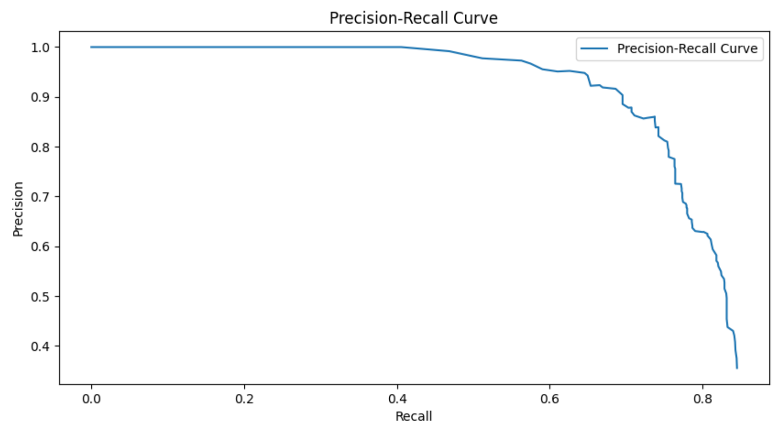

Figure 107. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=hadji_dimitar_square

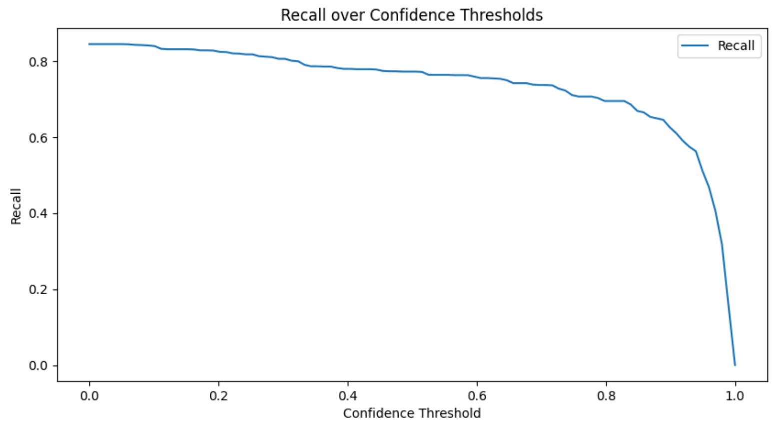

Figure 108. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=keskvaljak

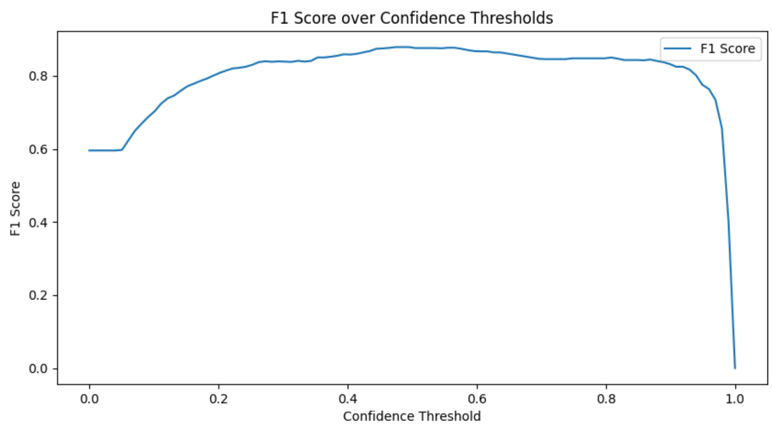

Figure 109. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=keskvaljak

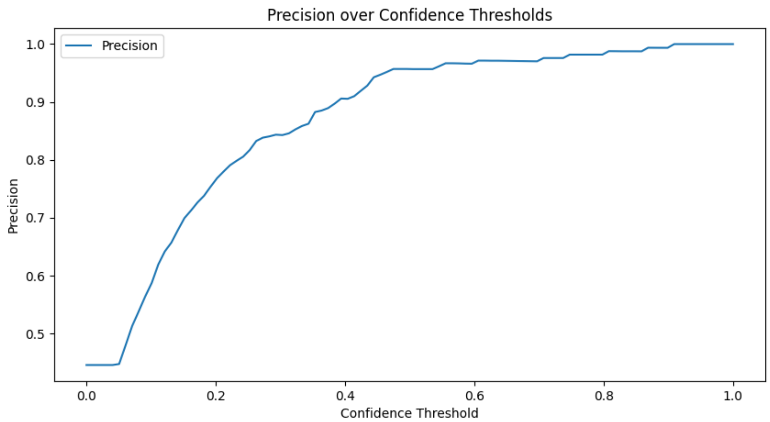

Figure 110. precision_over_recall, fasterrcnn, pre-trained=True, epochs=100, data=keskvaljak

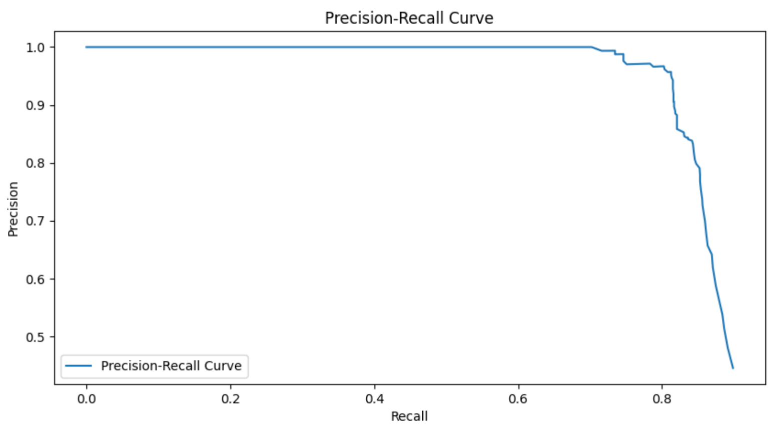

Figure 111. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=keskvaljak

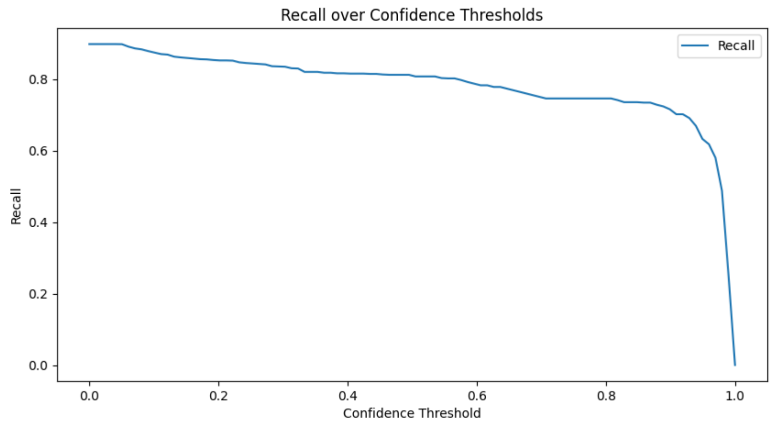

Figure 112. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=kielce_university_of_technology

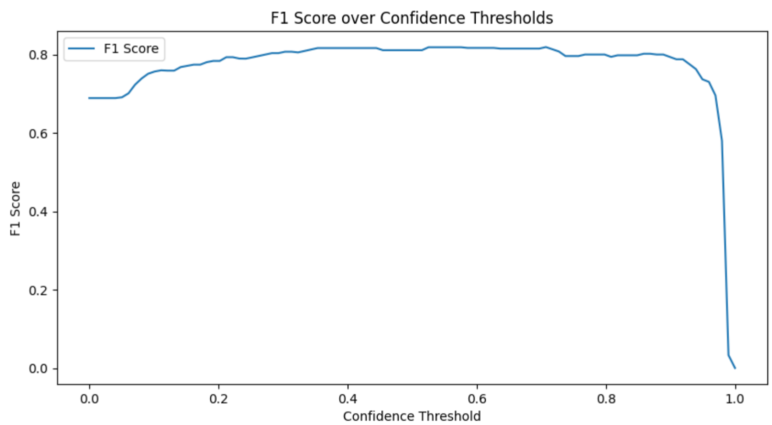

Figure 113. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=kielce_university_of_technology

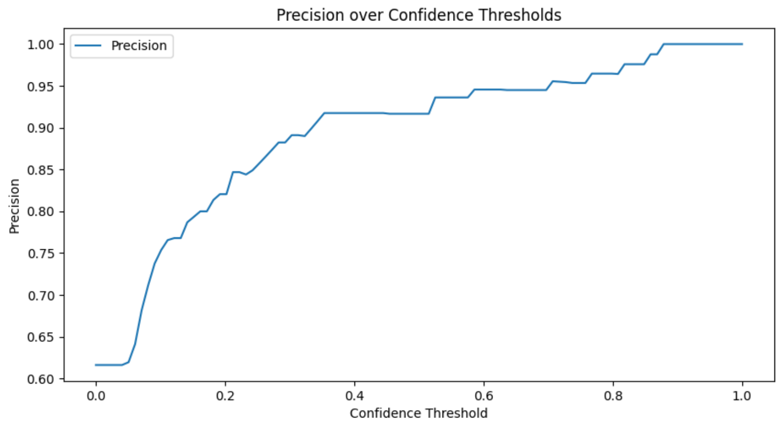

Figure 114. precision_over_recall, fasterrcnn, pre-trained=True, epochs=100, data=kielce_university_of_technology

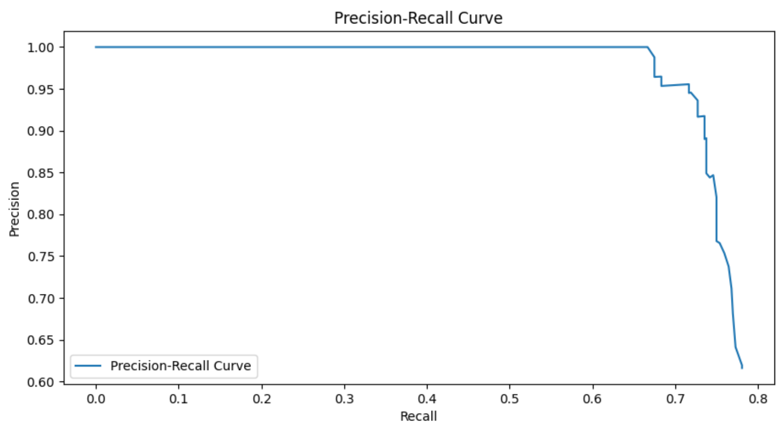

Figure 115. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=kielce_university_of_technology

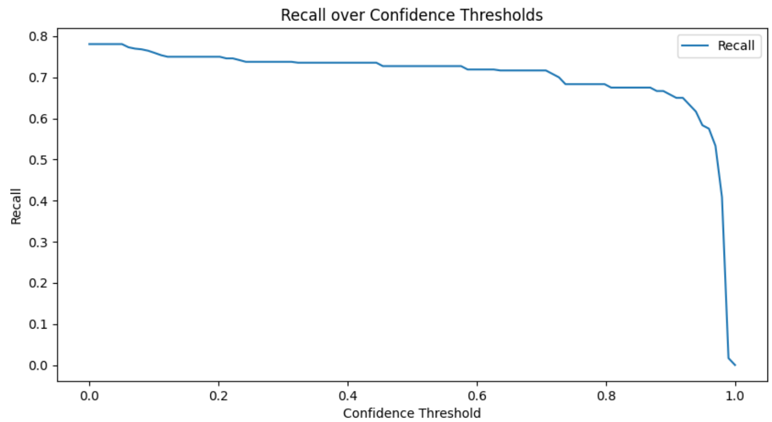

Figure 116. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch

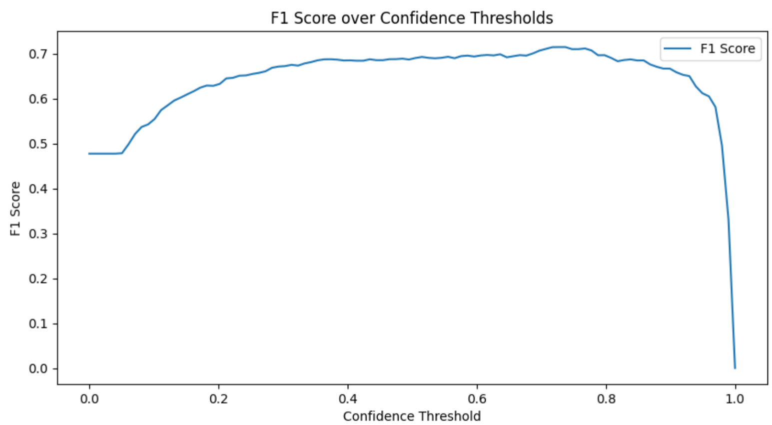

Figure 117. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch

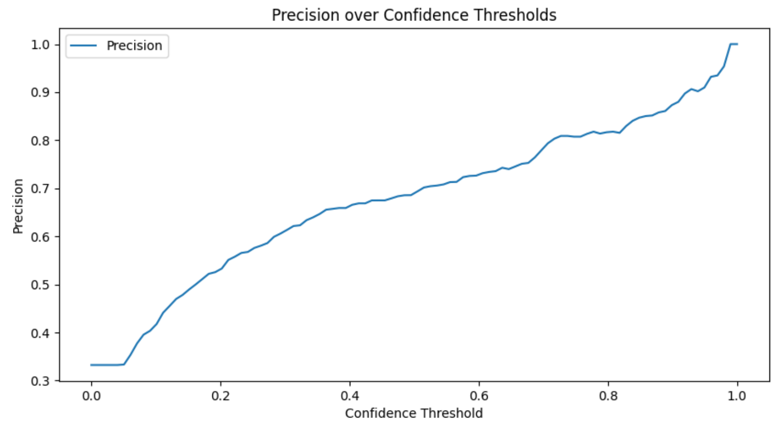

Figure 118. precision_over_recall, fasterrcnn, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch

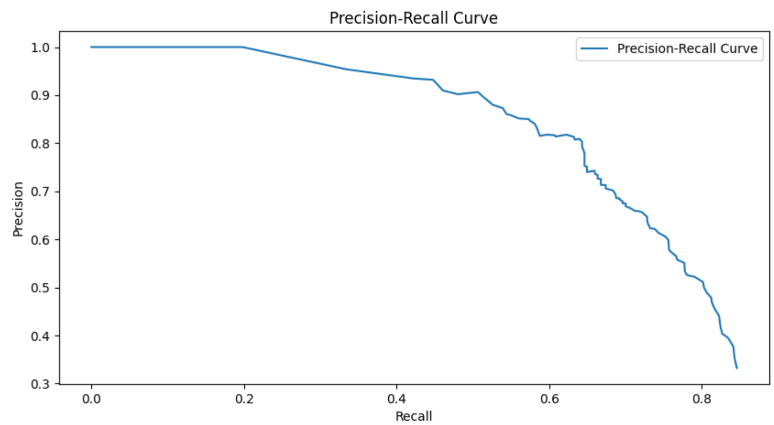

Figure 119. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch

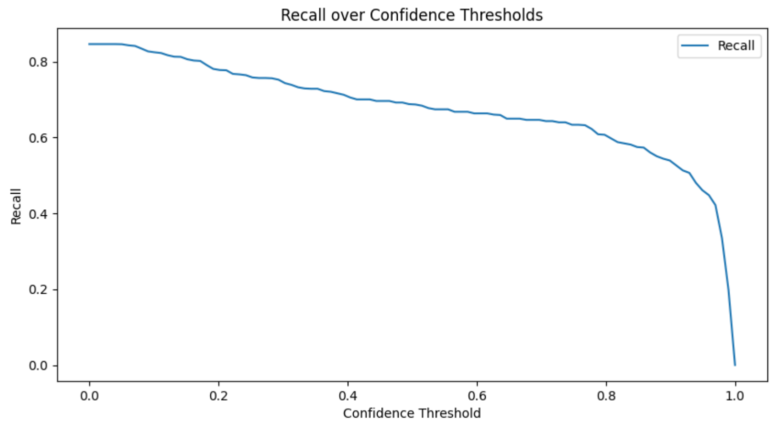

Figure 120. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=duomo

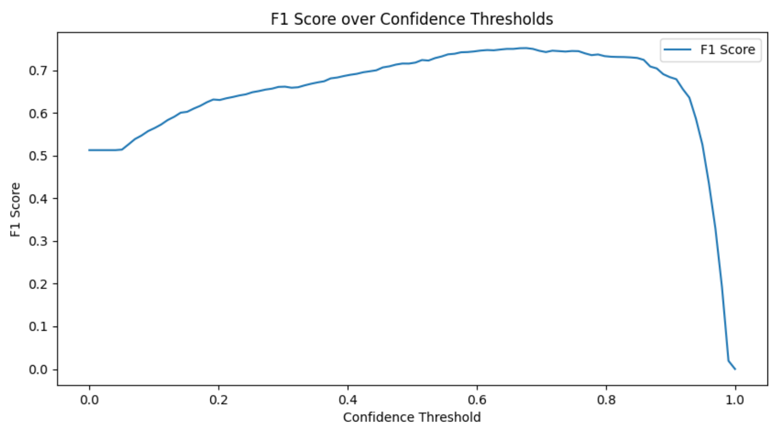

Figure 121. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=duomo

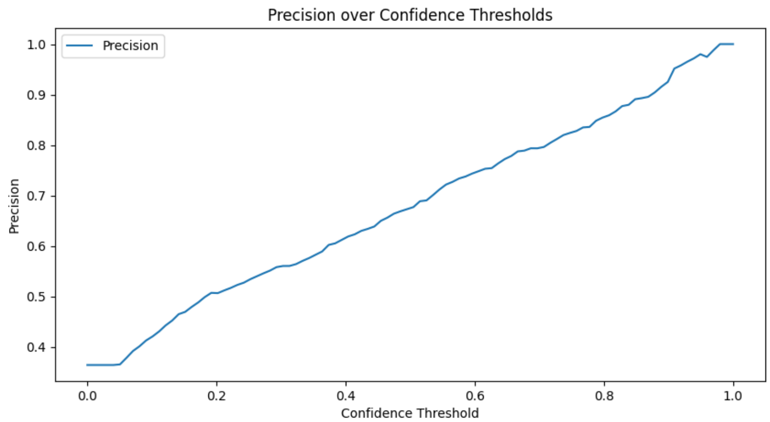

Figure 122. precision_over_recall, fasterrcnn, pre-trained=True, epochs=150, data=duomo

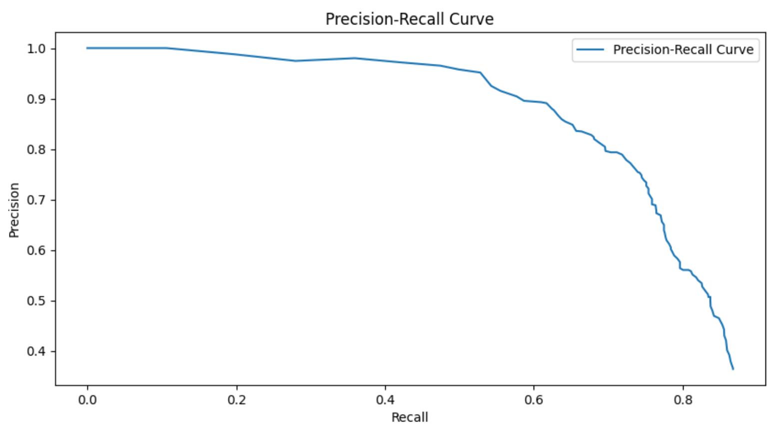

Figure 123. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=duomo

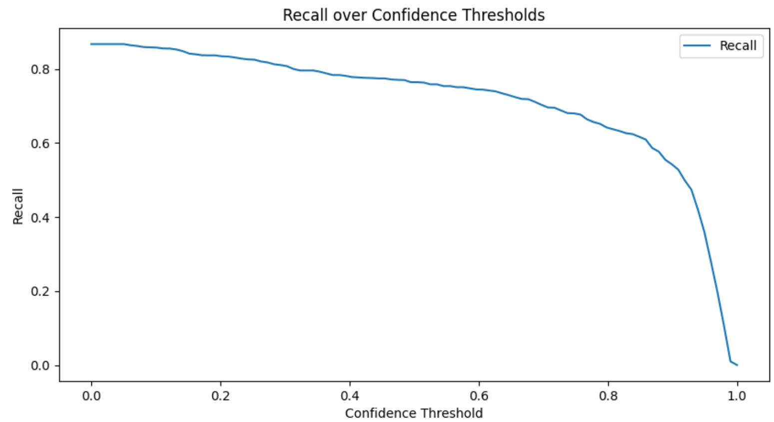

Figure 124. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=hadji_dimitar_square

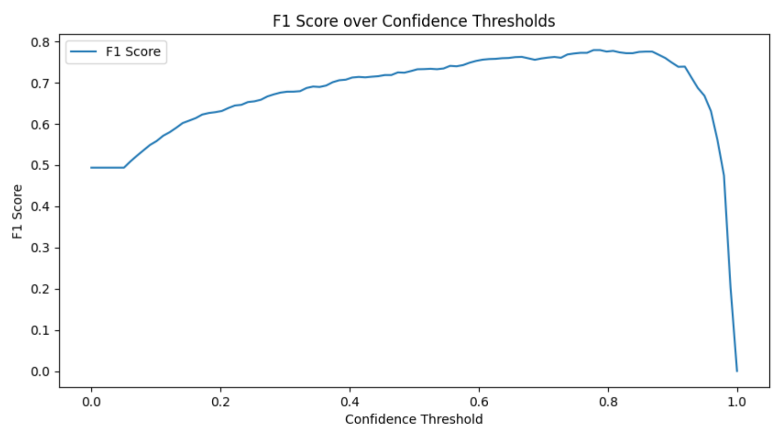

Figure 125. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=hadji_dimitar_square

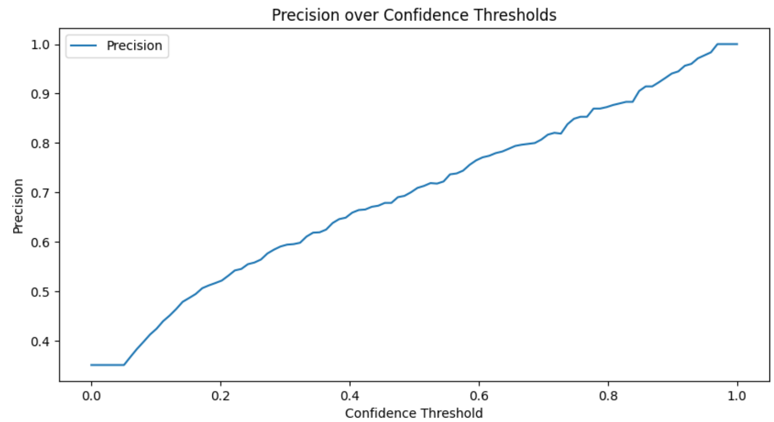

Figure 126. precision_over_recall, fasterrcnn, pre-trained=True, epochs=150, data=hadji_dimitar_square

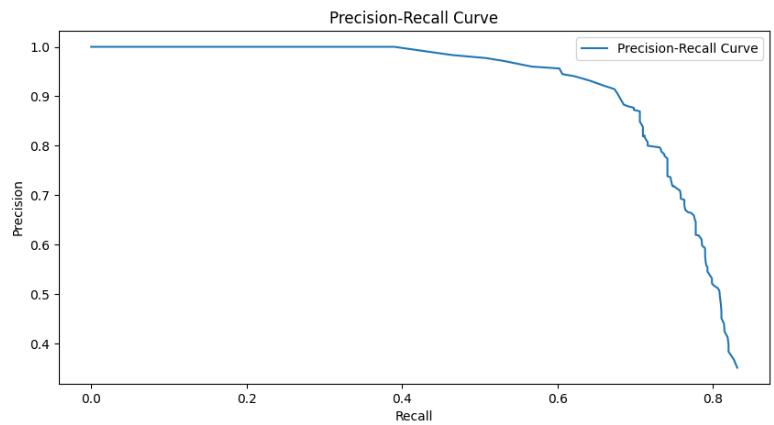

Figure 127. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=hadji_dimitar_square

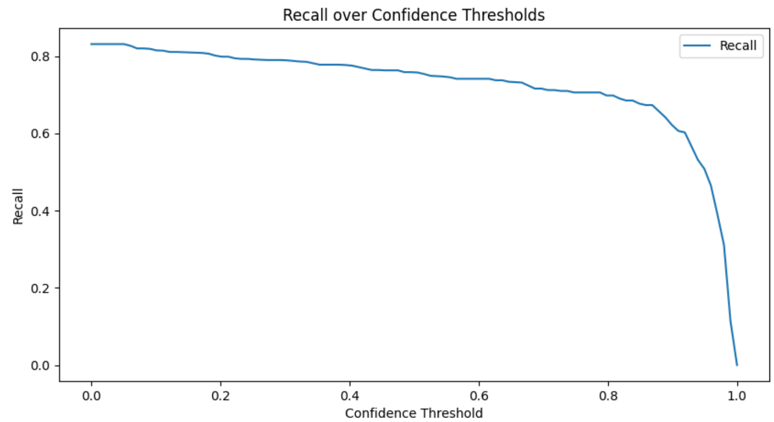

Figure 128. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=keskvaljak

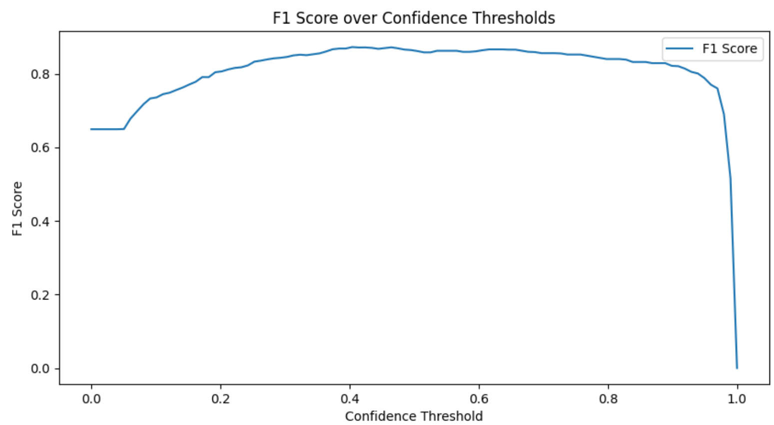

Figure 129. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=keskvaljak

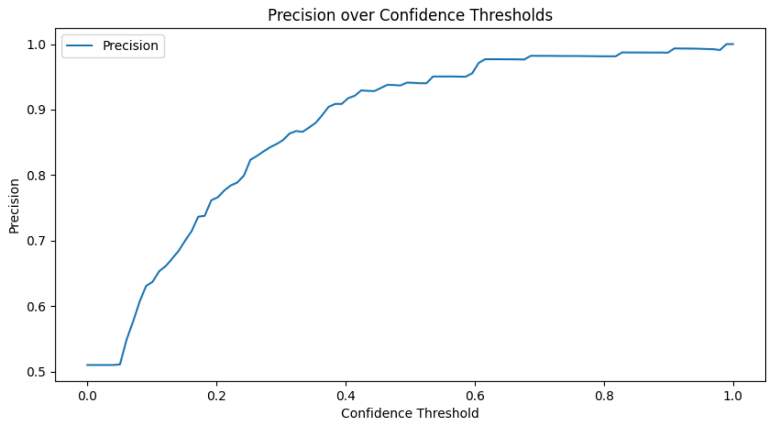

Figure 130. precision_over_recall, fasterrcnn, pre-trained=True, epochs=150, data=keskvaljak

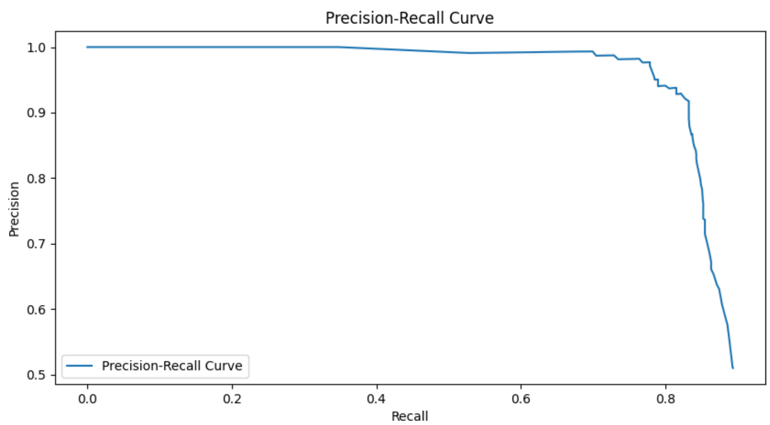

Figure 131. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=keskvaljak

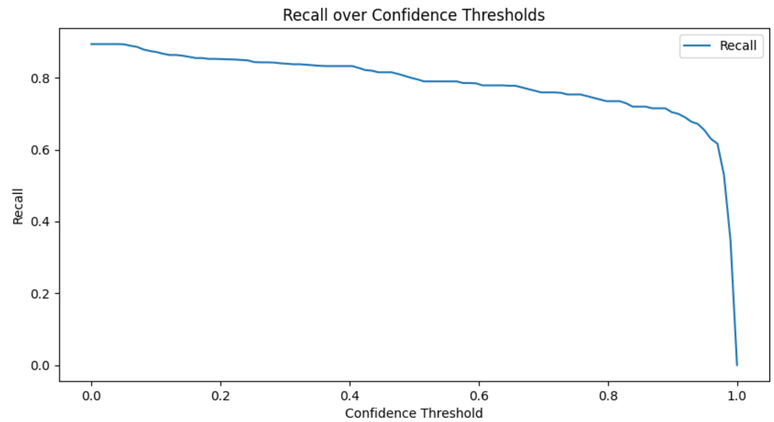

Figure 132. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=kielce_university_of_technology

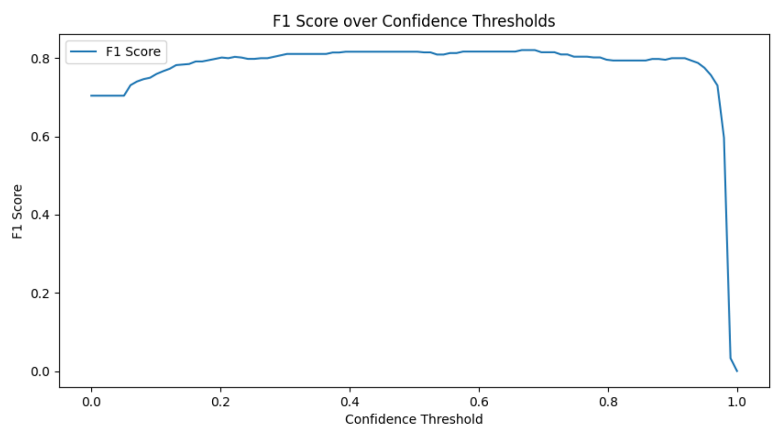

Figure 133. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=kielce_university_of_technology

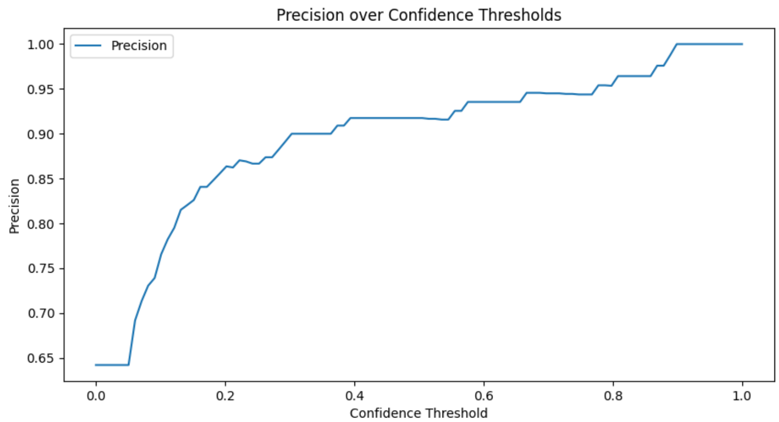

Figure 134. precision_over_recall, fasterrcnn, pre-trained=True, epochs=150, data=kielce_university_of_technology

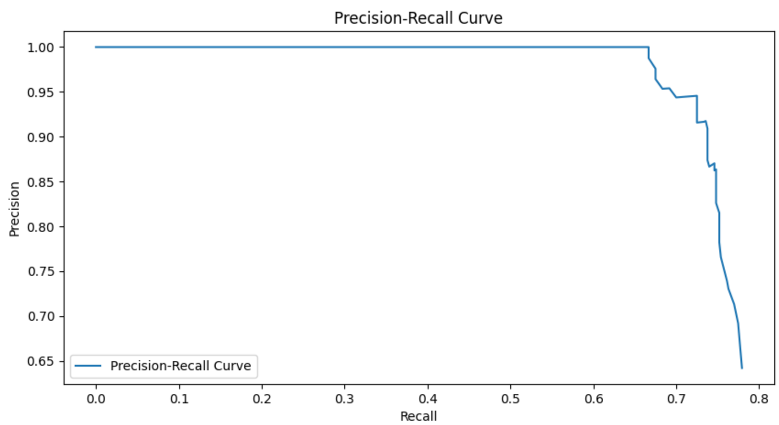

Figure 135. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=kielce_university_of_technology

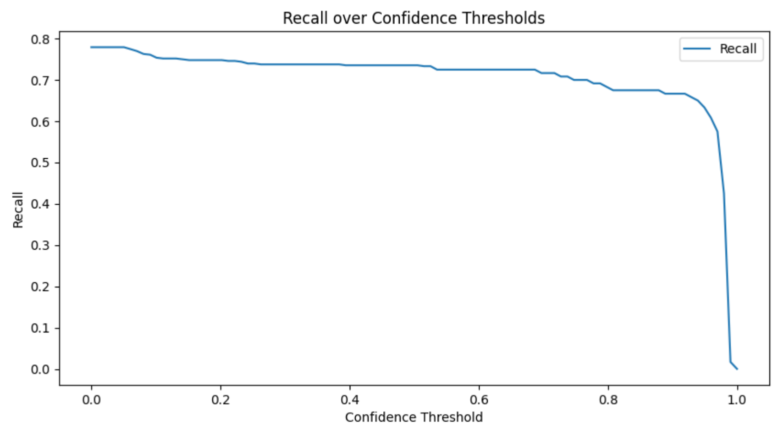

Figure 136. f1_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch

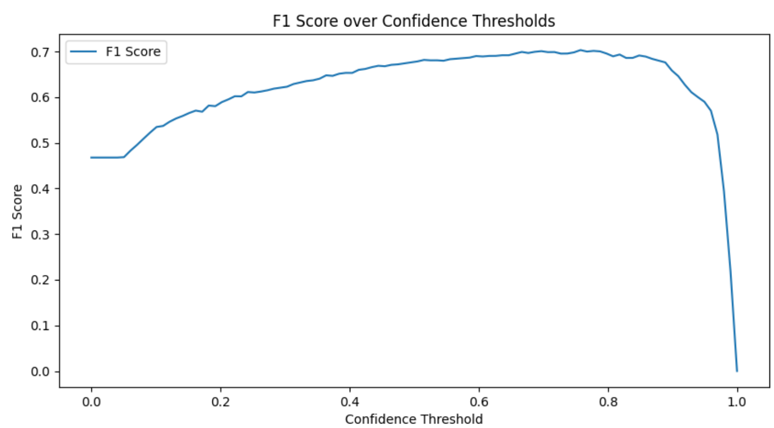

Figure 137. precision_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch

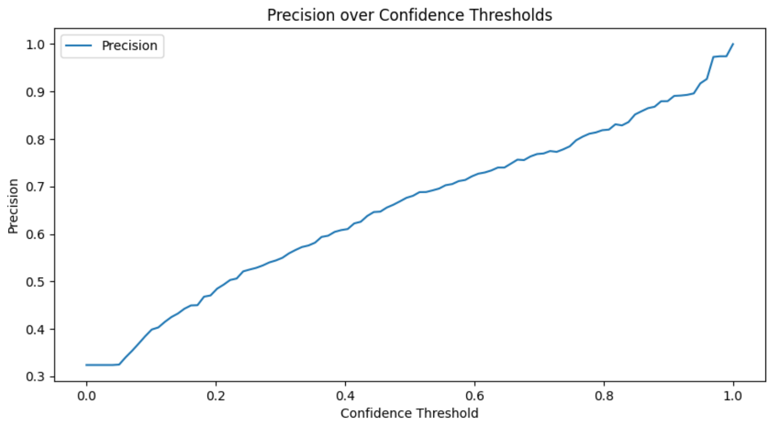

Figure 138. precision_over_recall, fasterrcnn, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch

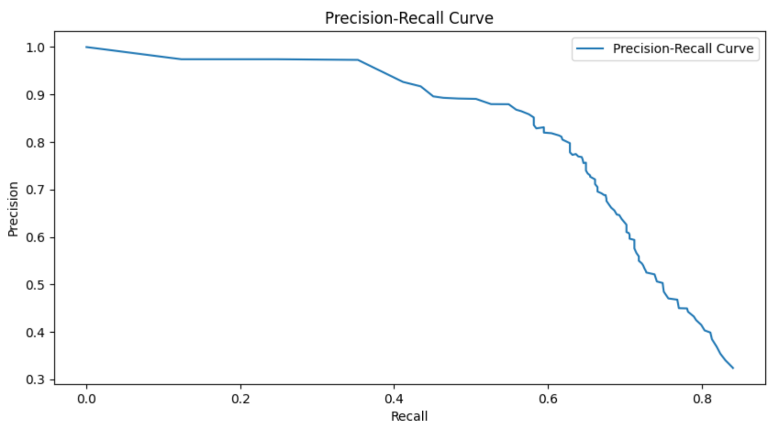

Figure 139. recall_over_confidence, fasterrcnn, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch

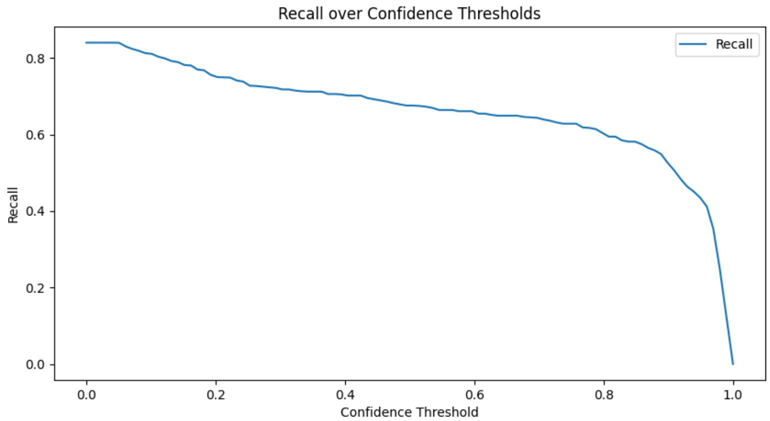

Figure 140. f1_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=duomo

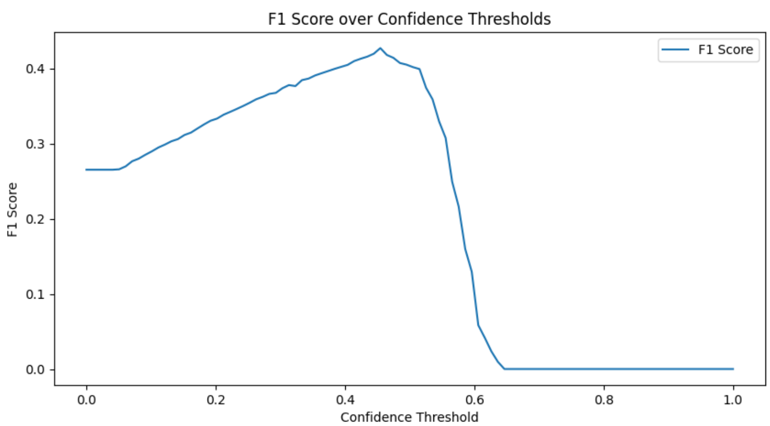

Figure 141. precision_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=duomo

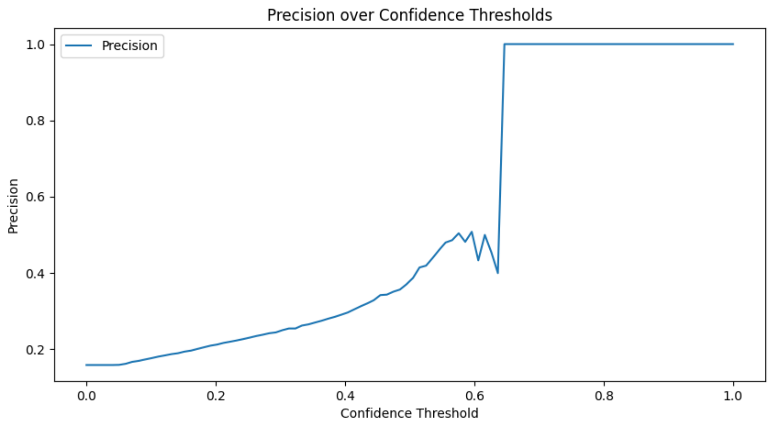

Figure 142. precision_over_recall, maskrcnn, pre-trained=False, epochs=50, data=duomo

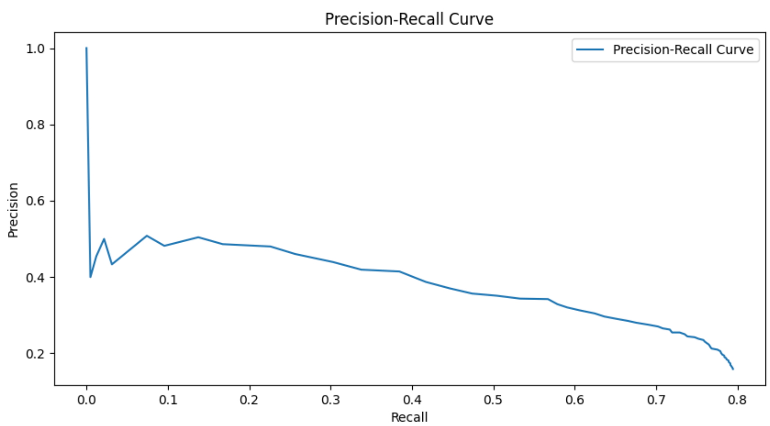

Figure 143. recall_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=duomo

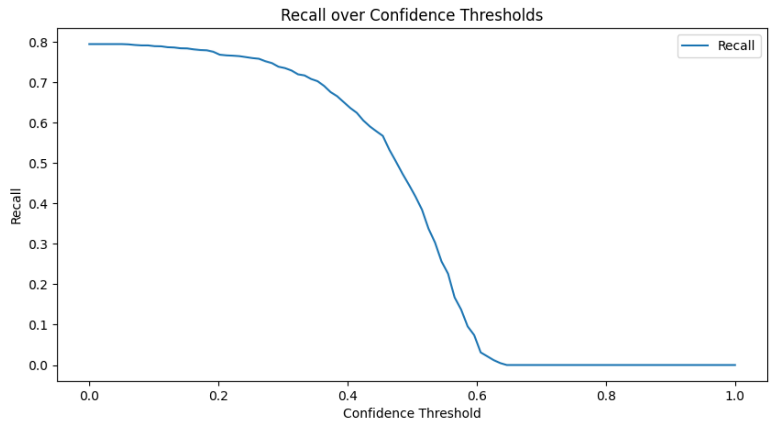

Figure 144. f1_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=hadji_dimitar_square

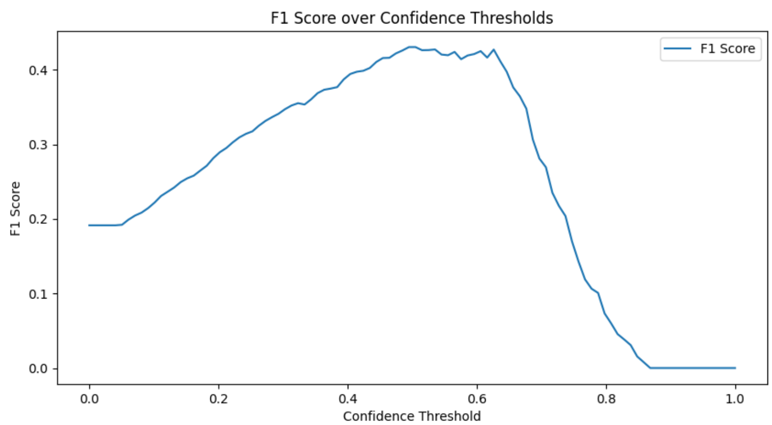

Figure 145. precision_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=hadji_dimitar_square

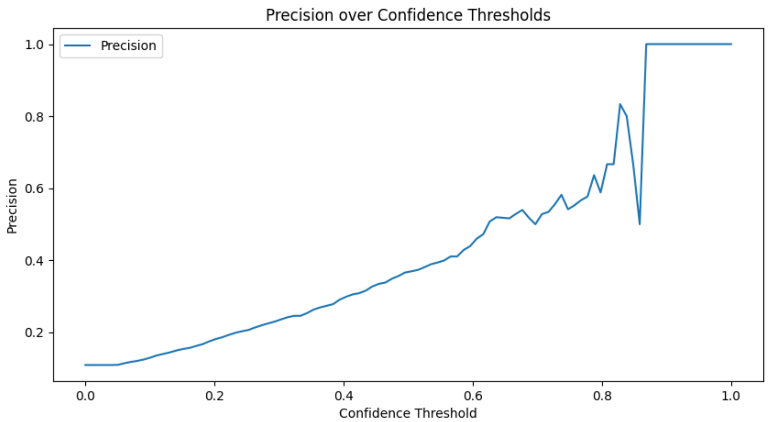

Figure 146. precision_over_recall, maskrcnn, pre-trained=False, epochs=50, data=hadji_dimitar_square

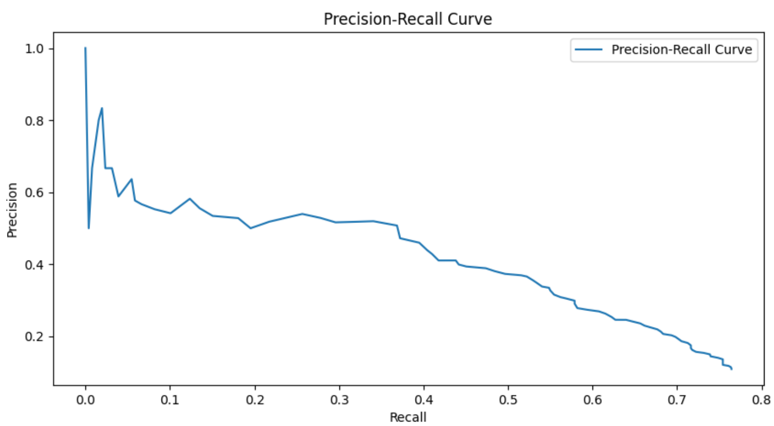

Figure 147. recall_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=hadji_dimitar_square

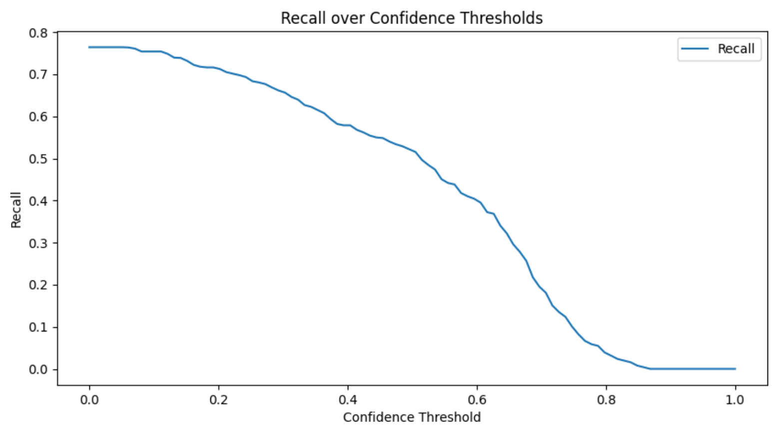

Figure 148. f1_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=keskvaljak

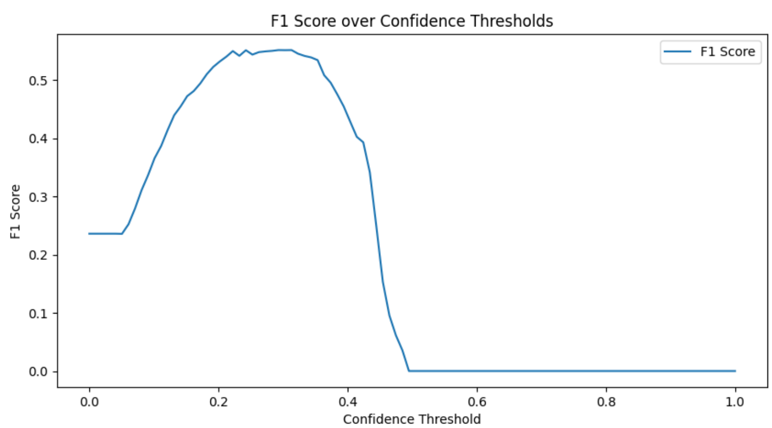

Figure 149. precision_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=keskvaljak

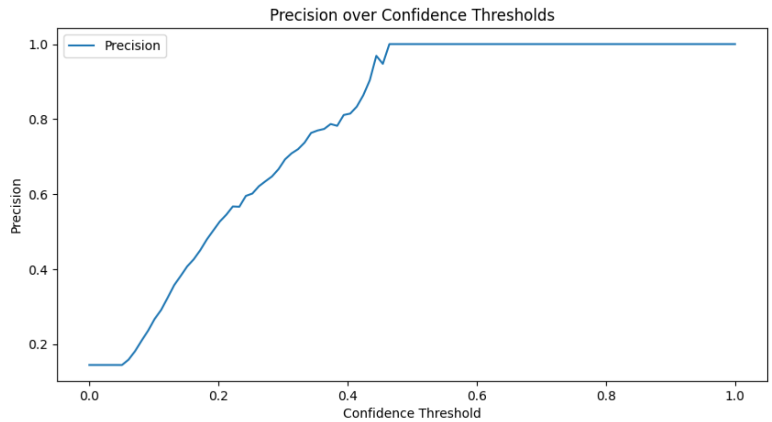

Figure 150. precision_over_recall, maskrcnn, pre-trained=False, epochs=50, data=keskvaljak

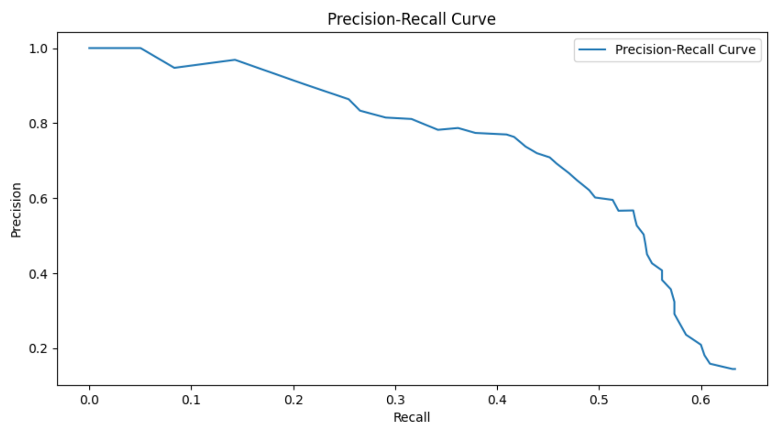

Figure 151. recall_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=keskvaljak

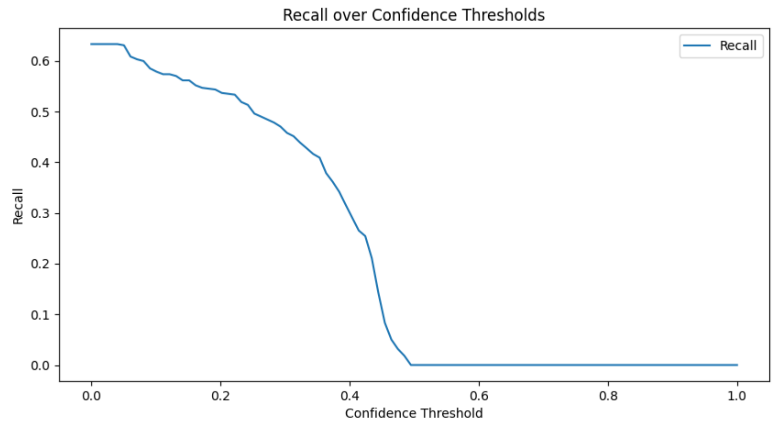

Figure 152. f1_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=kielce_university_of_technology

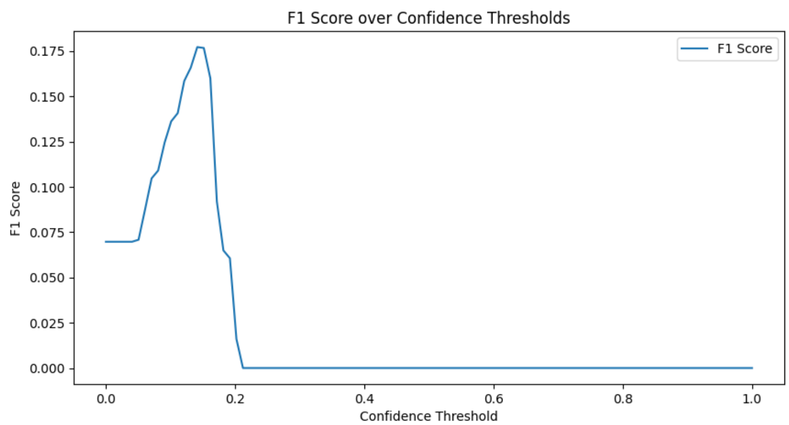

Figure 153. precision_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=kielce_university_of_technology

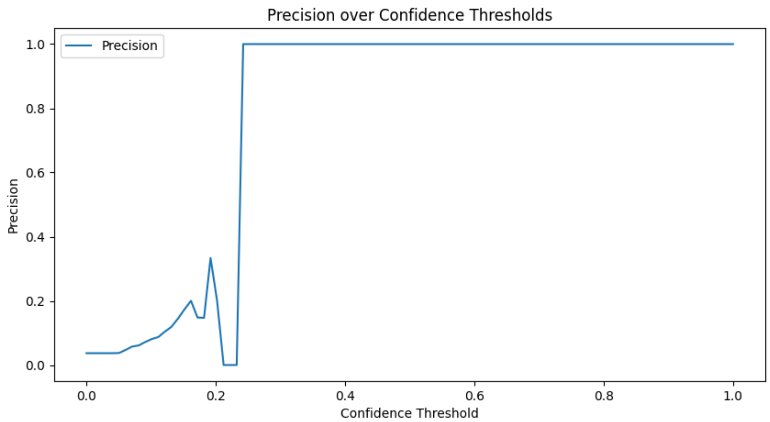

Figure 154. precision_over_recall, maskrcnn, pre-trained=False, epochs=50, data=kielce_university_of_technology

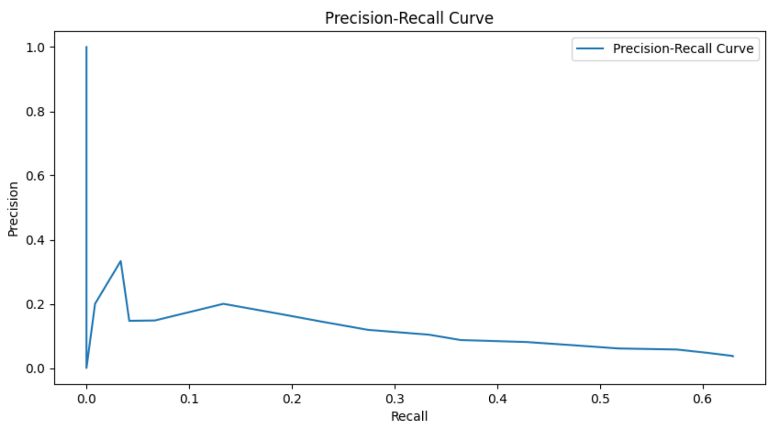

Figure 155. recall_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=kielce_university_of_technology

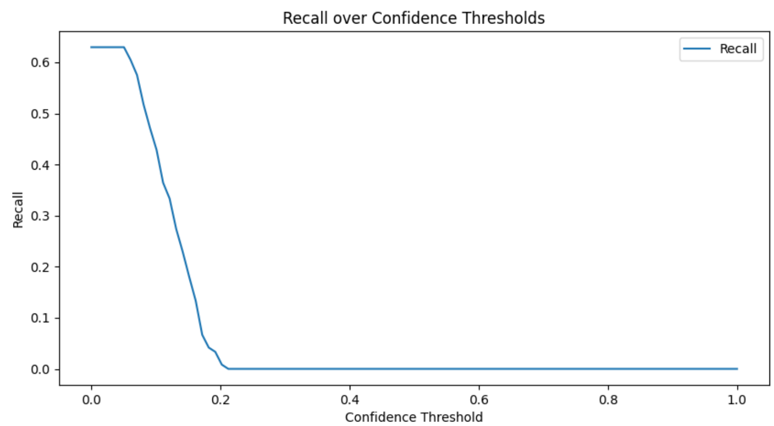

Figure 156. f1_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=toggenburg_alpaca_ranch

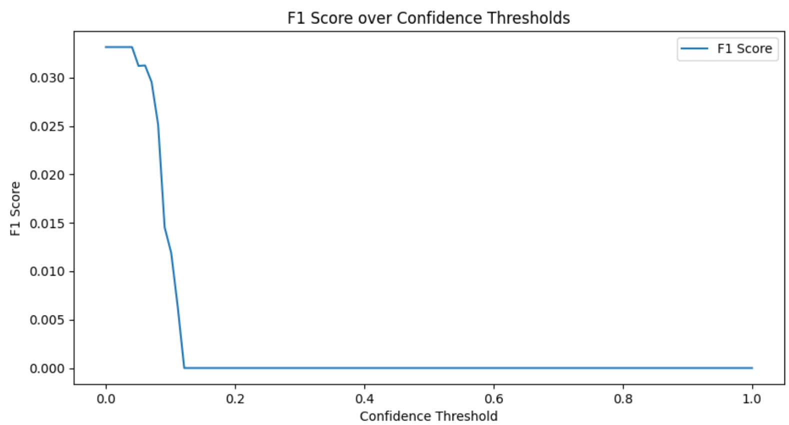

Figure 157. precision_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=toggenburg_alpaca_ranch

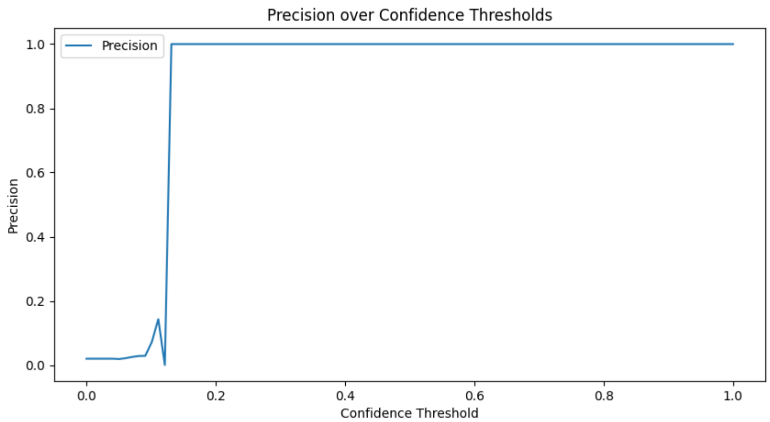

Figure 158. precision_over_recall, maskrcnn, pre-trained=False, epochs=50, data=toggenburg_alpaca_ranch

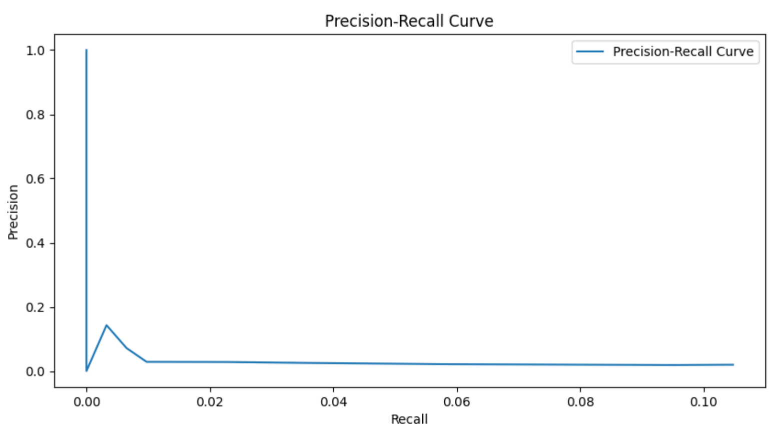

Figure 159. recall_over_confidence, maskrcnn, pre-trained=False, epochs=50, data=toggenburg_alpaca_ranch

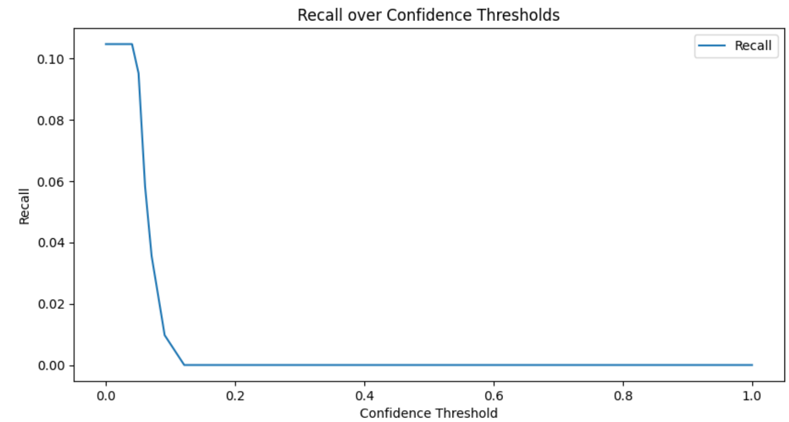

Figure 160. f1_over_confidence, maskrcnn, pre-trained=False, epochs=100, data=duomo

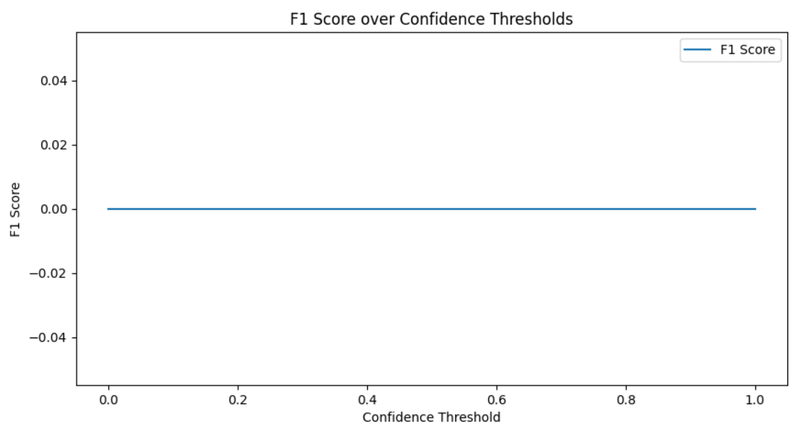

Figure 161. precision_over_confidence, maskrcnn, pre-trained=False, epochs=100, data=duomo

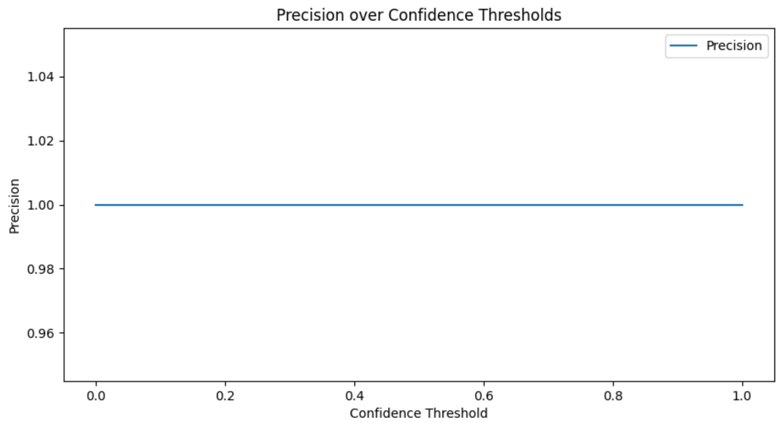

Figure 162. precision_over_recall, maskrcnn, pre-trained=False, epochs=100, data=duomo

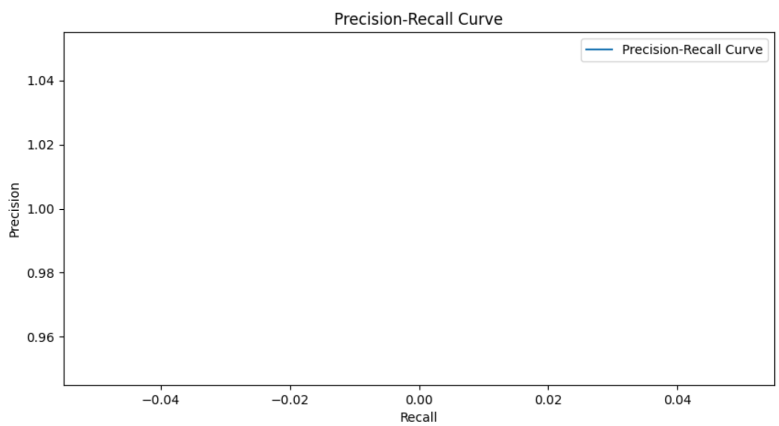

Figure 163. recall_over_confidence, maskrcnn, pre-trained=False, epochs=100, data=duomo

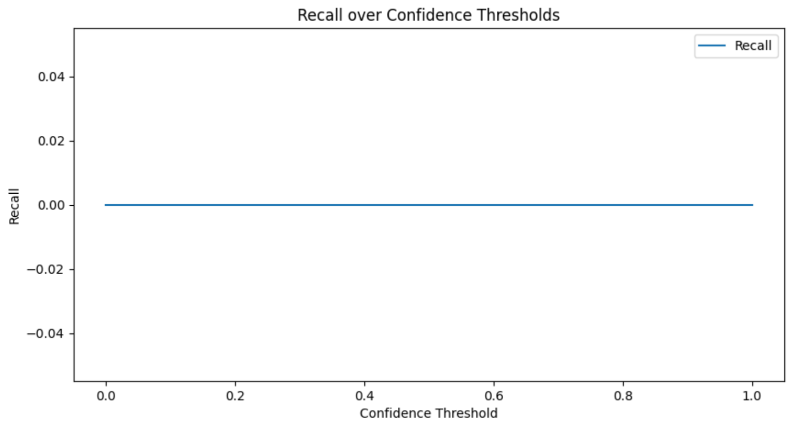

Figure 164. f1__over__confidence, maskrcnn, pre-trained=False, epochs=100, data=hadji__dimitar__square

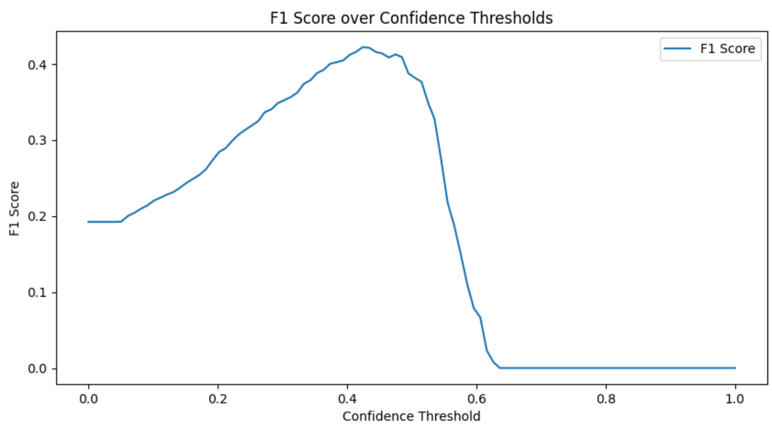

Figure 165. precision__over__confidence, maskrcnn, pre-trained=False, epochs=100, data=hadji__dimitar__square

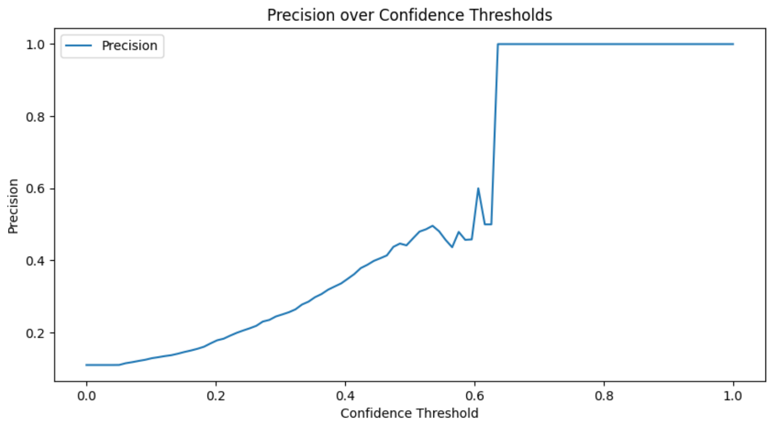

Figure 166. precision_over_recall, maskrcnn, pre-trained=False, epochs=100, data=hadji_dimitar_square

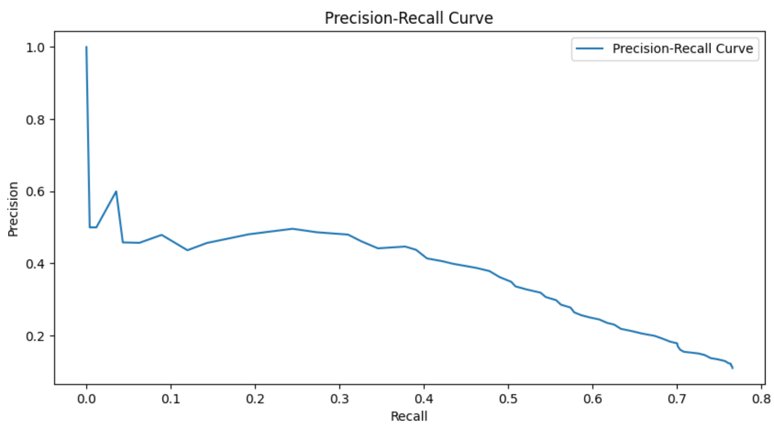

Figure 167. recall_over_confidence, maskrcnn, pre-trained=False, epochs=100, data=hadji_dimitar_square

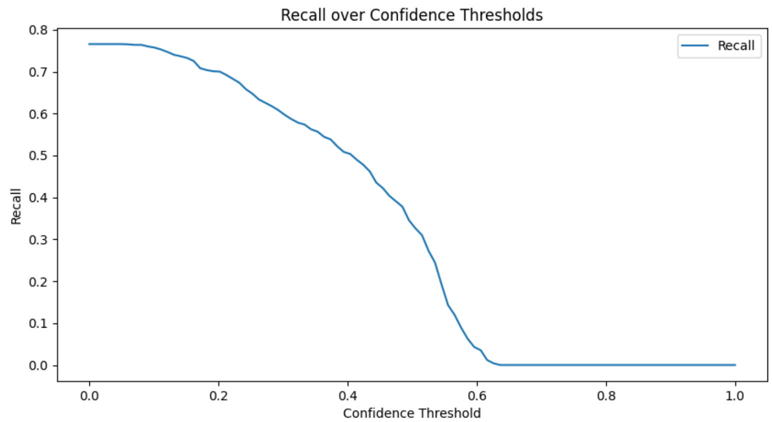

Figure 168. f1_over_confidence, maskrcnn, pre-trained=False, epochs=100, data=keskvaljak

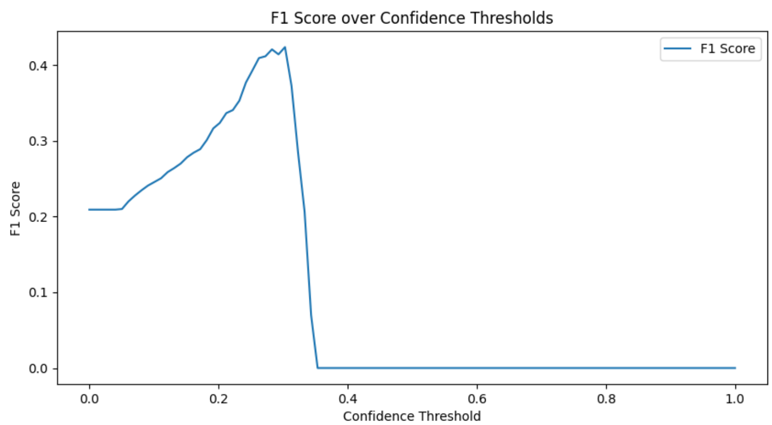

Figure 169. precision_over_confidence, maskrcnn, pre-trained=False, epochs=100, data=keskvaljak

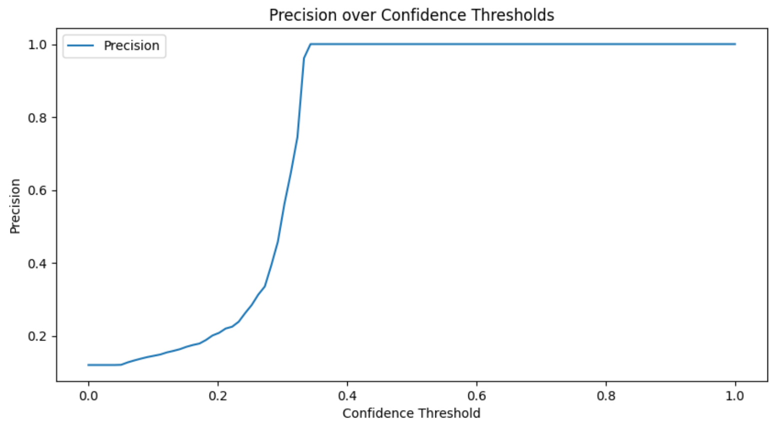

Figure 170. precision_over_recall, maskrcnn, pre-trained=False, epochs=100, data=keskvaljak

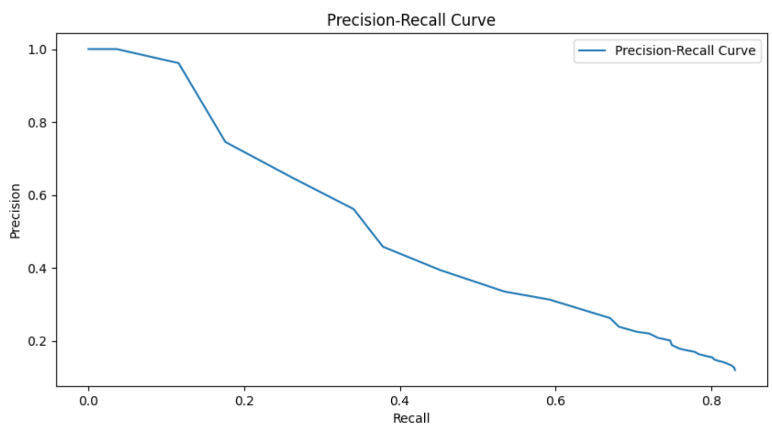

Figure 171. recall_over_confidence, maskrcnn, pre-trained=False, epochs=100, data=keskvaljak

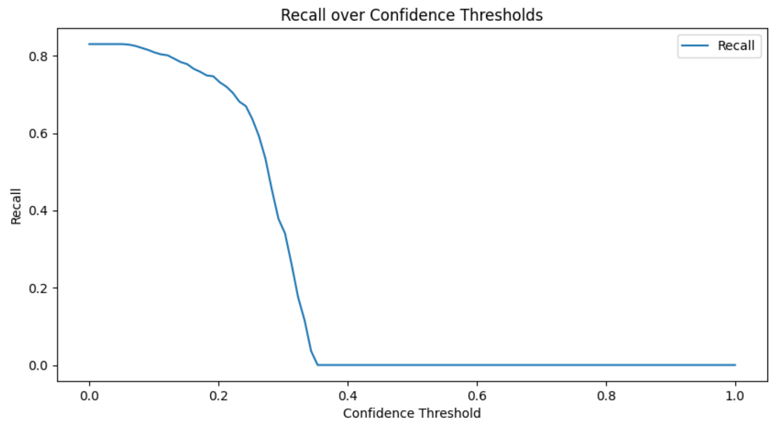

Figure 172. f1_over_confidence, maskrcnn, pre-trained=False, epochs=100, data=kielce_university_of_technology

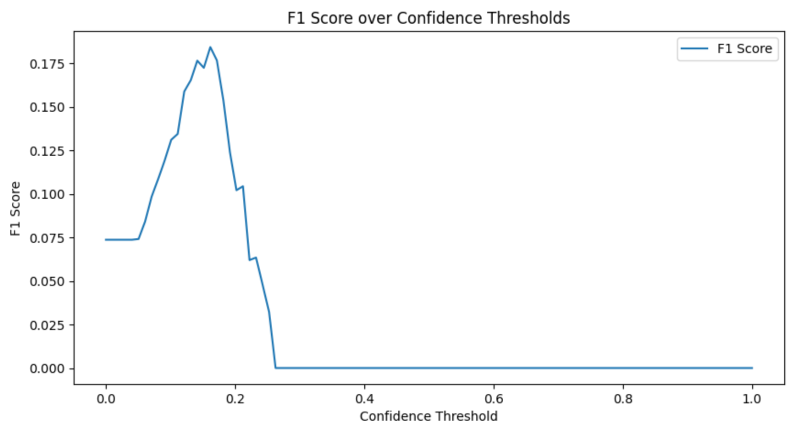

Figure 173. precision_over_confidence, maskrcnn, pre-trained=False, epochs=100, data=kielce_university_of_technology

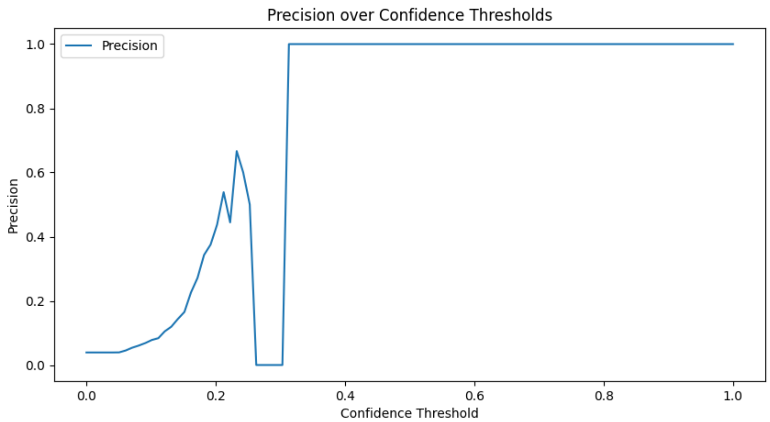

Figure 174. precision_over_recall, maskrcnn, pre-trained=False, epochs=100, data=kielce_university_of_technology

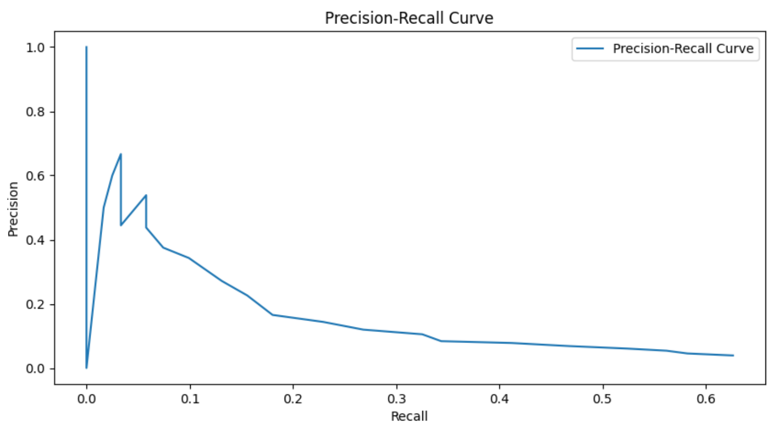

Figure 175. recall_over_confidence, maskrcnn, pre-trained=False, epochs=100, data=kielce_university_of_technology

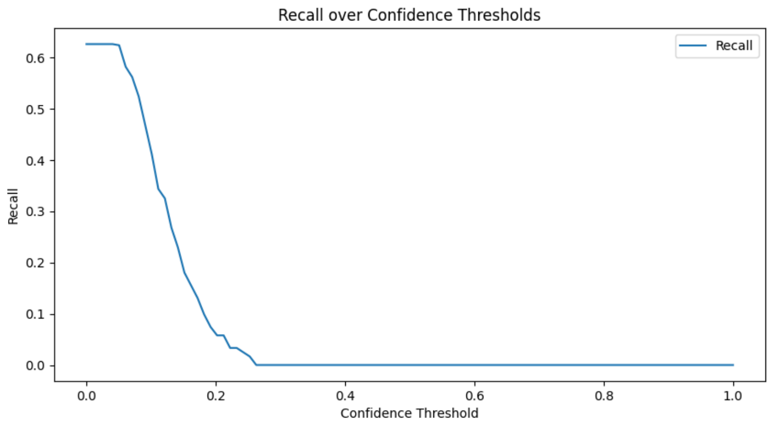

Figure 176. f1_over_confidence, maskrcnn, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch

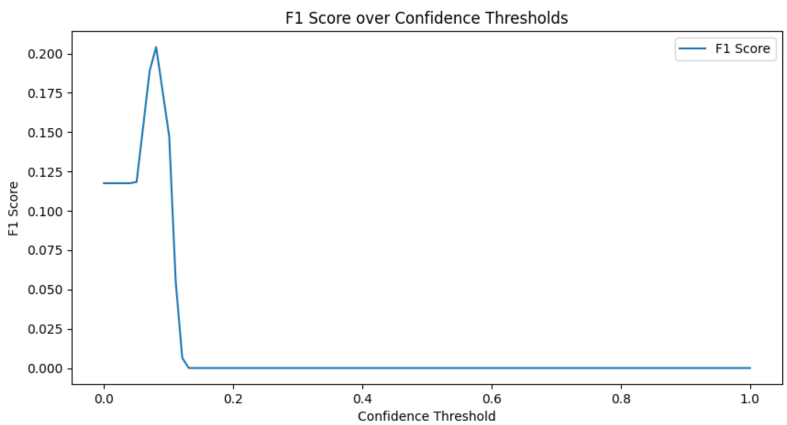

Figure 177. precision_over_confidence, maskrcnn, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch

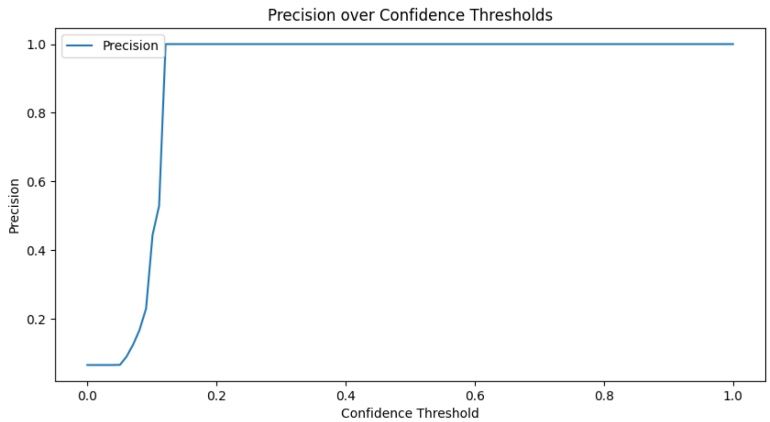

Figure 178. precision_over_recall, maskrcnn, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch

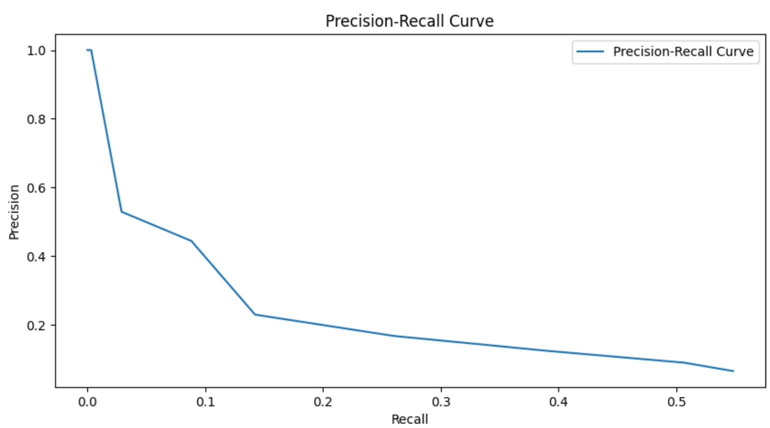

Figure 179. recall_over_confidence, maskrcnn, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch

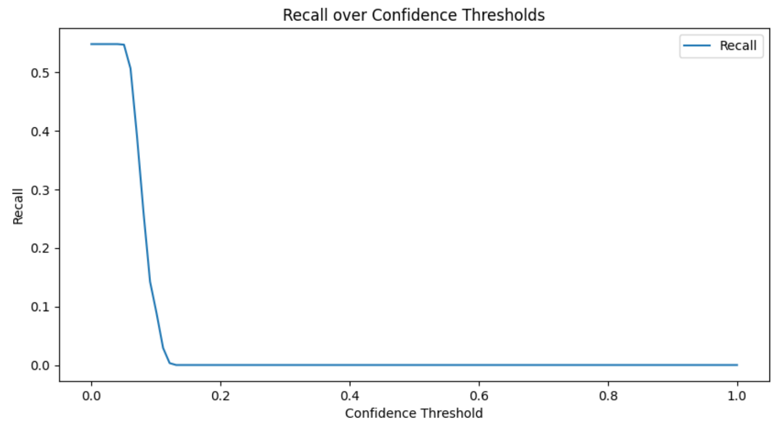

Figure 180. f1_over_confidence, maskrcnn, pre-trained=False, epochs=150, data=duomo

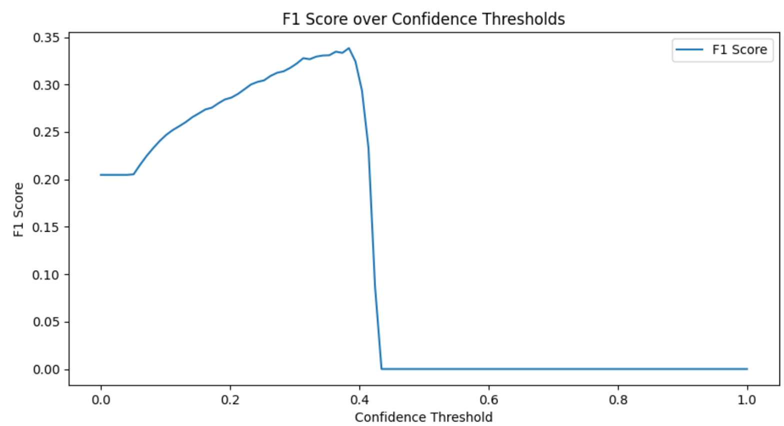

Figure 181. precision_over_confidence, maskrcnn, pre-trained=False, epochs=150, data=duomo

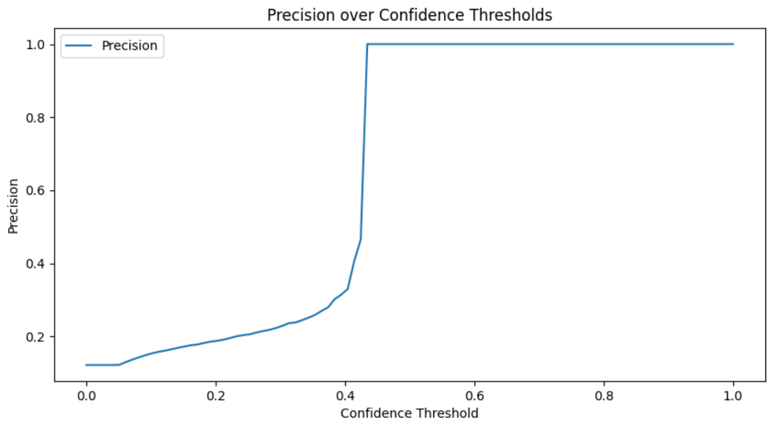

Figure 182. precision_over_recall, maskrcnn, pre-trained=False, epochs=150, data=duomo

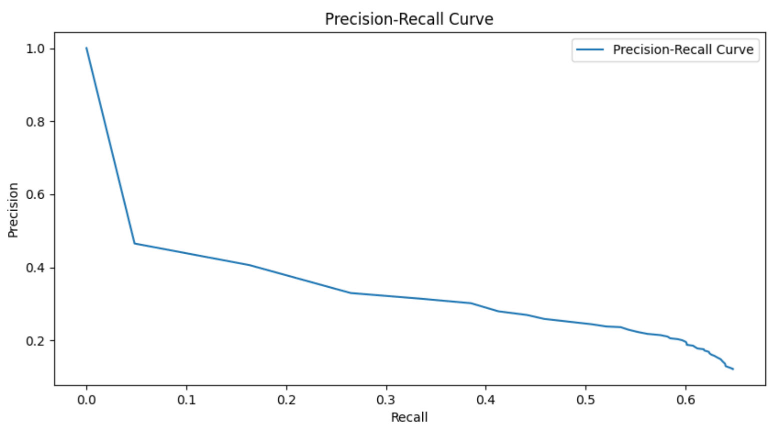

Figure 183. recall_over_confidence, maskrcnn, pre-trained=False, epochs=150, data=duomo

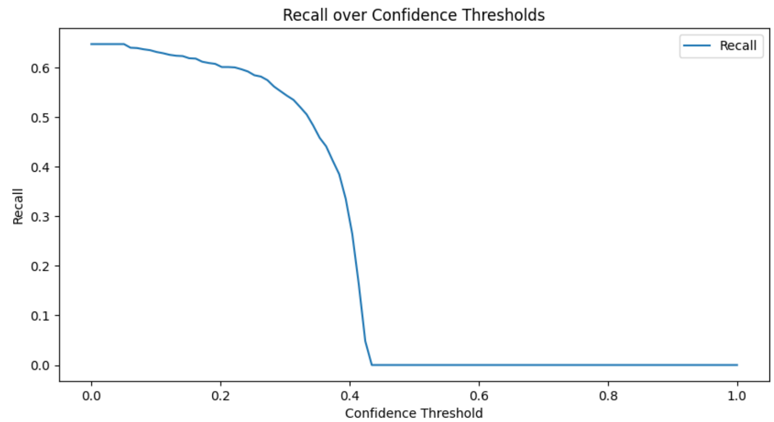

Figure 184. f1_over_confidence, maskrcnn, pre-trained=False, epochs=150, data=hadji_dimitar_square

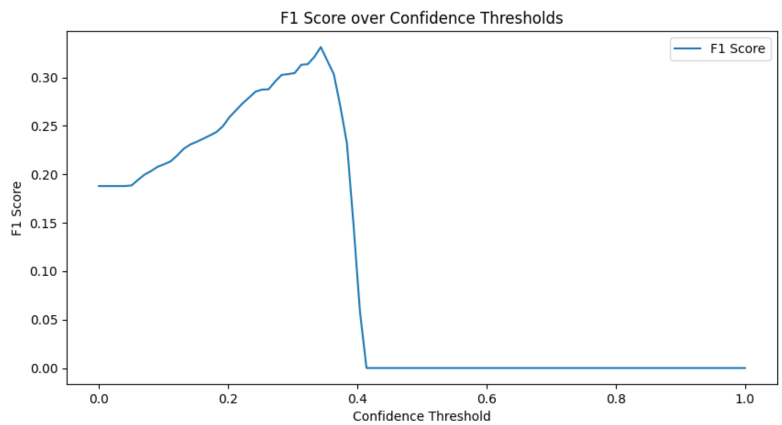

Figure 185. precision_over_confidence, maskrcnn, pre-trained=False, epochs=150, data=hadji_dimitar_square

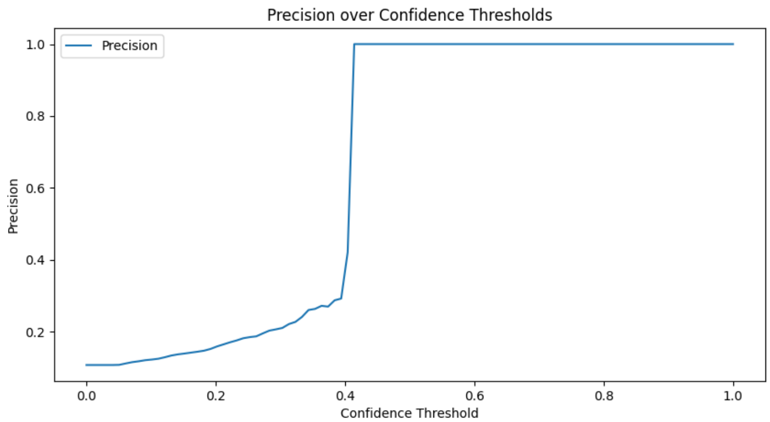

Figure 186. precision__over__recall, maskrcnn, pre-trained=False, epochs=150, data=hadji__dimitar__square

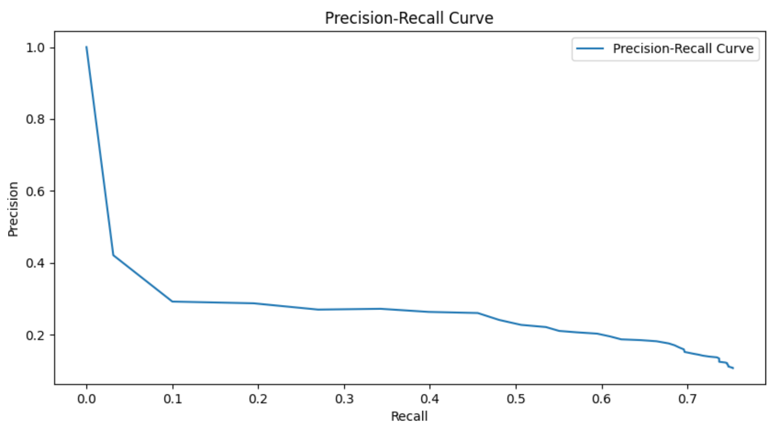

Figure 187. recall__over__confidence, maskrcnn, pre-trained=False, epochs=150, data=hadji__dimitar__square

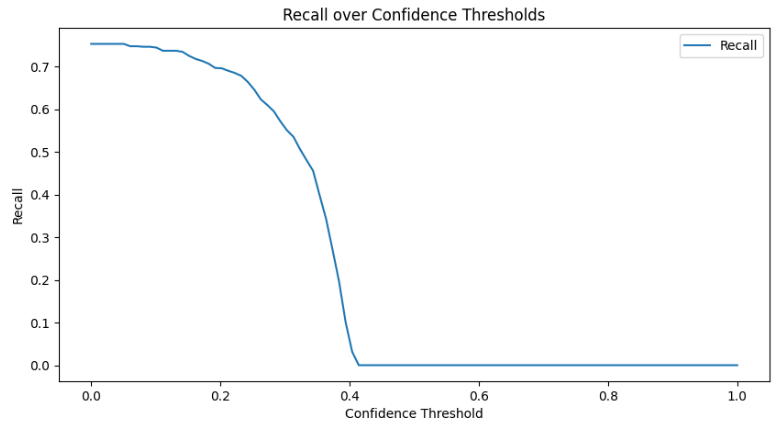

Figure 188. f1_over_confidence, maskrcnn, pre-trained=False, epochs=150, data=keskvaljak

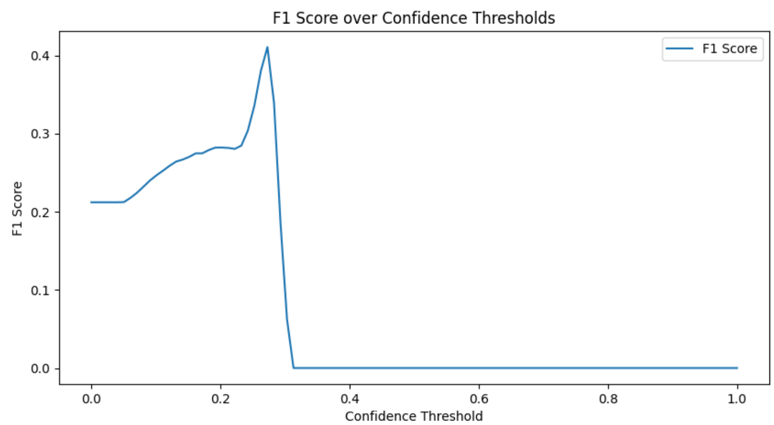

Figure 189. precision_over_confidence, maskrcnn, pre-trained=False, epochs=150, data=keskvaljak

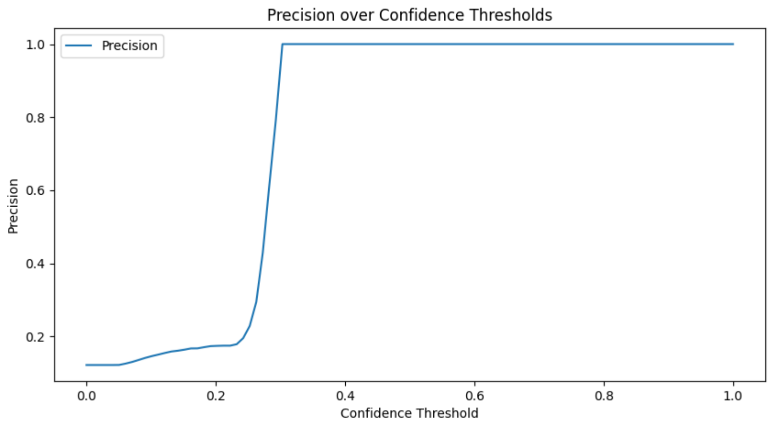

Figure 190. precision_over_recall, maskrcnn, pre-trained=False, epochs=150, data=keskvaljak

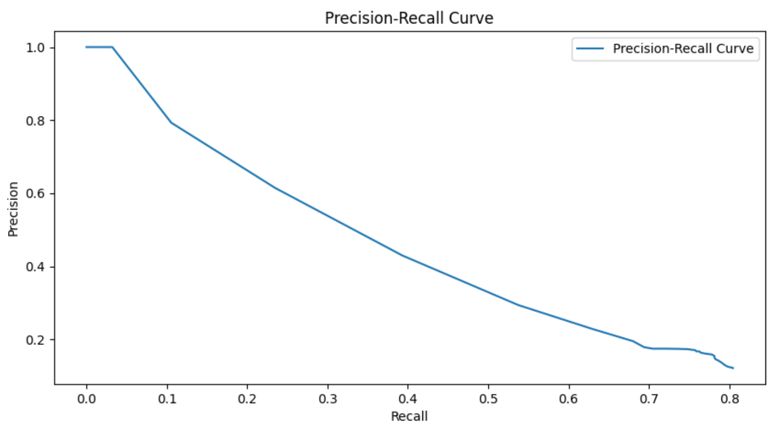

Figure 191. recall_over_confidence, maskrcnn, pre-trained=False, epochs=150, data=keskvaljak

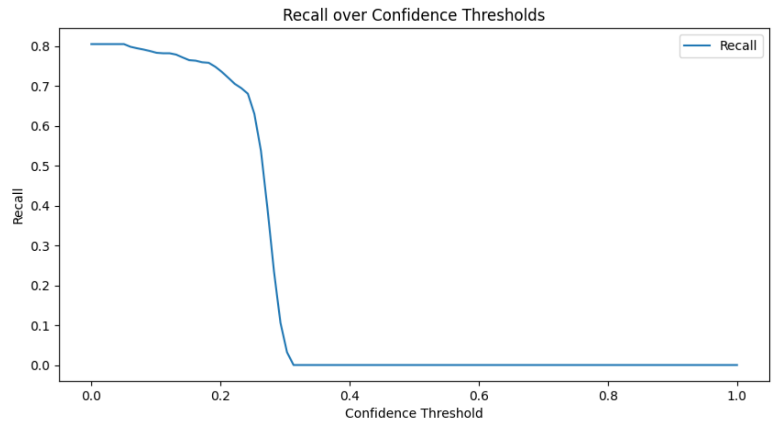

Figure 192. f1_over_confidence, maskrcnn, pre-trained=False, epochs=150, data=kielce_university_of_technology

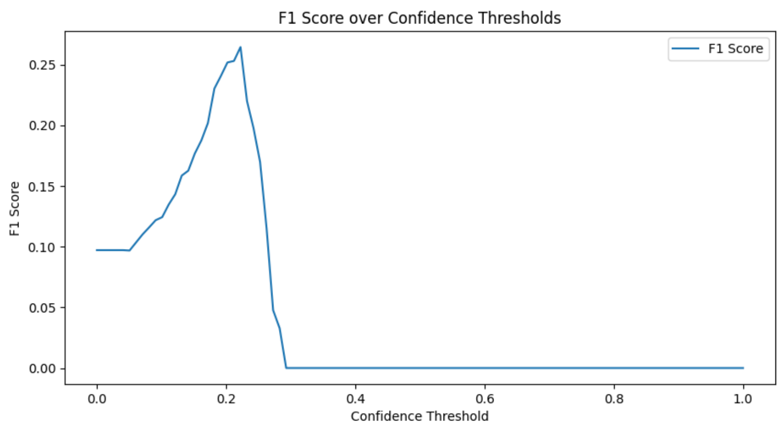

Figure 193. precision_over_confidence, maskrcnn, pre-trained=False, epochs=150, data=kielce_university_of_technology

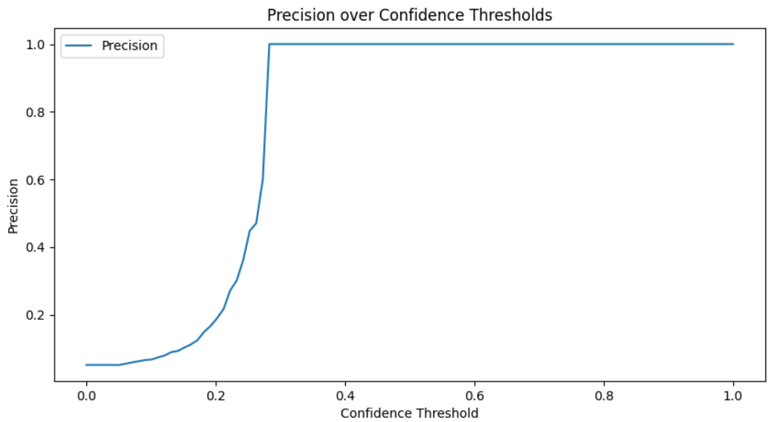

Figure 194. precision_over_recall, maskrcnn, pre-trained=False, epochs=150, data=kielce_university_of_technology

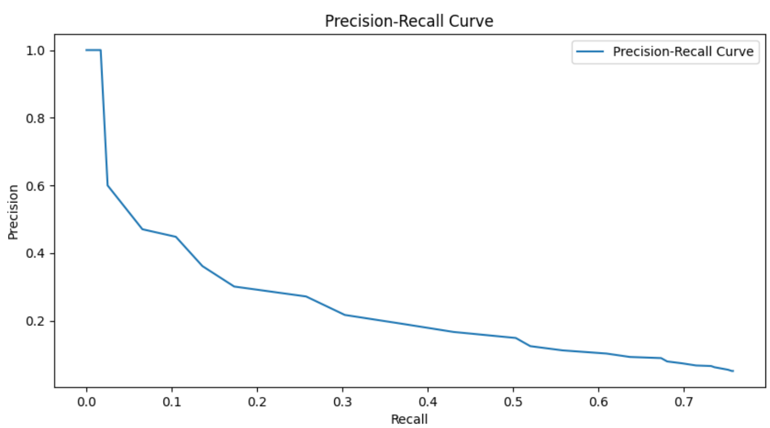

Figure 195. recall_over_confidence, maskrcnn, pre-trained=False, epochs=150, data=kielce_university_of_technology

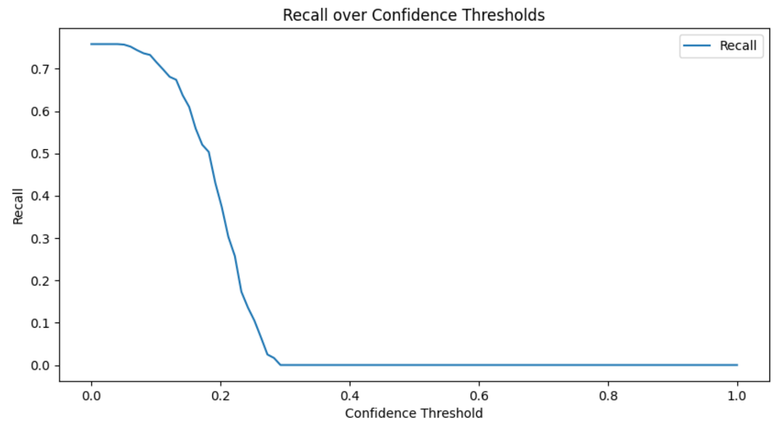

Figure 196. f1_over_confidence, maskrcnn, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch

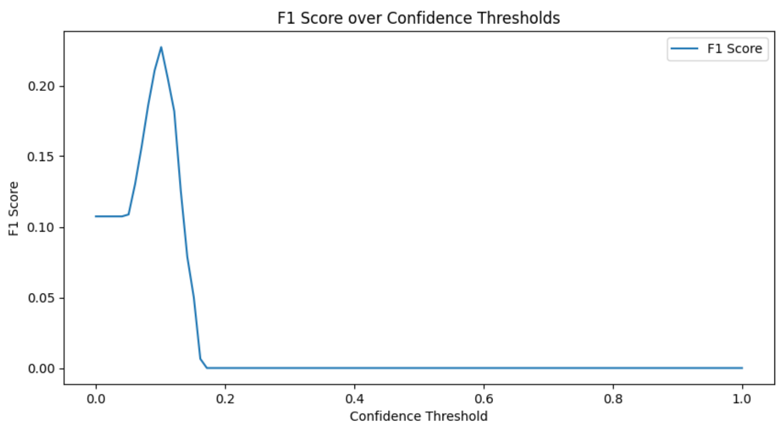

Figure 197. precision_over_confidence, maskrcnn, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch

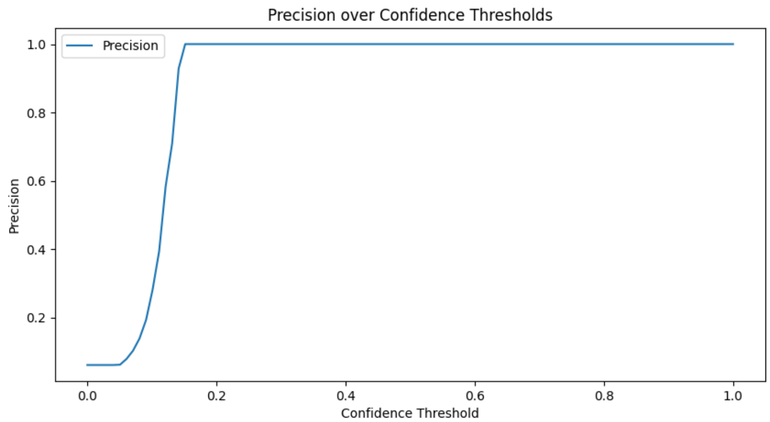

Figure 198. precision_over_recall, maskrcnn, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch

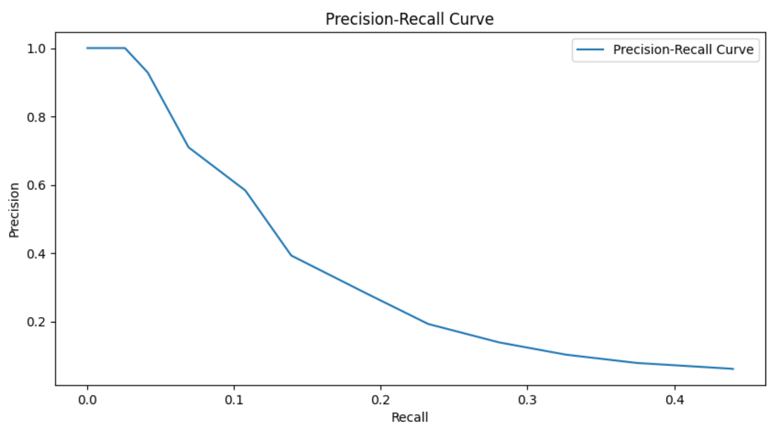

Figure 199. recall_over_confidence, maskrcnn, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch

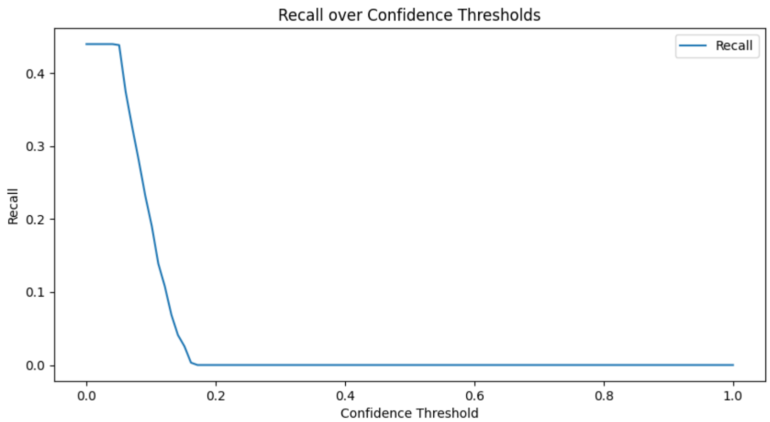

Figure 200. f1_over_confidence, maskrcnn, pre-trained=True, epochs=0, data=duomo

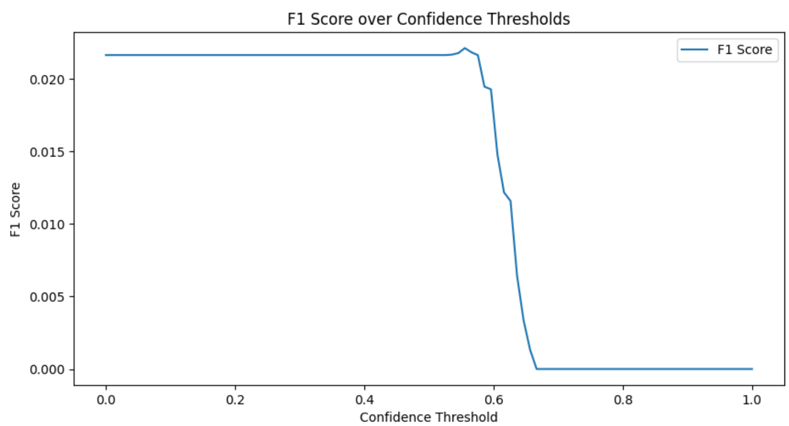

Figure 201. precision_over_confidence, maskrcnn, pre-trained=True, epochs=0, data=duomo

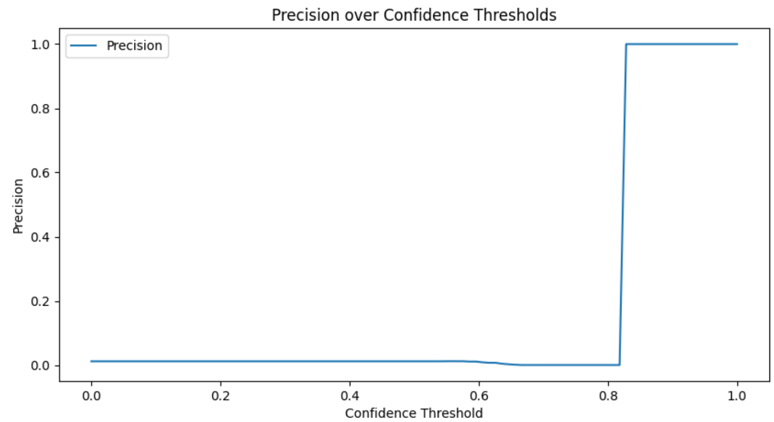

Figure 202. precision_over_recall, maskrcnn, pre-trained=True, epochs=0, data=duomo

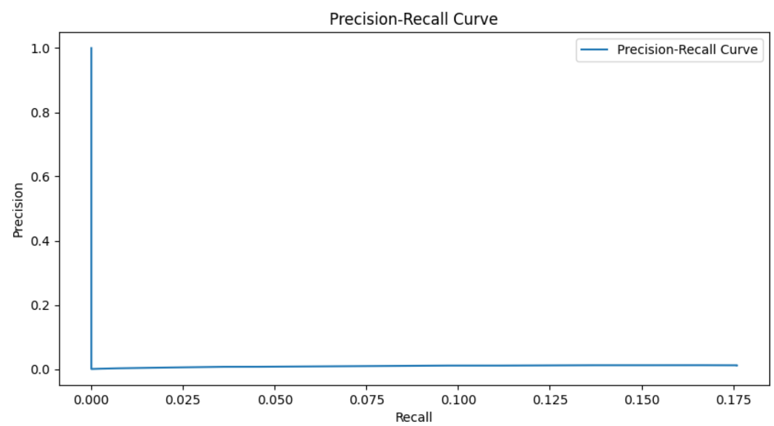

Figure 203. recall_over_confidence, maskrcnn, pre-trained=True, epochs=0, data=duomo

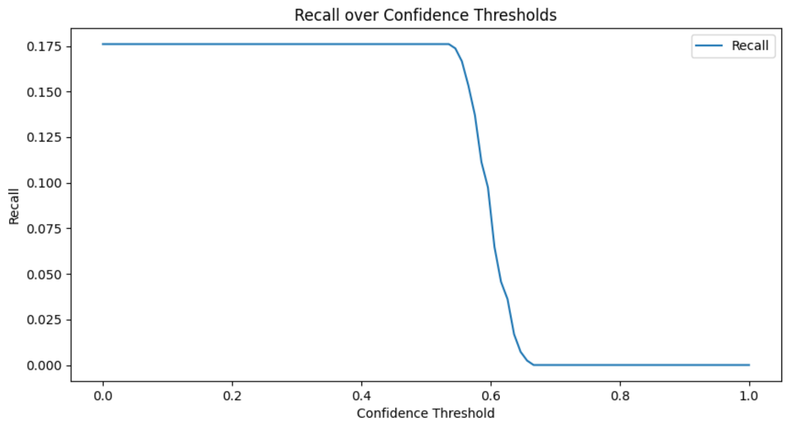

Figure 204. f1_over_confidence, maskrcnn, pre-trained=True, epochs=0, data=hadji_dimitar_square

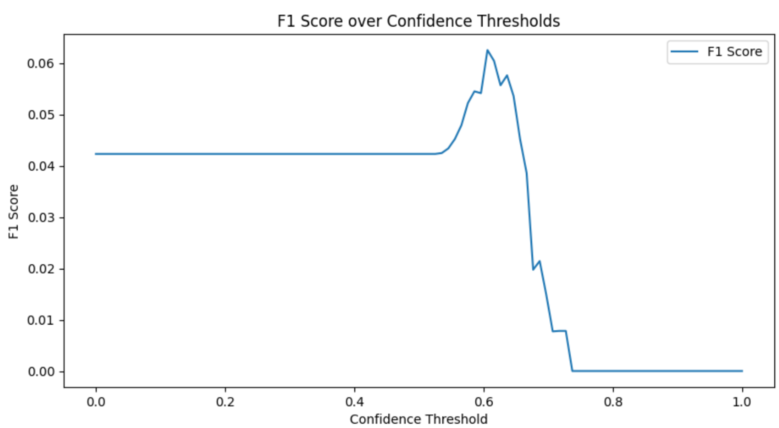

Figure 205. precision_over_confidence, maskrcnn, pre-trained=True, epochs=0, data=hadji_dimitar_square

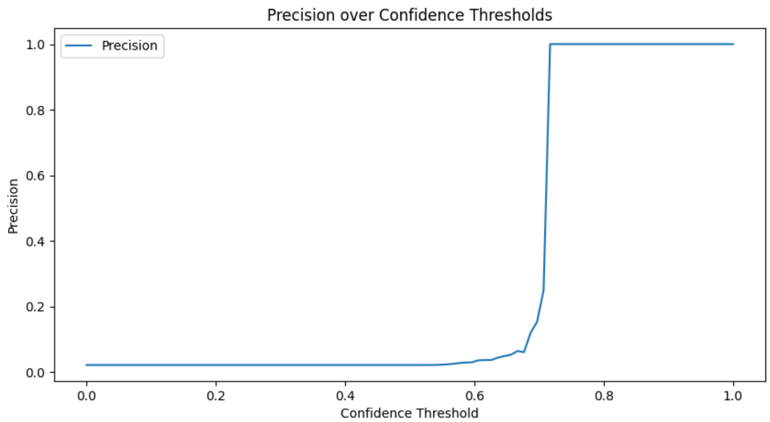

Figure 206. precision__over__recall, maskrcnn, pre-trained=True, epochs=0, data=hadji__dimitar__square

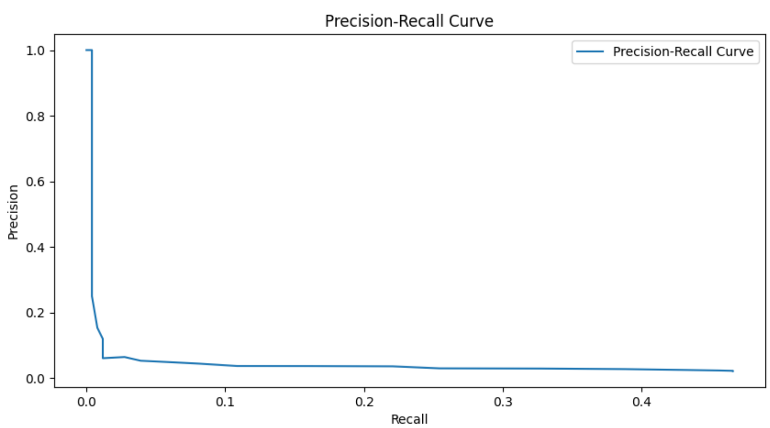

Figure 207. recall__over__confidence, maskrcnn, pre-trained=True, epochs=0, data=hadji__dimitar__square

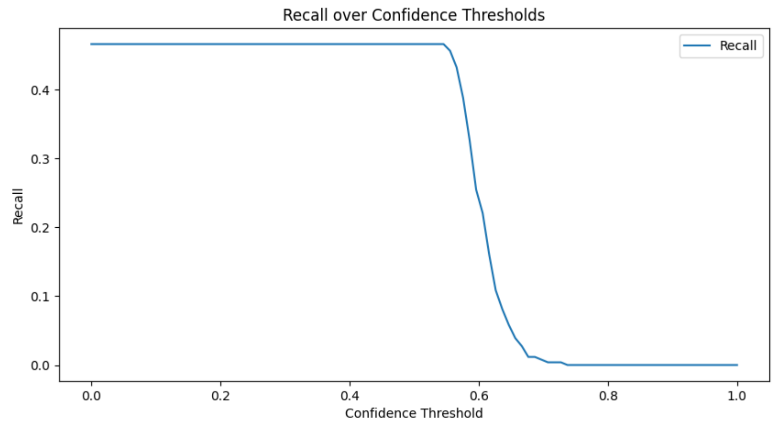

Figure 208. f1_over_confidence, maskrcnn, pre-trained=True, epochs=0, data=keskvaljak

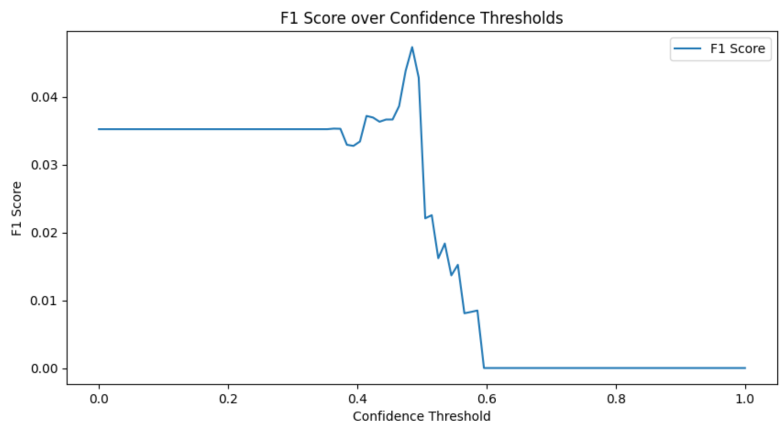

Figure 209. precision_over_confidence, maskrcnn, pre-trained=True, epochs=0, data=keskvaljak

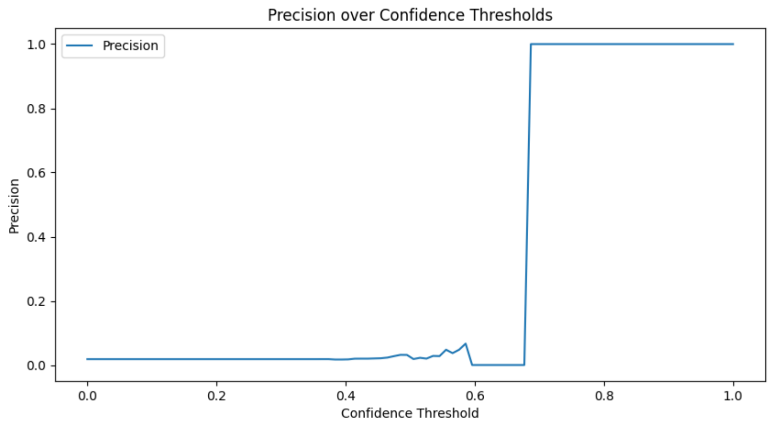

Figure 210. precision_over_recall, maskrcnn, pre-trained=True, epochs=0, data=keskvaljak

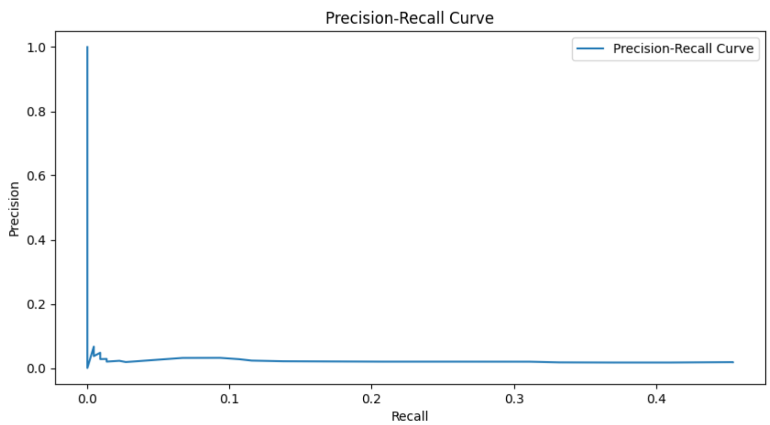

Figure 211. recall_over_confidence, maskrcnn, pre-trained=True, epochs=0, data=keskvaljak

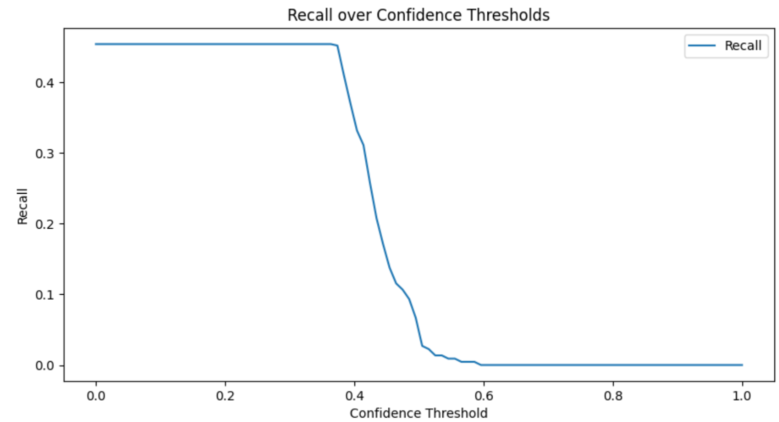

Figure 212. f1_over_confidence, maskrcnn, pre-trained=True, epochs=0, data=kielce_university_of_technology

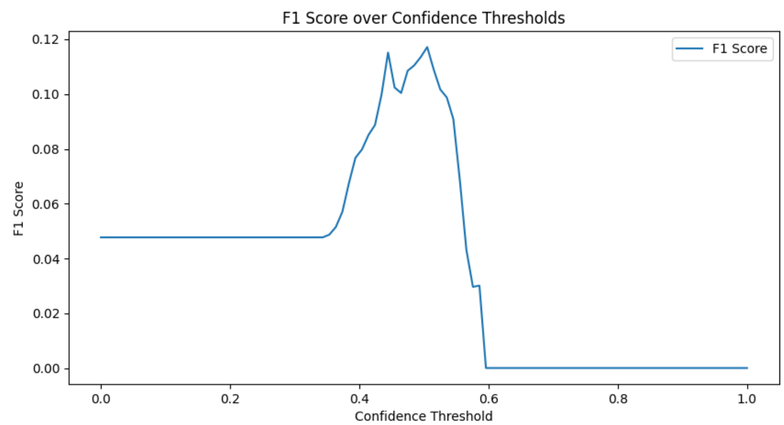

Figure 213. precision_over_confidence, maskrcnn, pre-trained=True, epochs=0, data=kielce_university_of_technology

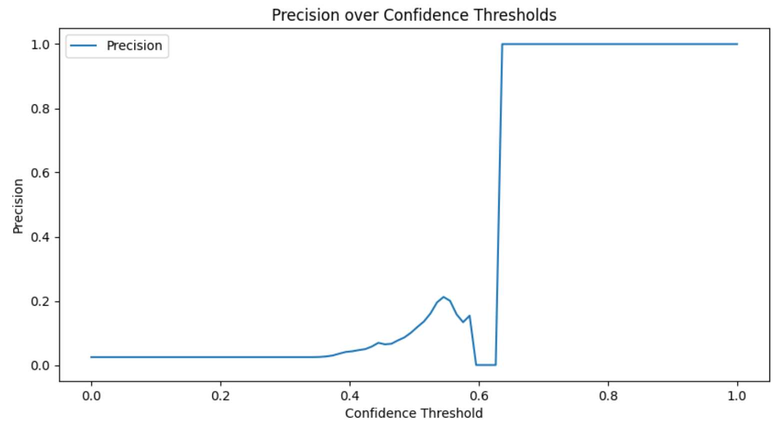

Figure 214. precision_over_recall, maskrcnn, pre-trained=True, epochs=0, data=kielce_university_of_technology

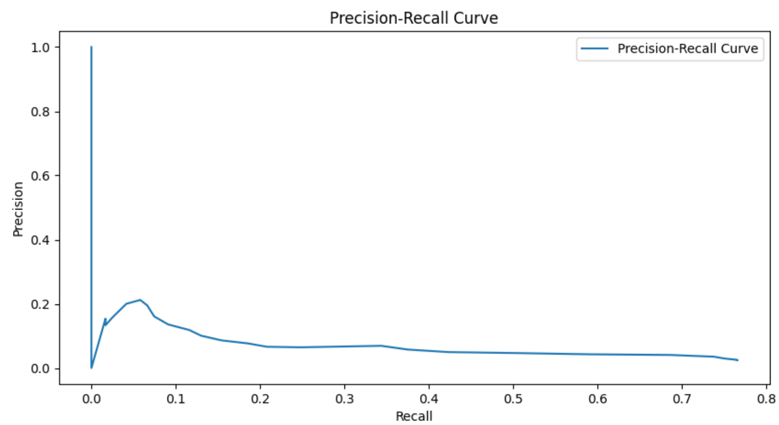

Figure 215. recall_over_confidence, maskrcnn, pre-trained=True, epochs=0, data=kielce_university_of_technology

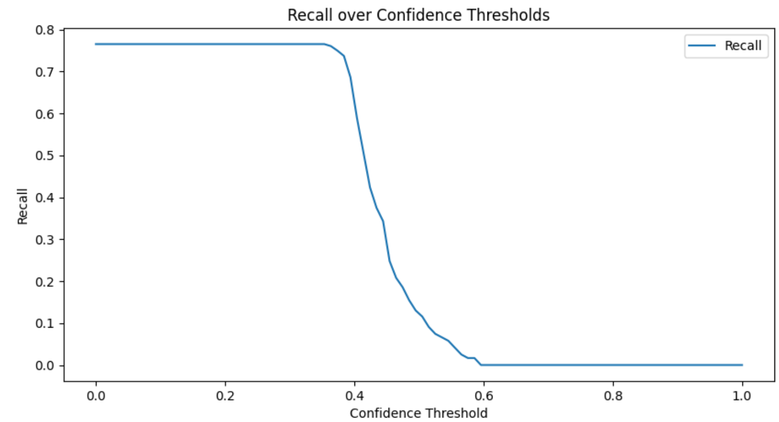

Figure 216. f1_over_confidence, maskrcnn, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch

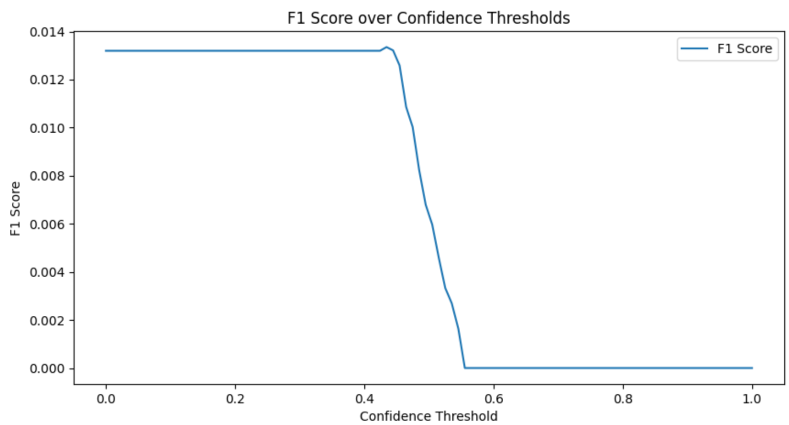

Figure 217. precision_over_confidence, maskrcnn, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch

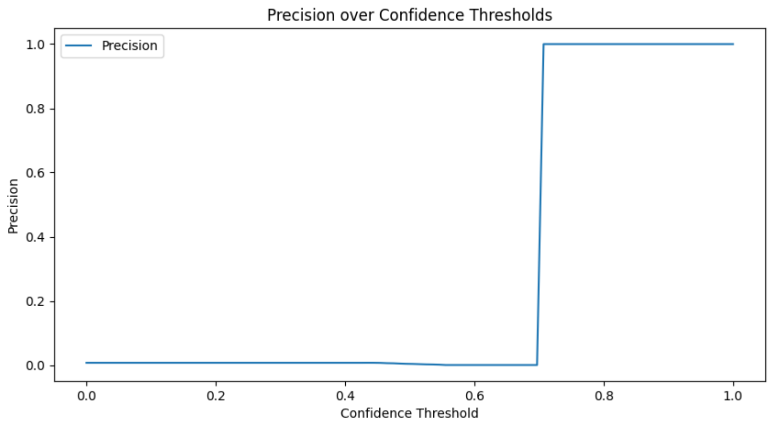

Figure 218. precision_over_recall, maskrcnn, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch

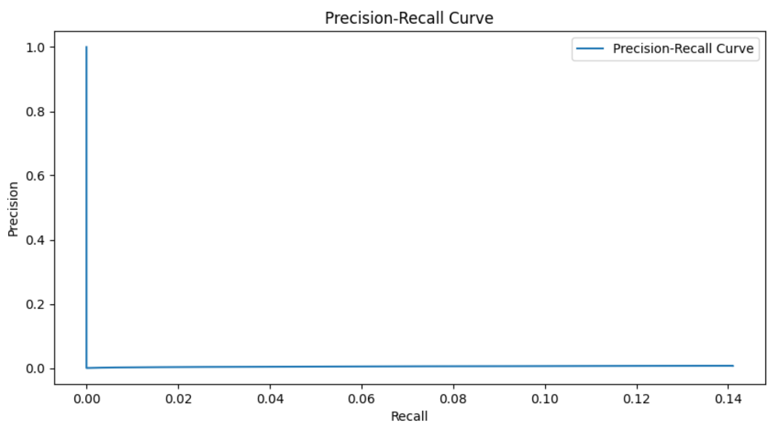

Figure 219. recall_over_confidence, maskrcnn, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch

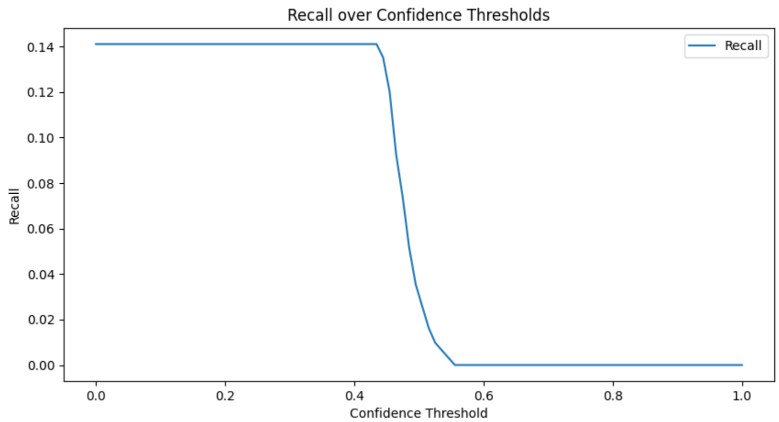

Figure 220. f1_over_confidence, maskrcnn, pre-trained=True, epochs=50, data=duomo

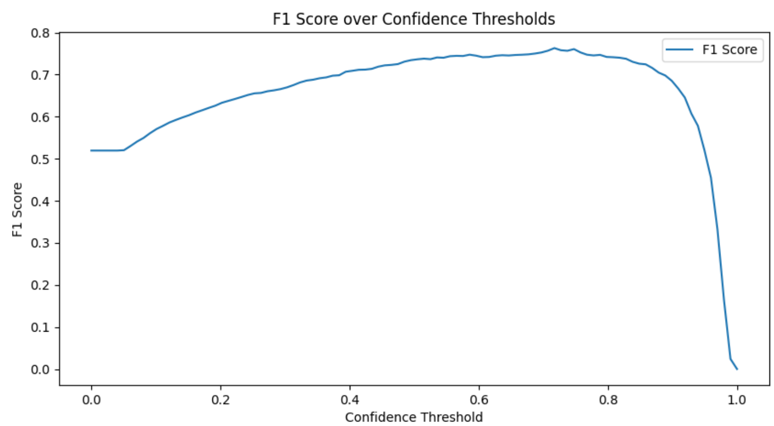

Figure 221. precision_over_confidence, maskrcnn, pre-trained=True, epochs=50, data=duomo

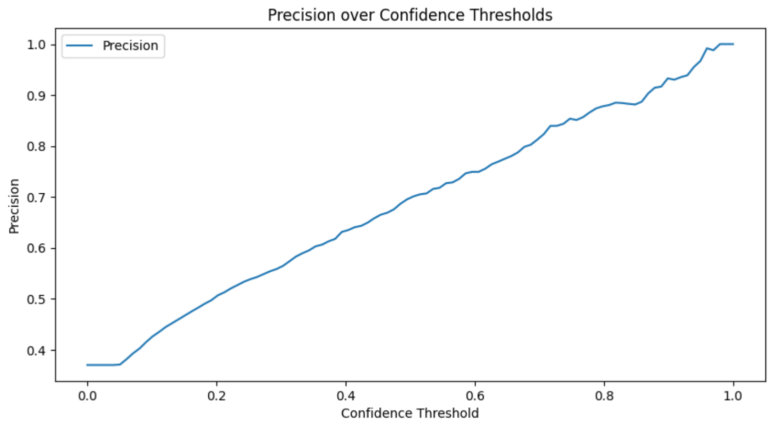

Figure 222. precision_over_recall, maskrcnn, pre-trained=True, epochs=50, data=duomo

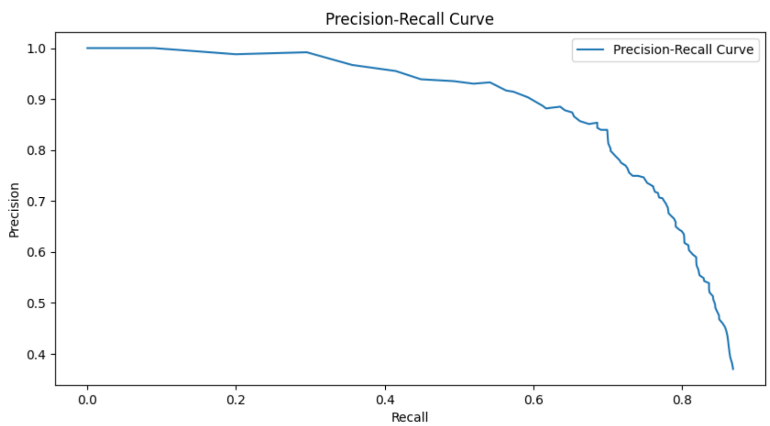

Figure 223. recall_over_confidence, maskrcnn, pre-trained=True, epochs=50, data=duomo

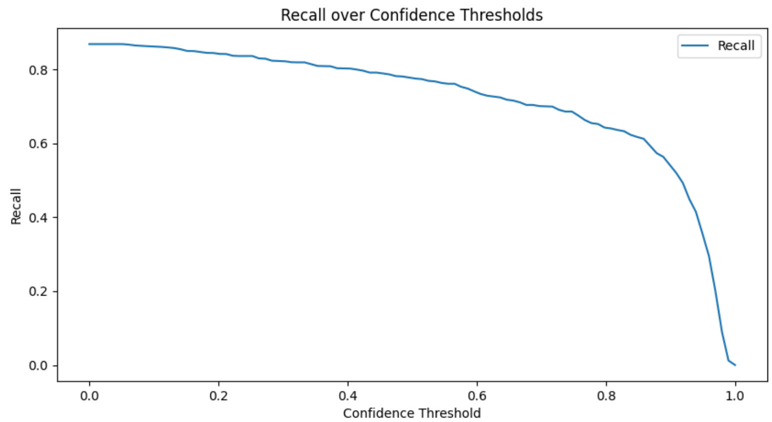

Figure 224. f1__over__confidence, maskrcnn, pre-trained=True, epochs=50, data=hadji__dimitar__square

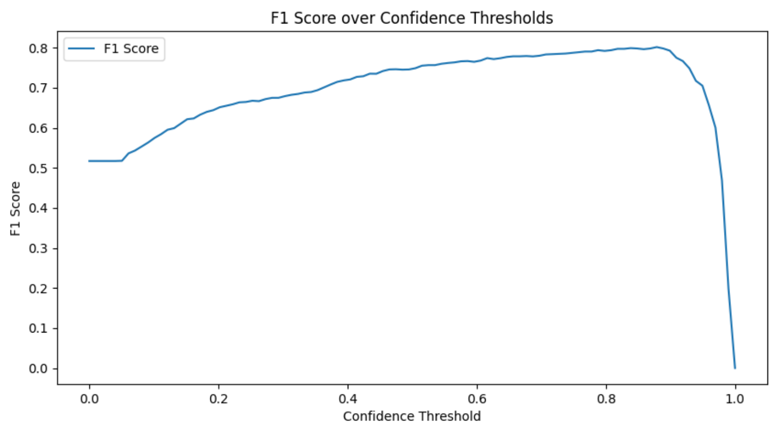

Figure 225. precision__over__confidence, maskrcnn, pre-trained=True, epochs=50, data=hadji__dimitar__square

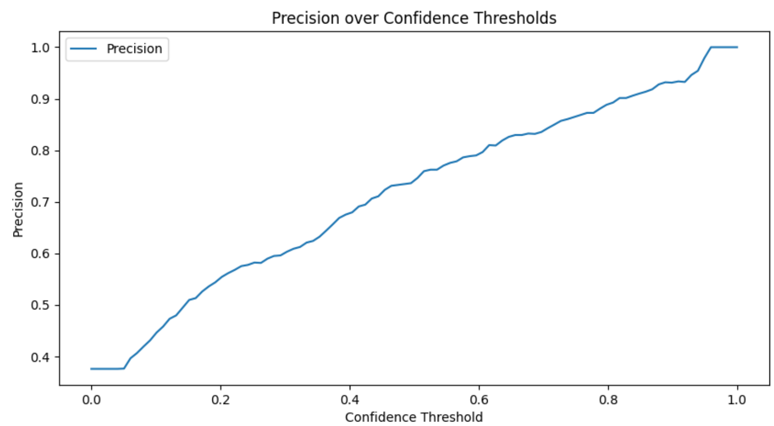

Figure 226. precision_over_recall, maskrcnn, pre-trained=True, epochs=50, data=hadji_dimitar_square

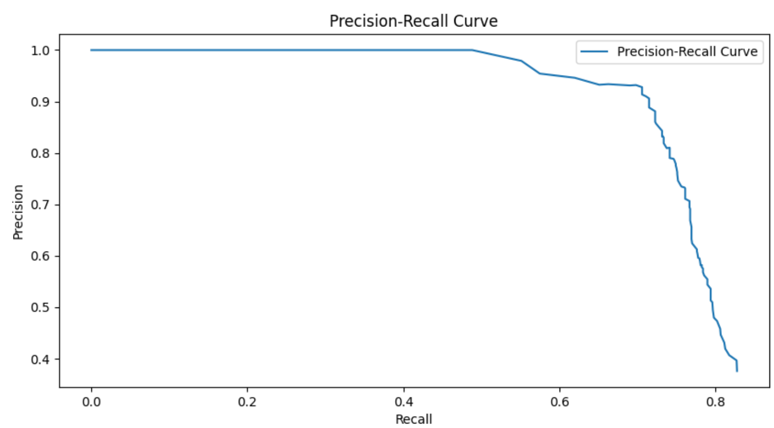

Figure 227. recall_over_confidence, maskrcnn, pre-trained=True, epochs=50, data=hadji_dimitar_square

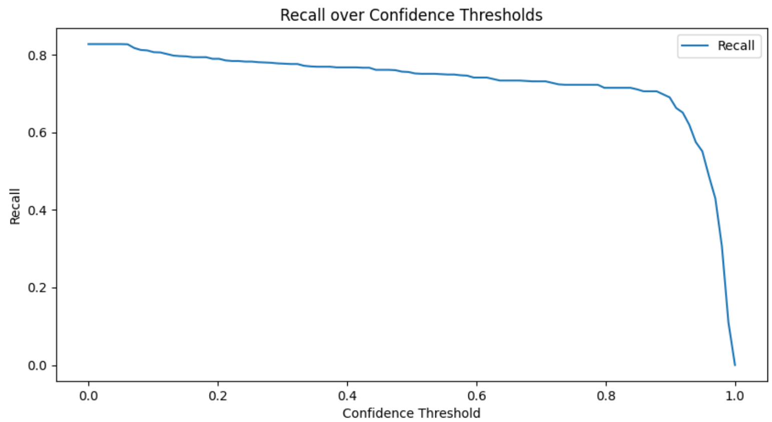

Figure 228. f1_over_confidence, maskrcnn, pre-trained=True, epochs=50, data=keskvaljak

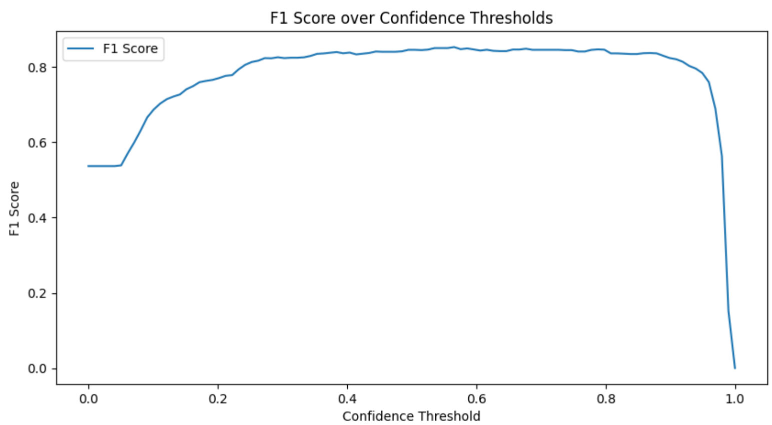

Figure 229. precision_over_confidence, maskrcnn, pre-trained=True, epochs=50, data=keskvaljak

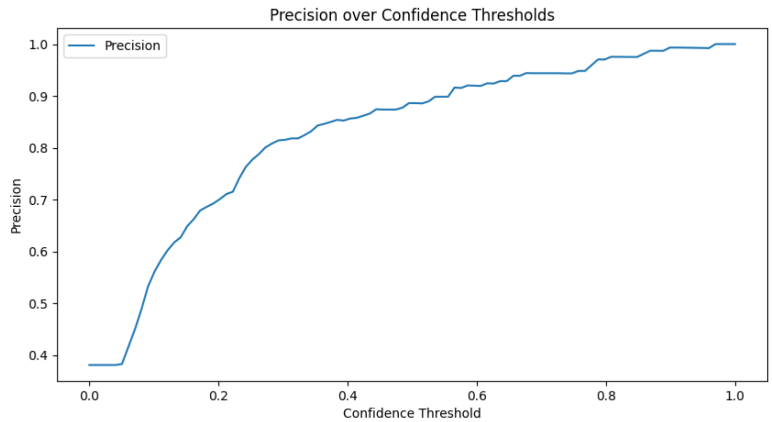

Figure 230. precision_over_recall, maskrcnn, pre-trained=True, epochs=50, data=keskvaljak

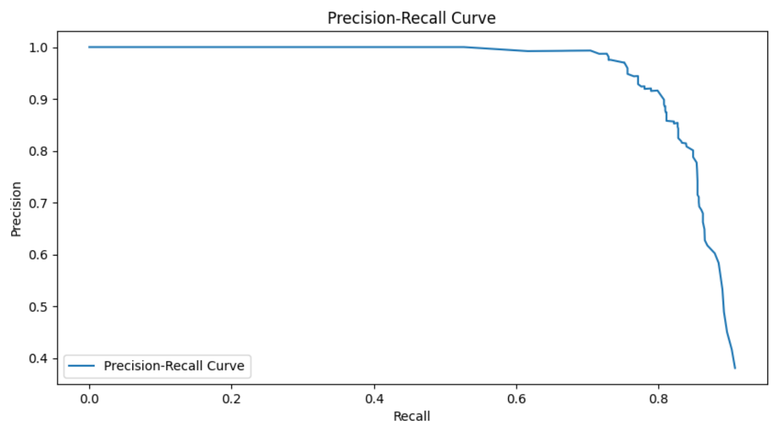

Figure 231. recall_over_confidence, maskrcnn, pre-trained=True, epochs=50, data=keskvaljak

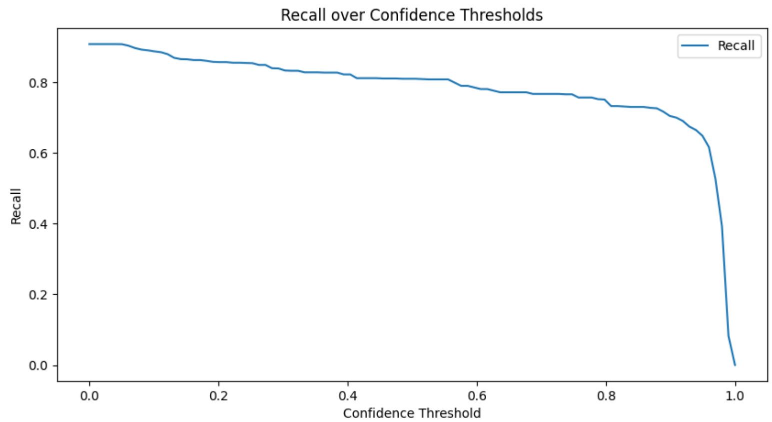

Figure 232. f1_over_confidence, maskrcnn, pre-trained=True, epochs=50, data=kielce_university_of_technology

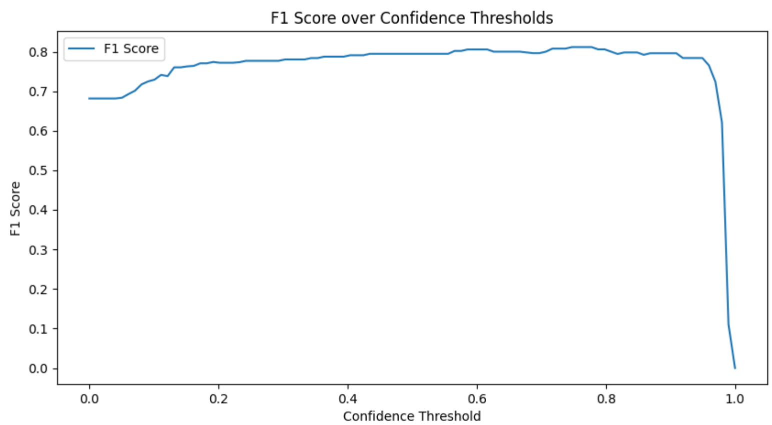

Figure 233. precision_over_confidence, maskrcnn, pre-trained=True, epochs=50, data=kielce_university_of_technology

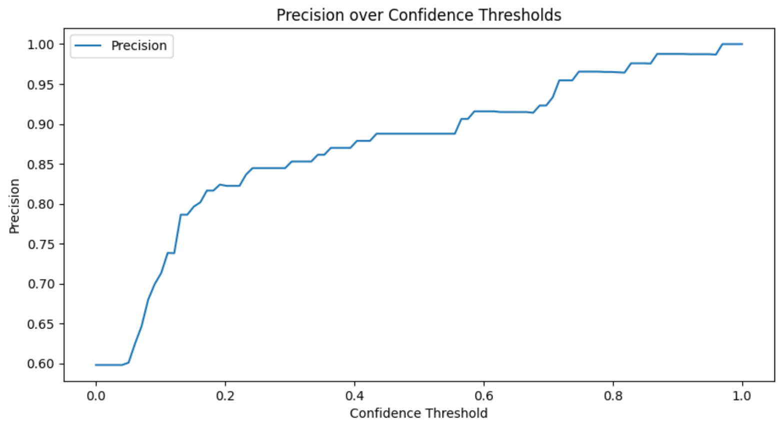

Figure 234. precision_over_recall, maskrcnn, pre-trained=True, epochs=50, data=kielce_university_of_technology

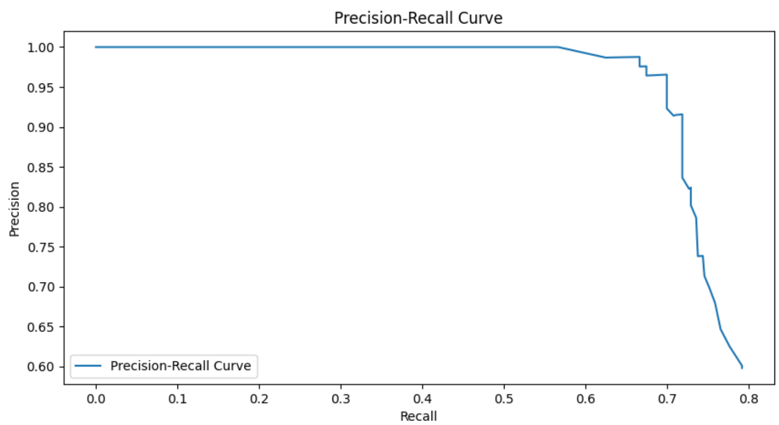

Figure 235. recall_over_confidence, maskrcnn, pre-trained=True, epochs=50, data=kielce_university_of_technology

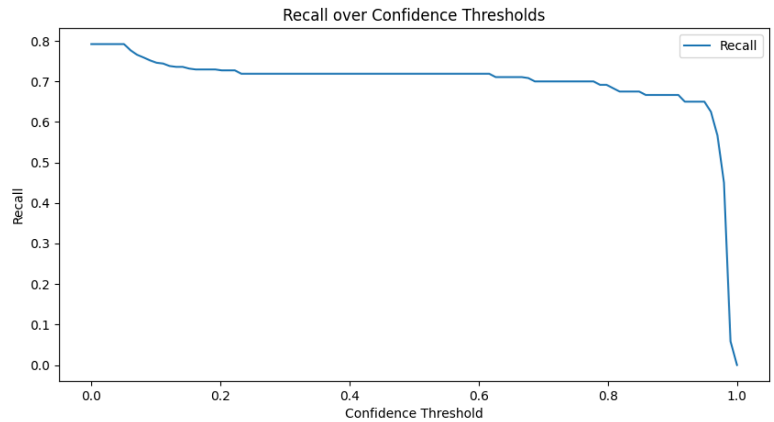

Figure 236. f1_over_confidence, maskrcnn, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch

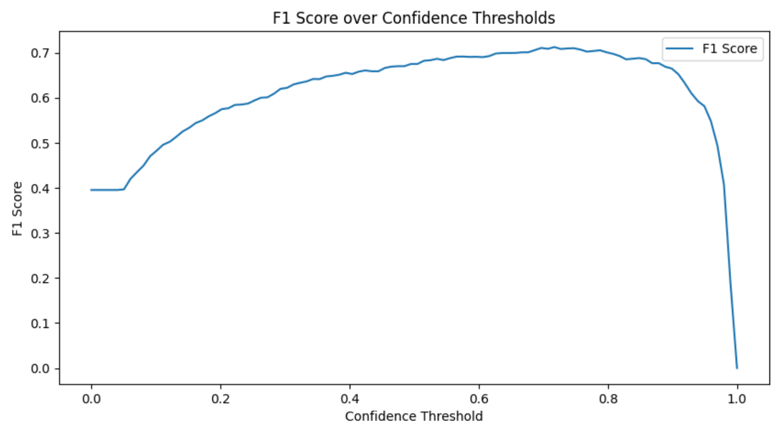

Figure 237. precision_over_confidence, maskrcnn, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch

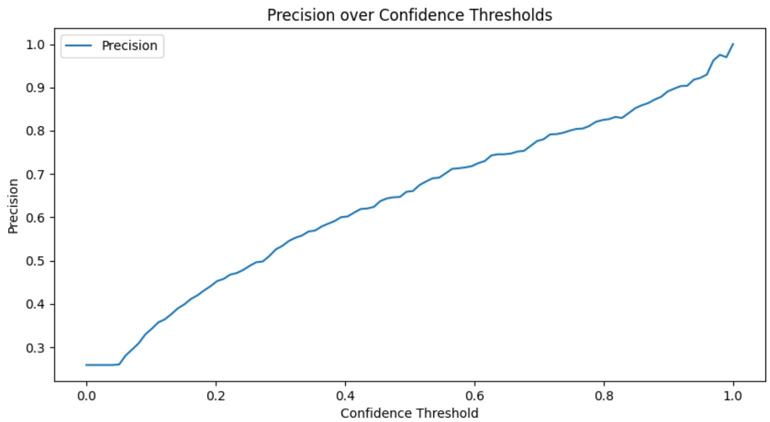

Figure 238. precision_over_recall, maskrcnn, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch

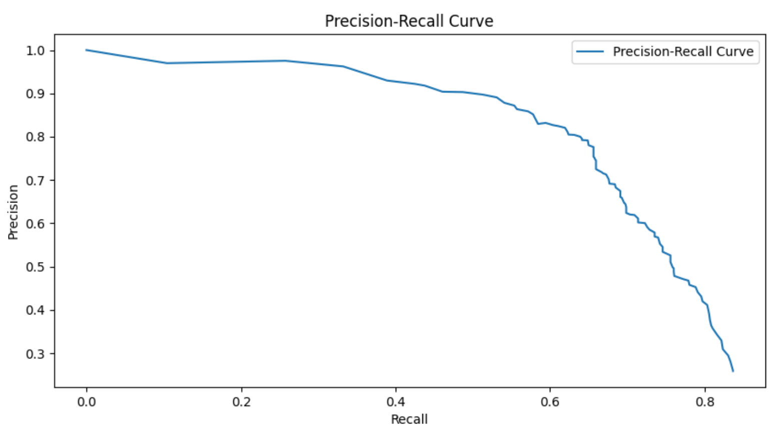

Figure 239. recall_over_confidence, maskrcnn, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch

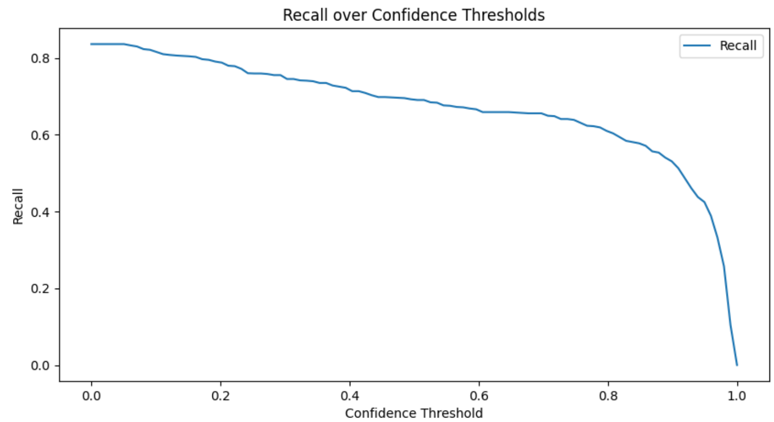

Figure 240. f1_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=duomo

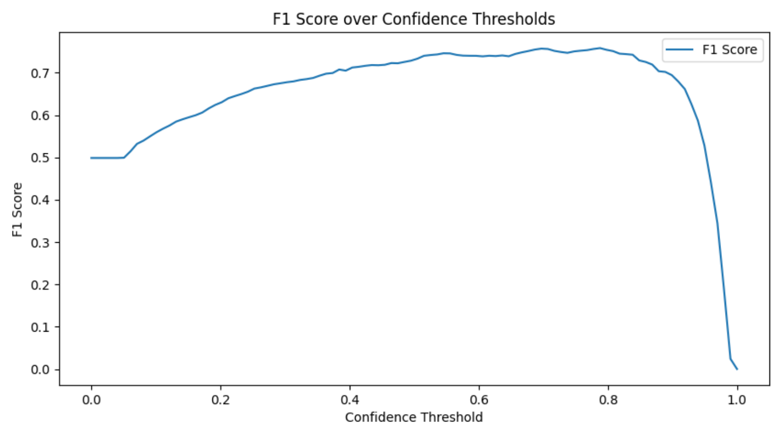

Figure 241. precision_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=duomo

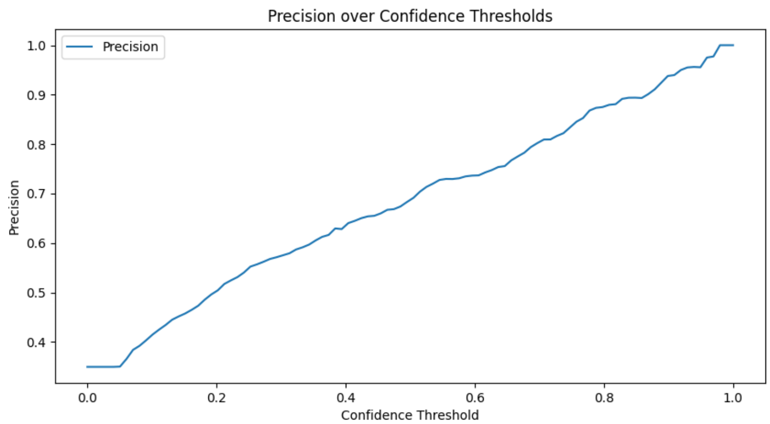

Figure 242. precision_over_recall, maskrcnn, pre-trained=True, epochs=100, data=duomo

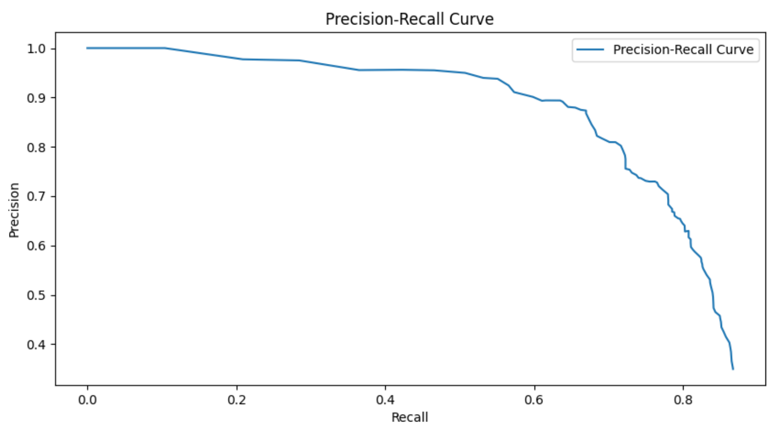

Figure 243. recall_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=duomo

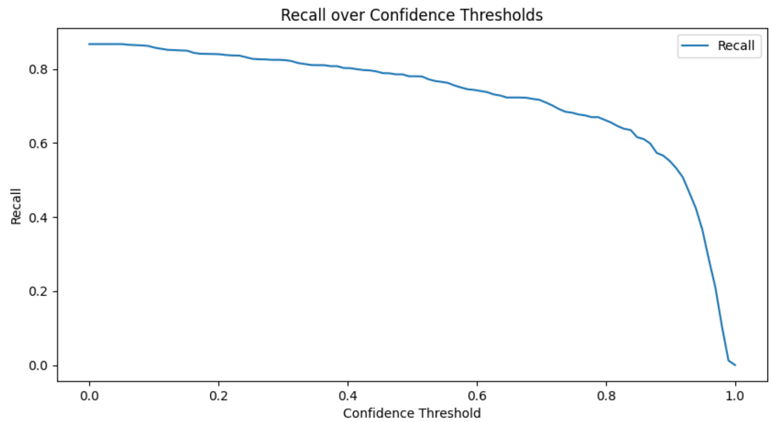

Figure 244. f1_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=hadji_dimitar_square

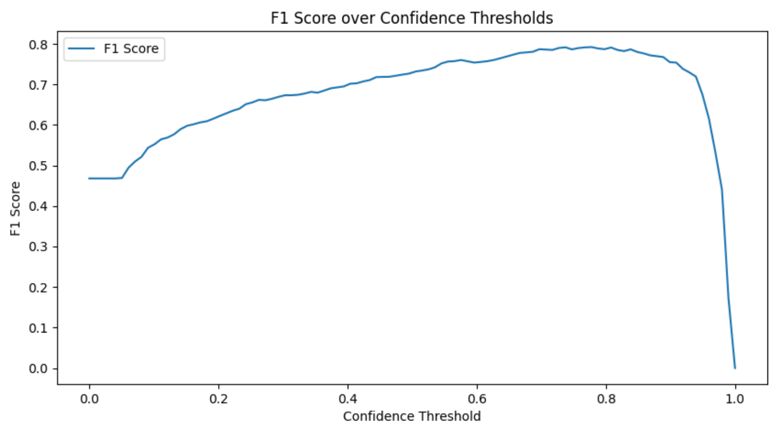

Figure 245. precision_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=hadji_dimitar_square

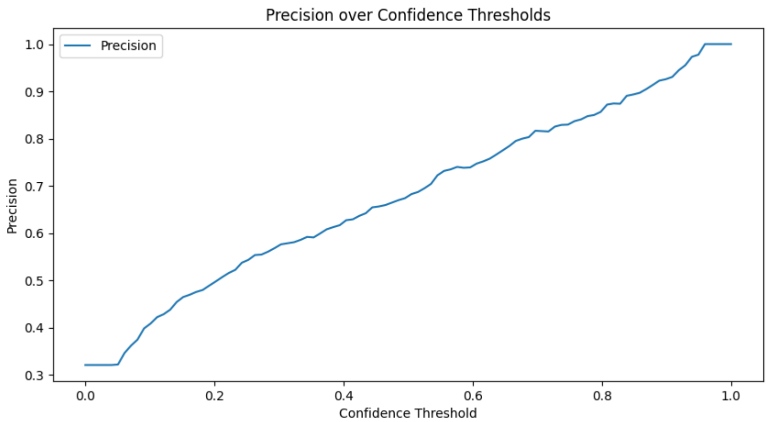

Figure 246. precision_over_recall, maskrcnn, pre-trained=True, epochs=100, data=hadji_dimitar_square

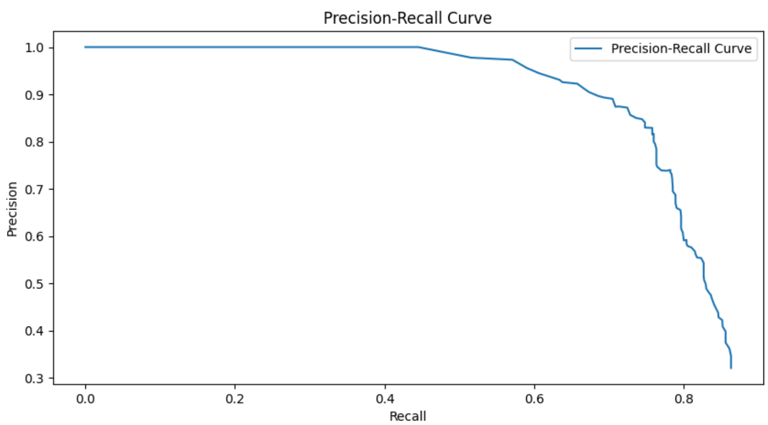

Figure 247. recall_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=hadji_dimitar_square

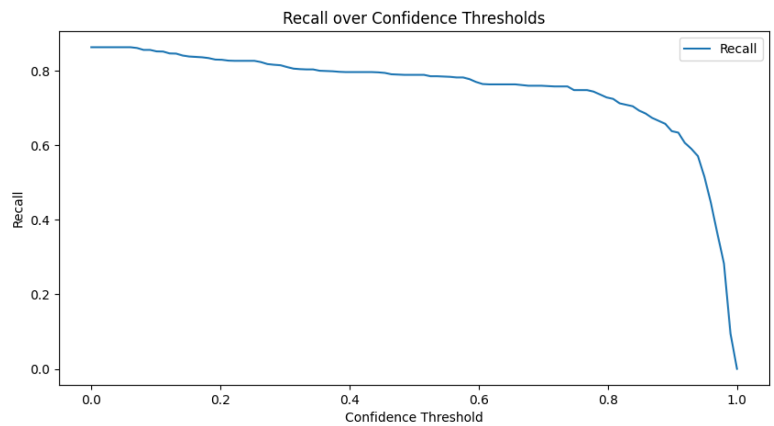

Figure 248. f1_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=keskvaljak

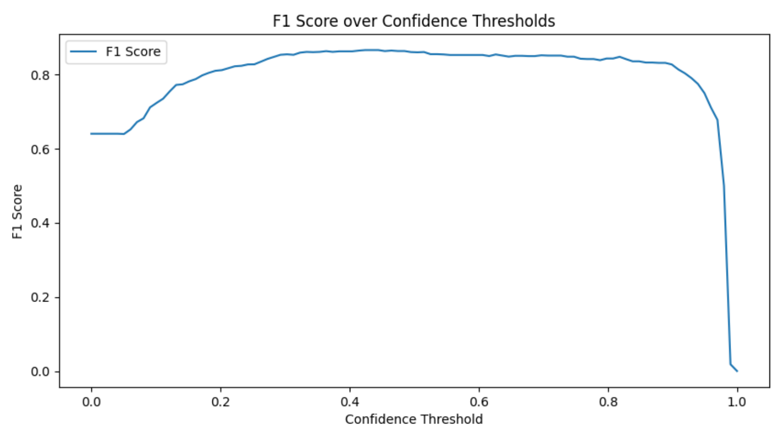

Figure 249. precision_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=keskvaljak

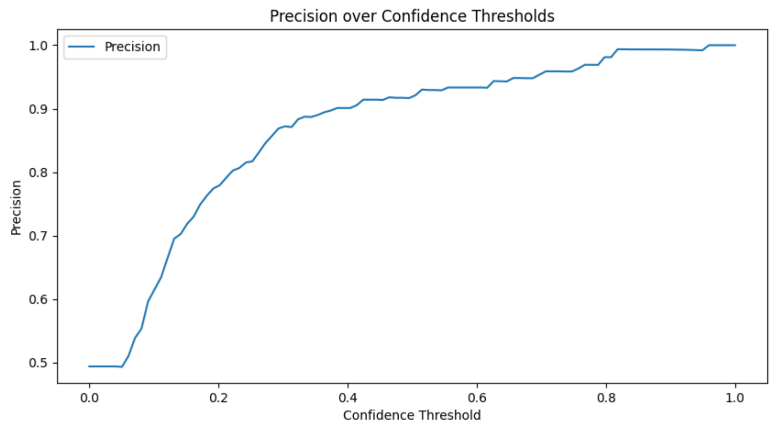

Figure 250. precision_over_recall, maskrcnn, pre-trained=True, epochs=100, data=keskvaljak

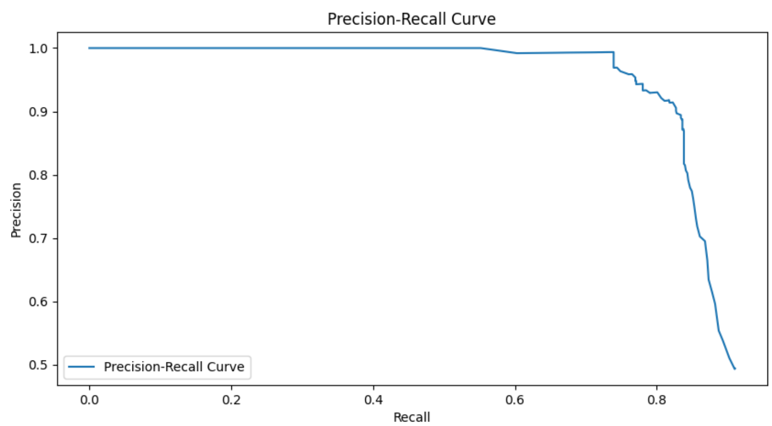

Figure 251. recall_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=keskvaljak

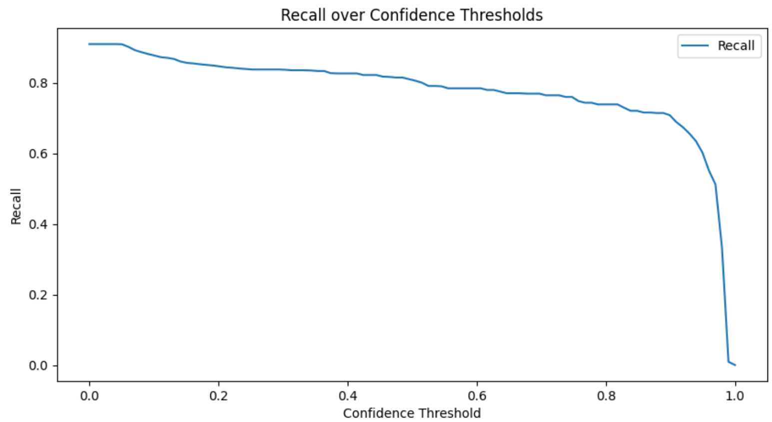

Figure 252. f1_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=kielce_university_of_technology

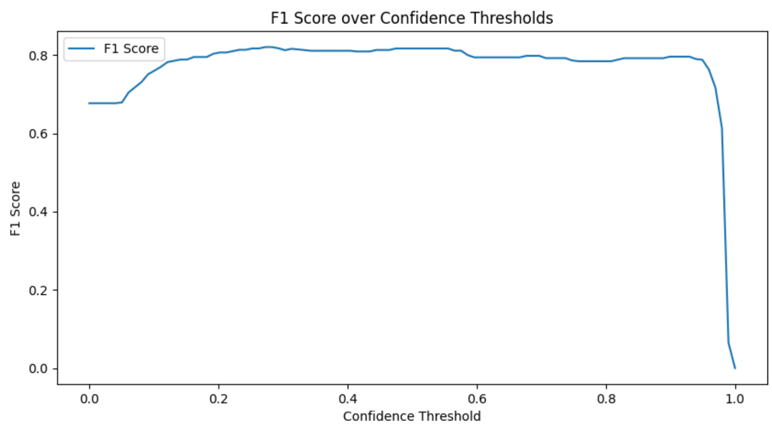

Figure 253. precision_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=kielce_university_of_technology

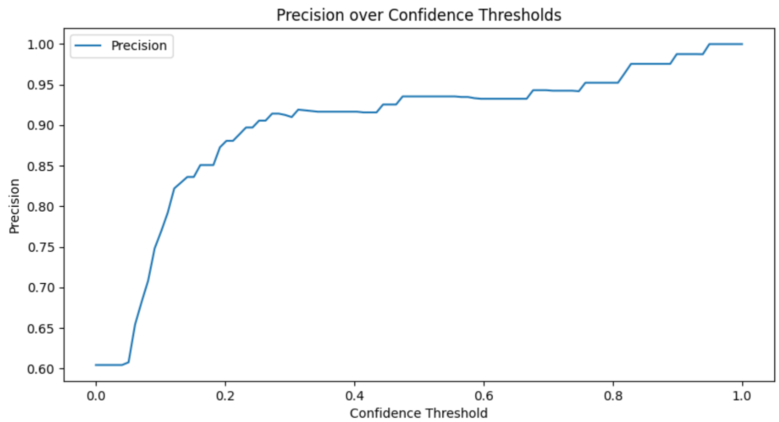

Figure 254. precision_over_recall, maskrcnn, pre-trained=True, epochs=100, data=kielce_university_of_technology

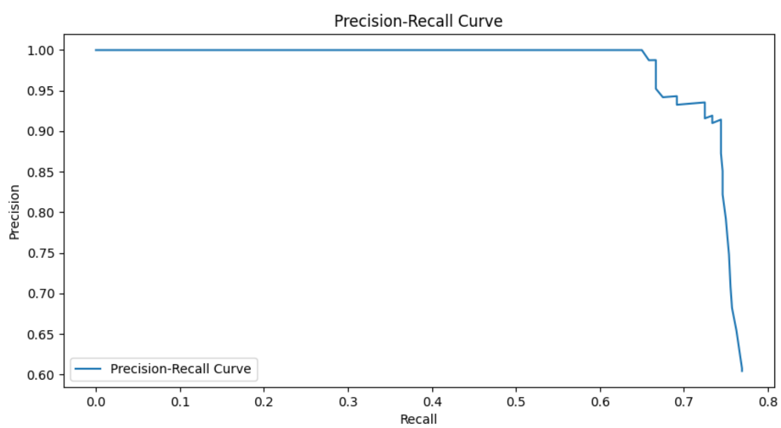

Figure 255. recall_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=kielce_university_of_technology

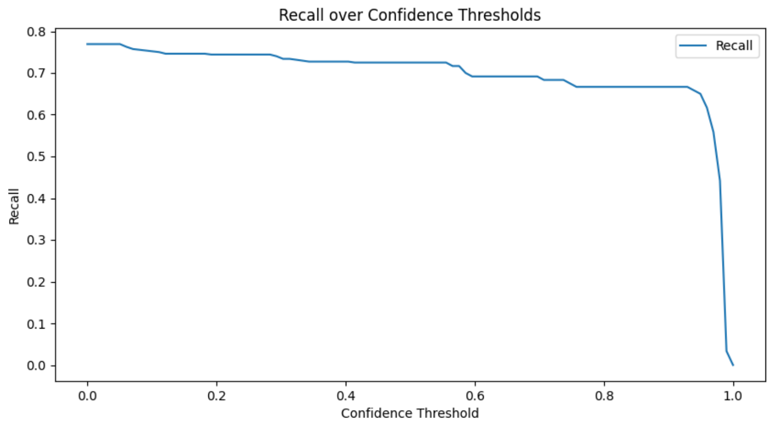

Figure 256. f1_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch

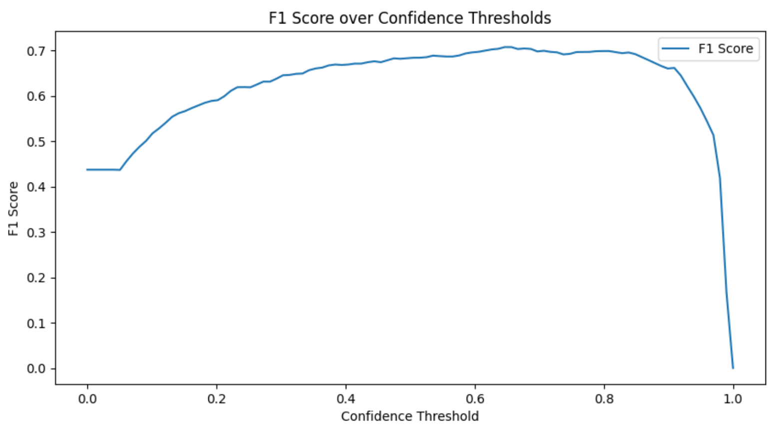

Figure 257. precision_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch

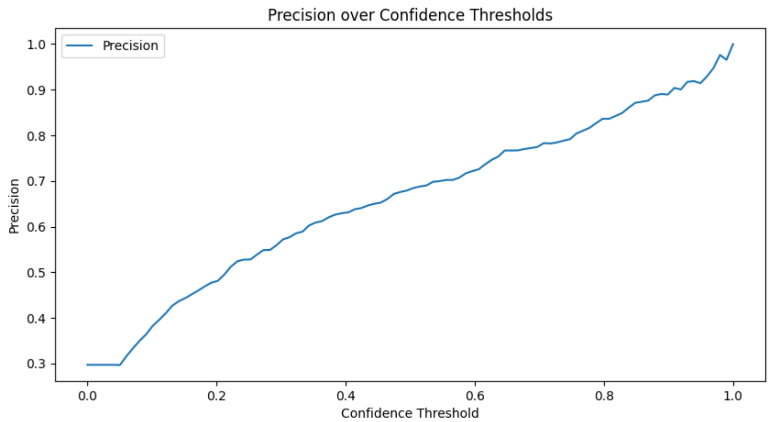

Figure 258. precision_over_recall, maskrcnn, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch

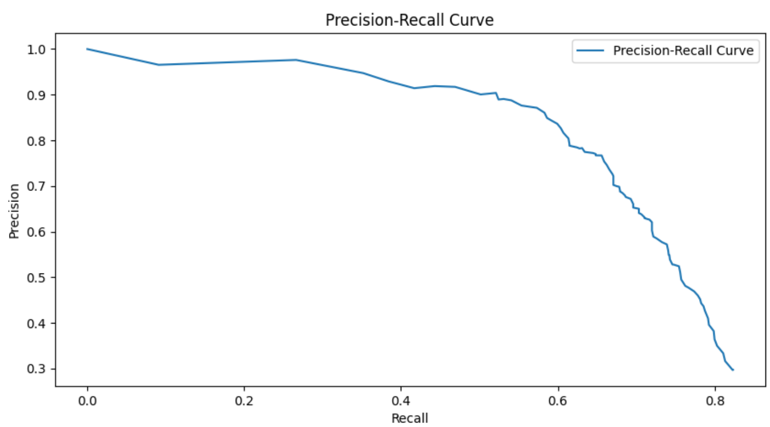

Figure 259. recall_over_confidence, maskrcnn, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch

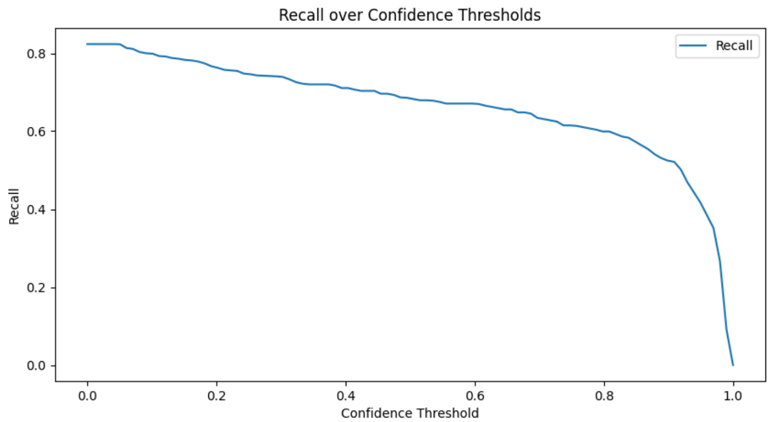

Figure 260. f1_over_confidence, maskrcnn, pre-trained=True, epochs=150, data=duomo

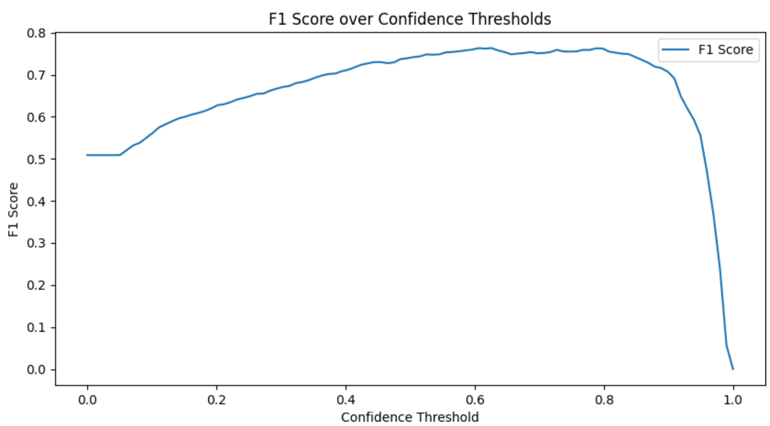

Figure 261. precision_over_confidence, maskrcnn, pre-trained=True, epochs=150, data=duomo

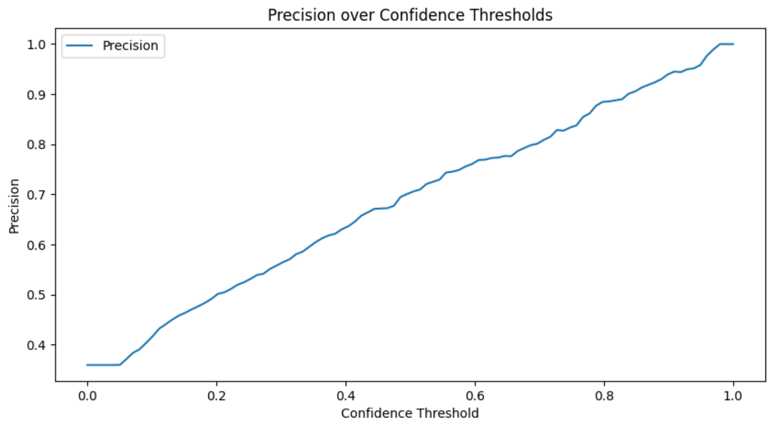

Figure 262. precision_over_recall, maskrcnn, pre-trained=True, epochs=150, data=duomo

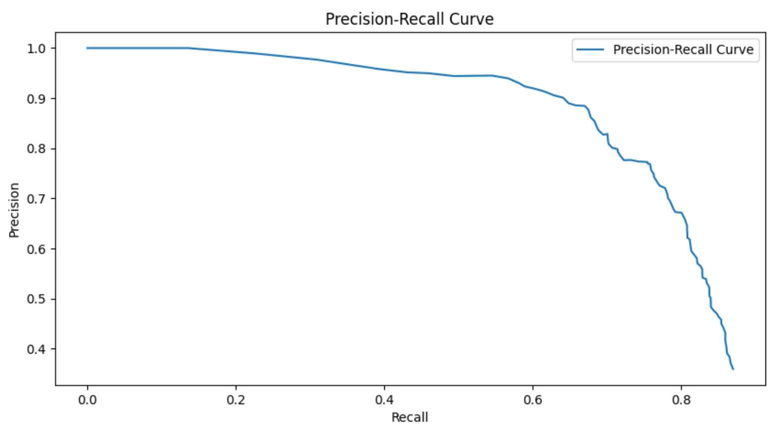

Figure 263. recall_over_confidence, maskrcnn, pre-trained=True, epochs=150, data=duomo

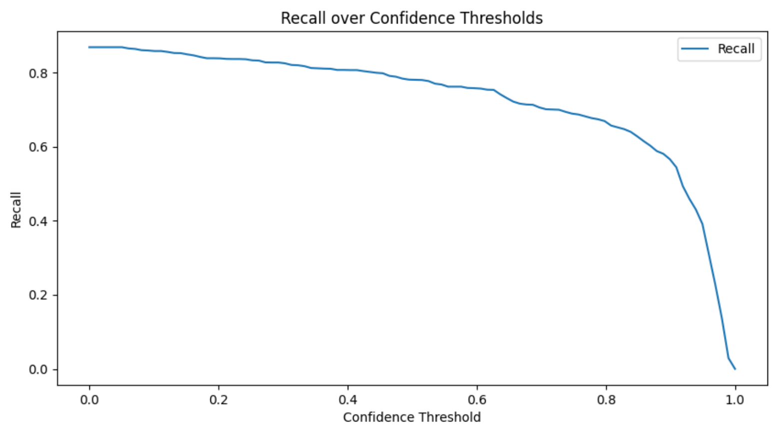

Figure 264. confidence, maskrcnn, pre-trained=True, epochs=150, data=hadji_dimitar_square

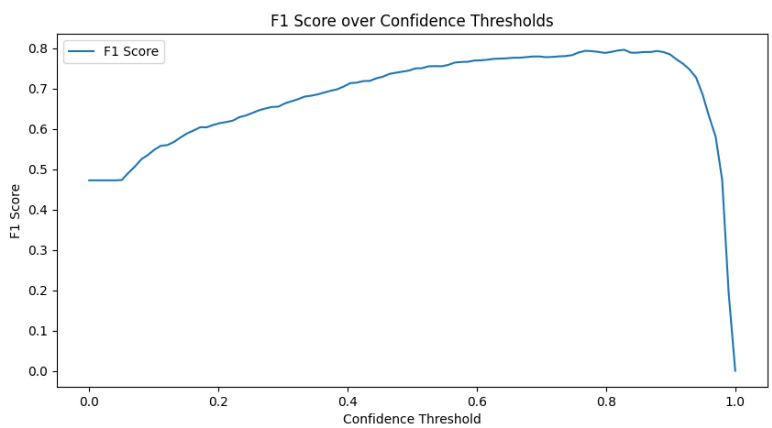

Figure 265. precision_over_confidence, maskrcnn, pre-trained=True, epochs=150, data=hadji_dimitar_square

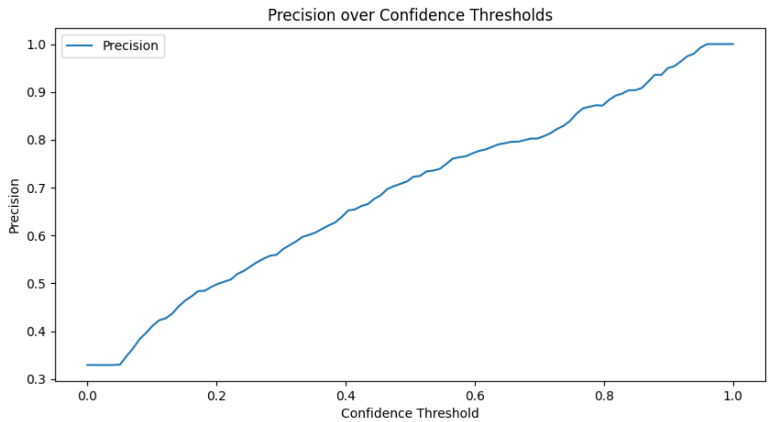

Figure 266. precision_over_recall, maskrcnn, pre-trained=True, epochs=150, data=hadji_dimitar_square

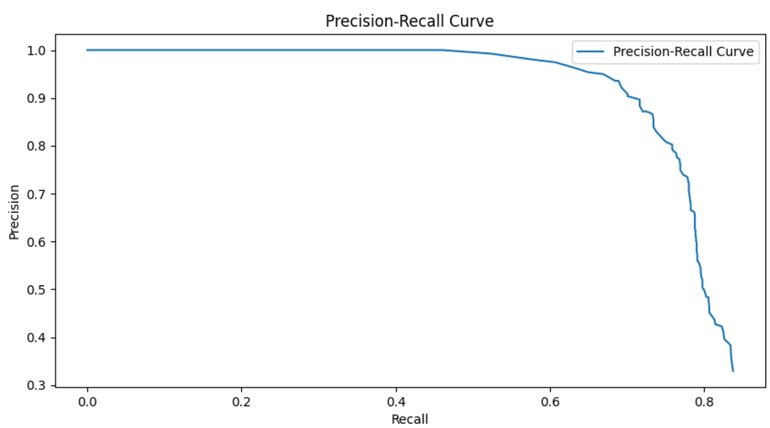

Figure 267. recall_over_confidence, maskrcnn, pre-trained=True, epochs=150, data=hadji_dimitar_square

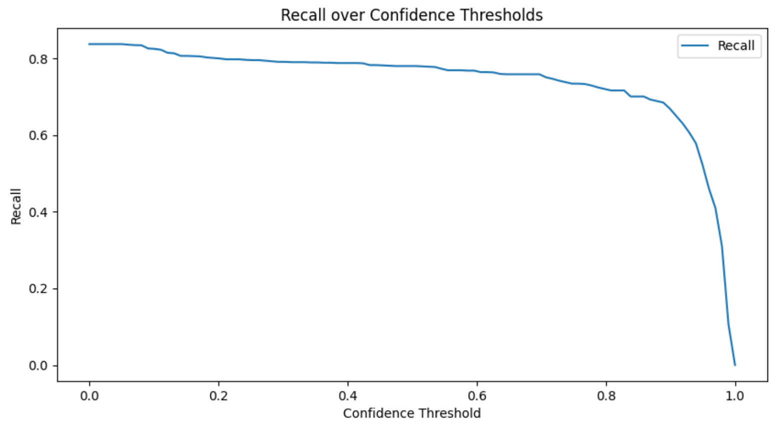

Figure 268. f1_over_confidence, maskrcnn, pre-trained=True, epochs=150, data=keskvaljak

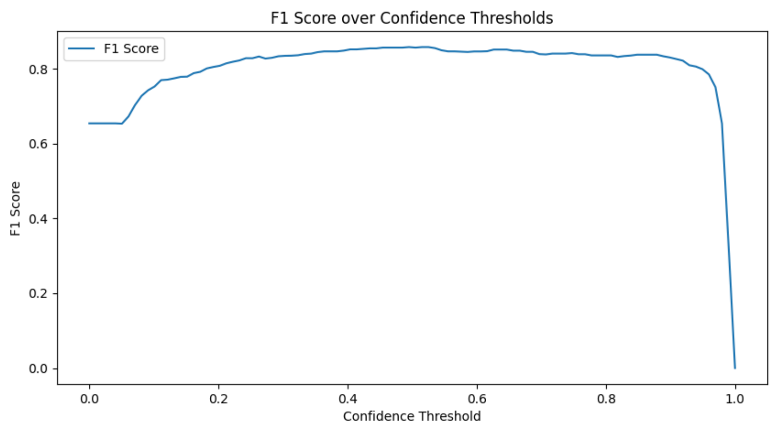

Figure 269. precision_over_confidence, maskrcnn, pre-trained=True, epochs=150, data=keskvaljak

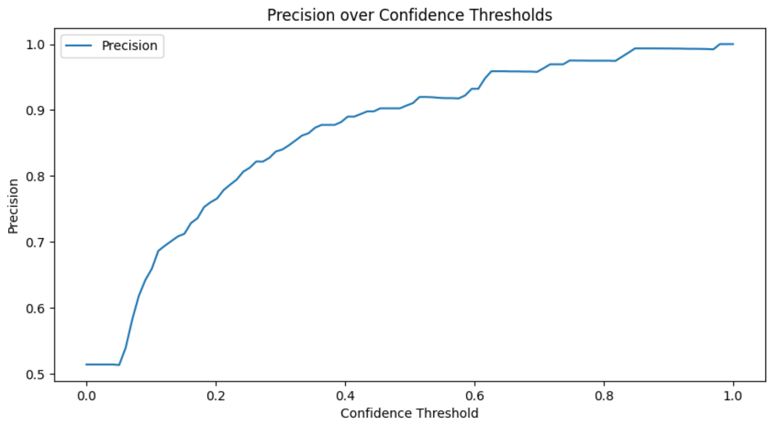

Figure 270. precision_over_recall, maskrcnn, pre-trained=True, epochs=150, data=keskvaljak

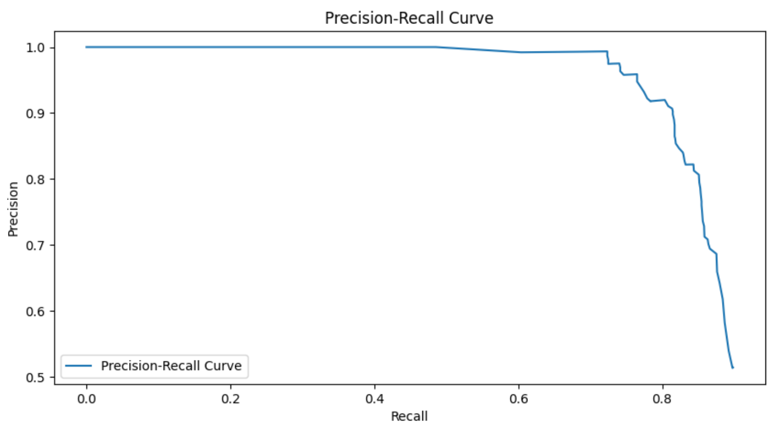

Figure 271. recall_over_confidence, maskrcnn, pre-trained=True, epochs=150, data=keskvaljak

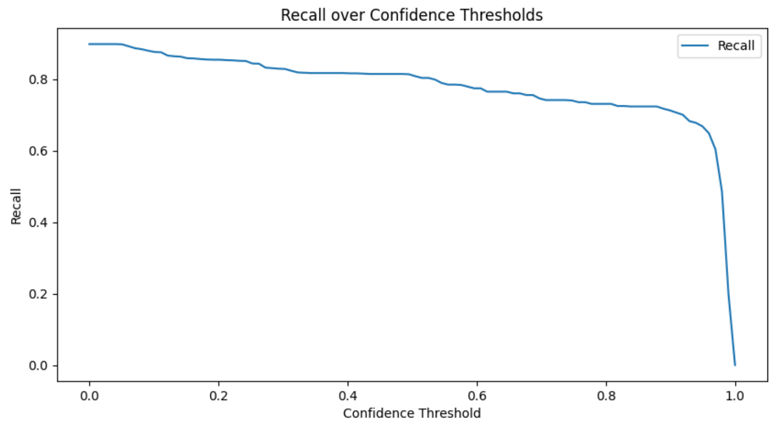

Figure 272. f1__over__confidence, maskrcnn, pre-trained=True, epochs=150, data=kielce__university__of__technology

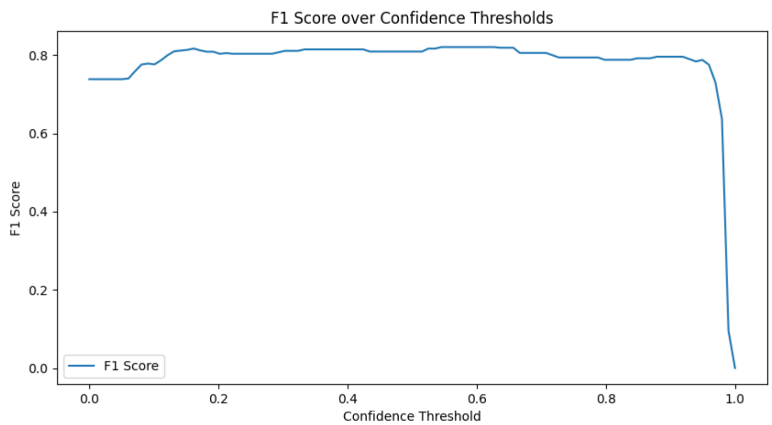

Figure 273. precision__over__confidence, maskrcnn, pre-trained=True, epochs=150, data=kielce__university__of__technology

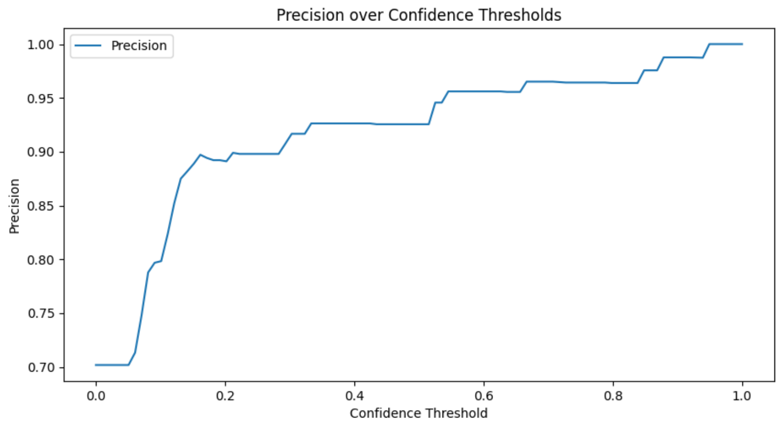

Figure 274. precision_over_recall, maskrcnn, pre-trained=True, epochs=150, data=kielce_university_of_technology

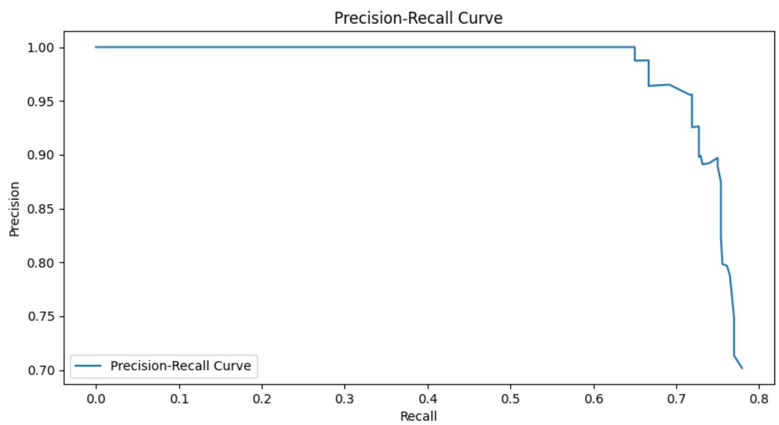

Figure 275. recall_over_confidence, maskrcnn, pre-trained=True, epochs=150, data=kielce_university_of_technology

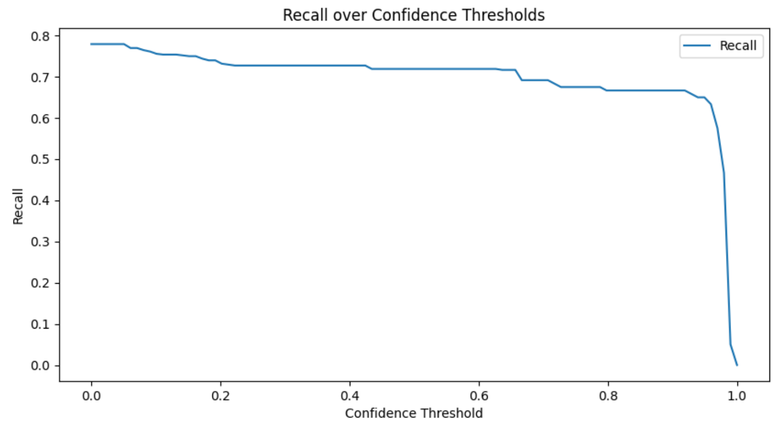

Figure 276. f1__over__confidence, maskrcnn, pre-trained=True, epochs=150, data=toggenburg__alpaca__ranch

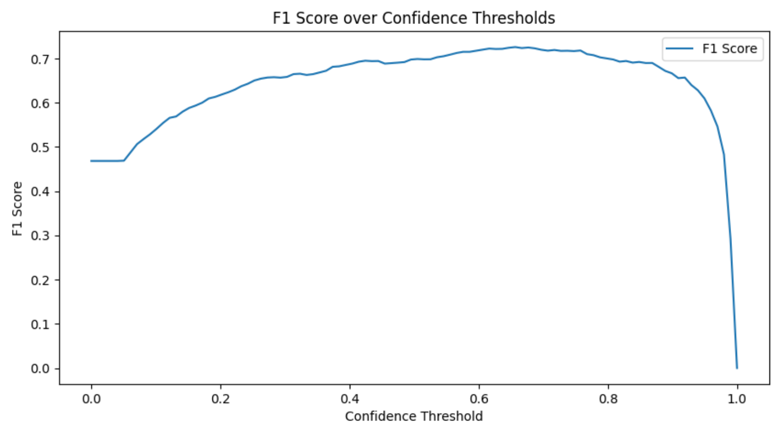

Figure 277. precision__over__confidence, maskrcnn, pre-trained=True, epochs=150, data=toggenburg__alpaca__ranch

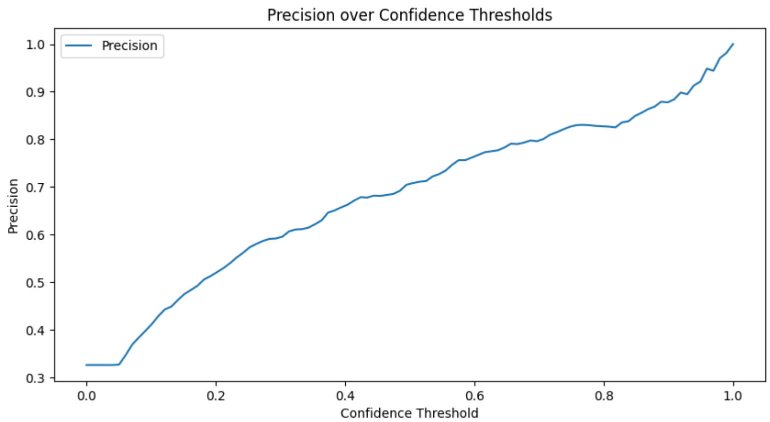

Figure 278. precision_over_recall, maskrcnn, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch

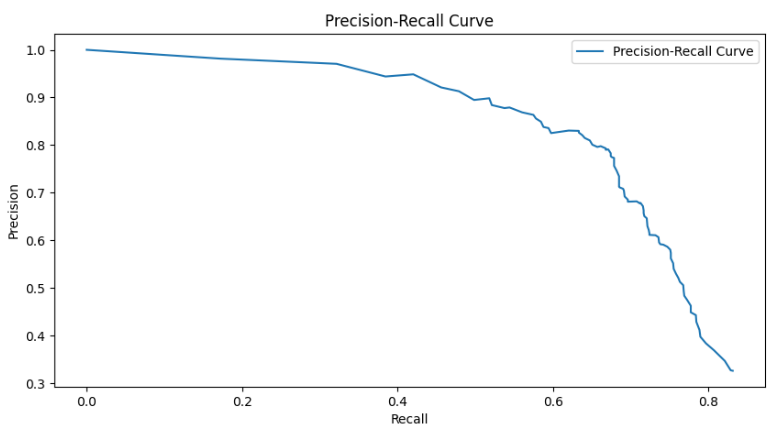

Figure 279. recall_over_confidence, maskrcnn, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch

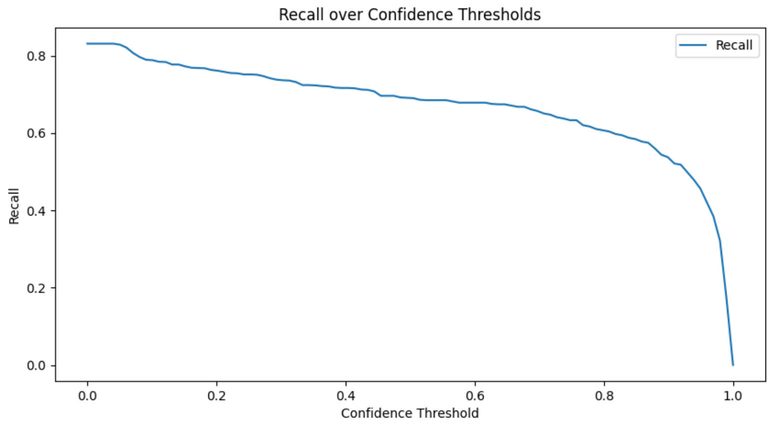

Figure 280. f1_over_confidence, retinanet, pre-trained=True, epochs=0, data=duomo

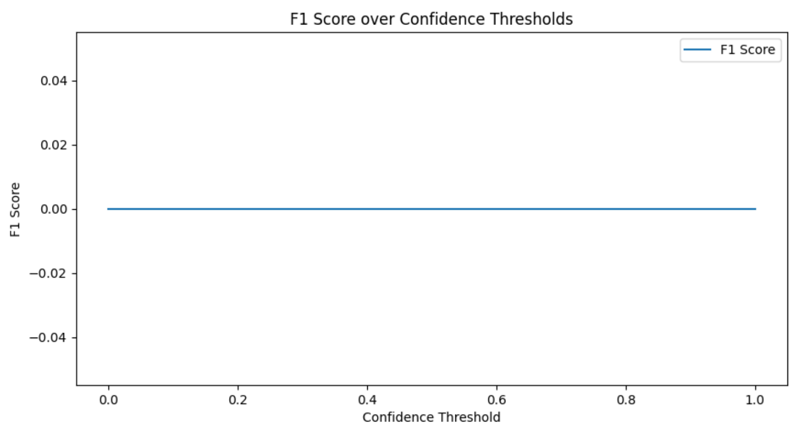

Figure 281. precision_over_confidence, retinanet, pre-trained=True, epochs=0, data=duomo

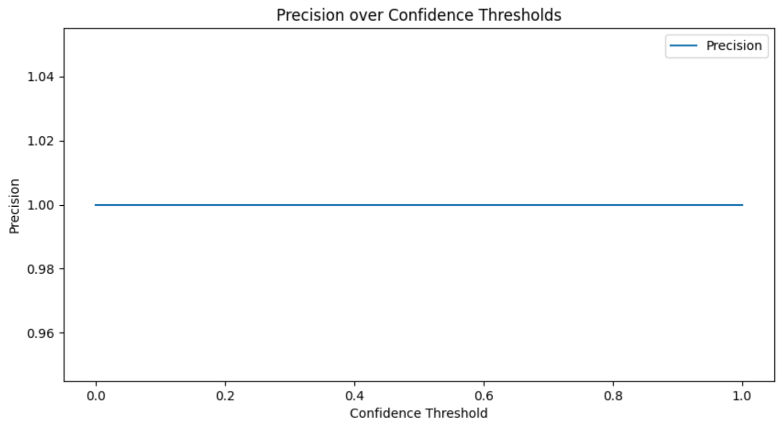

Figure 282. precision_over_recall, retinanet, pre-trained=True, epochs=0, data=duomo

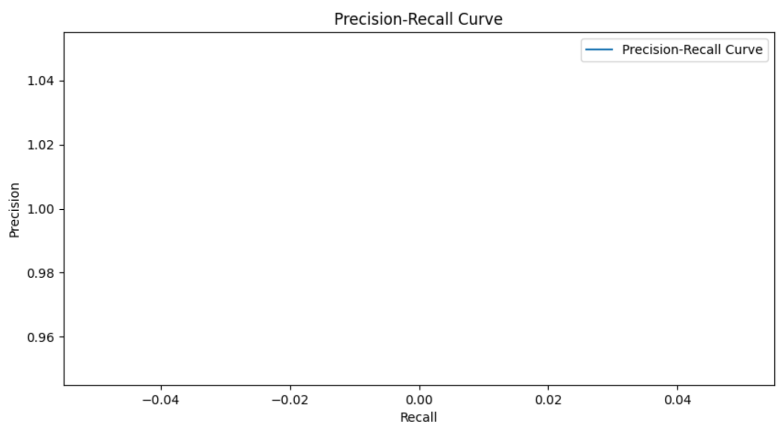

Figure 283. recall_over_confidence, retinanet, pre-trained=True, epochs=0, data=duomo

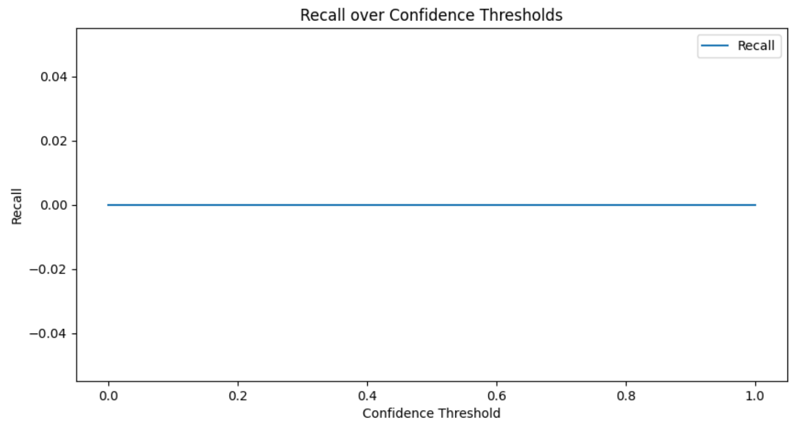

Figure 284. f1_over_confidence, retinanet, pre-trained=True, epochs=0, data=hadji_dimitar_square

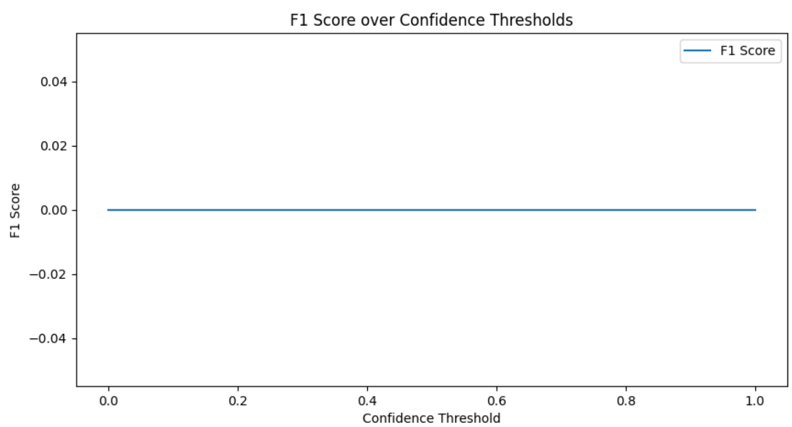

Figure 285. precision_over_confidence, retinanet, pre-trained=True, epochs=0, data=hadji_dimitar_square

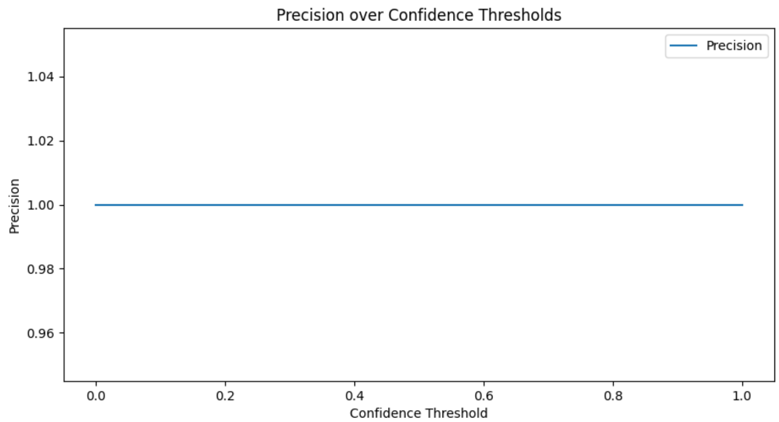

Figure 286. precision_over_recall, retinanet, pre-trained=True, epochs=0, data=hadji_dimitar_square

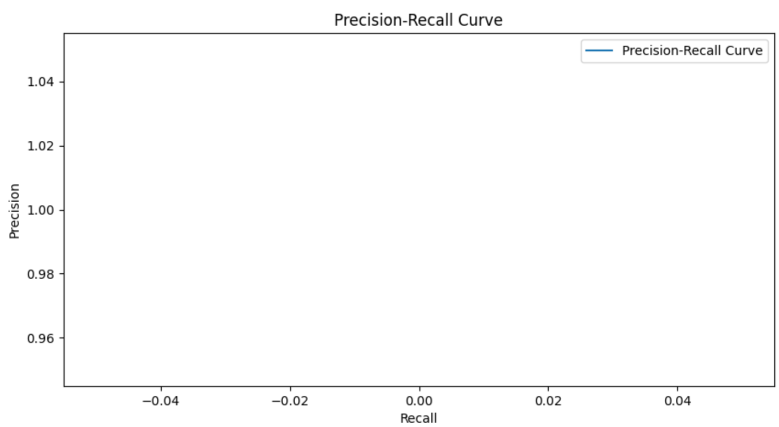

Figure 287. recall_over_confidence, retinanet, pre-trained=True, epochs=0, data=hadji_dimitar_square

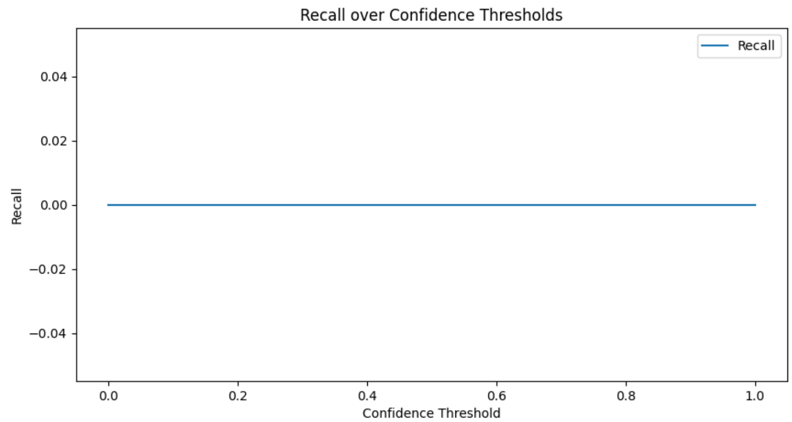

Figure 288. f1_over_confidence, retinanet, pre-trained=True, epochs=0, data=keskvaljak

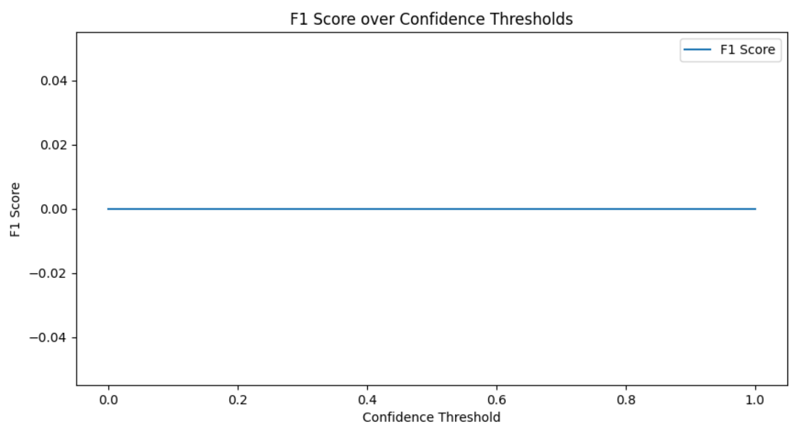

Figure 289. precision_over_confidence, retinanet, pre-trained=True, epochs=0, data=keskvaljak

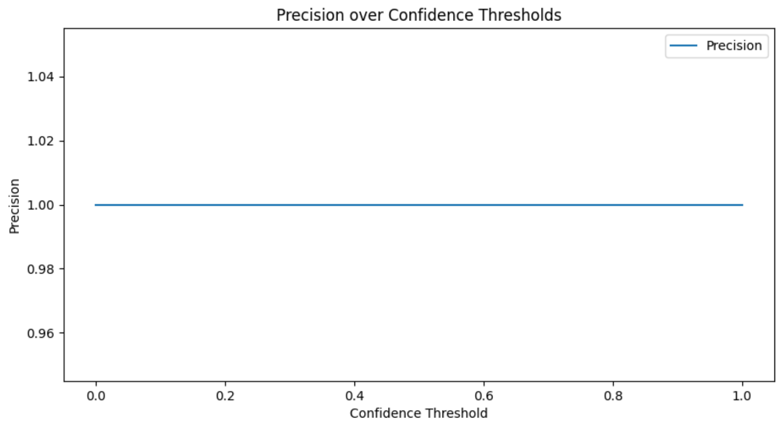

Figure 290. precision_over_recall, retinanet, pre-trained=True, epochs=0, data=keskvaljak

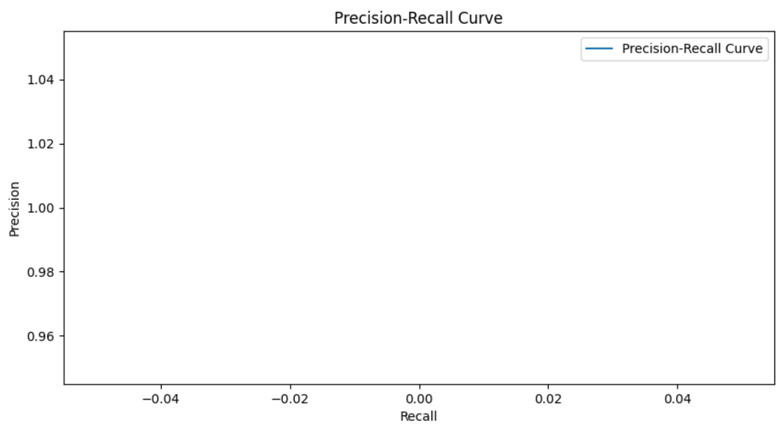

Figure 291. recall_over_confidence, retinanet, pre-trained=True, epochs=0, data=keskvaljak

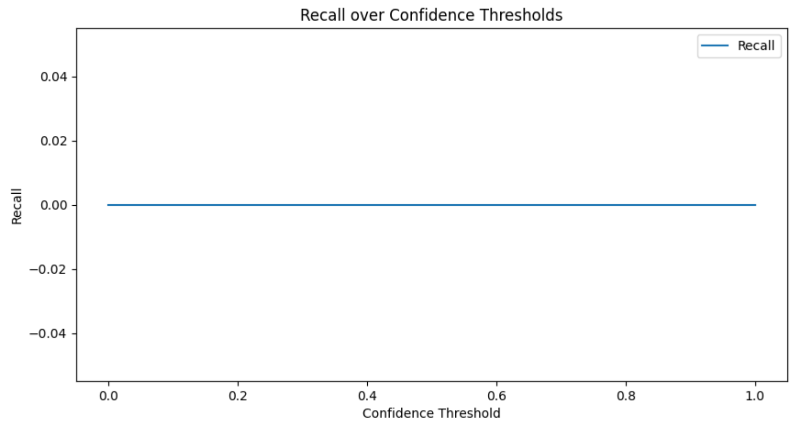

Figure 292. f1_over_confidence, retinanet, pre-trained=True, epochs=0, data=kielce_university_of_technology

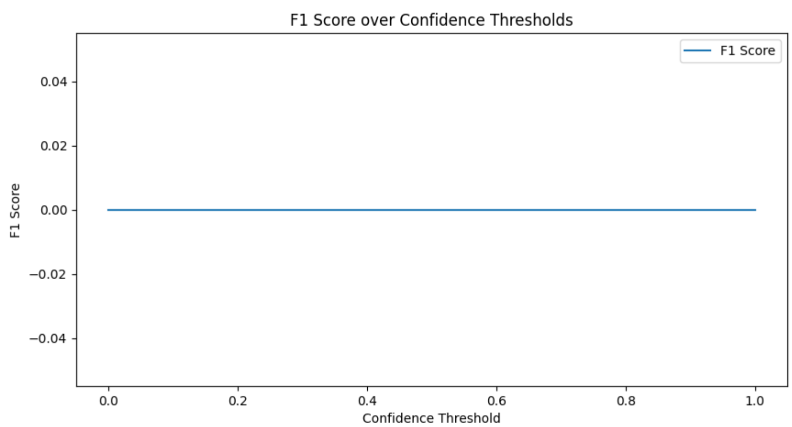

Figure 293. precision_over_confidence, retinanet, pre-trained=True, epochs=0, data=kielce_university_of_technology

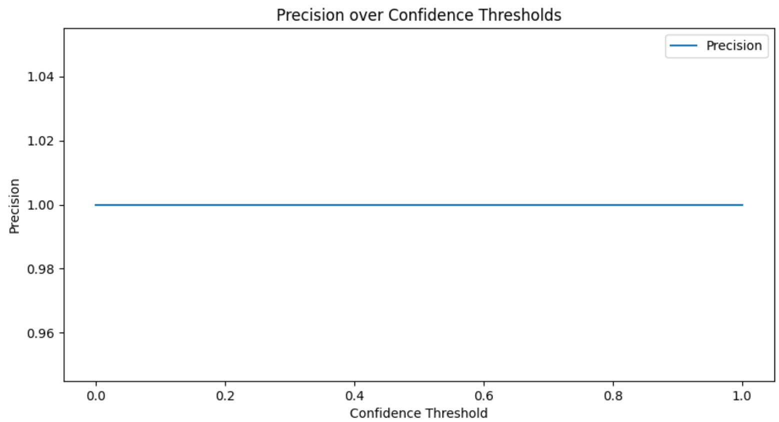

Figure 294. precision_over_recall, retinanet, pre-trained=True, epochs=0, data=kielce_university_of_technology

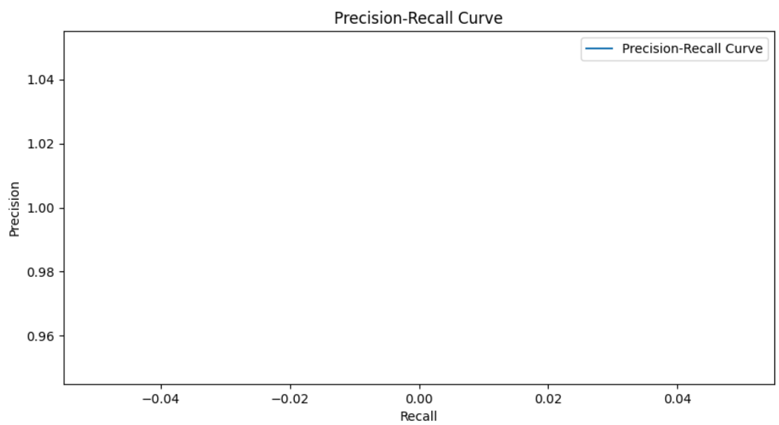

Figure 295. recall_over_confidence, retinanet, pre-trained=True, epochs=0, data=kielce_university_of_technology

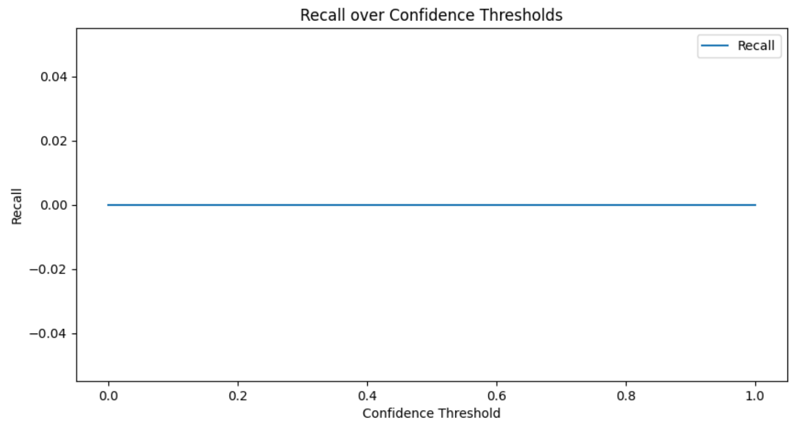

Figure 296. f1_over_confidence, retinanet, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch

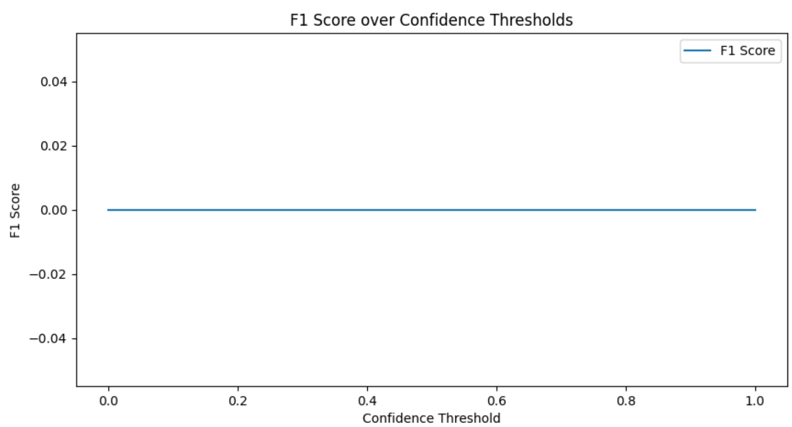

Figure 297. precision_over_confidence, retinanet, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch

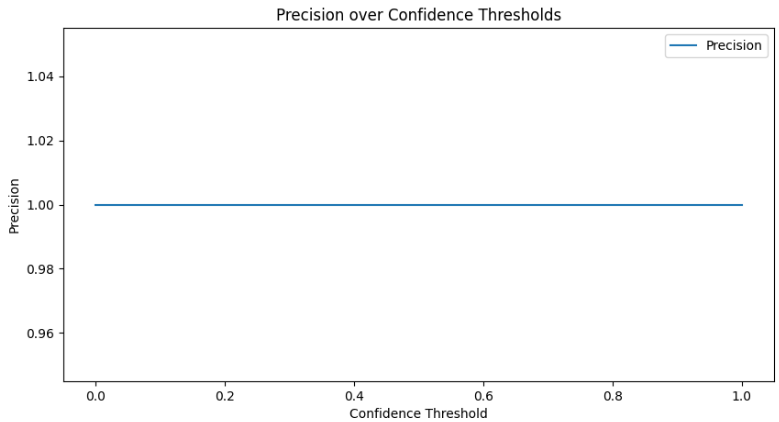

Figure 298. precision_over_recall, retinanet, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch

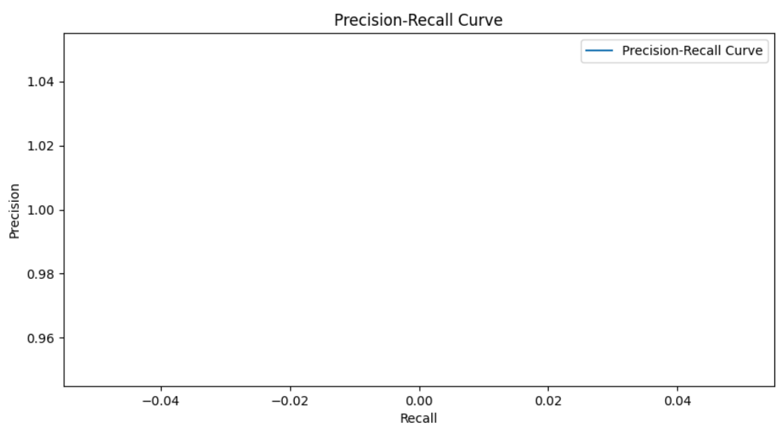

Figure 299. recall_over_confidence, retinanet, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch

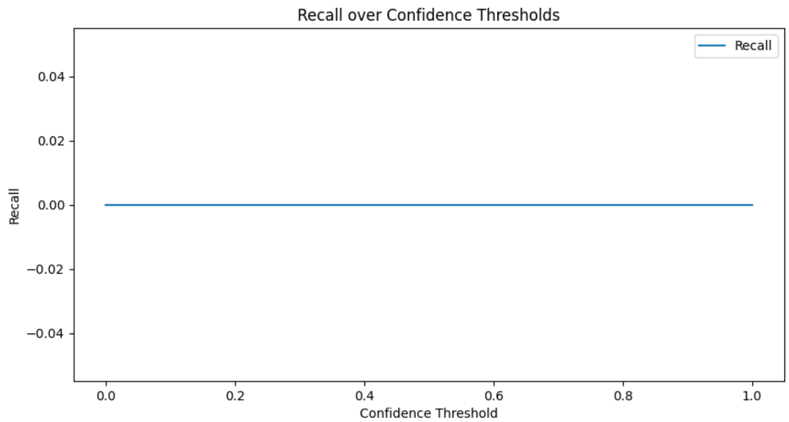

Figure 300. f1_over_confidence, retinanet, pre-trained=True, epochs=50, data=duomo

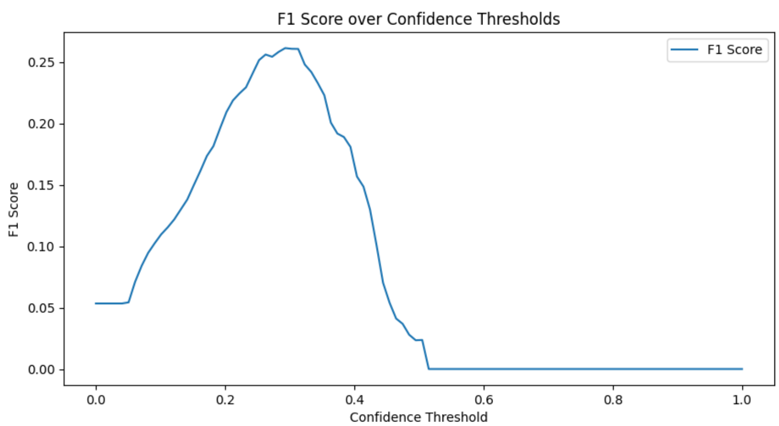

Figure 301. precision_over_confidence, retinanet, pre-trained=True, epochs=50, data=duomo

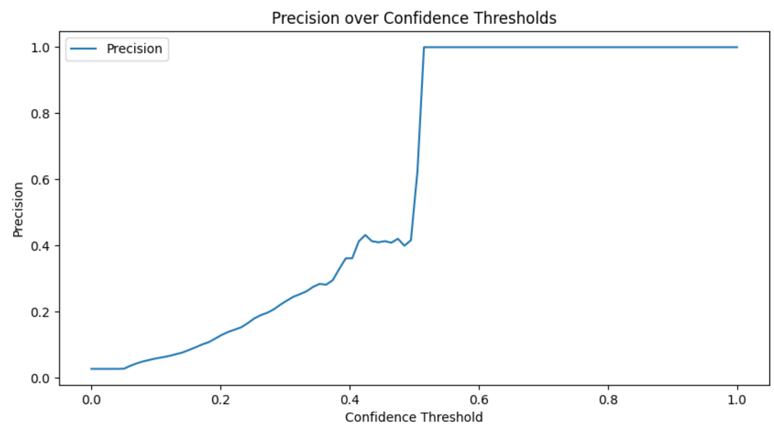

Figure 302. precision_over_recall, retinanet, pre-trained=True, epochs=50, data=duomo

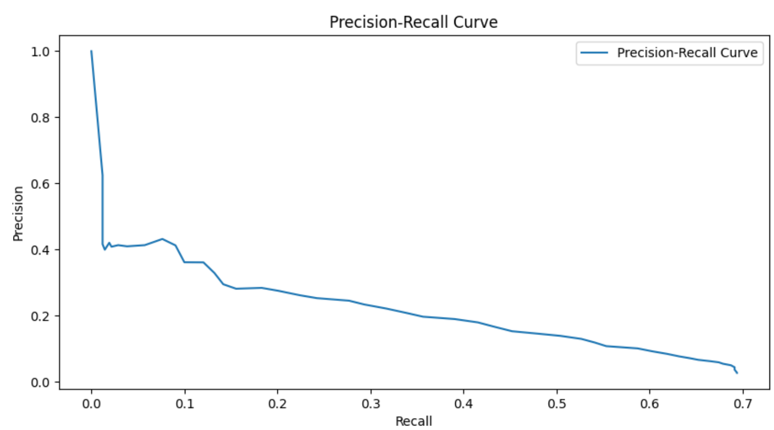

Figure 303. recall_over_confidence, retinanet, pre-trained=True, epochs=50, data=duomo

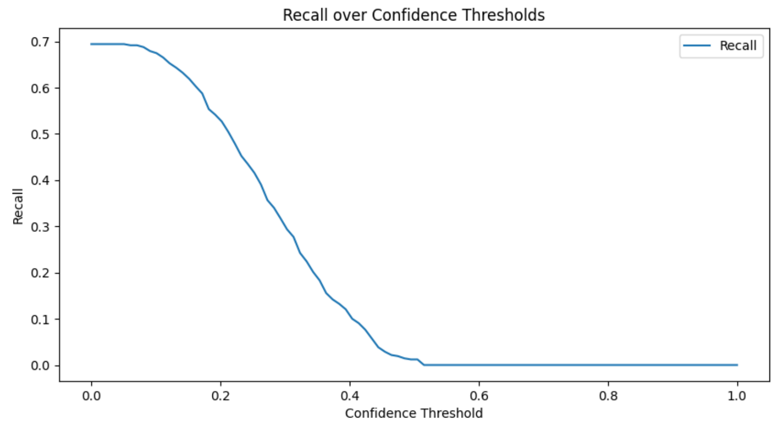

Figure 304. f1_over_confidence, retinanet, pre-trained=True, epochs=50, data=hadji_dimitar_square

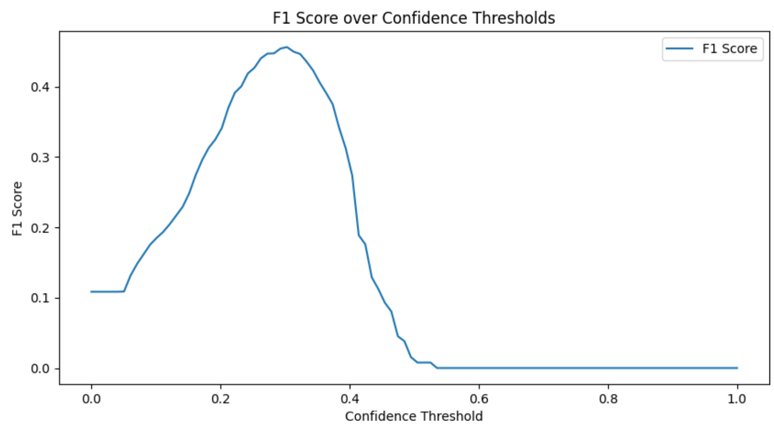

Figure 305. precision_over_confidence, retinanet, pre-trained=True, epochs=50, data=hadji_dimitar_square

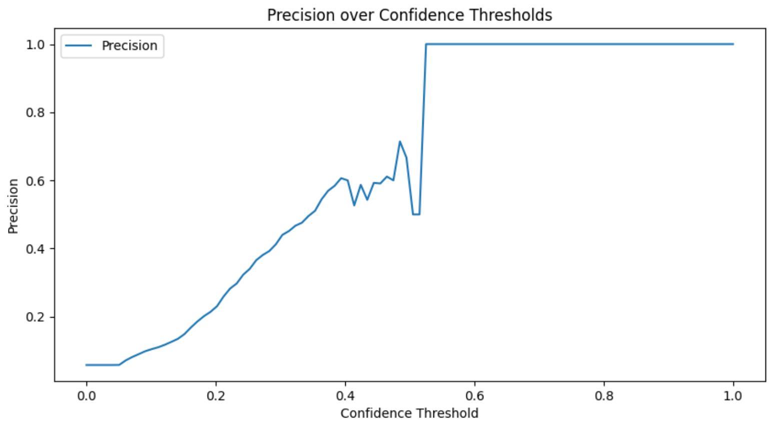

Figure 306. precision_over_recall, retinanet, pre-trained=True, epochs=50, data=hadji_dimitar_square

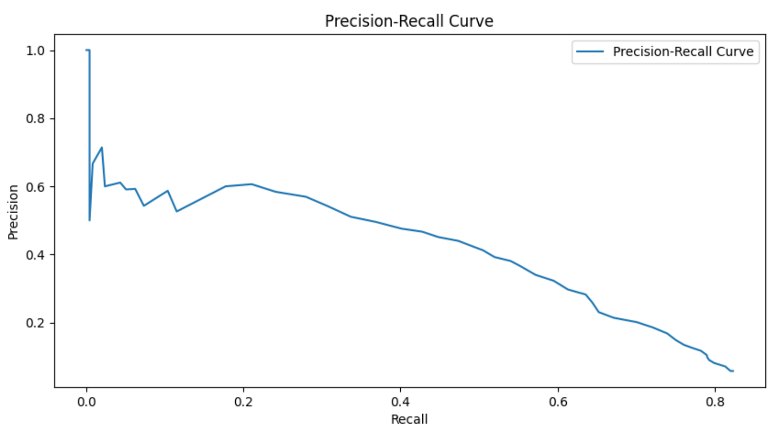

Figure 307. recall_over_confidence, retinanet, pre-trained=True, epochs=50, data=hadji_dimitar_square

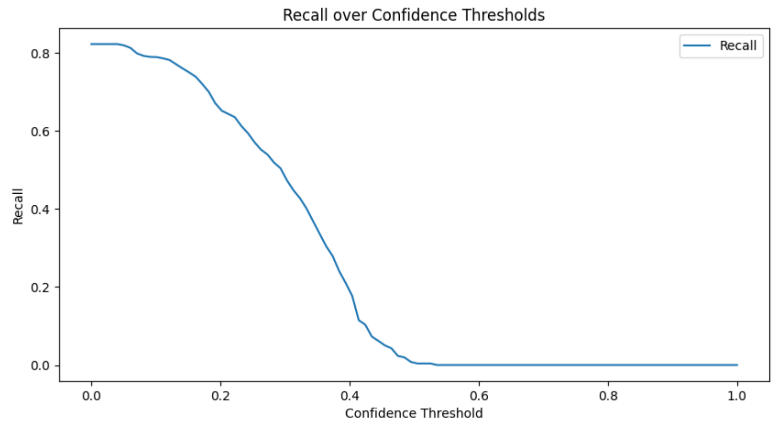

Figure 308. f1_over_confidence, retinanet, pre-trained=True, epochs=50, data=keskvaljak

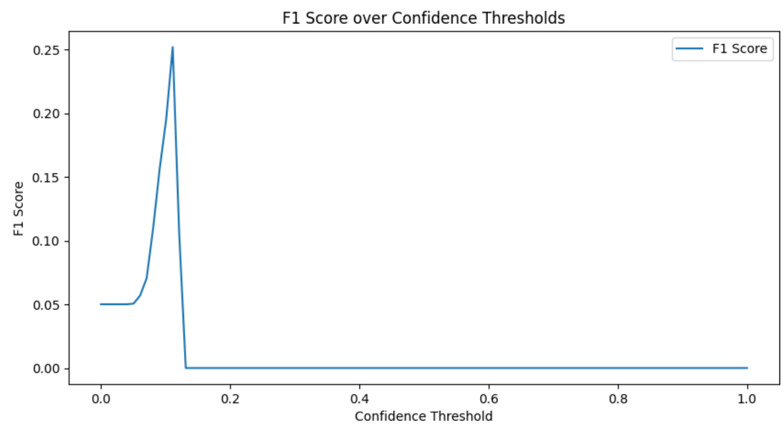

Figure 309. precision_over_confidence, retinanet, pre-trained=True, epochs=50, data=keskvaljak

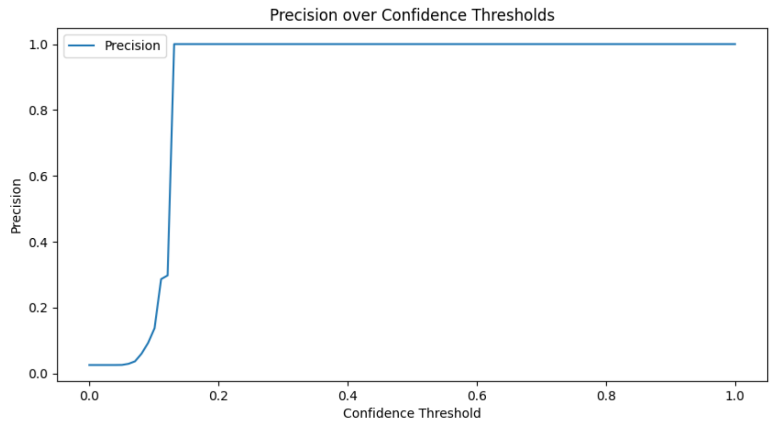

Figure 310. precision_over_recall, retinanet, pre-trained=True, epochs=50, data=keskvaljak

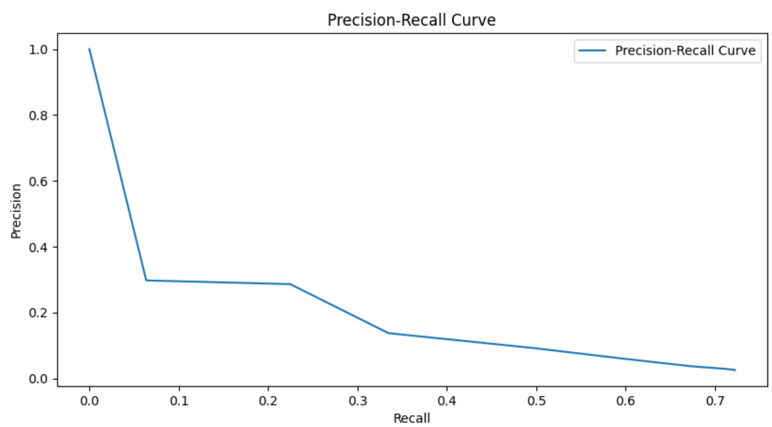

Figure 311. recall_over_confidence, retinanet, pre-trained=True, epochs=50, data=keskvaljak

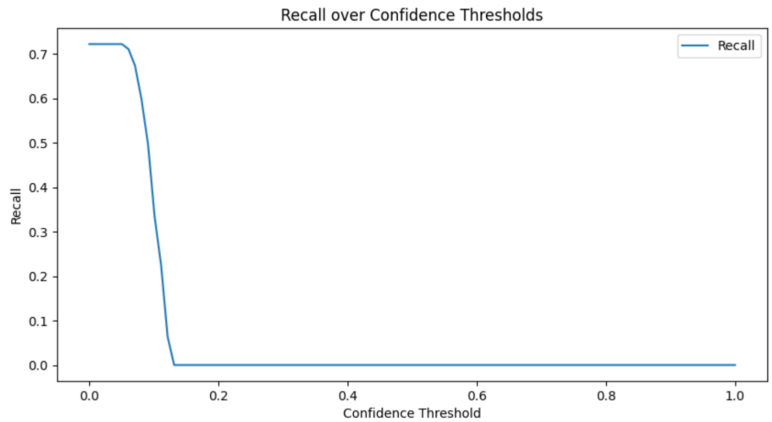

Figure 312. f1_over_confidence, retinanet, pre-trained=True, epochs=50, data=kielce_university_of_technology

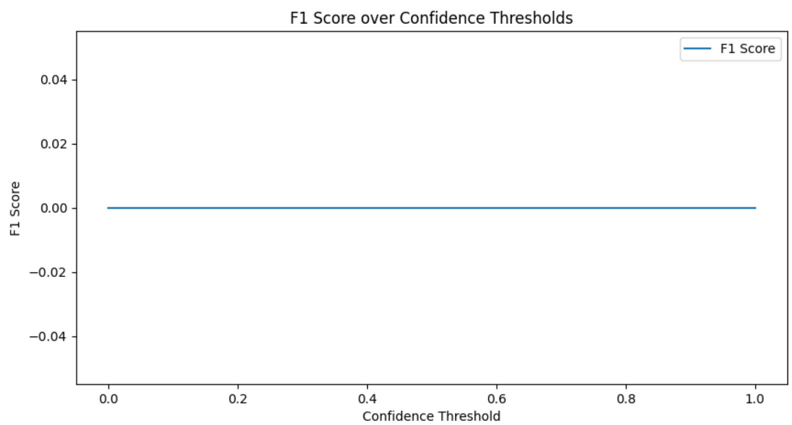

Figure 313. precision_over_confidence, retinanet, pre-trained=True, epochs=50, data=kielce_university_of_technology

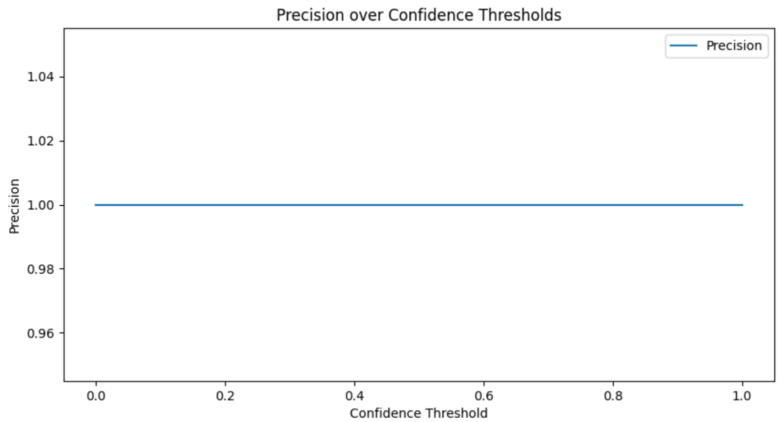

Figure 314. precision_over_recall, retinanet, pre-trained=True, epochs=50, data=kielce_university_of_technology

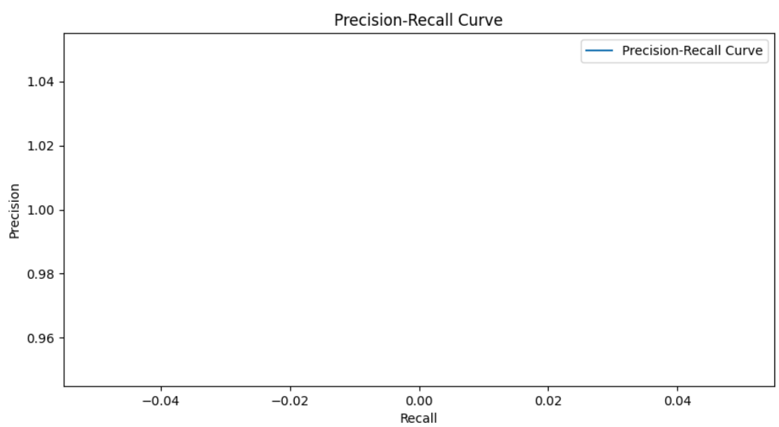

Figure 315. recall_over_confidence, retinanet, pre-trained=True, epochs=50, data=kielce_university_of_technology

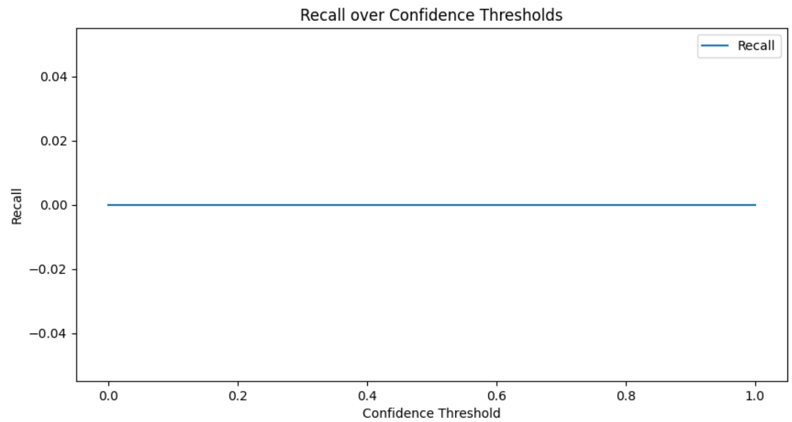

Figure 316. f1_over_confidence, retinanet, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch

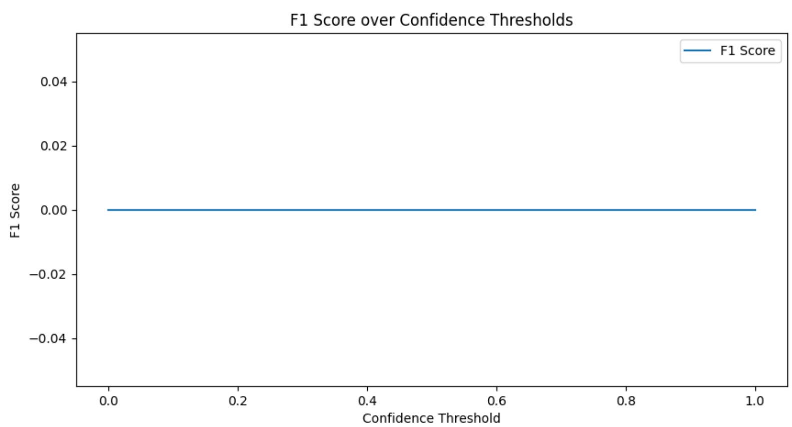

Figure 317. precision_over_confidence, retinanet, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch

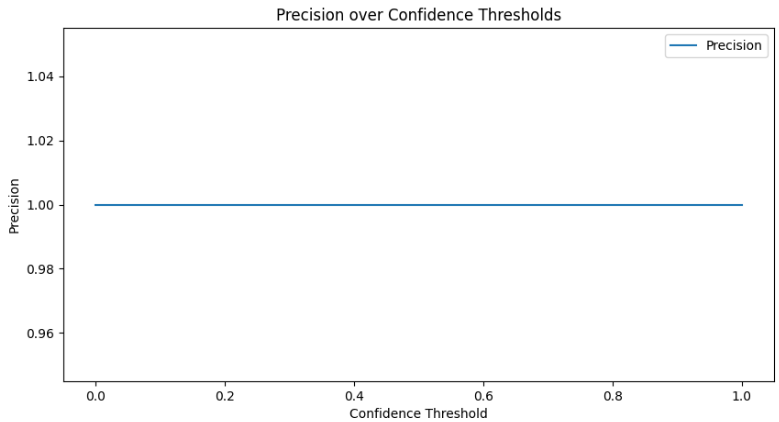

Figure 318. precision_over_recall, retinanet, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch

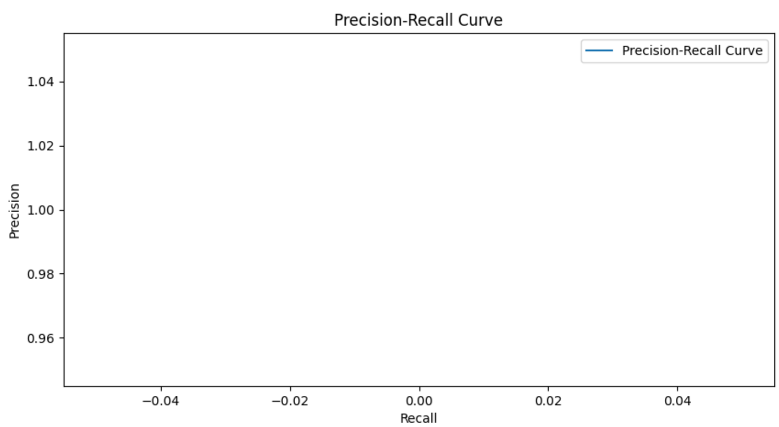

Figure 319. recall_over_confidence, retinanet, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch

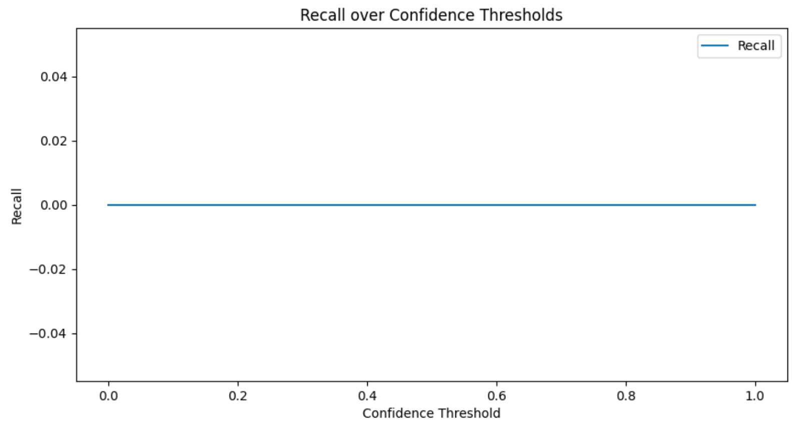

Figure 320. f1_over_confidence, retinanet, pre-trained=True, epochs=100, data=duomo

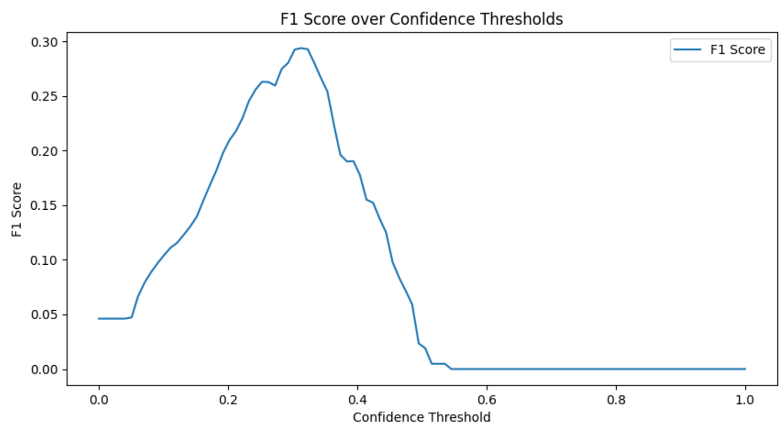

Figure 321. precision_over_confidence, retinanet, pre-trained=True, epochs=100, data=duomo

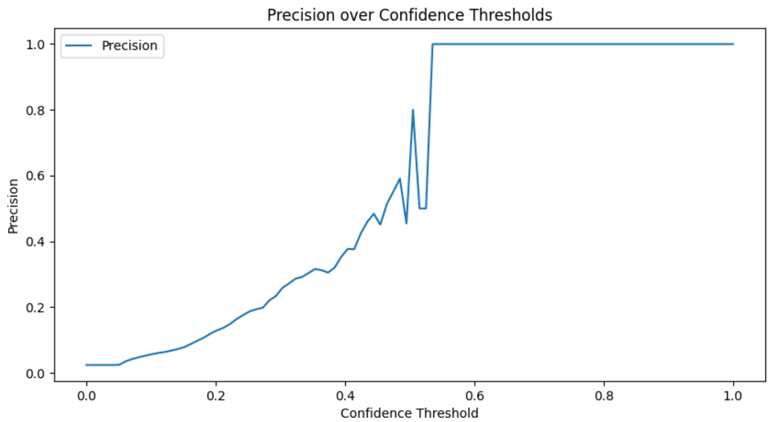

Figure 322. precision_over_recall, retinanet, pre-trained=True, epochs=100, data=duomo

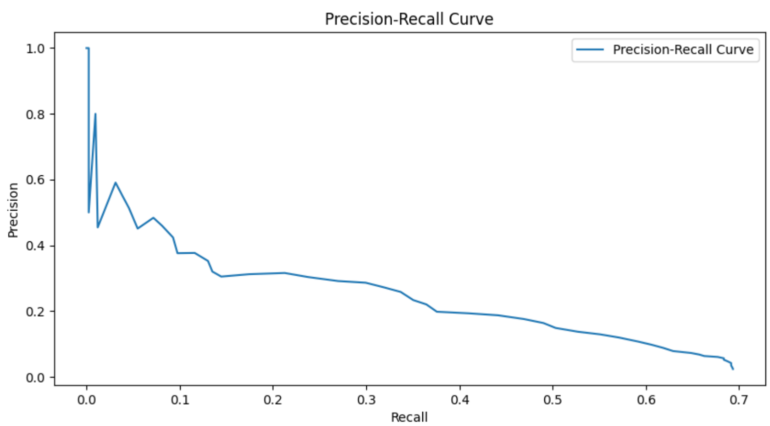

Figure 323. recall_over_confidence, retinanet, pre-trained=True, epochs=100, data=duomo

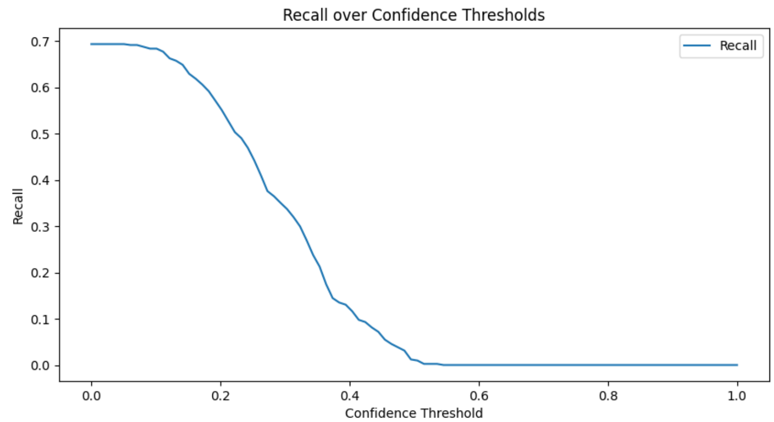

Figure 324. f1__over__confidence, retinanet, pre-trained=True, epochs=100, data=hadji__dimitar__square

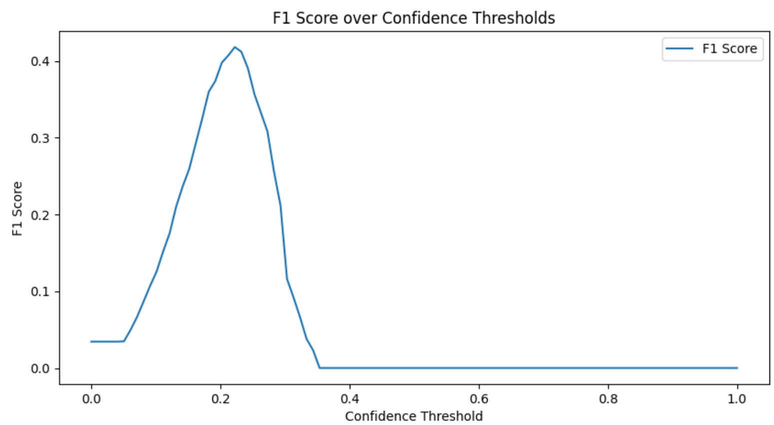

Figure 325. precision__over__confidence, retinanet, pre-trained=True, epochs=100, data=hadji__dimitar__square

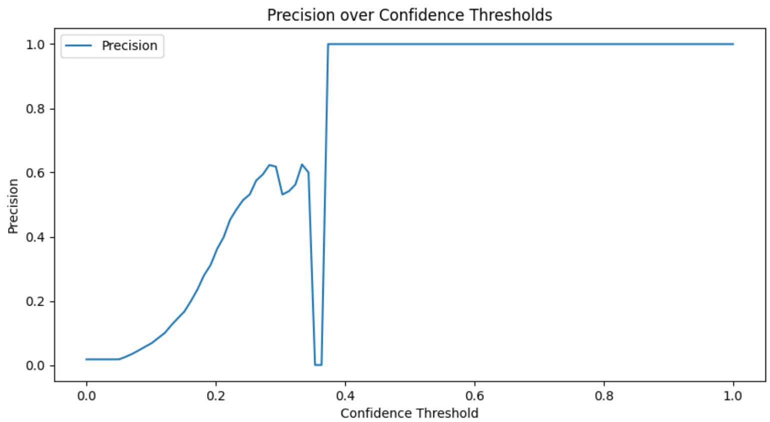

Figure 326. precision_over_recall, retinanet, pre-trained=True, epochs=100, data=hadji_dimitar_square

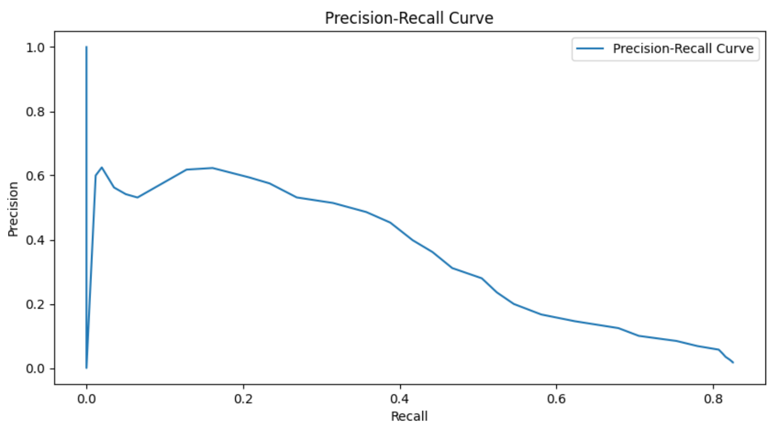

Figure 327. recall_over_confidence, retinanet, pre-trained=True, epochs=100, data=hadji_dimitar_square

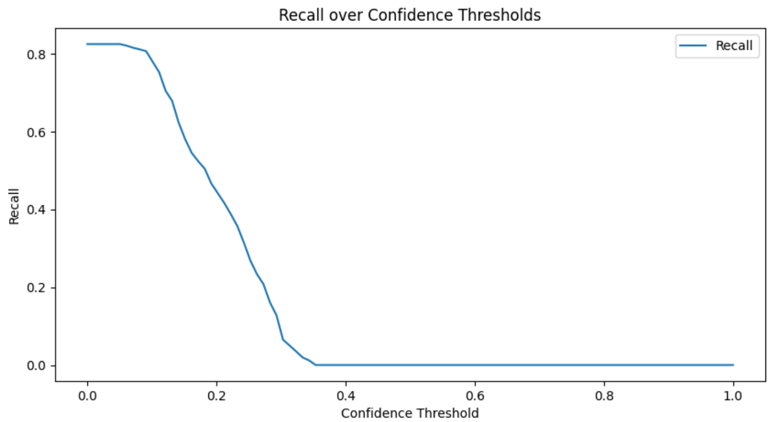

Figure 328. f1_over_confidence, retinanet, pre-trained=True, epochs=100, data=keskvaljak

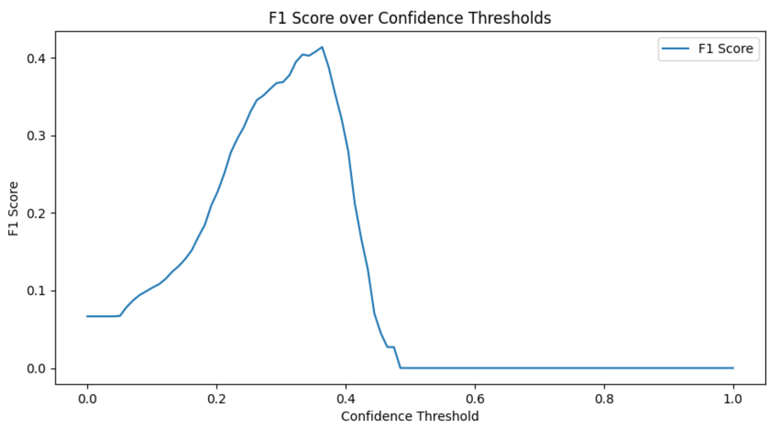

Figure 329. precision_over_confidence, retinanet, pre-trained=True, epochs=100, data=keskvaljak

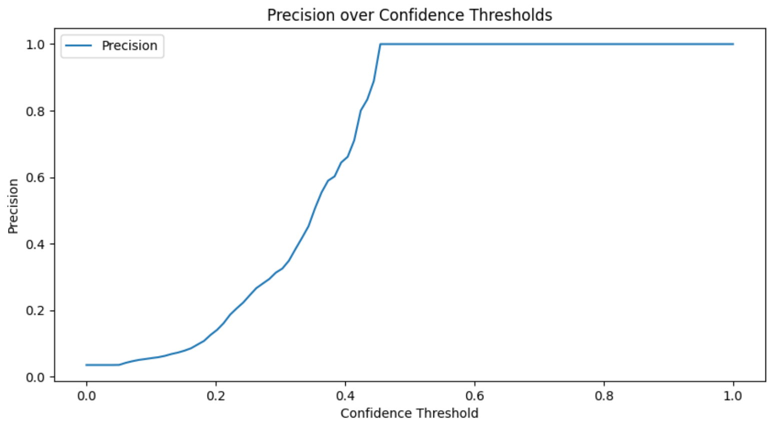

Figure 330. precision_over_recall, retinanet, pre-trained=True, epochs=100, data=keskvaljak

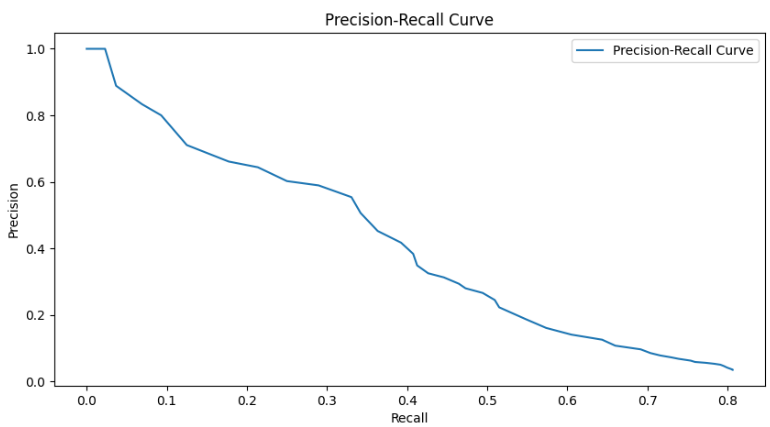

Figure 331. recall_over_confidence, retinanet, pre-trained=True, epochs=100, data=keskvaljak

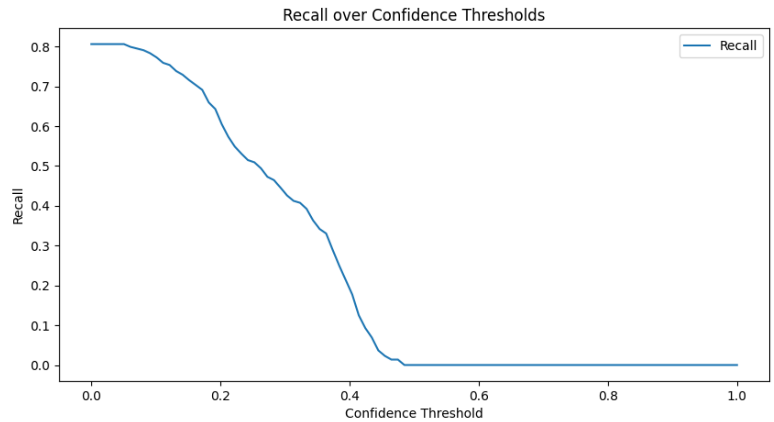

Figure 332. f1_over_confidence, retinanet, pre-trained=True, epochs=100, data=kielce_university_of_technology

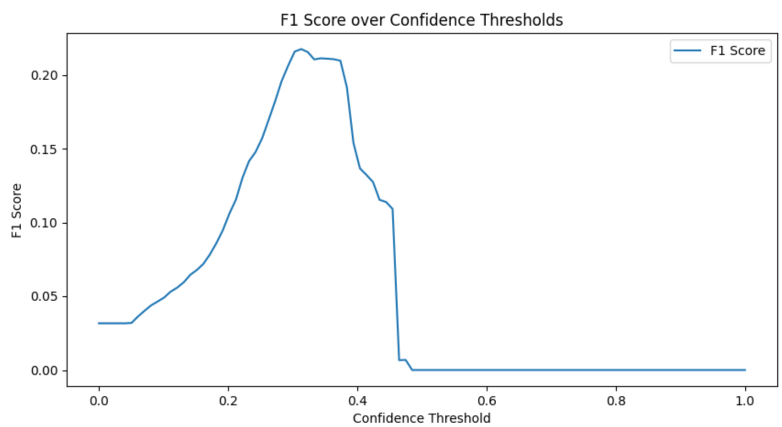

Figure 333. precision_over_confidence, retinanet, pre-trained=True, epochs=100, data=kielce_university_of_technology

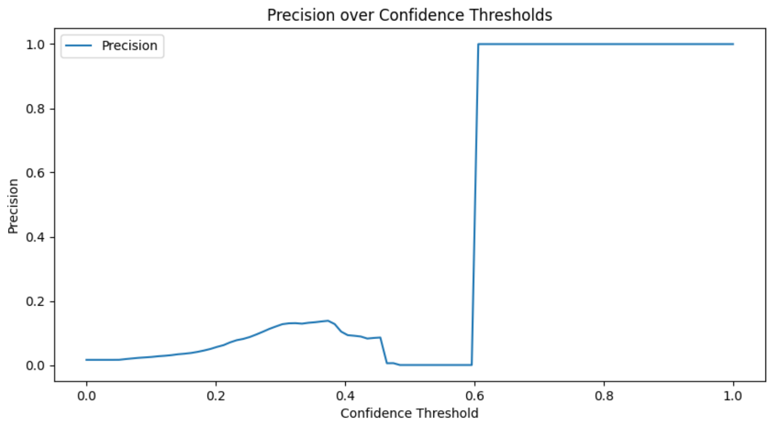

Figure 334. precision_over_recall, retinanet, pre-trained=True, epochs=100, data=kielce_university_of_technology

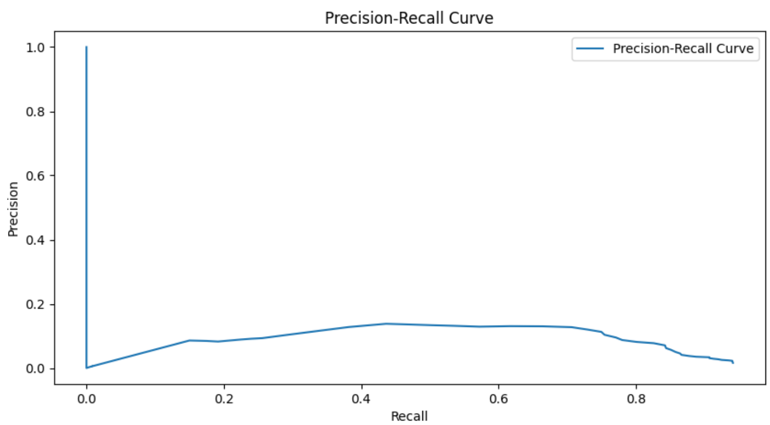

Figure 335. recall_over_confidence, retinanet, pre-trained=True, epochs=100, data=kielce_university_of_technology

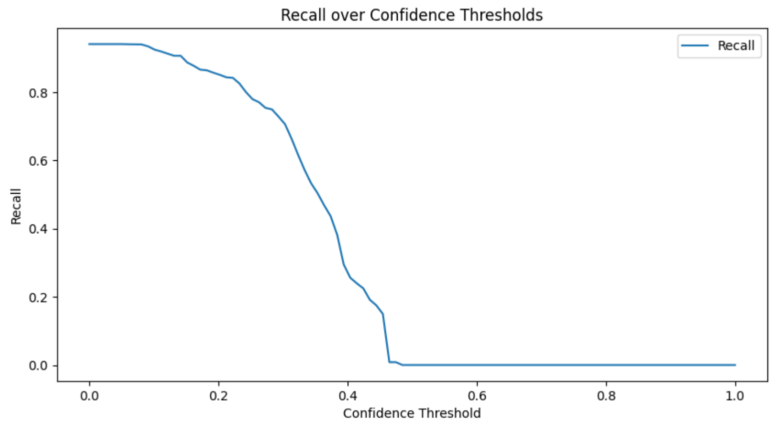

Figure 336. f1_over_confidence, retinanet, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch

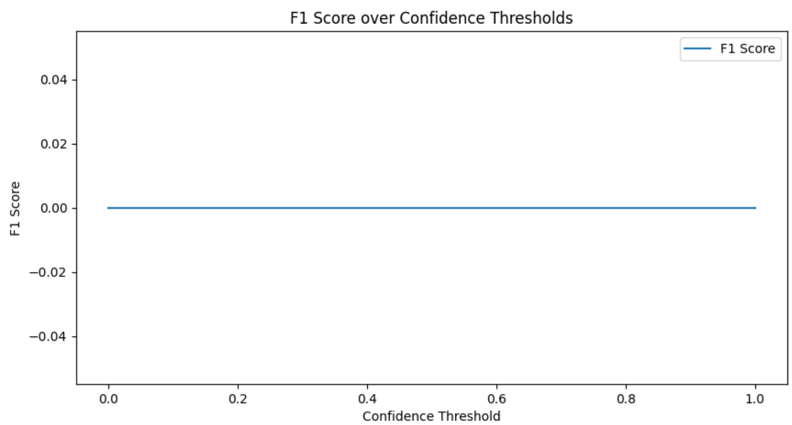

Figure 337. precision_over_confidence, retinanet, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch

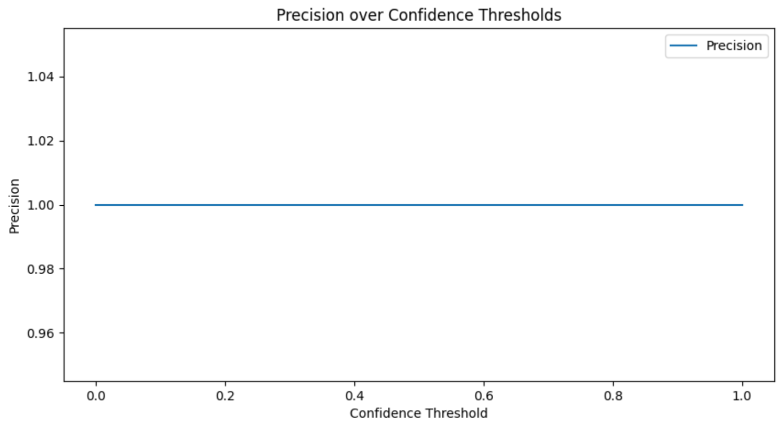

Figure 338. precision_over_recall, retinanet, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch

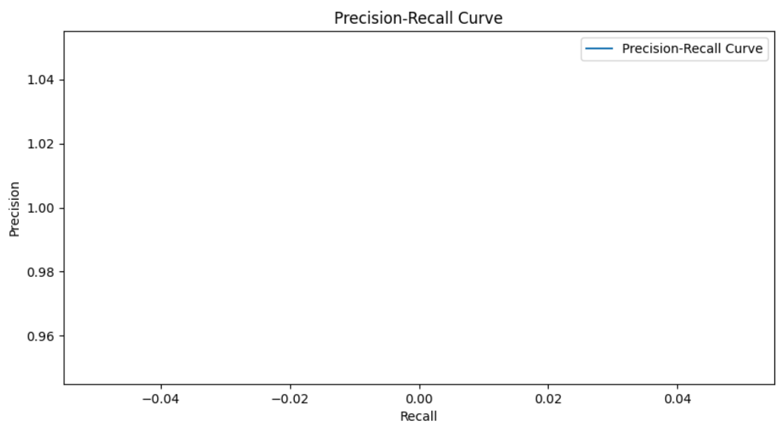

Figure 339. recall_over_confidence, retinanet, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch

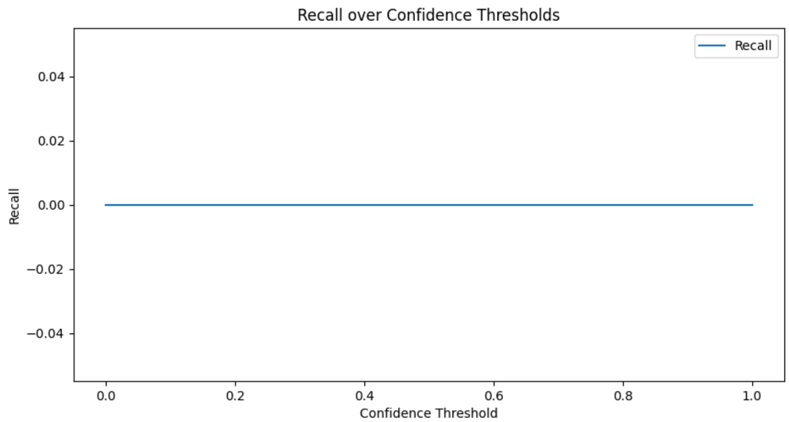

Figure 340. f1_over_confidence, retinanet, pre-trained=True, epochs=150, data=duomo

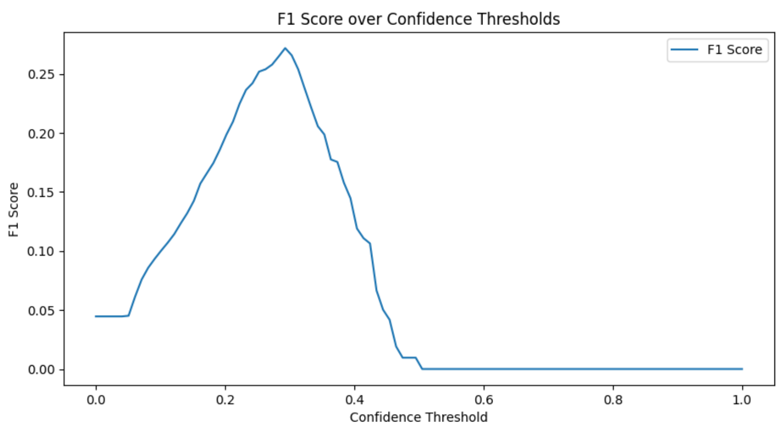

Figure 341. precision_over_confidence, retinanet, pre-trained=True, epochs=150, data=duomo

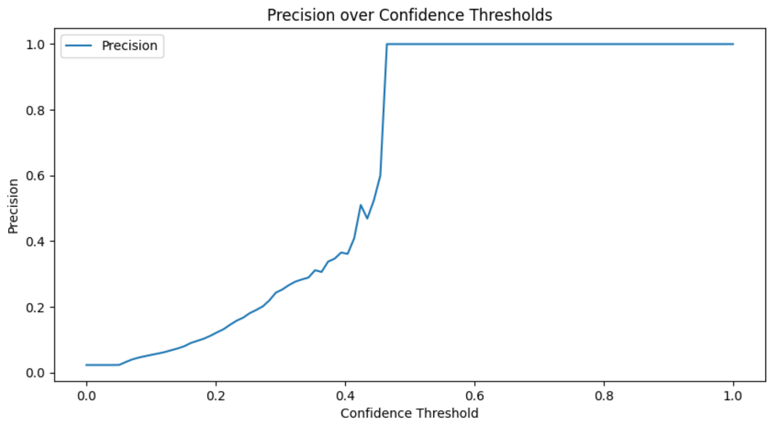

Figure 342. precision_over_recall, retinanet, pre-trained=True, epochs=150, data=duomo

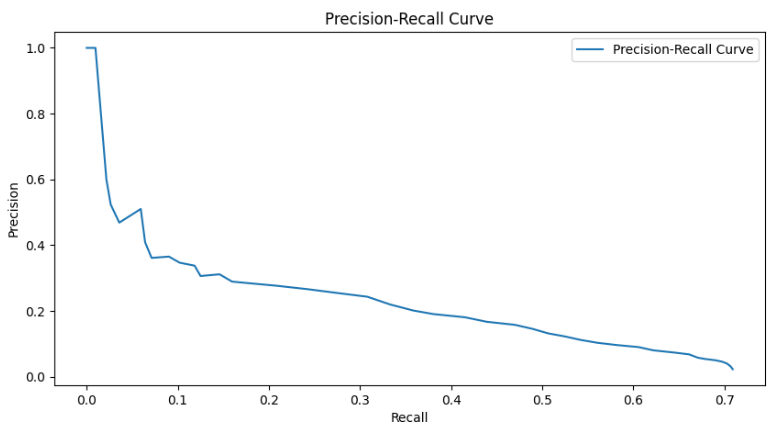

Figure 343. recall_over_confidence, retinanet, pre-trained=True, epochs=150, data=duomo

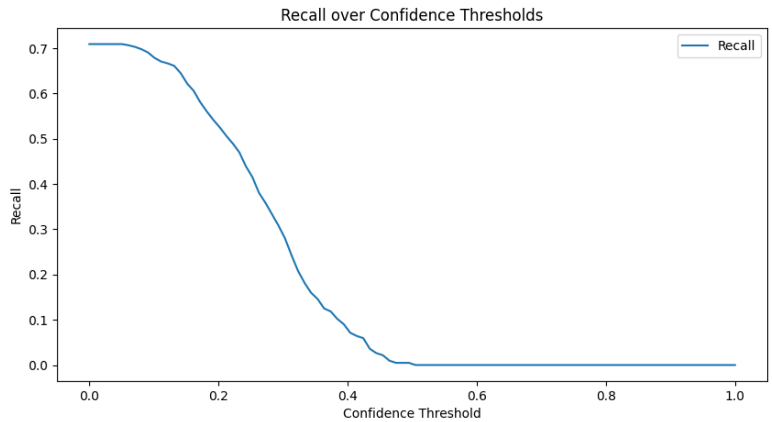

Figure 344. f1_over_confidence, retinanet, pre-trained=True, epochs=150, data=hadji_dimitar_square

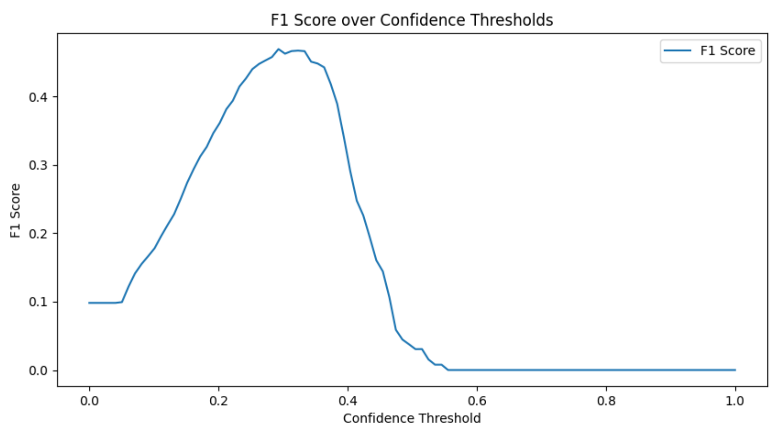

Figure 345. precision_over_confidence, retinanet, pre-trained=True, epochs=150, data=hadji_dimitar_square

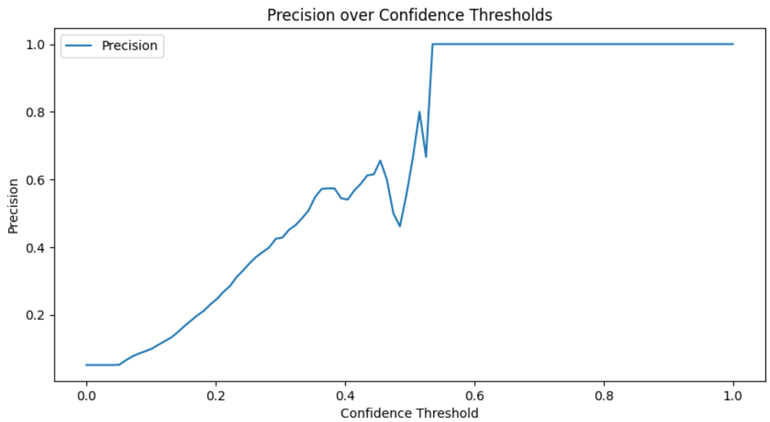

Figure 346. precision_over_recall, retinanet, pre-trained=True, epochs=150, data=hadji_dimitar_square

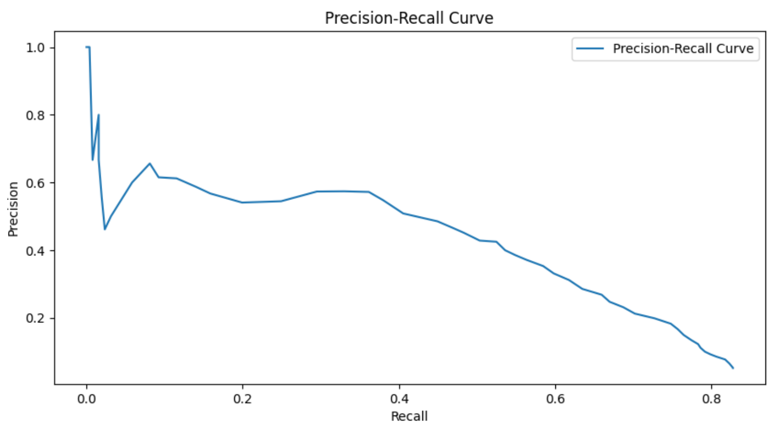

Figure 347. recall_over_confidence, retinanet, pre-trained=True, epochs=150, data=hadji_dimitar_square

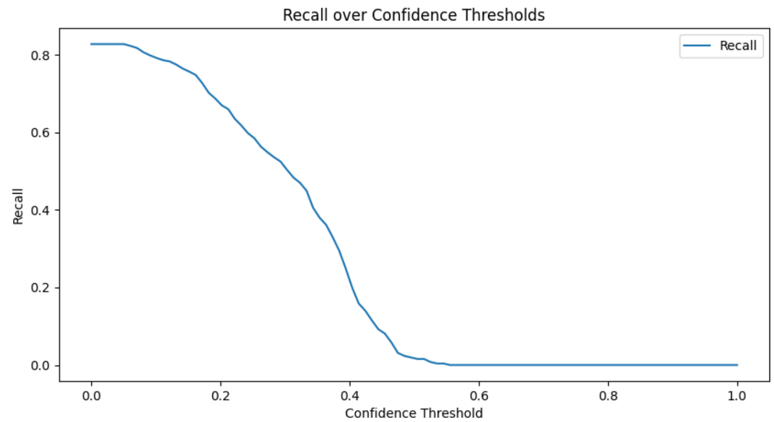

Figure 348. f1_over_confidence, retinanet, pre-trained=True, epochs=150, data=keskvaljak

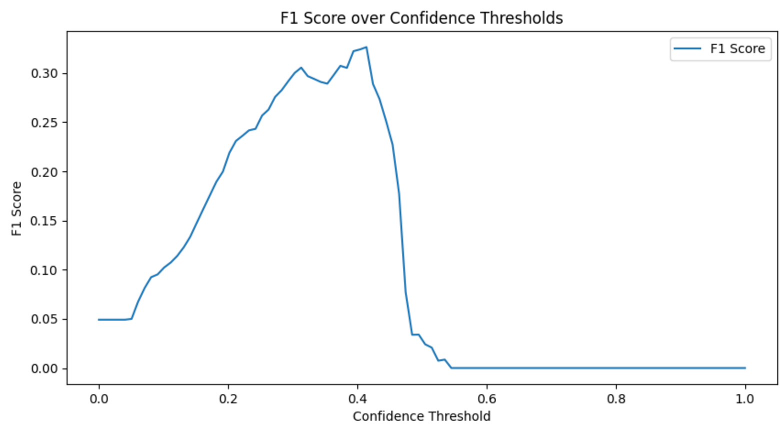

Figure 349. precision_over_confidence, retinanet, pre-trained=True, epochs=150, data=keskvaljak

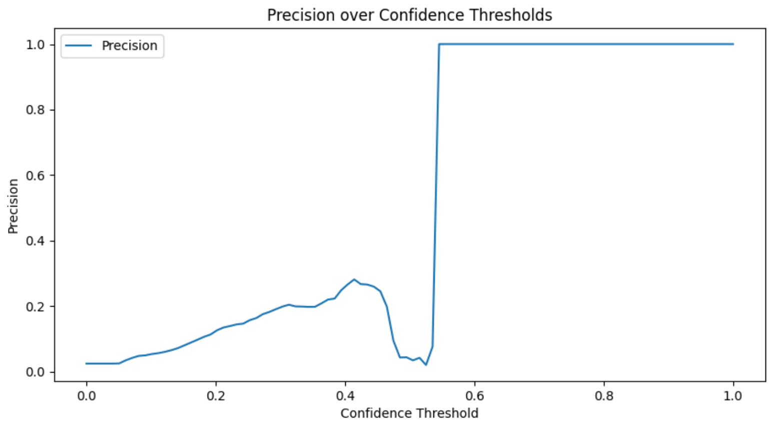

Figure 350. precision_over_recall, retinanet, pre-trained=True, epochs=150, data=keskvaljak

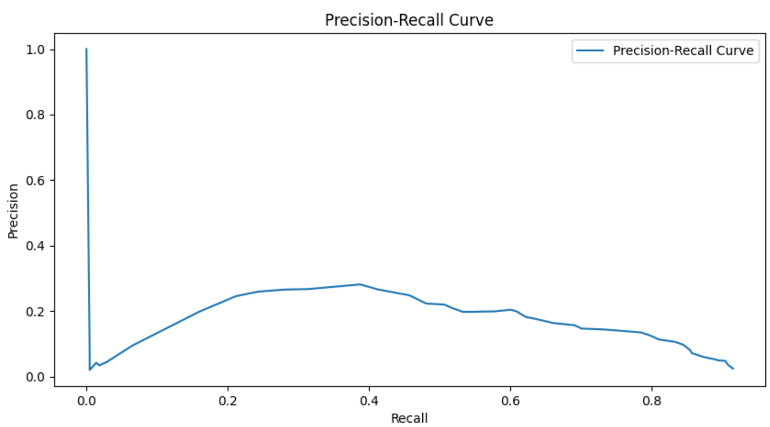

Figure 351. recall_over_confidence, retinanet, pre-trained=True, epochs=150, data=keskvaljak

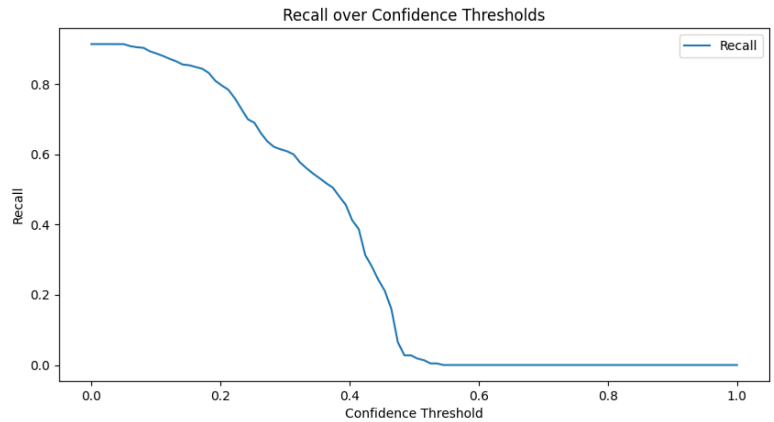

Figure 352. f1_over_confidence, retinanet, pre-trained=True, epochs=150, data=kielce_university_of_technology

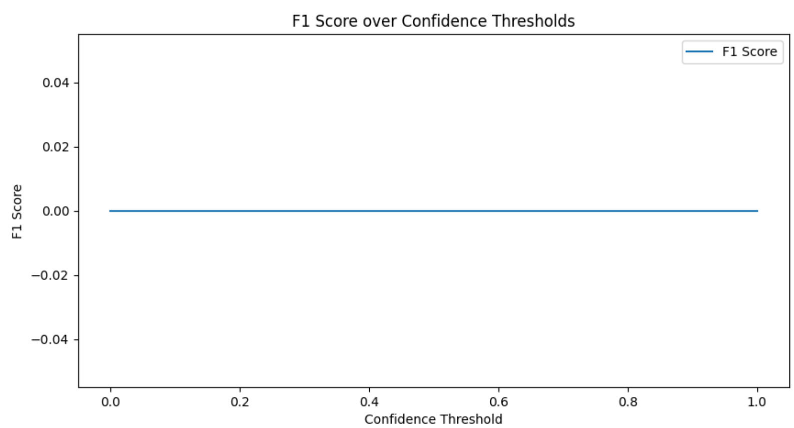

Figure 353. precision_over_confidence, retinanet, pre-trained=True, epochs=150, data=kielce_university_of_technology

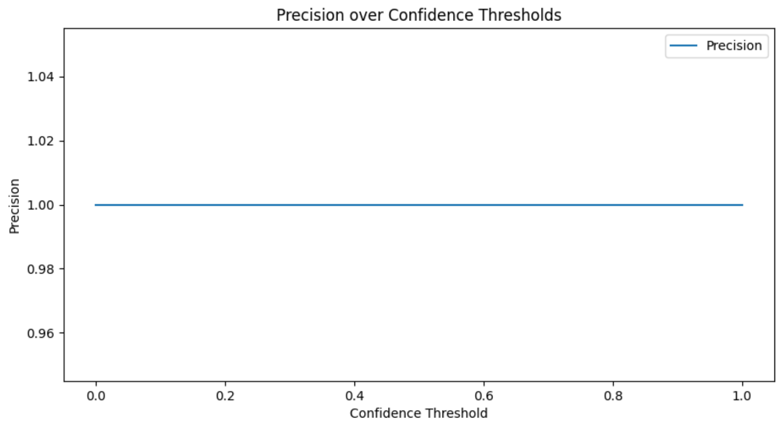

Figure 354. precision_over_recall, retinanet, pre-trained=True, epochs=150, data=kielce_university_of_technology

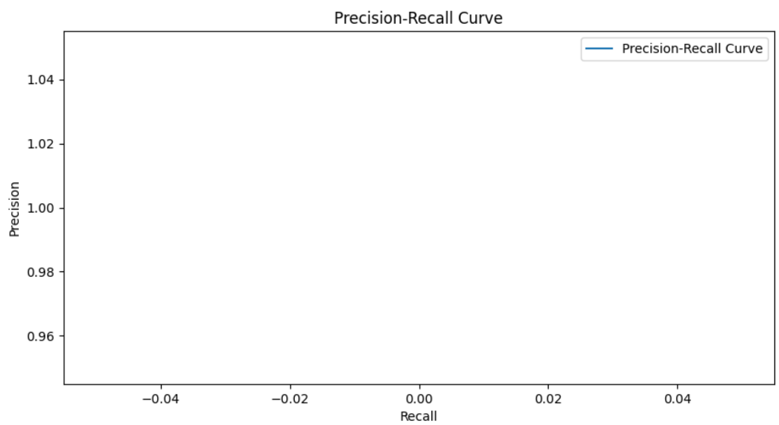

Figure 355. recall_over_confidence, retinanet, pre-trained=True, epochs=150, data=kielce_university_of_technology

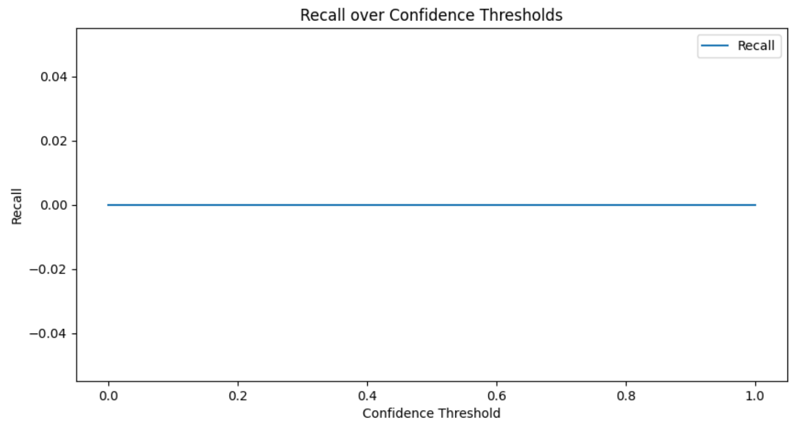

Figure 356. f1_over_confidence, retinanet, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch

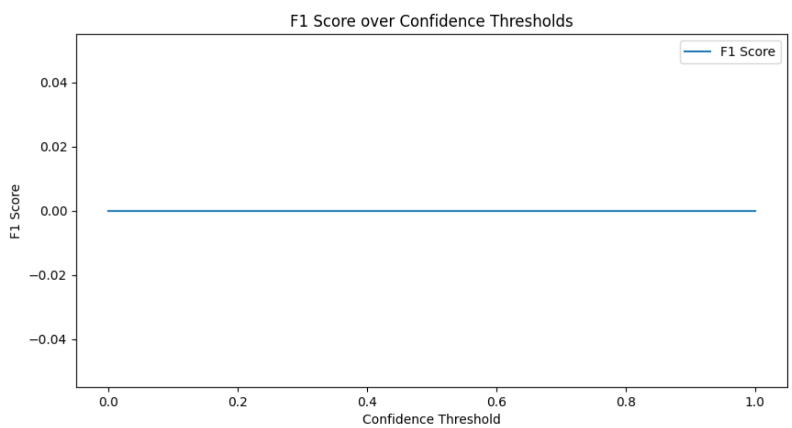

Figure 357. precision_over_confidence, retinanet, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch

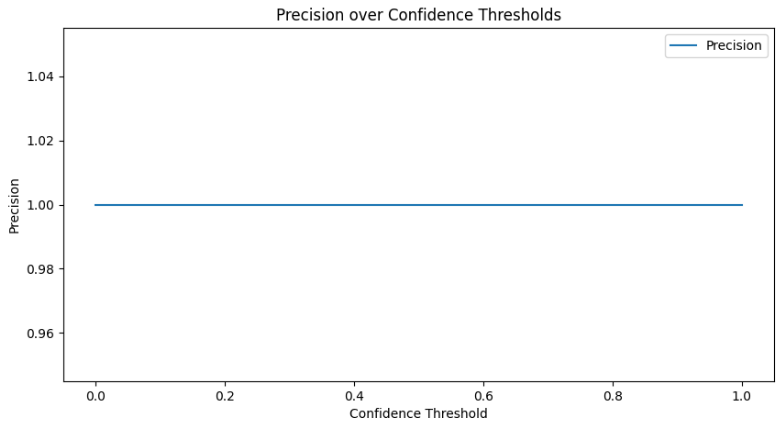

Figure 358. precision_over_recall, retinanet, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch

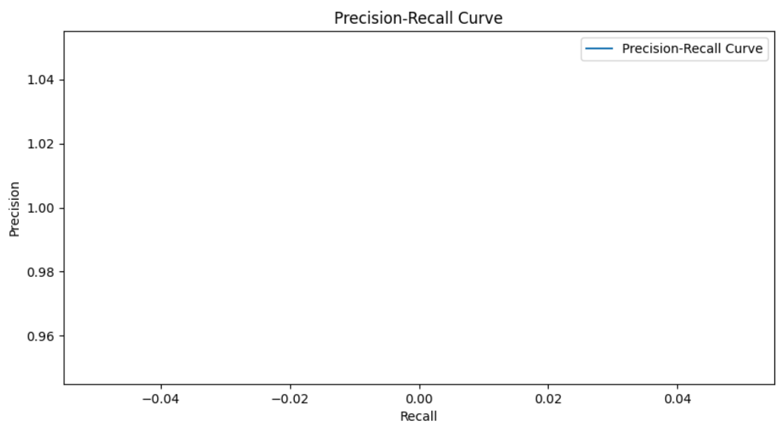

Figure 359. recall_over_confidence, retinanet, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch

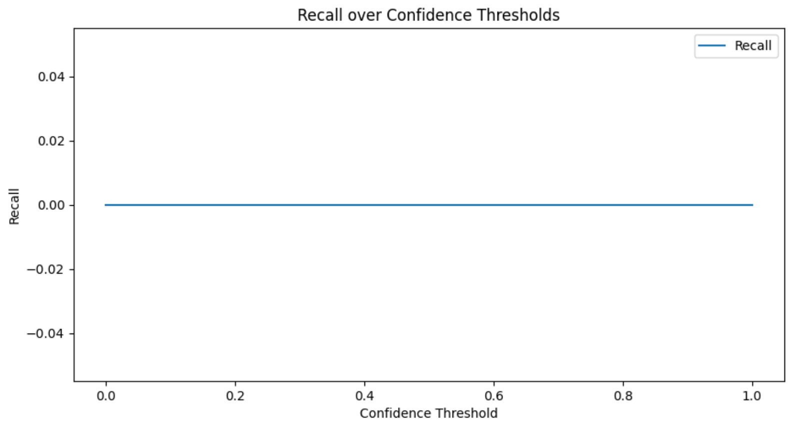

Figure 360. f1_over_confidence, yolov8n, pre-trained=True, epochs=50, data=duomo, hyperparameter-tuned=False

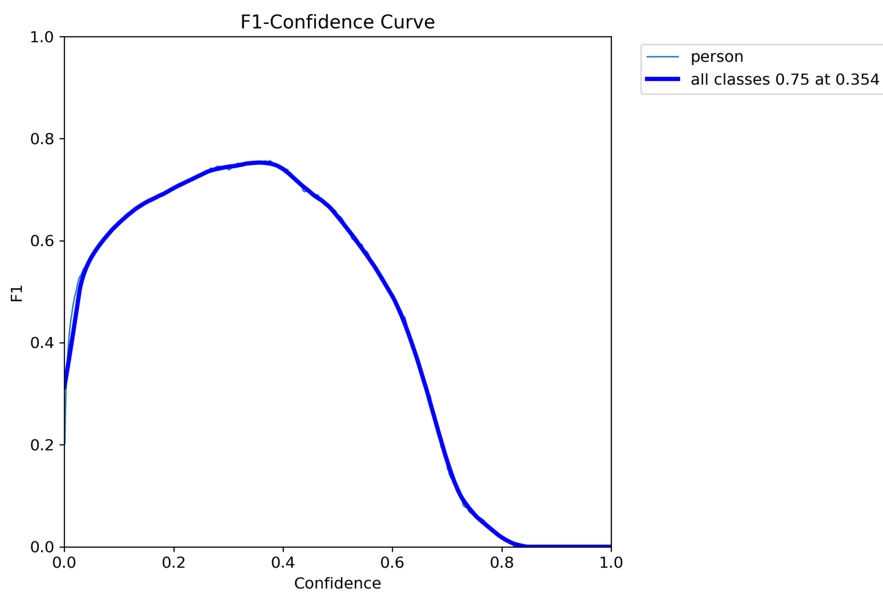

Figure 361. precision_over_recall, yolov8n, pre-trained=True, epochs=50, data=duomo, hyperparameter-tuned=False

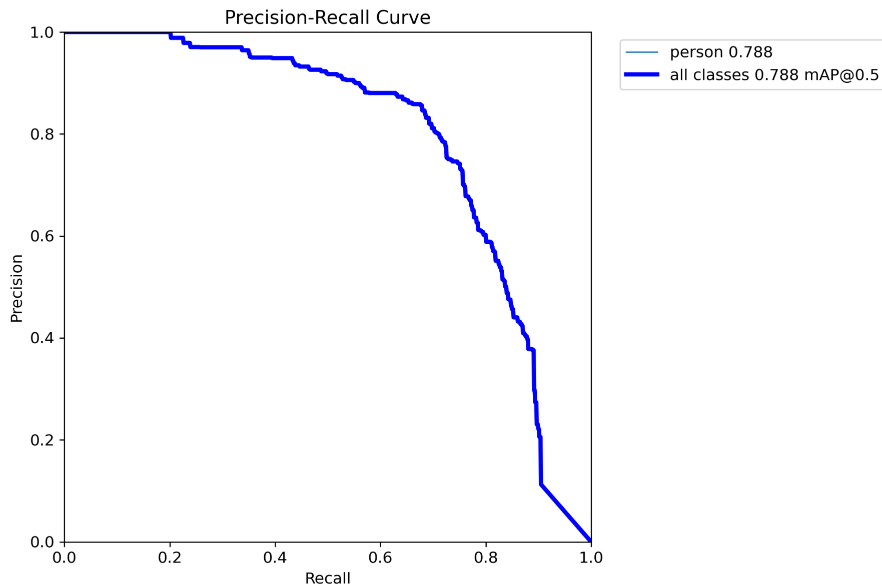

Figure 362. precision_over_confidence, yolov8n, pre-trained=True, epochs=50, data=duomo, hyperparameter-tuned=False

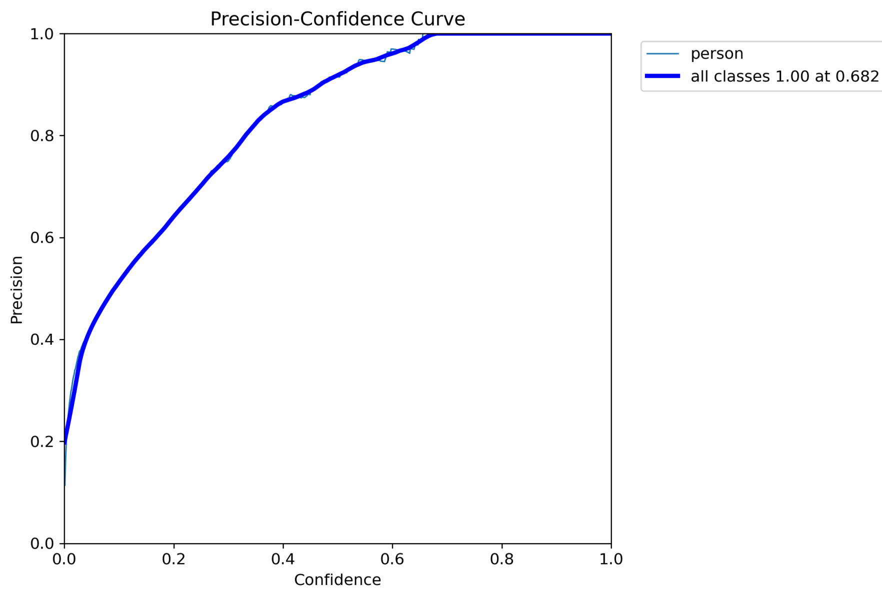

Figure 363. recall_over_confidence, yolov8n, pre-trained=True, epochs=50, data=duomo, hyperparameter-tuned=False

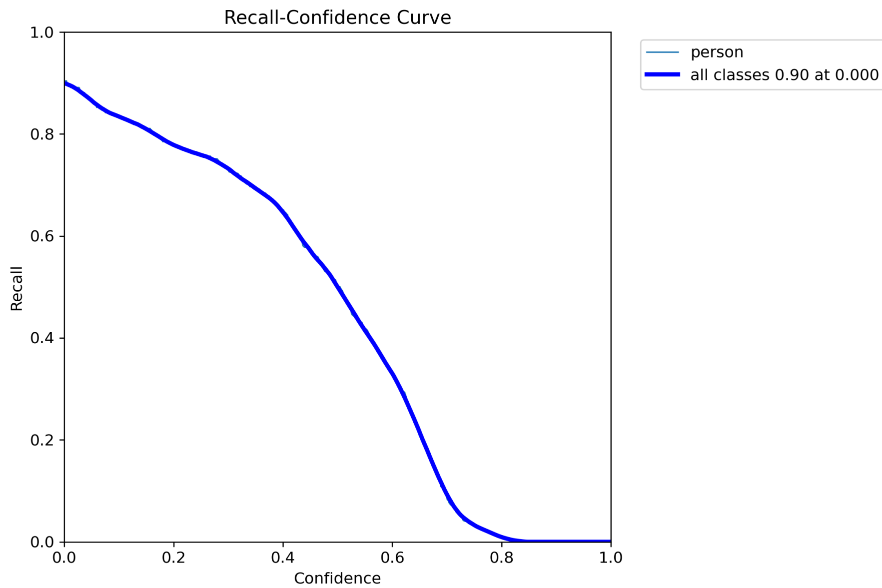

Figure 364. confusion_matrix, yolov8n, pre-trained=True, epochs=50, data=duomo, hyperparameter-tuned=False

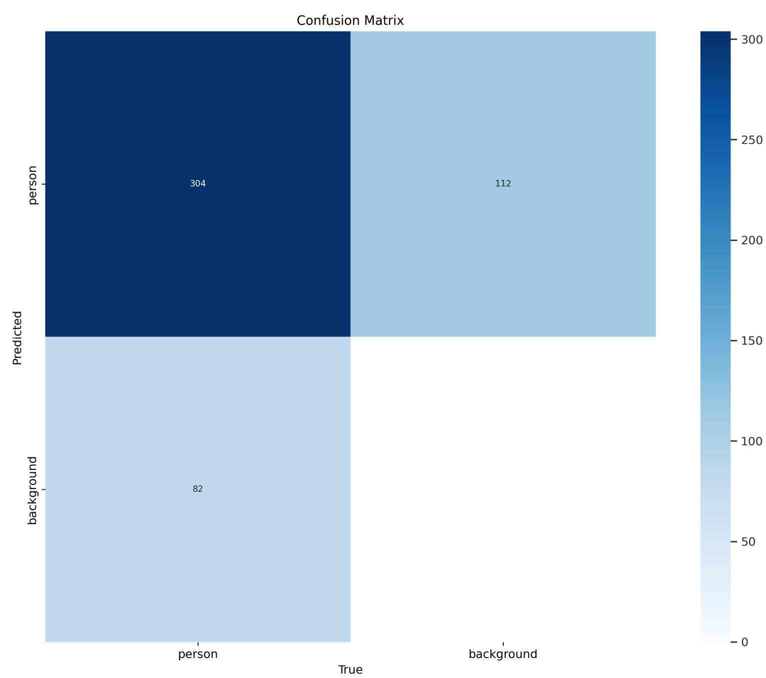

Figure 365. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=50, data=duomo, hyperparameter-tuned=False

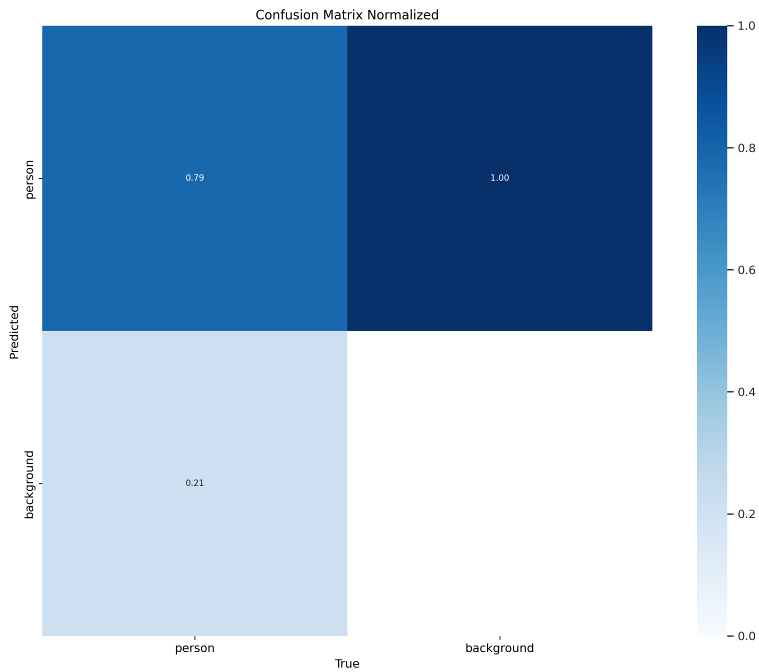

Figure 366. f1_over_confidence, yolov8n, pre-trained=True, epochs=100, data=duomo, hyperparameter-tuned=False

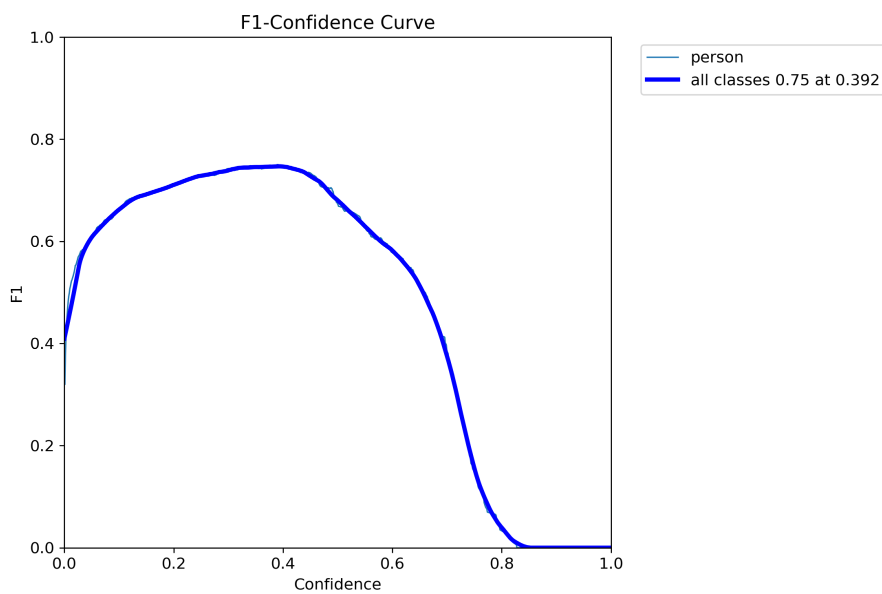

Figure 367. precision_over_recall, yolov8n, pre-trained=True, epochs=100, data=duomo, hyperparameter-tuned=False

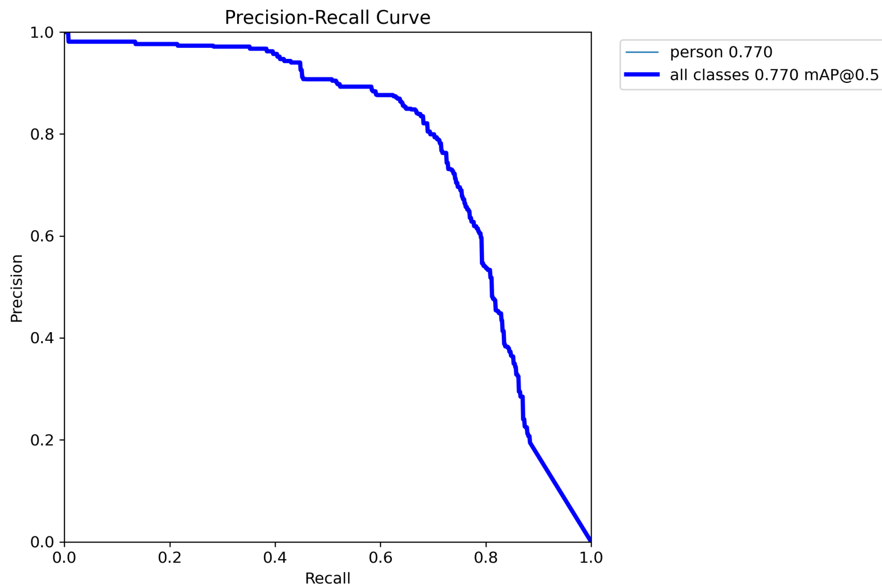

Figure 368. precision_over_confidence, yolov8n, pre-trained=True, epochs=100, data=duomo, hyperparameter-tuned=False

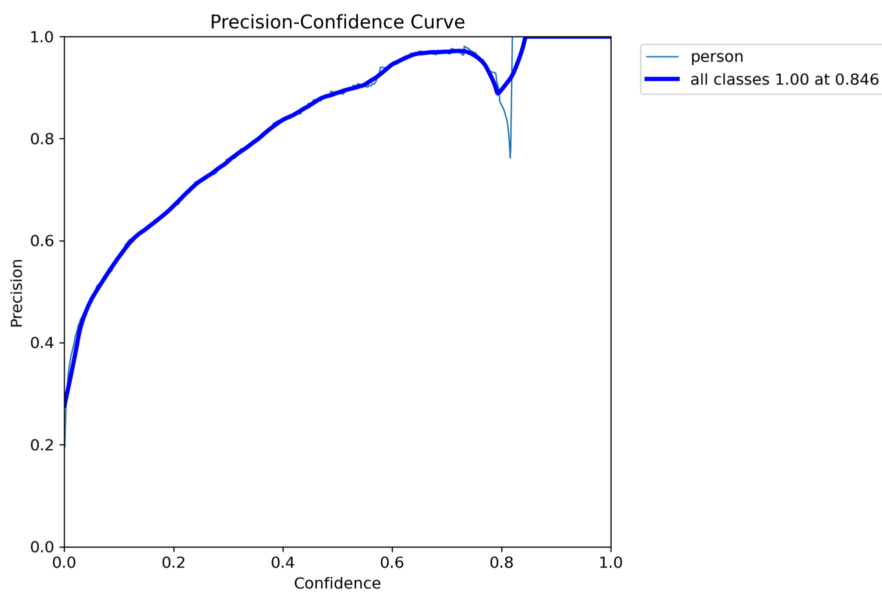

Figure 369. recall_over_confidence, yolov8n, pre-trained=True, epochs=100, data=duomo, hyperparameter-tuned=False

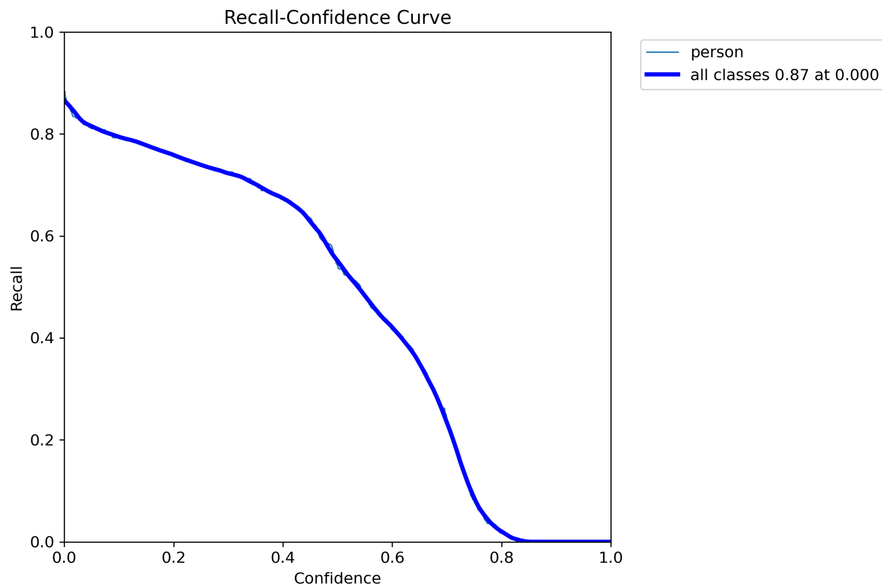

Figure 370. confusion_matrix, yolov8n, pre-trained=True, epochs=100, data=duomo, hyperparameter-tuned=False

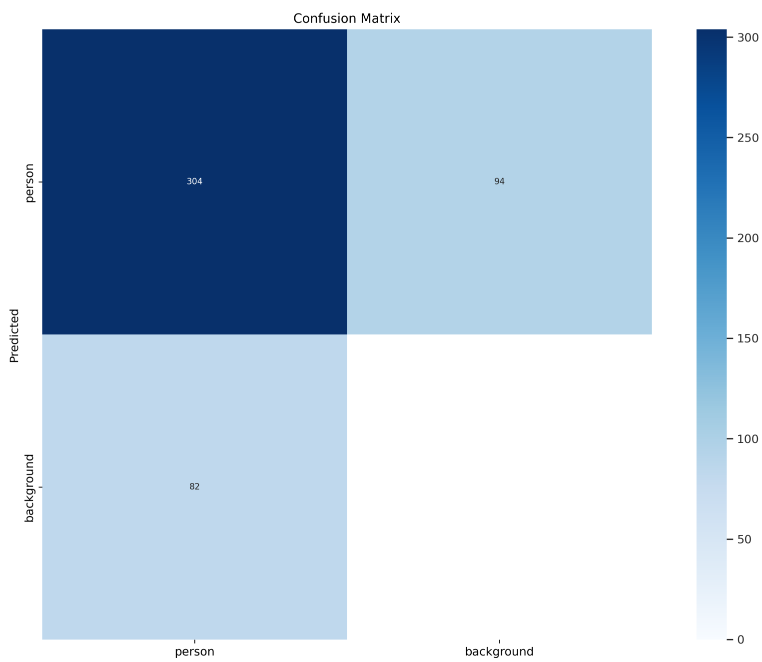

Figure 371. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=100, data=duomo, hyperparameter-tuned=False

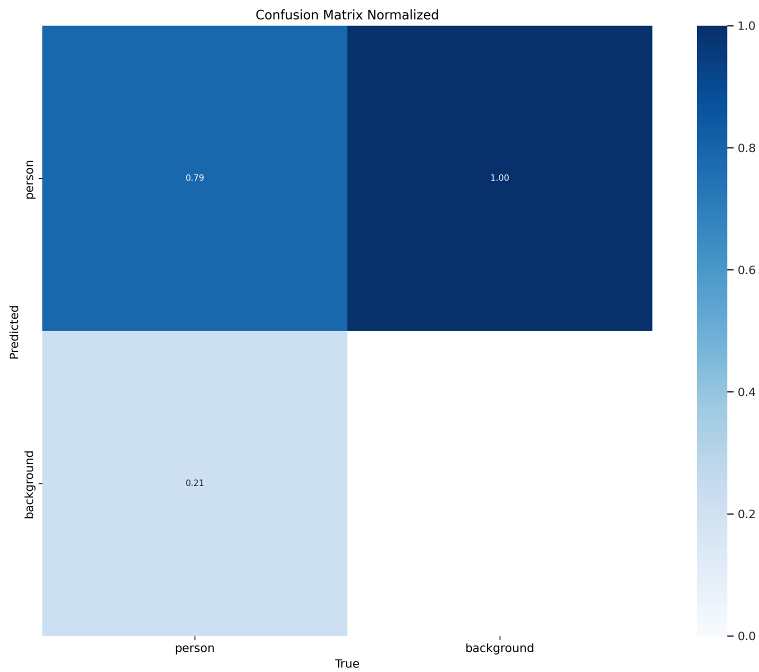

Figure 372. f1_over_confidence, yolov8n, pre-trained=True, epochs=150, data=duomo, hyperparameter-tuned=False

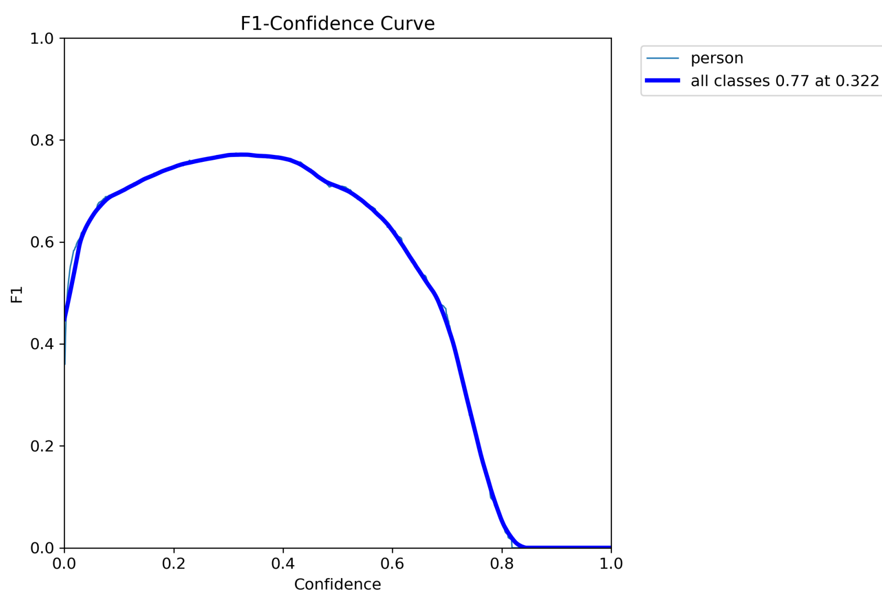

Figure 373. precision_over_recall, yolov8n, pre-trained=True, epochs=150, data=duomo, hyperparameter-tuned=False

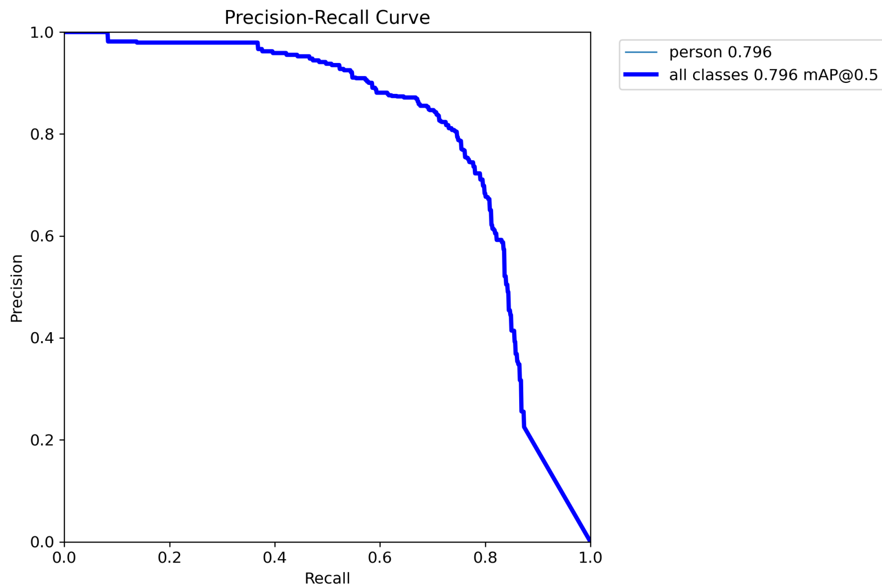

Figure 374. precision_over_confidence, yolov8n, pre-trained=True, epochs=150, data=duomo, hyperparameter-tuned=False

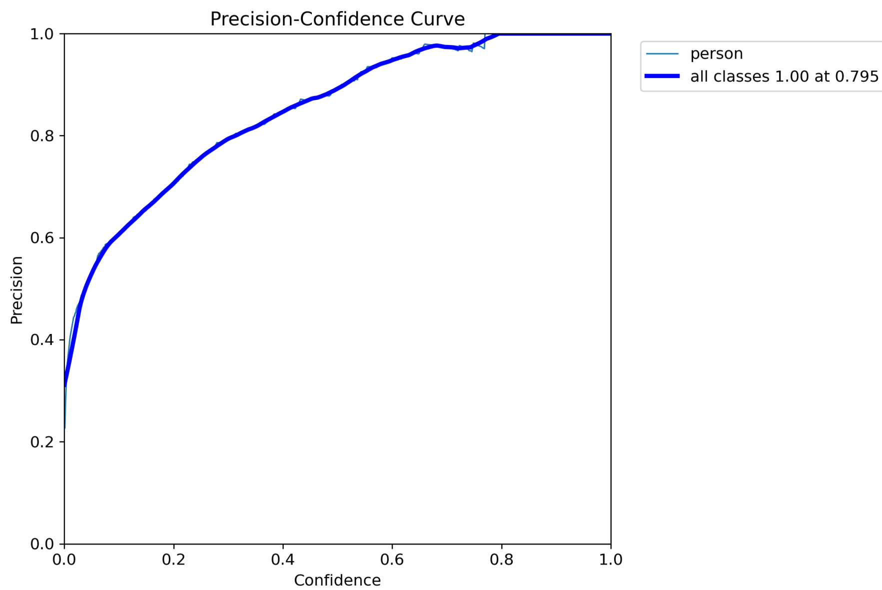

Figure 375. recall_over_confidence, yolov8n, pre-trained=True, epochs=150, data=duomo, hyperparameter-tuned=False

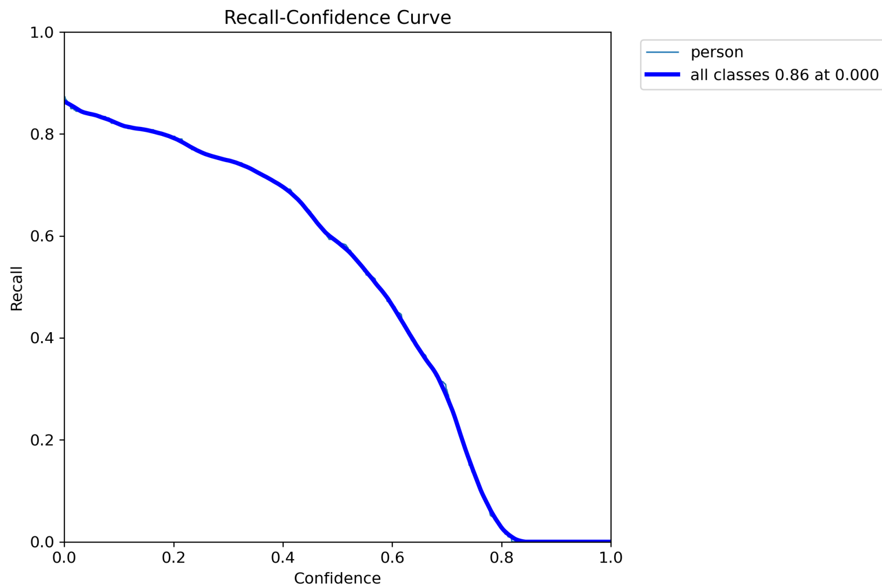

Figure 376. confusion_matrix, yolov8n, pre-trained=True, epochs=150, data=duomo, hyperparameter-tuned=False

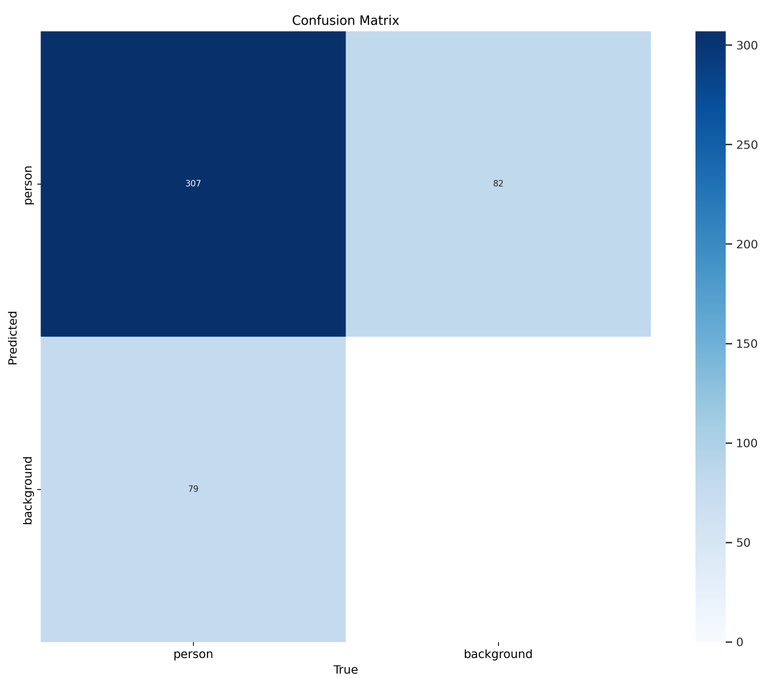

Figure 377. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=150, data=duomo, hyperparameter-tuned=False

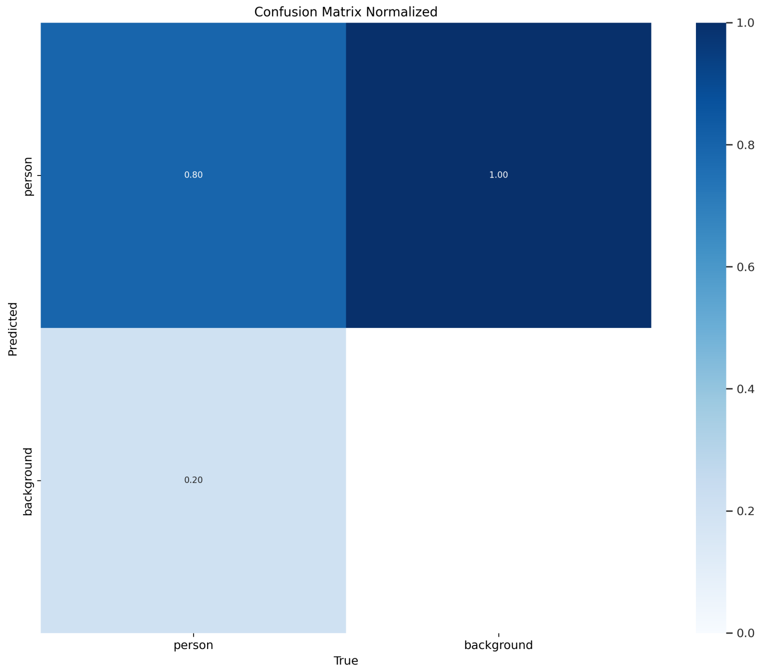

Figure 378. f1_over_confidence, yolov8n, pre-trained=True, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=False

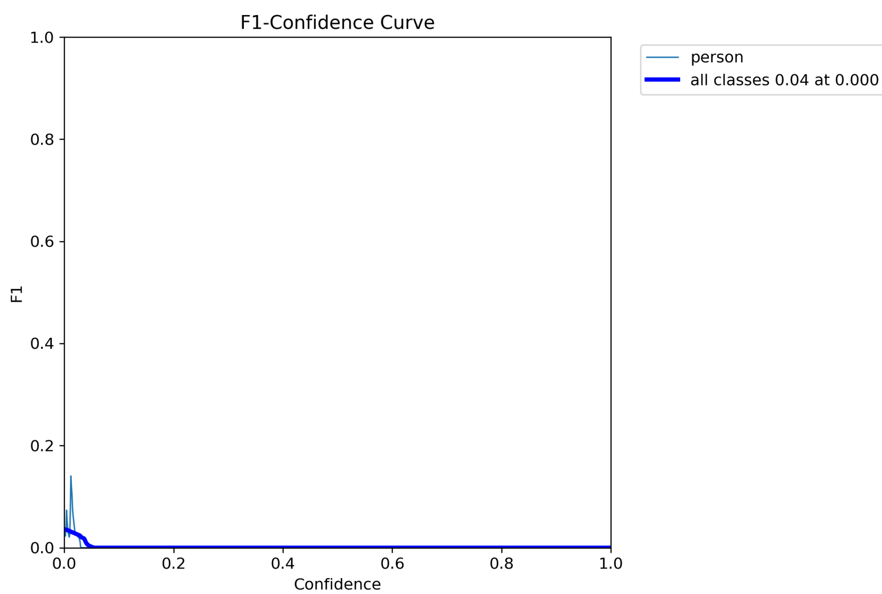

Figure 379. precision_over_recall, yolov8n, pre-trained=True, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=False

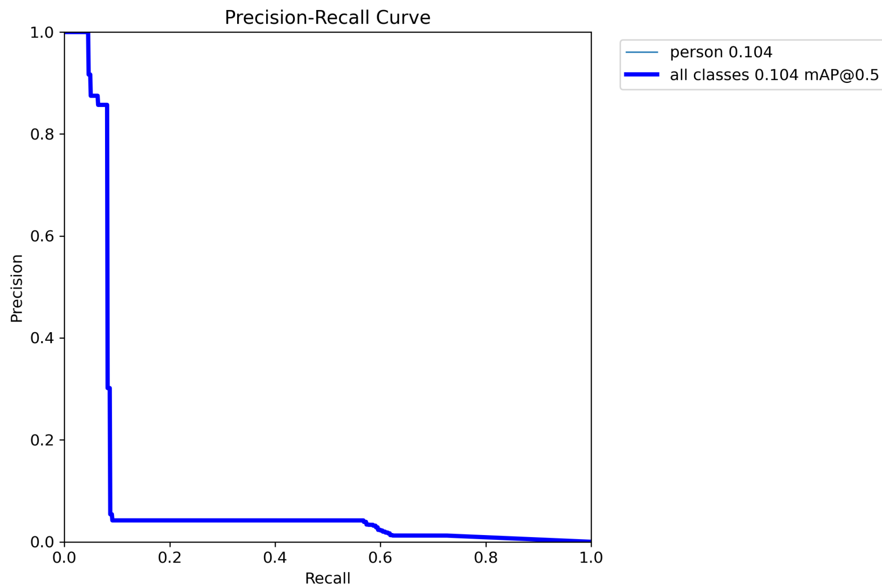

Figure 380. precision_over_confidence, yolov8n, pre-trained=True, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=False

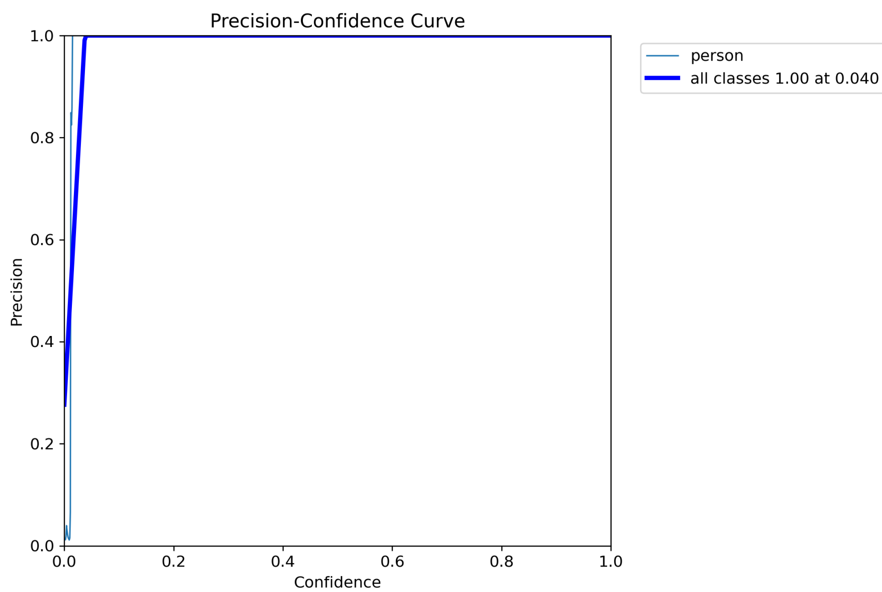

Figure 381. recall_over_confidence, yolov8n, pre-trained=True, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=False

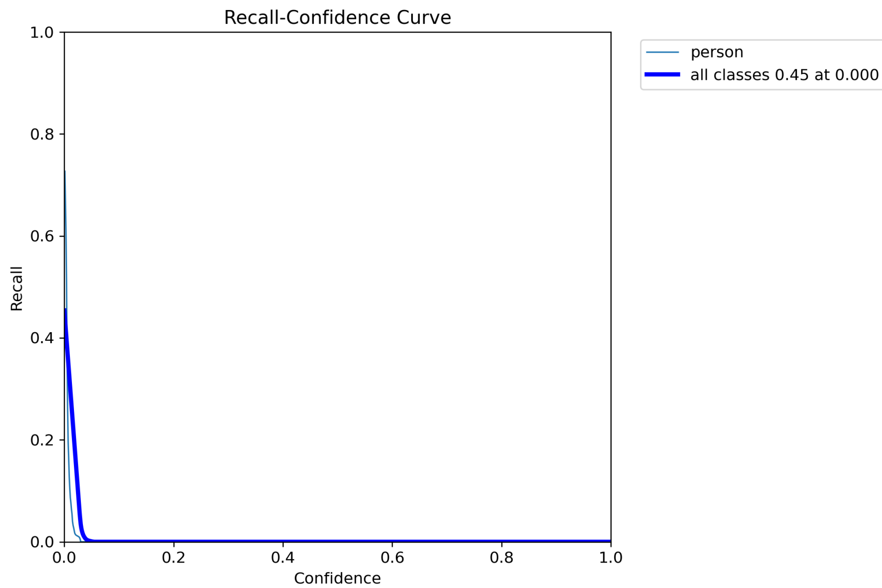

Figure 382. confusion_matrix, yolov8n, pre-trained=True, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=False

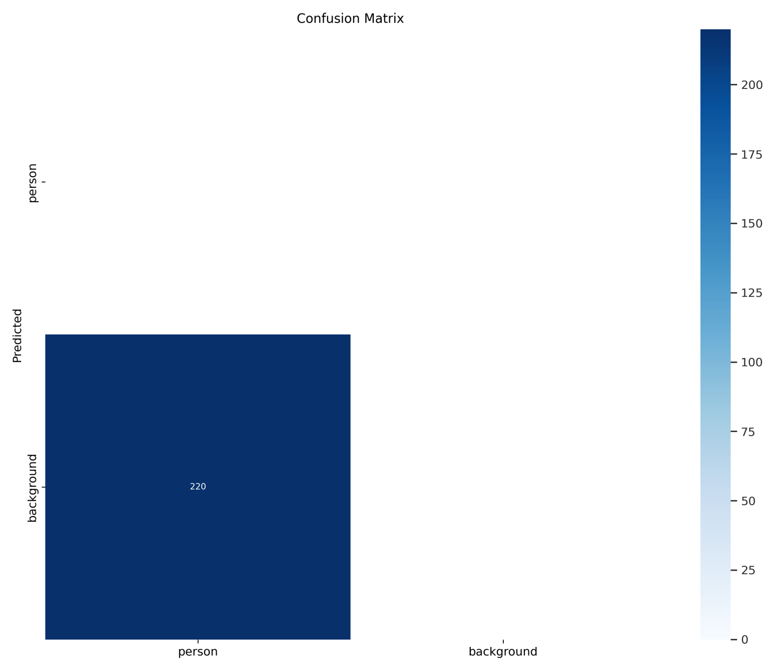

Figure 383. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=False

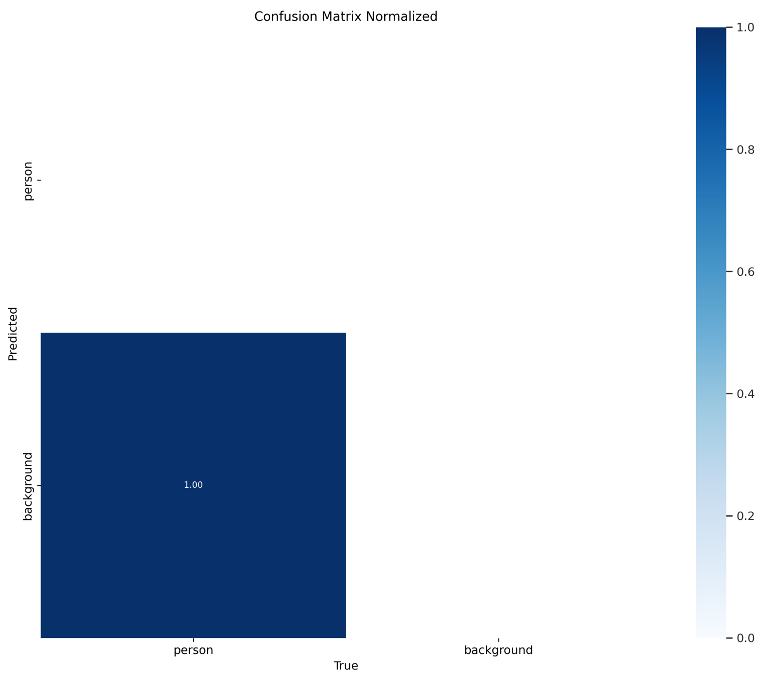

Figure 384. f1_over_confidence, yolov8n, pre-trained=True, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=False

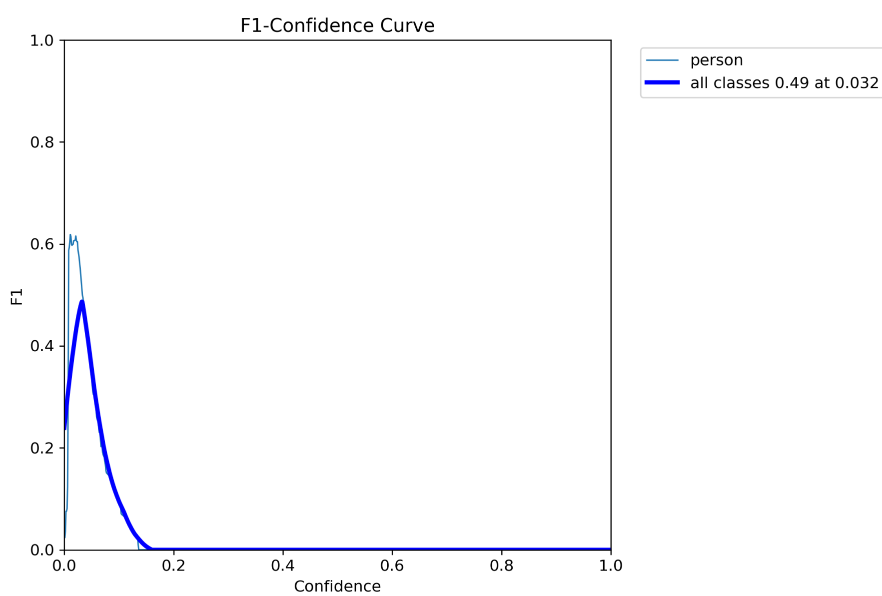

Figure 385. precision_over_recall, yolov8n, pre-trained=True, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=False

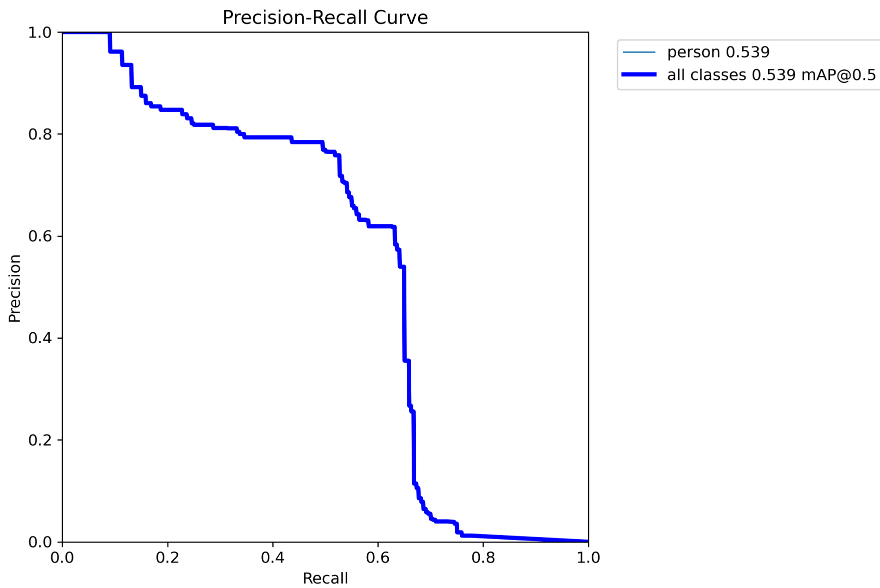

Figure 386. precision_over_confidence, yolov8n, pre-trained=True, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=False

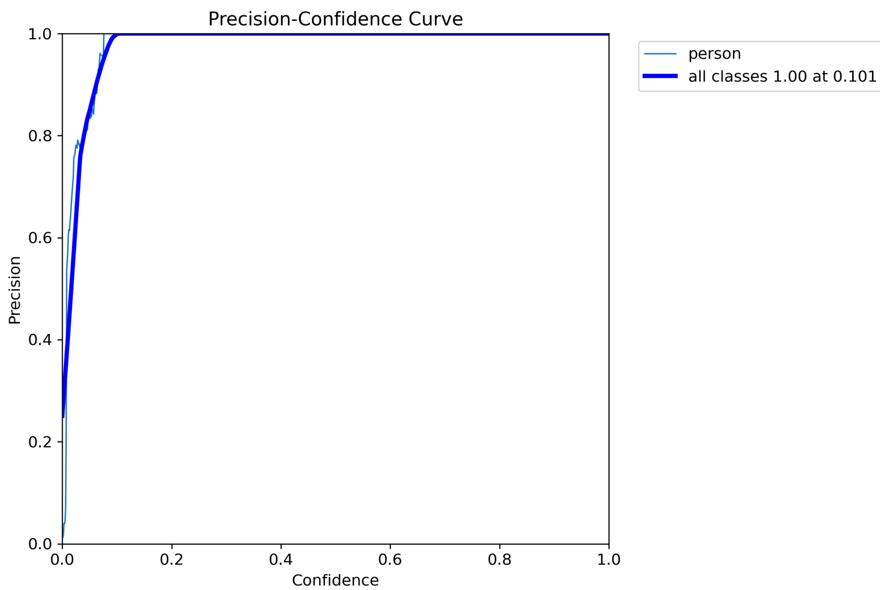

Figure 387. recall_over_confidence, yolov8n, pre-trained=True, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=False

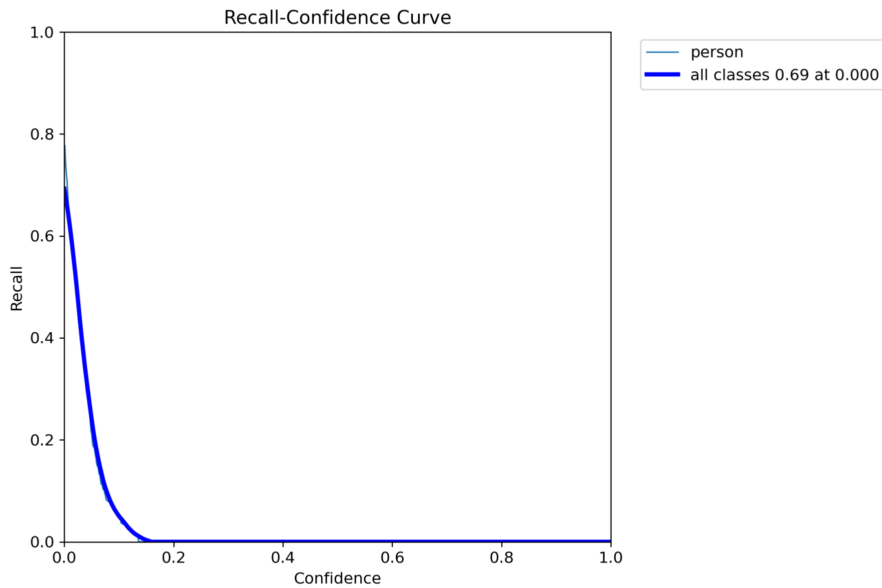

Figure 388. confusion_matrix, yolov8n, pre-trained=True, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=False

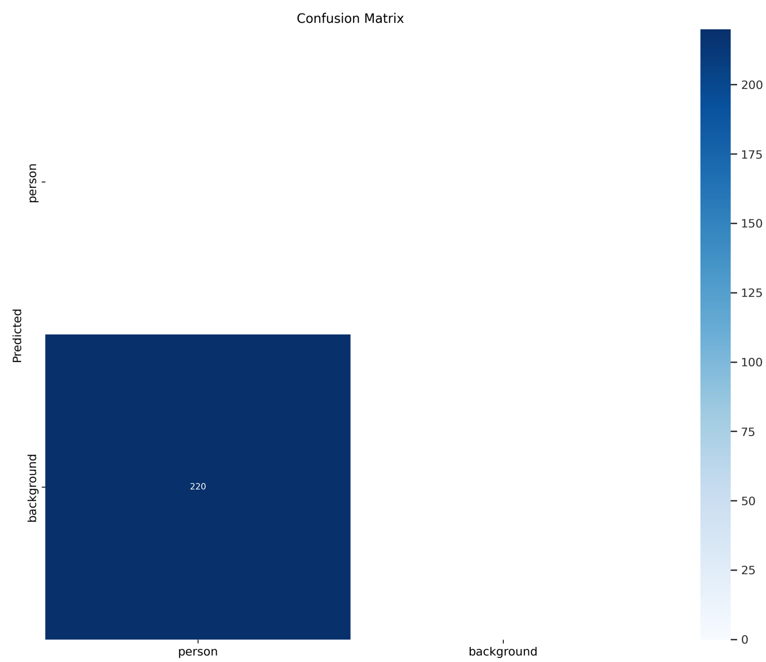

Figure 389. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=False

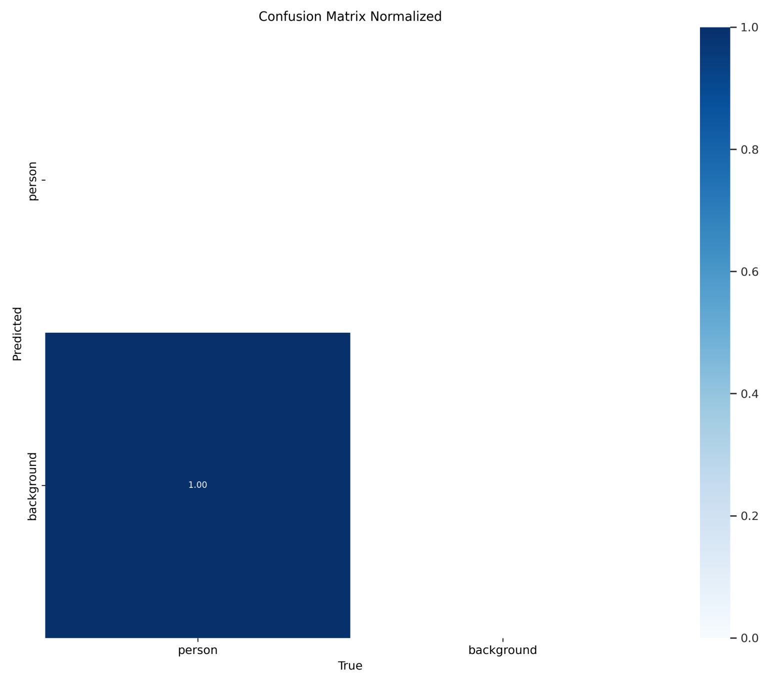

Figure 390. f1_over_confidence, yolov8n, pre-trained=True, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=False

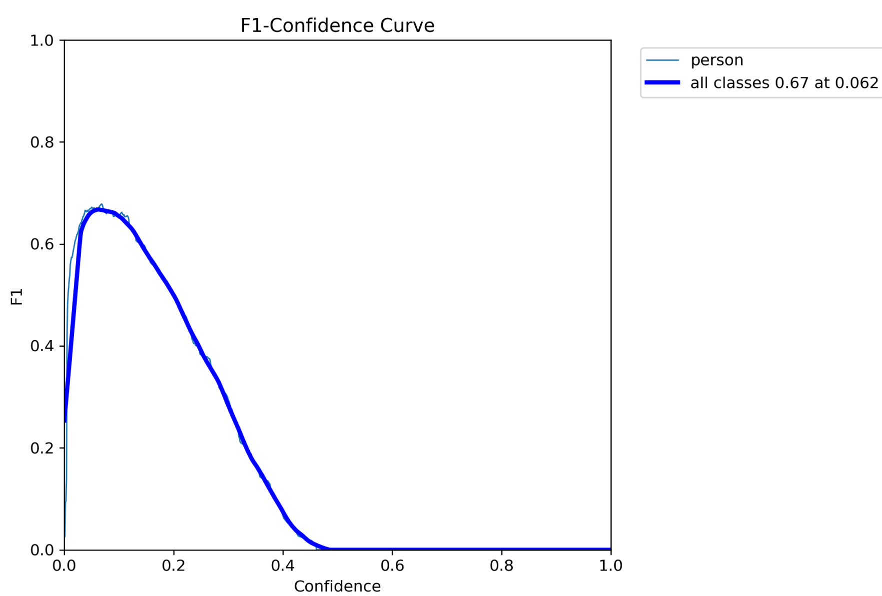

Figure 391. precision_over_recall, yolov8n, pre-trained=True, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=False

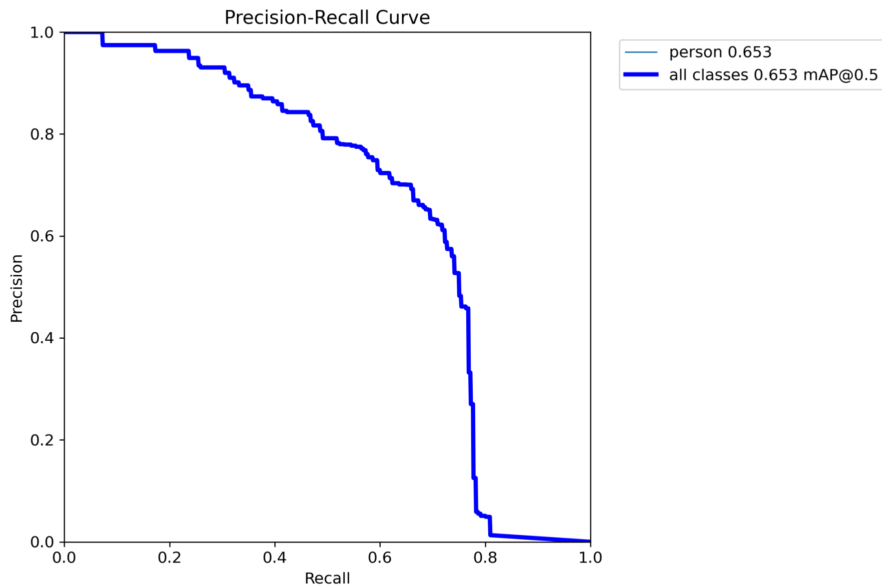

Figure 392. precision_over_confidence, yolov8n, pre-trained=True, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=False

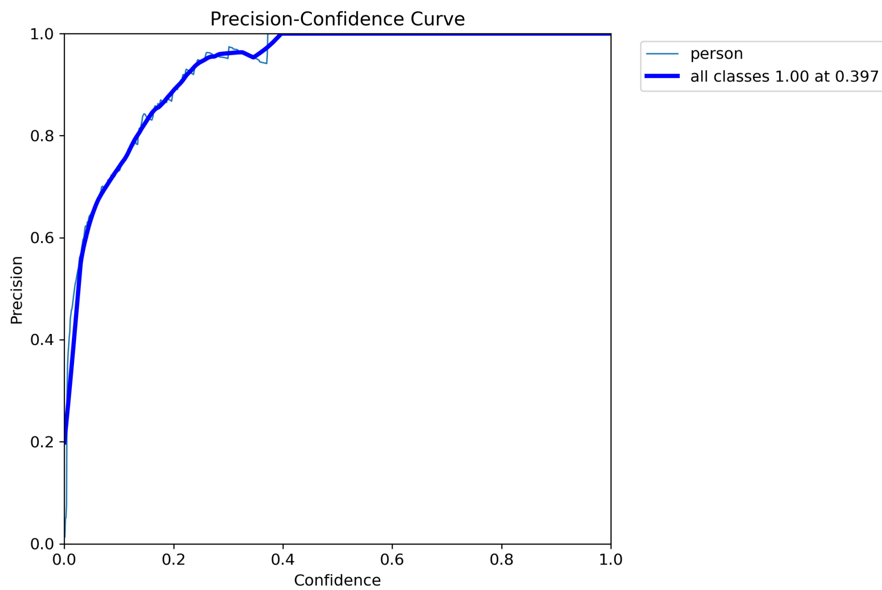

Figure 393. recall_over_confidence, yolov8n, pre-trained=True, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=False

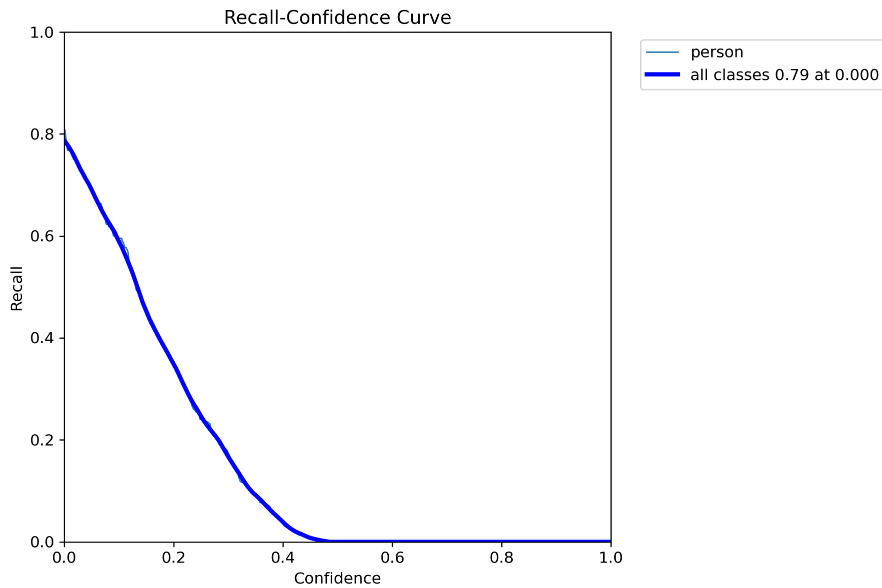

Figure 394. confusion_matrix, yolov8n, pre-trained=True, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=False

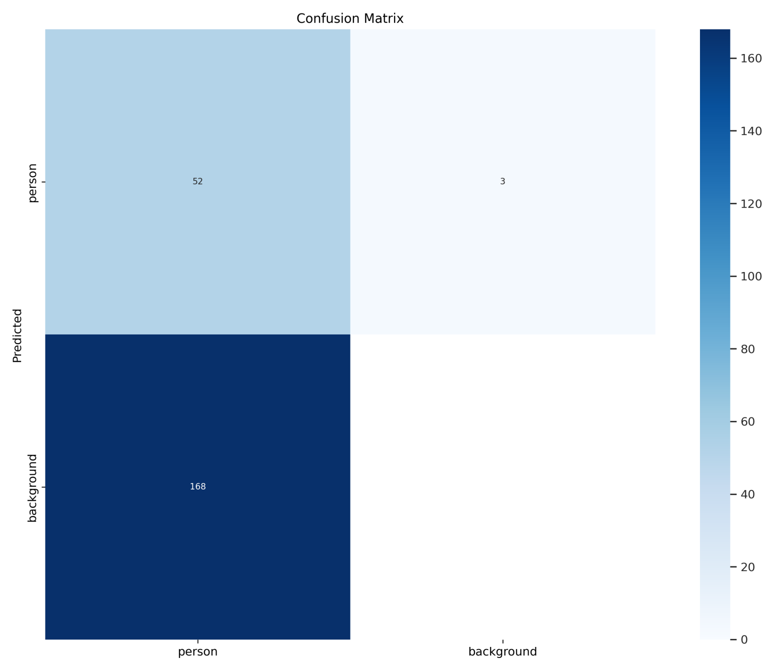

Figure 395. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=False

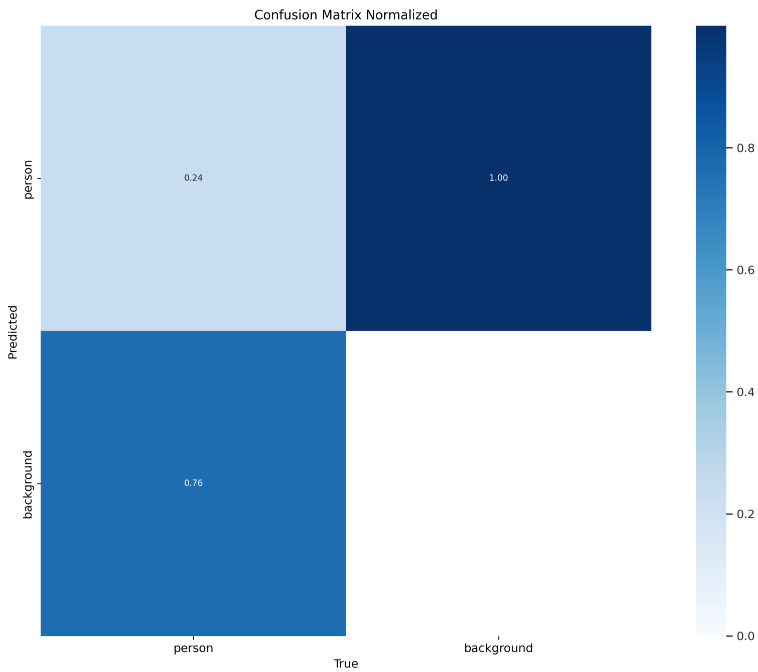

Figure 396. f1_over_confidence, yolov8n, pre-trained=True, epochs=50, data=keskvaljak, hyperparameter-tuned=False

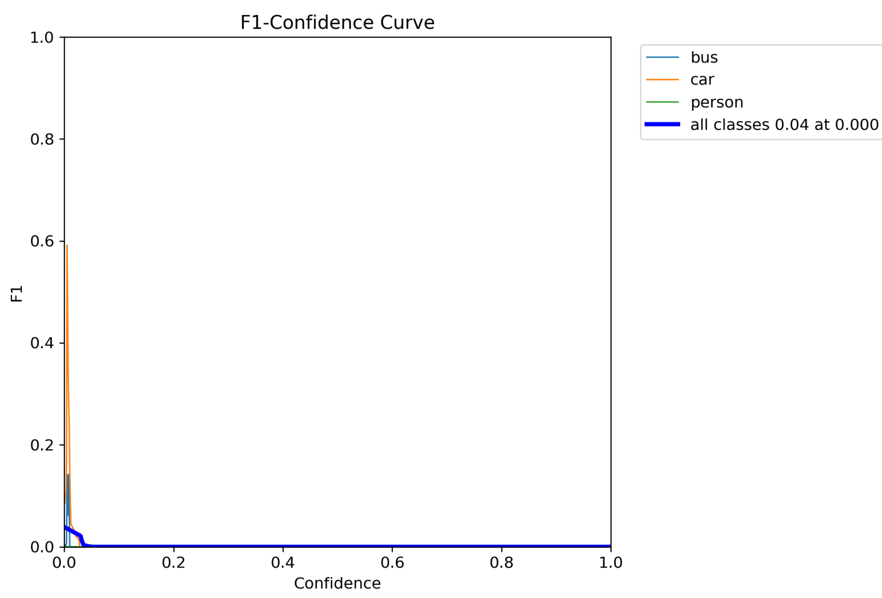

Figure 397. precision_over_recall, yolov8n, pre-trained=True, epochs=50, data=keskvaljak, hyperparameter-tuned=False

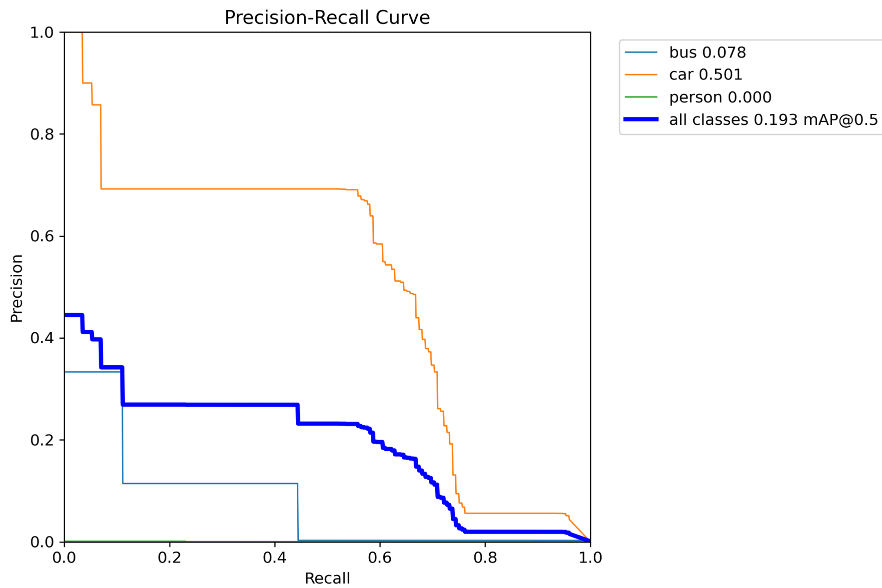

Figure 398. precision_over_confidence, yolov8n, pre-trained=True, epochs=50, data=keskvaljak, hyperparameter-tuned=False

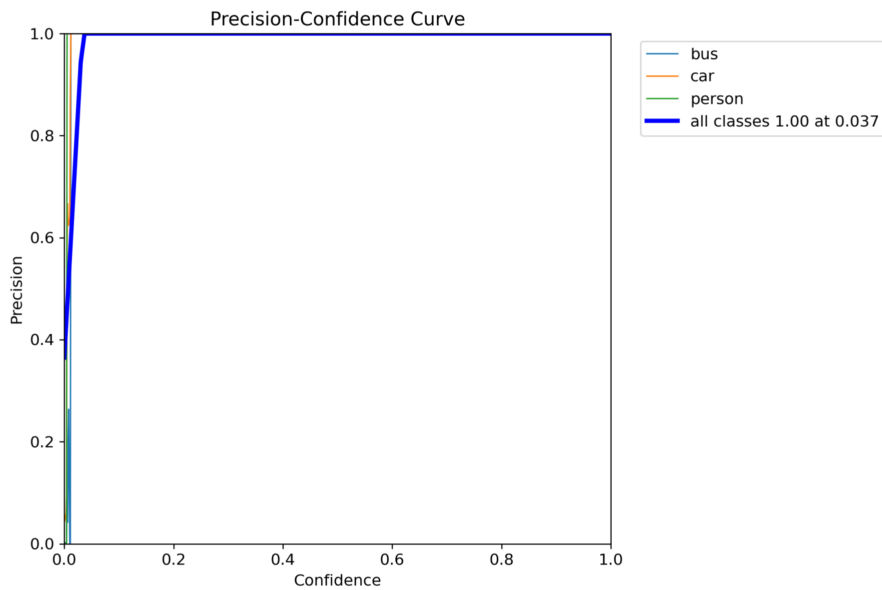

Figure 399. recall_over_confidence, yolov8n, pre-trained=True, epochs=50, data=keskvaljak, hyperparameter-tuned=False

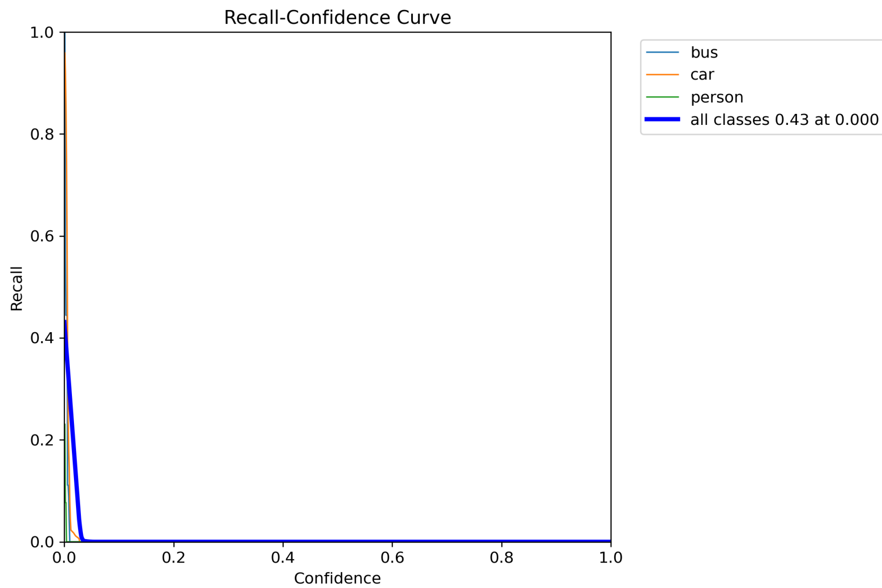

Figure 400. confusion_matrix, yolov8n, pre-trained=True, epochs=50, data=keskvaljak, hyperparameter-tuned=False

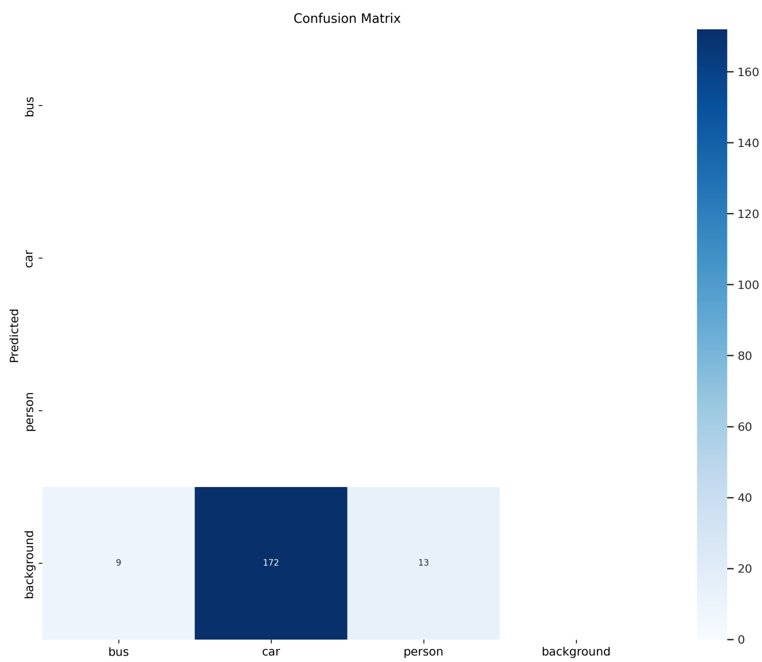

Figure 401. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=50, data=keskvaljak, hyperparameter-tuned=False

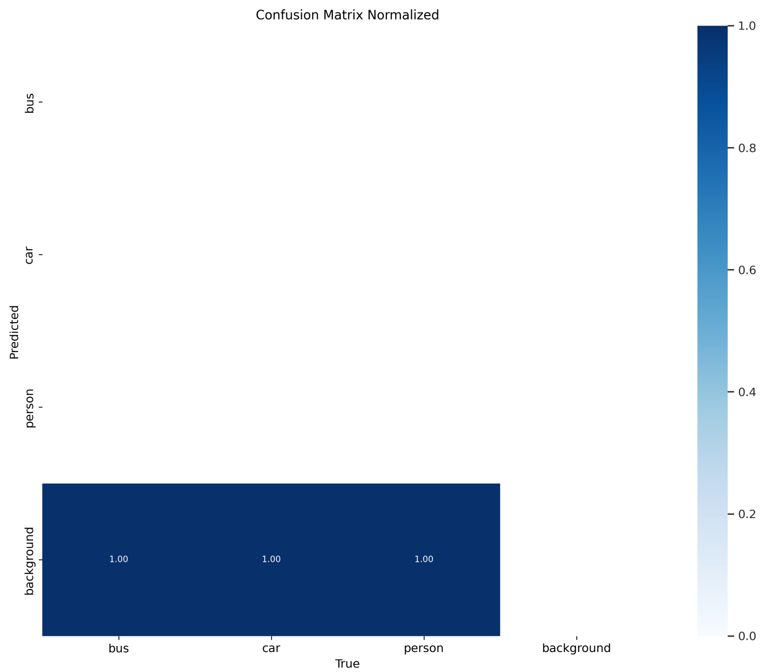

Figure 402. f1_over_confidence, yolov8n, pre-trained=True, epochs=100, data=keskvaljak, hyperparameter-tuned=False

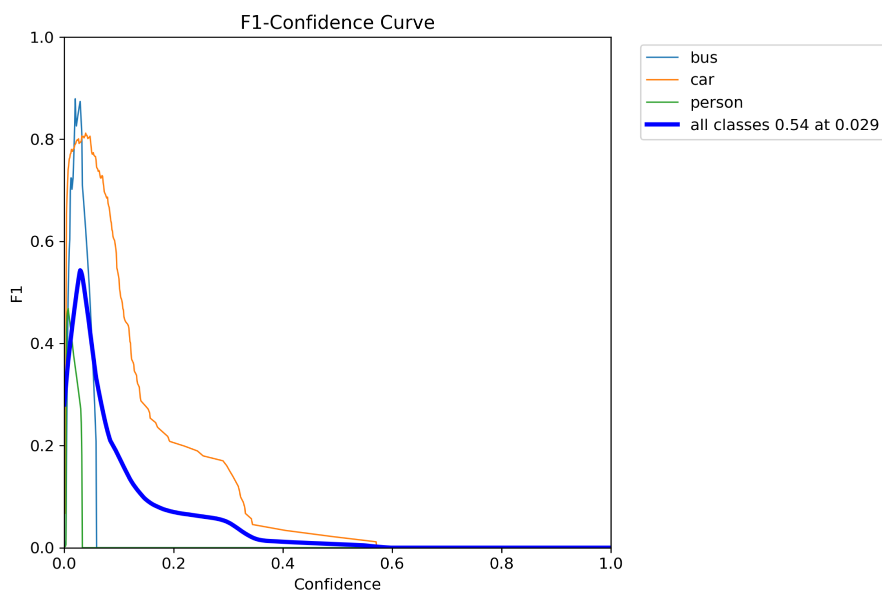

Figure 403. precision_over_recall, yolov8n, pre-trained=True, epochs=100, data=keskvaljak, hyperparameter-tuned=False

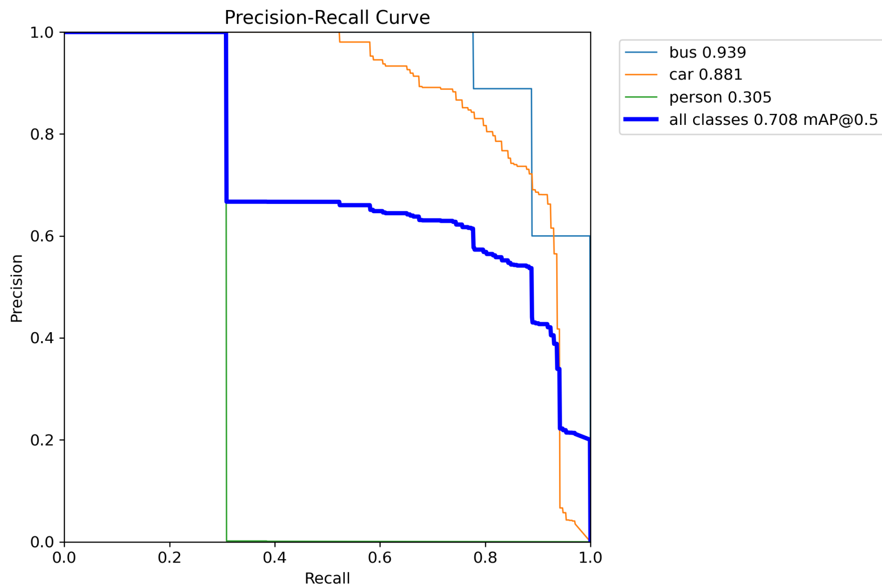

Figure 404. precision_over_confidence, yolov8n, pre-trained=True, epochs=100, data=keskvaljak, hyperparameter-tuned=False

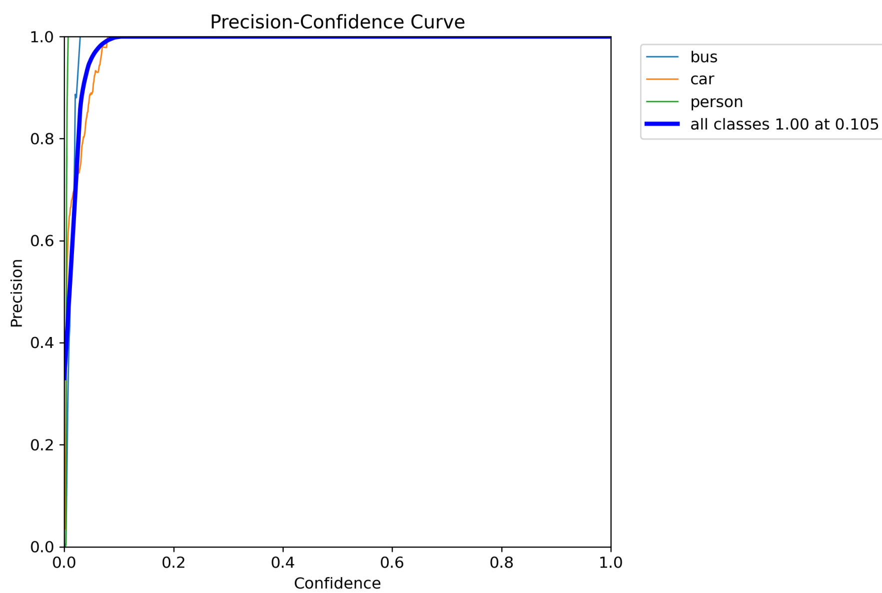

Figure 405. recall_over_confidence, yolov8n, pre-trained=True, epochs=100, data=keskvaljak, hyperparameter-tuned=False

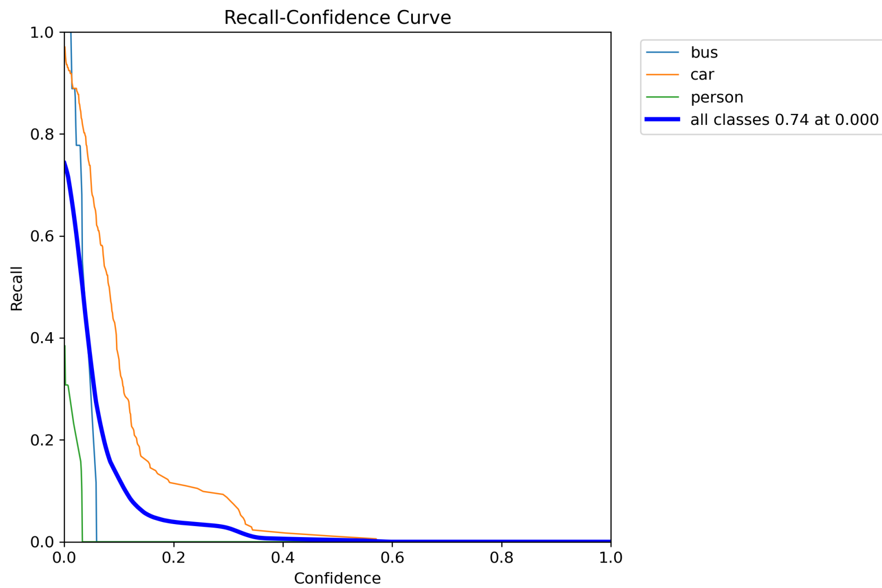

Figure 406. confusion_matrix, yolov8n, pre-trained=True, epochs=100, data=keskvaljak, hyperparameter-tuned=False

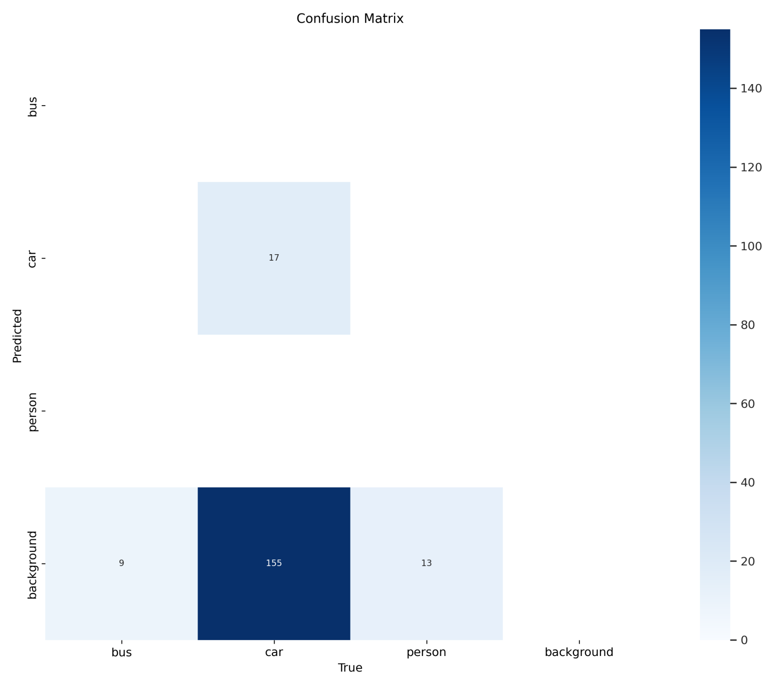

Figure 407. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=100, data=keskvaljak, hyperparameter-tuned=False

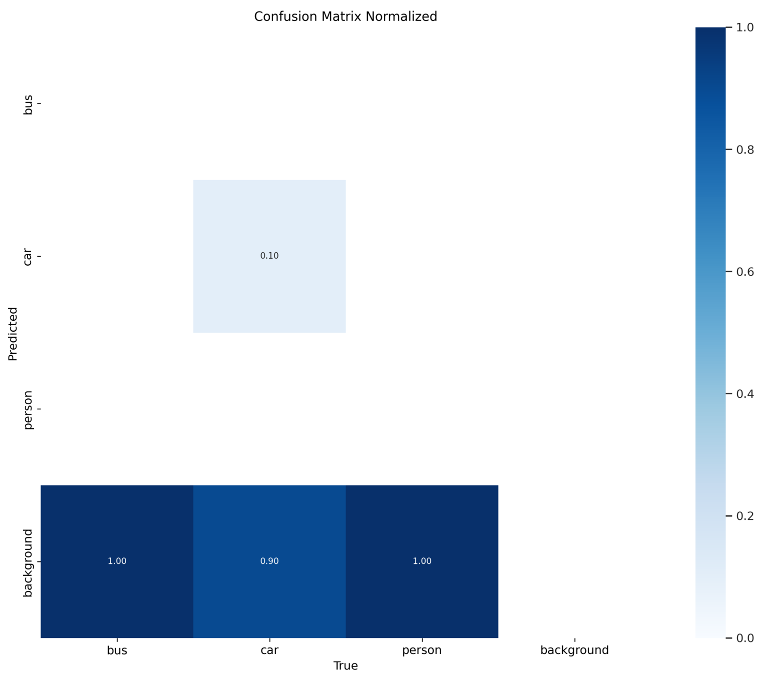

Figure 408. f1_over_confidence, yolov8n, pre-trained=True, epochs=150, data=keskvaljak, hyperparameter-tuned=False

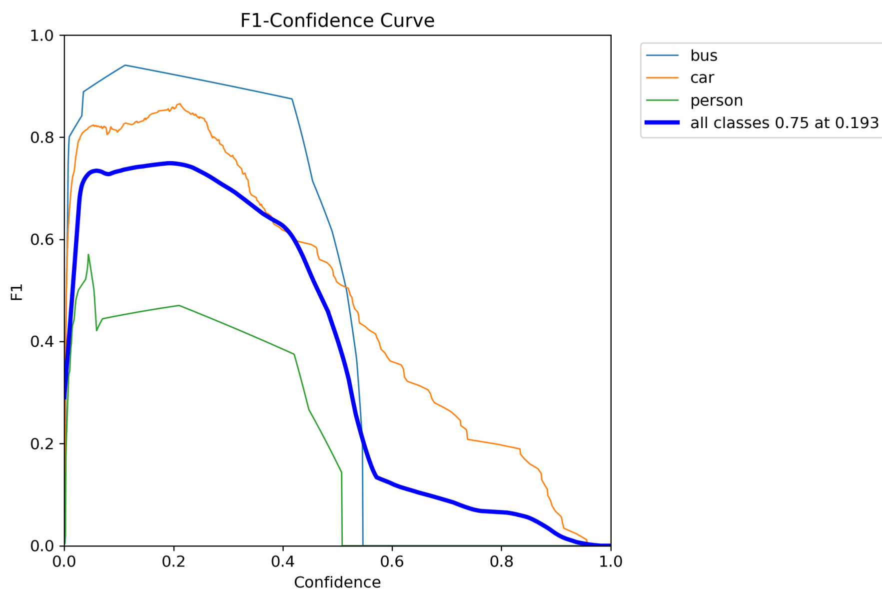

Figure 409. precision_over_recall, yolov8n, pre-trained=True, epochs=150, data=keskvaljak, hyperparameter-tuned=False

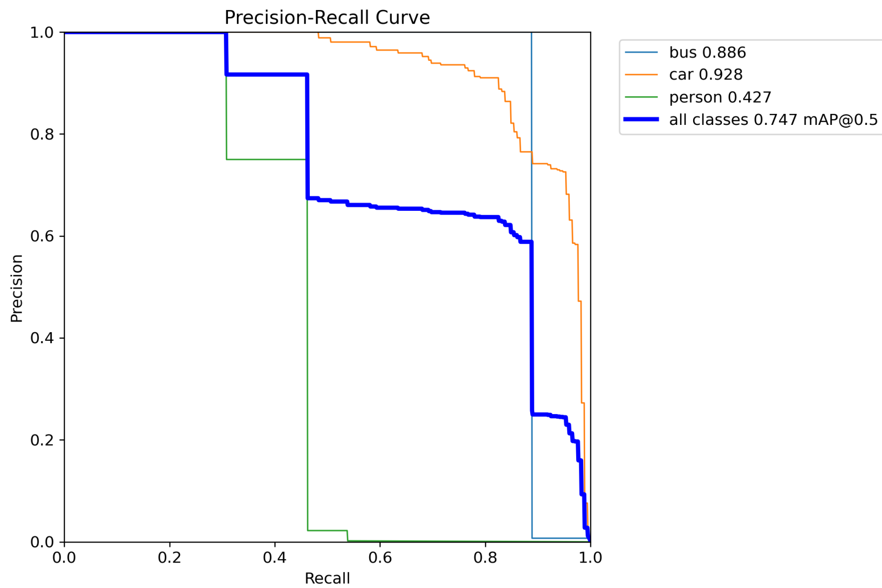

Figure 410. precision_over_confidence, yolov8n, pre-trained=True, epochs=150, data=keskvaljak, hyperparameter-tuned=False

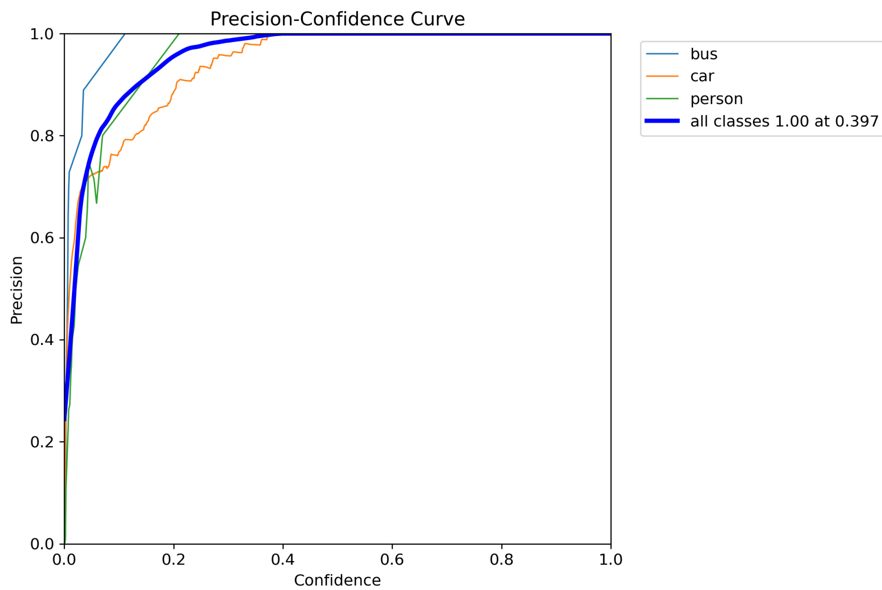

Figure 411. recall_over_confidence, yolov8n, pre-trained=True, epochs=150, data=keskvaljak, hyperparameter-tuned=False

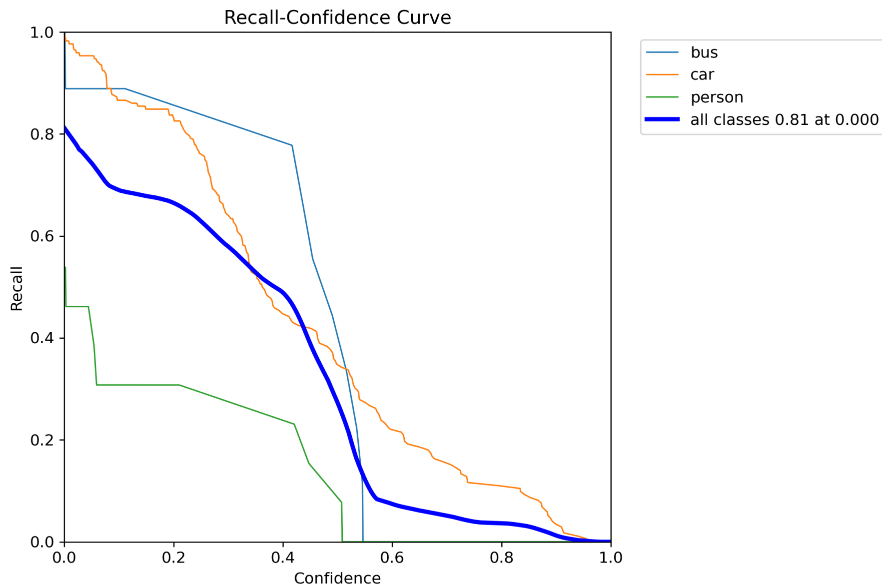

Figure 412. confusion_matrix, yolov8n, pre-trained=True, epochs=150, data=keskvaljak, hyperparameter-tuned=False

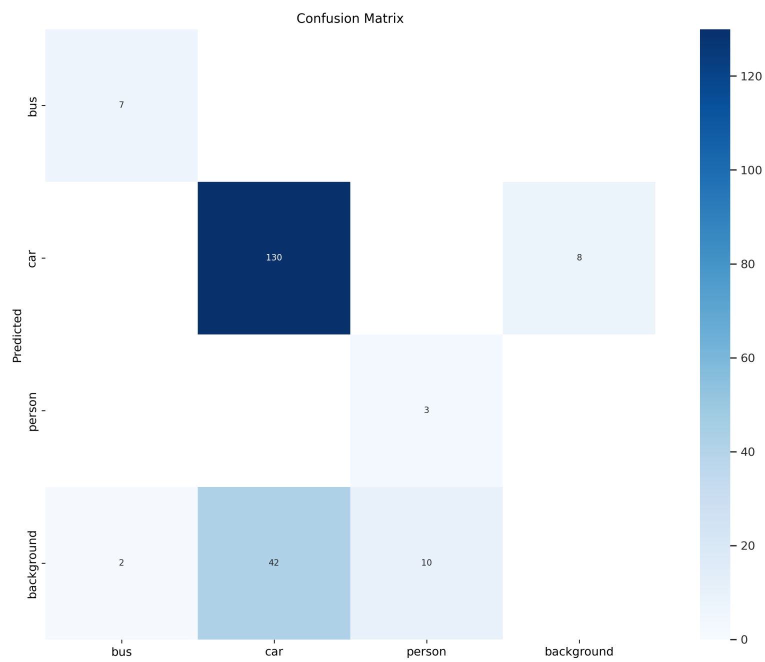

Figure 413. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=150, data=keskvaljak, hyperparameter-tuned=False

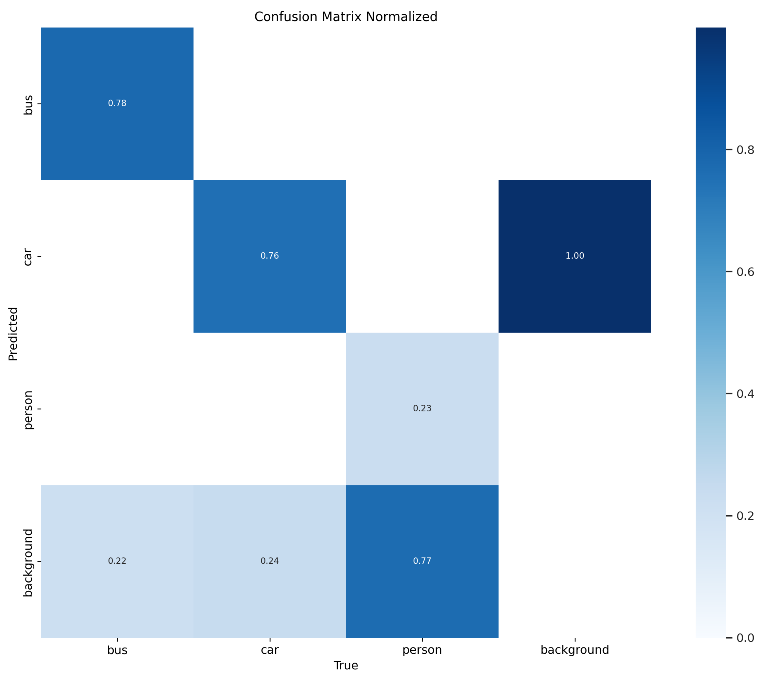

Figure 414. f1_over_confidence, yolov8n, pre-trained=True, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=False

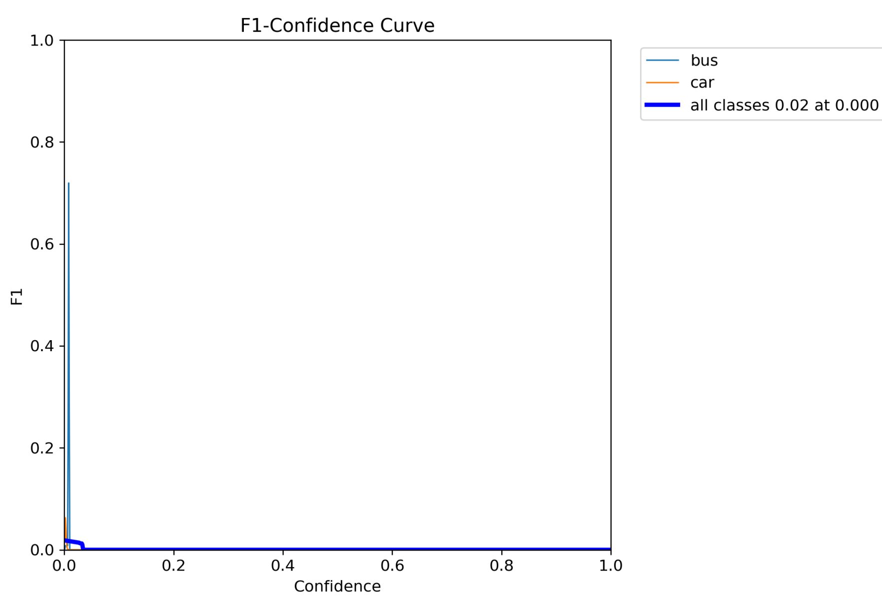

Figure 415. precision_over_recall, yolov8n, pre-trained=True, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=False

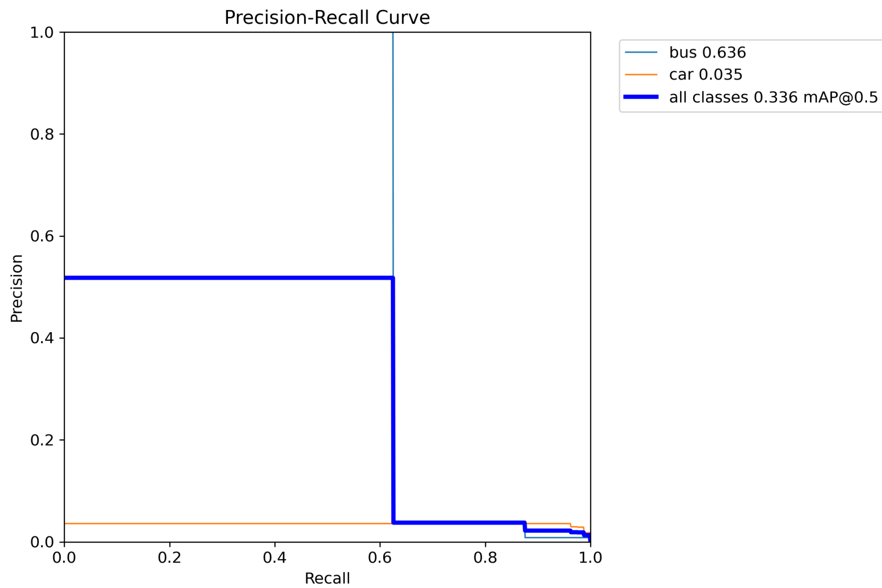

Figure 416. precision_over_confidence, yolov8n, pre-trained=True, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=False

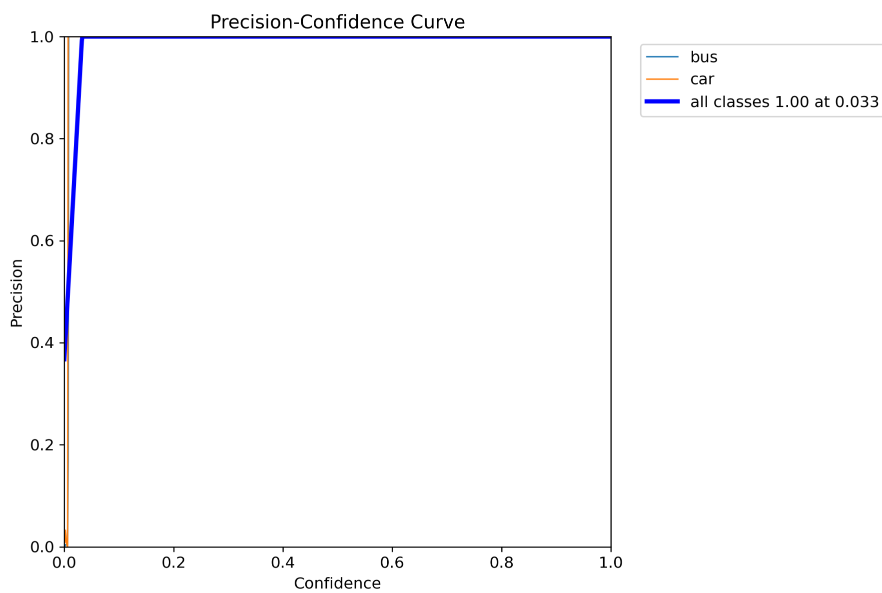

Figure 417. recall_over_confidence, yolov8n, pre-trained=True, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=False

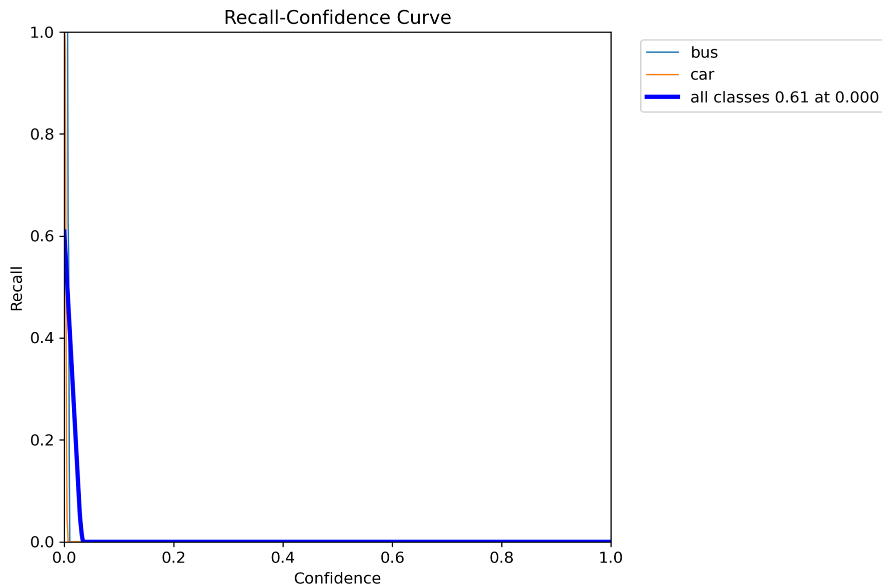

Figure 418. confusion_matrix, yolov8n, pre-trained=True, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=False

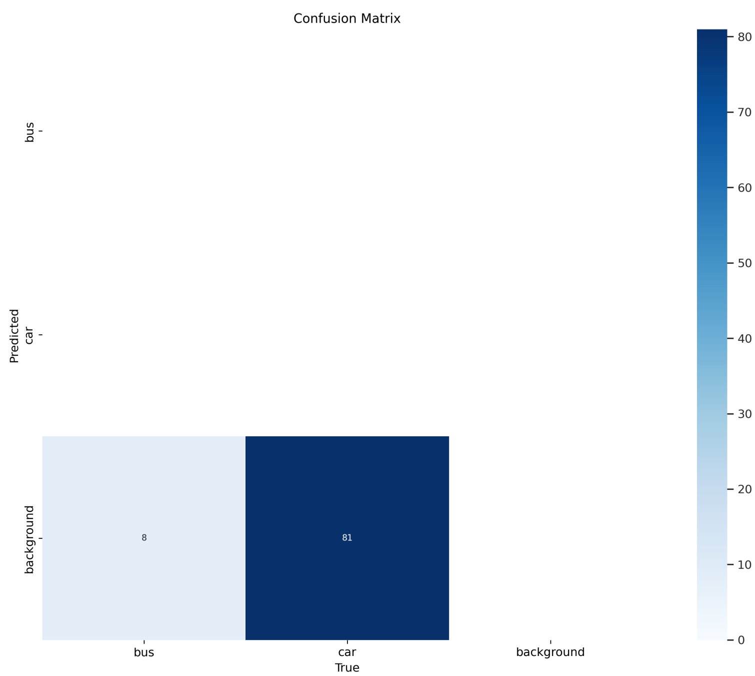

Figure 419. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=50, data=kielce_university_of_technology, hyperparameter-

tuned=False

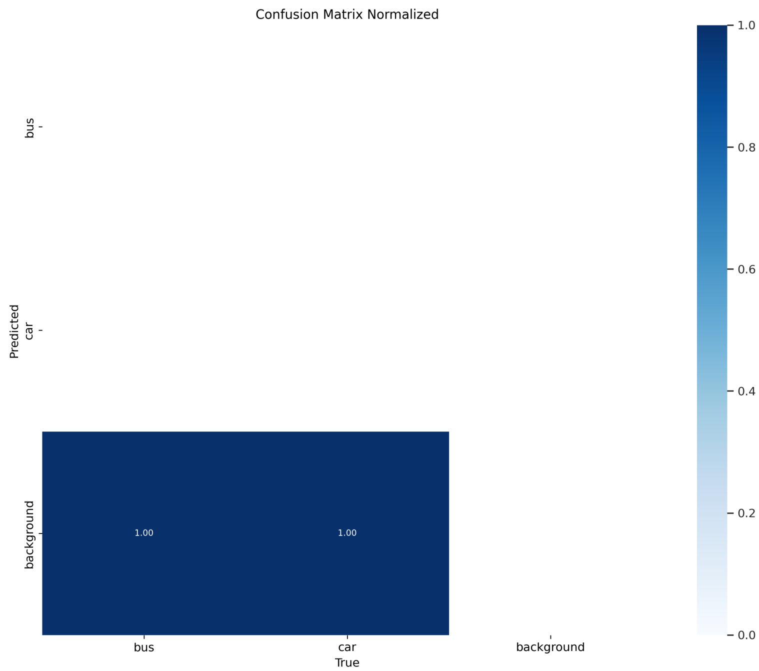

Figure 420. f1_over_confidence, yolov8n, pre-trained=True, epochs=100, data=kielce_university_of_technology, hyperparameter-tuned=False

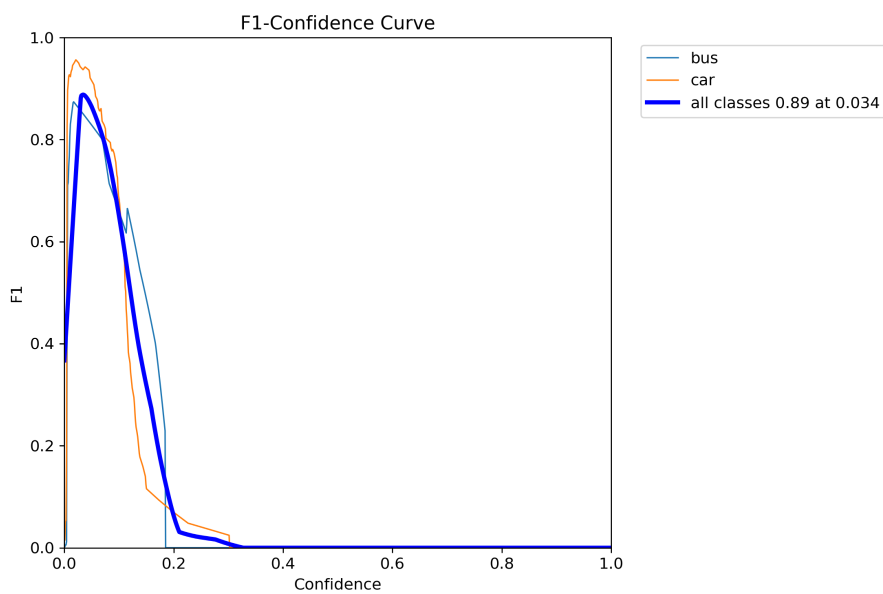

Figure 421. precision_over_recall, yolov8n, pre-trained=True, epochs=100,

data=kielce_university_of_technology, hyperparameter-tuned=False

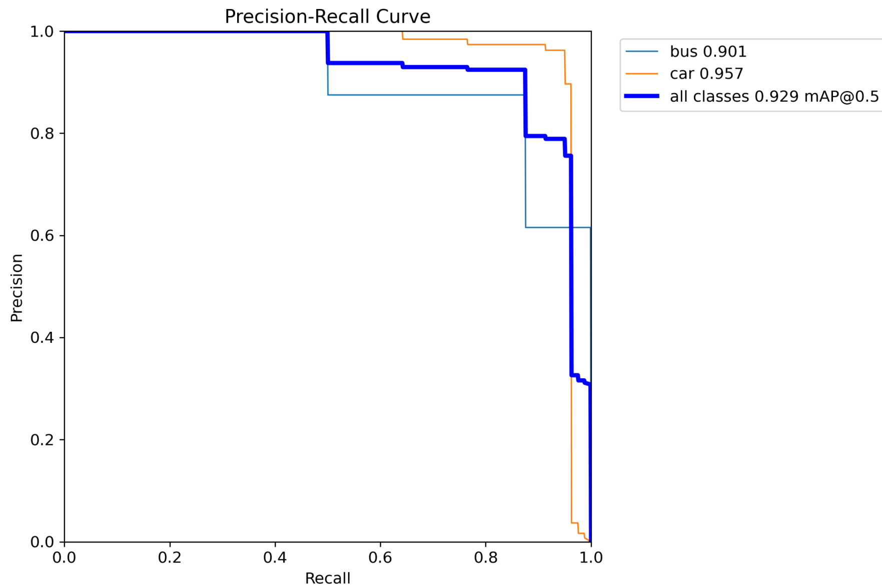

Figure 422. precision_over_confidence, yolov8n, pre-trained=True, epochs=100, data=kielce_university_of_technology, hyperparameter-tuned=False

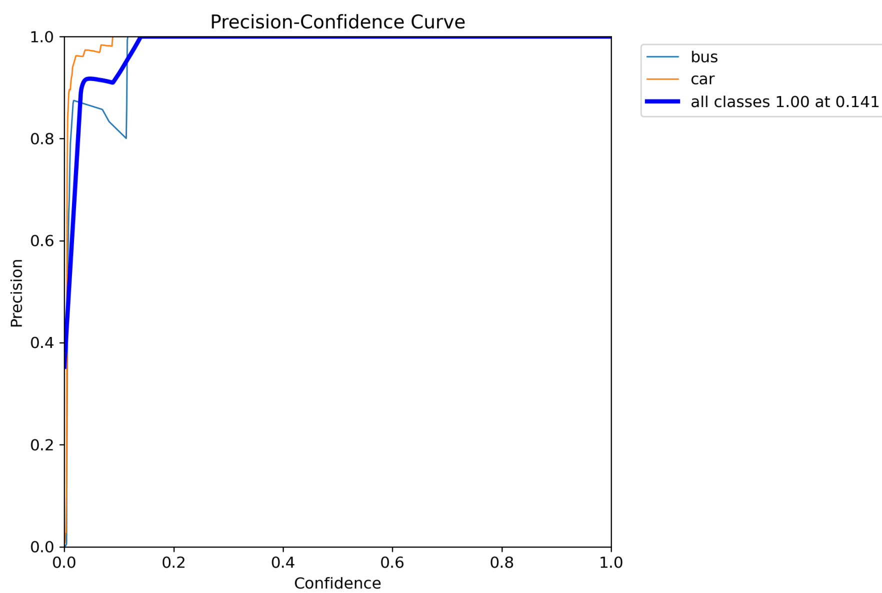

Figure 423. recall_over_confidence, yolov8n, pre-trained=True, epochs=100, data=kielce_university_of_technology, hyperparameter-tuned=False

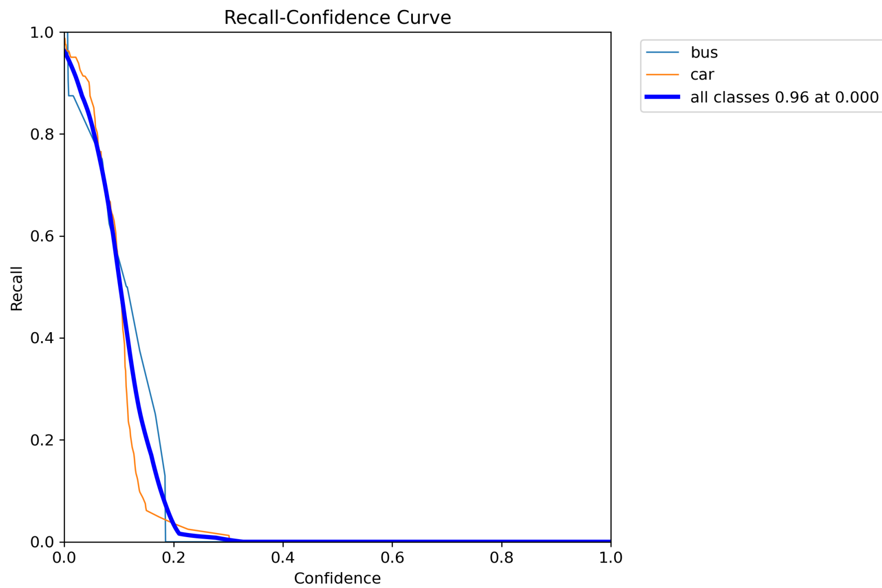

Figure 424. confusion__matrix, yolov8n, pre-trained=True, epochs=100, data=kielce__university__of__technology, hyperparameter-tuned=False

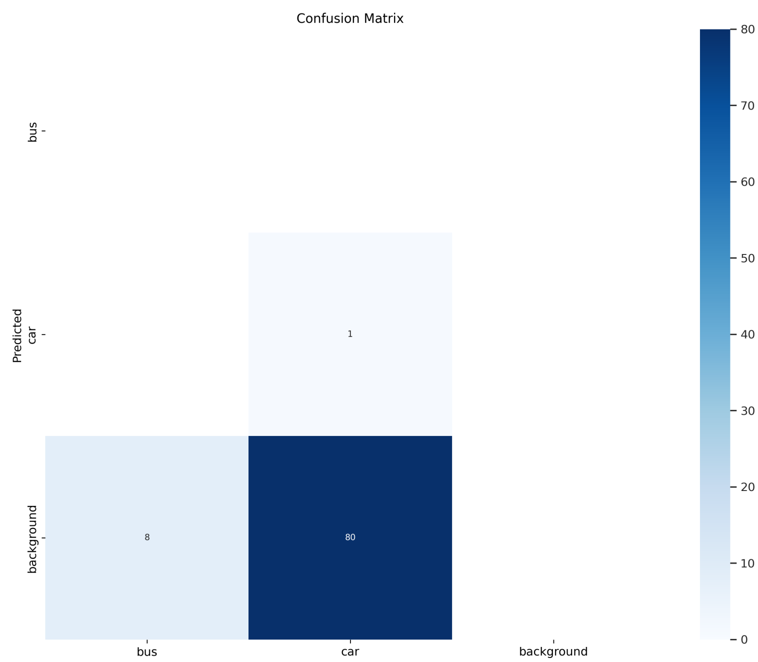

Figure 425. confusion__matrix__normalized, yolov8n, pre-trained=True, epochs=100, data=kielce__university__of__technology, hyperparameter-

tuned=False

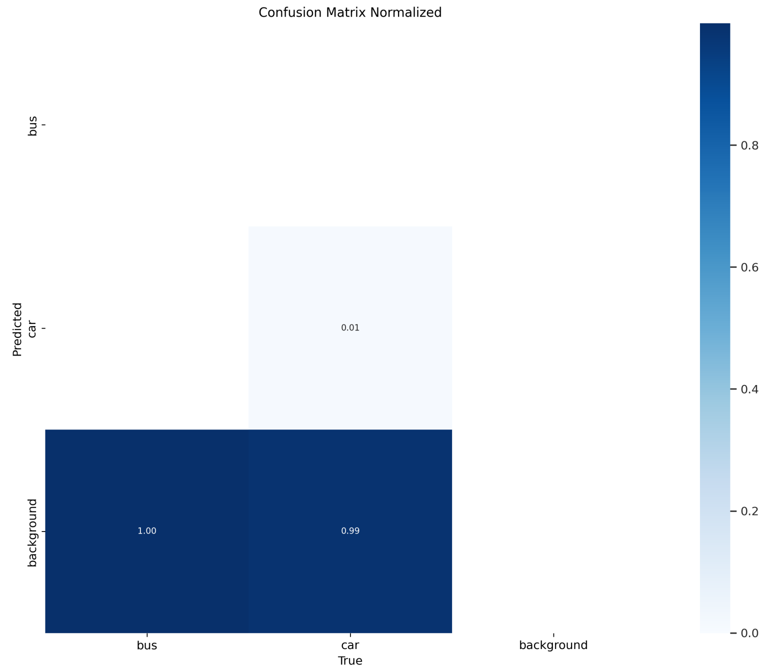

Figure 426. f1_over_confidence, yolov8n, pre-trained=True, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=False

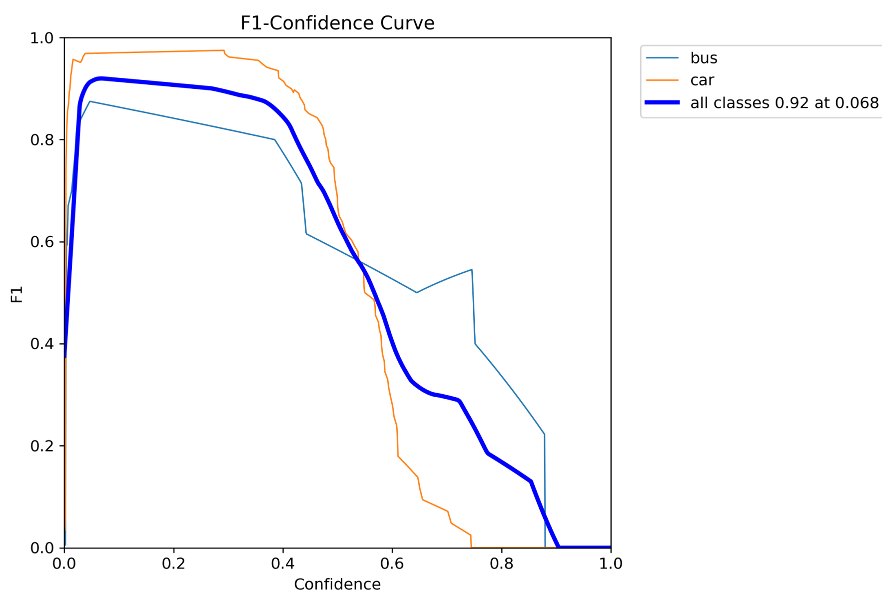

Figure 427. precision_over_recall, yolov8n, pre-trained=True, epochs=150,

data=kielce_university_of_technology, hyperparameter-tuned=False

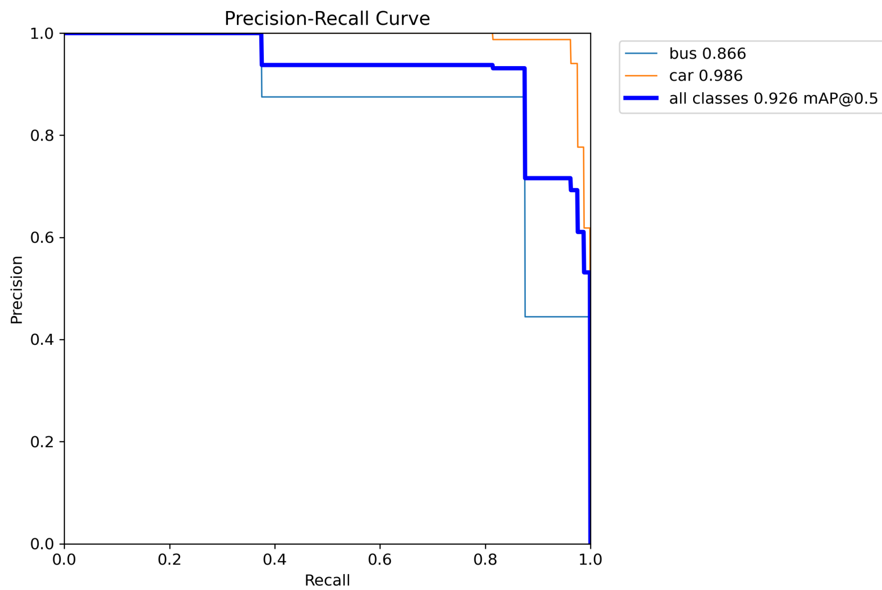

Figure 428. precision_over_confidence, yolov8n, pre-trained=True, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=False

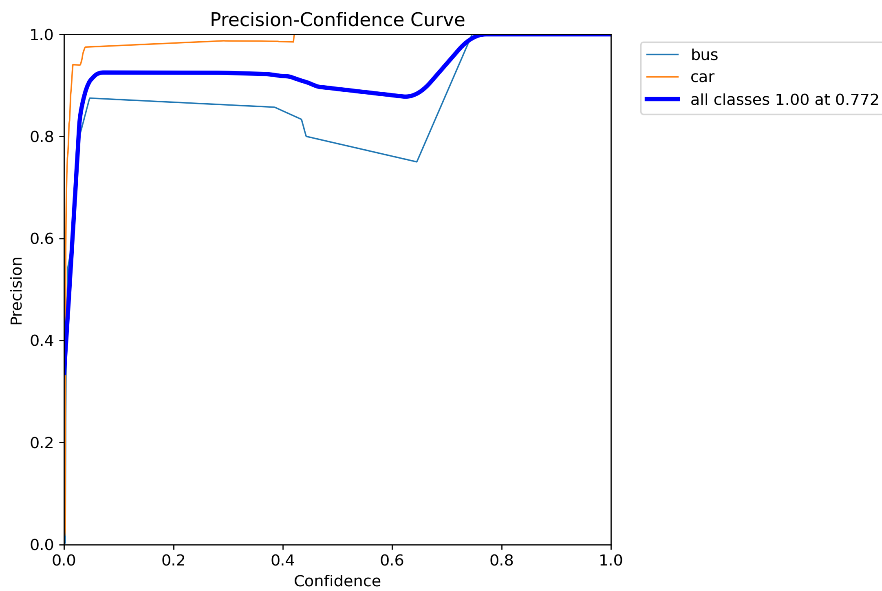

Figure 429. recall_over_confidence, yolov8n, pre-trained=True, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=False

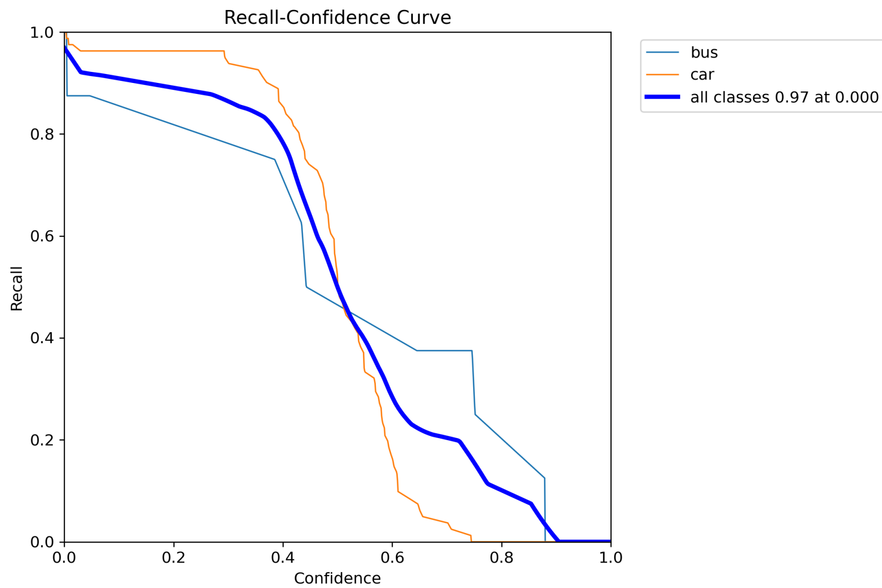

Figure 430. confusion_matrix, yolov8n, pre-trained=True, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=False

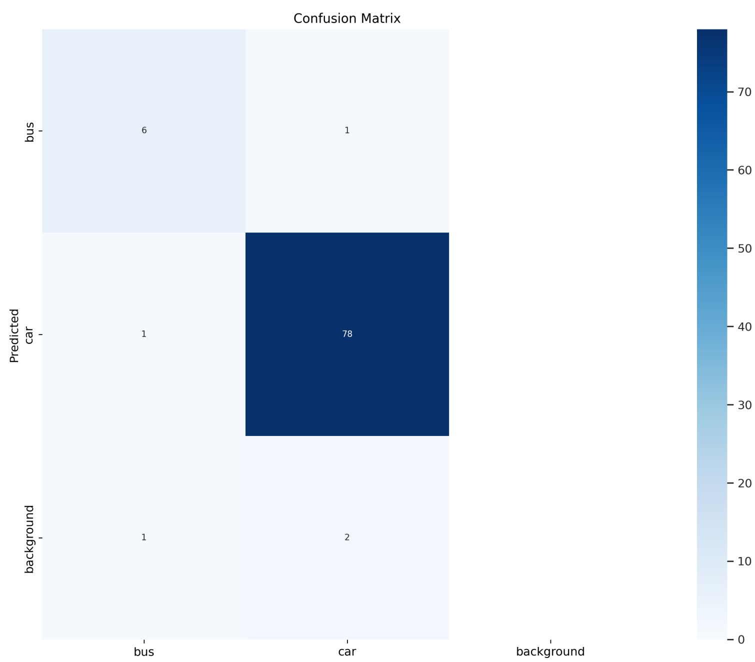

Figure 431. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=150, data=kielce_university_of_technology, hyperparameter-

tuned=False

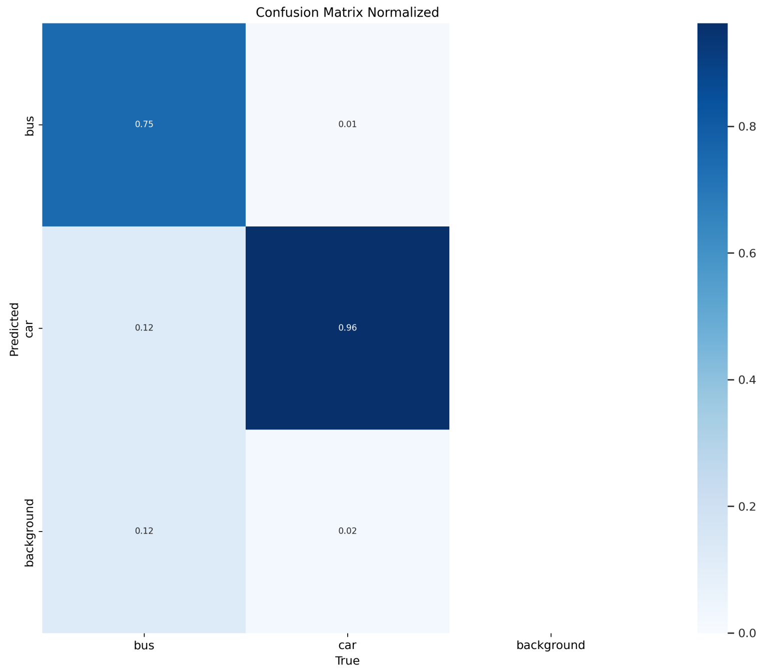

Figure 432. f1_over_confidence, yolov8n, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

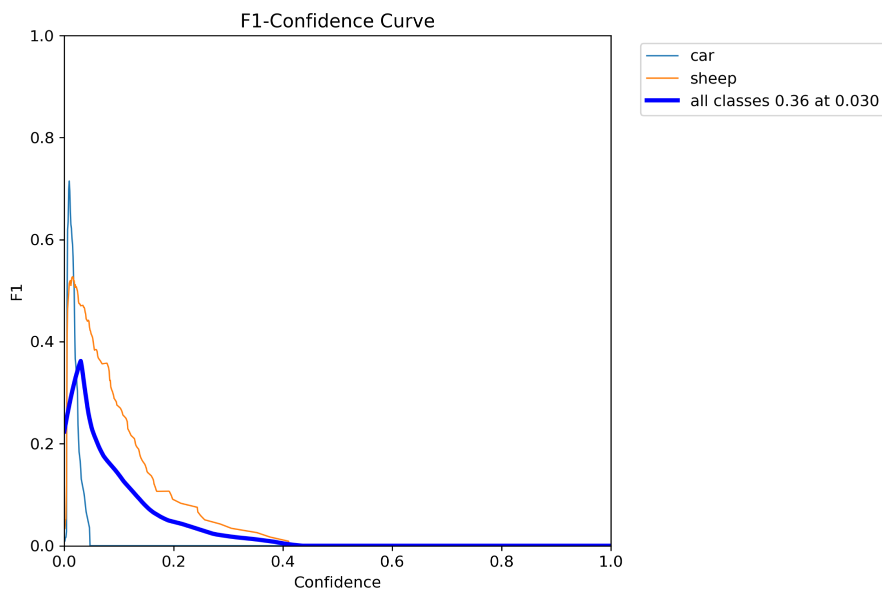

Figure 433. precision_over_recall, yolov8n, pre-trained=True, epochs=50,

data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

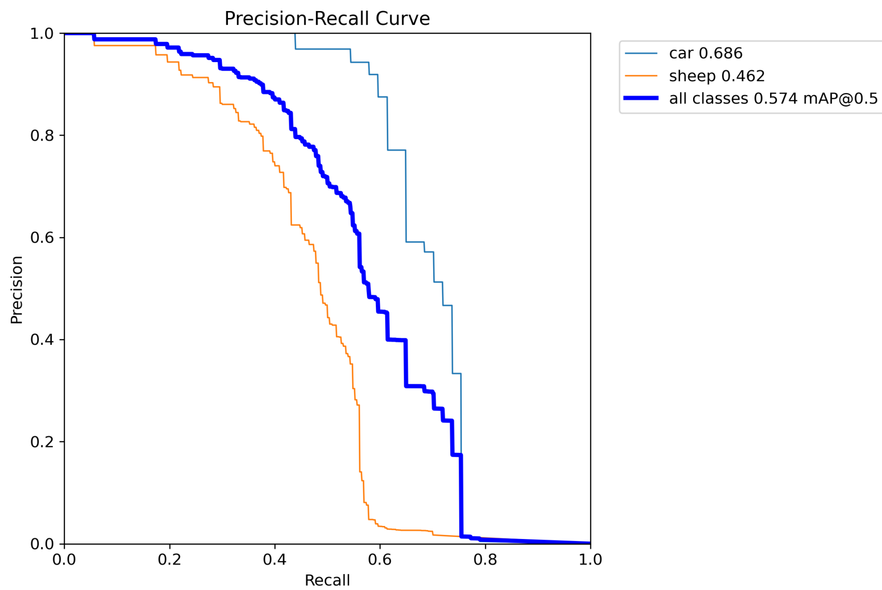

Figure 434. precision_over_confidence, yolov8n, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

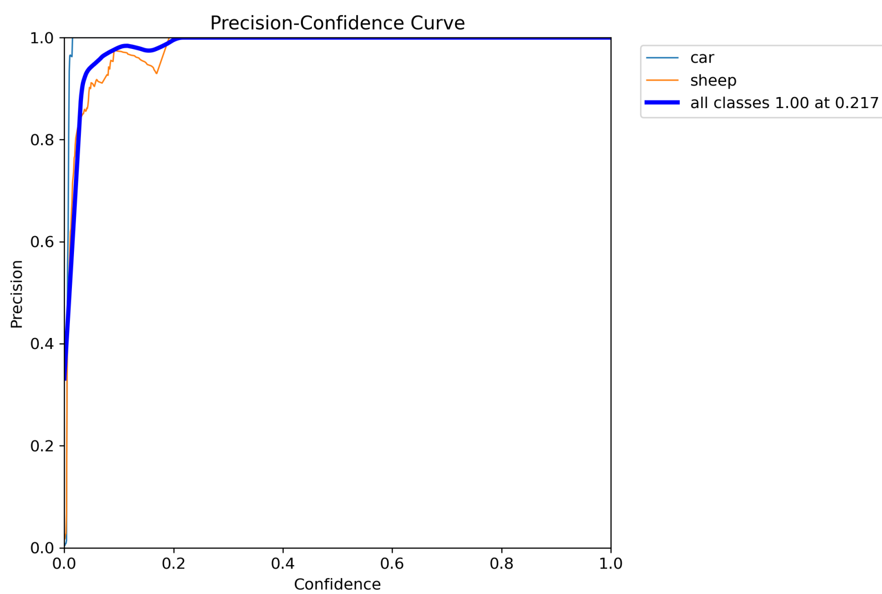

Figure 435. recall_over_confidence, yolov8n, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

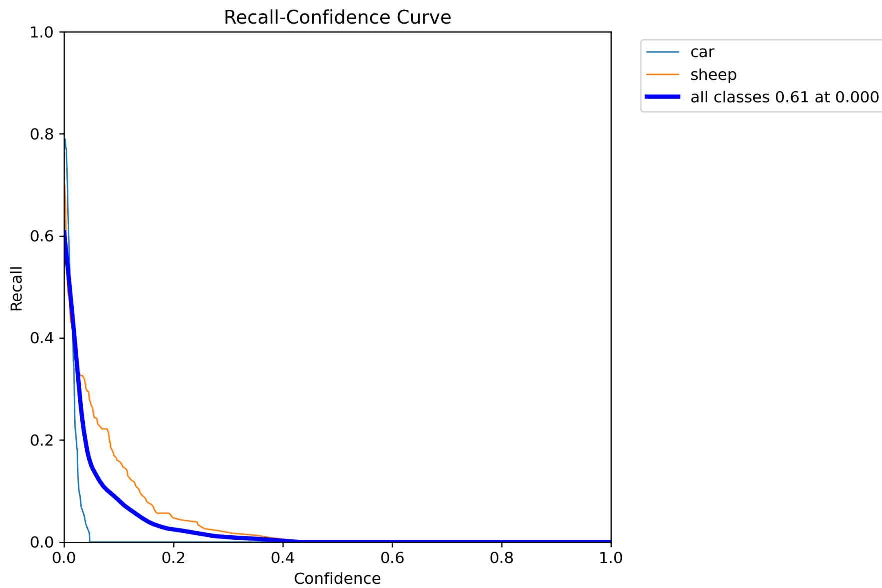

Figure 436. confusion_matrix, yolov8n, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

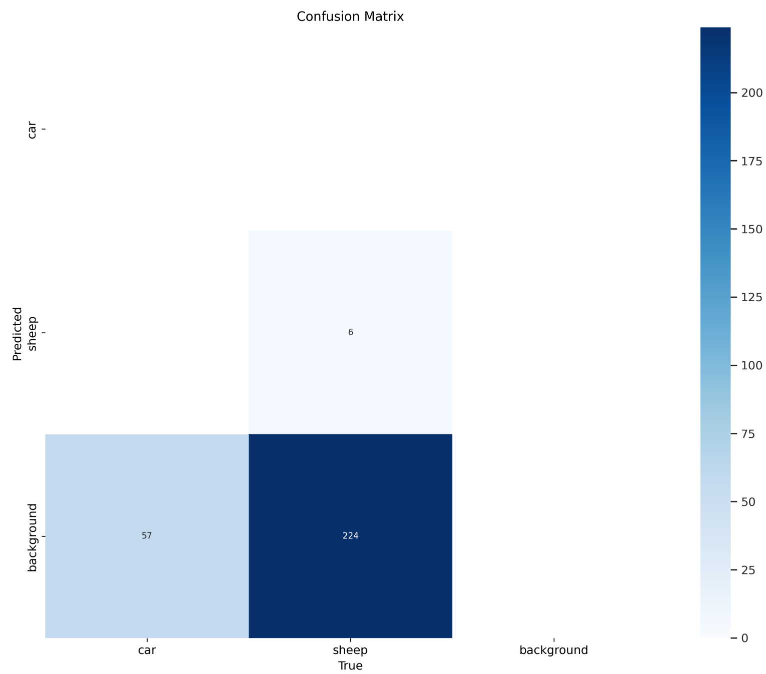

Figure 437. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

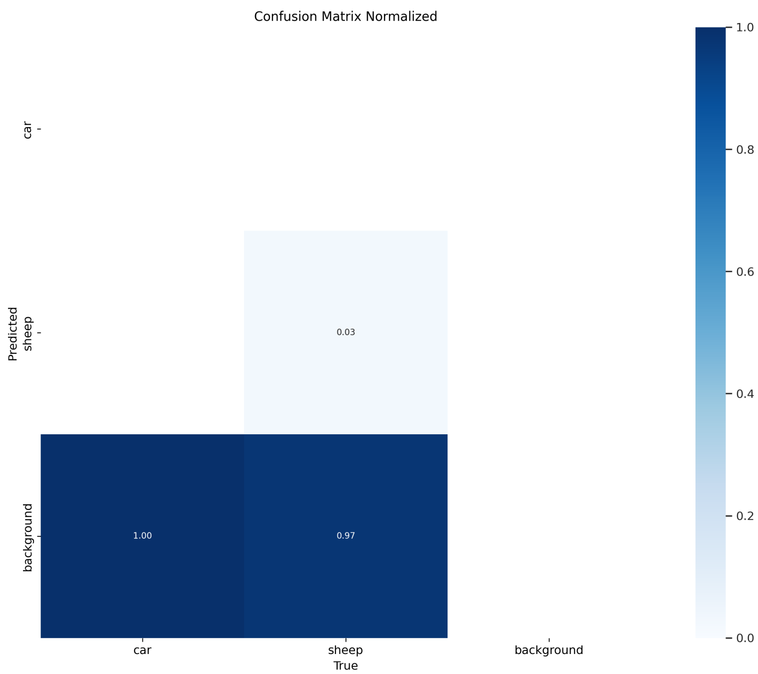

Figure 438. f1_over_confidence, yolov8n, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

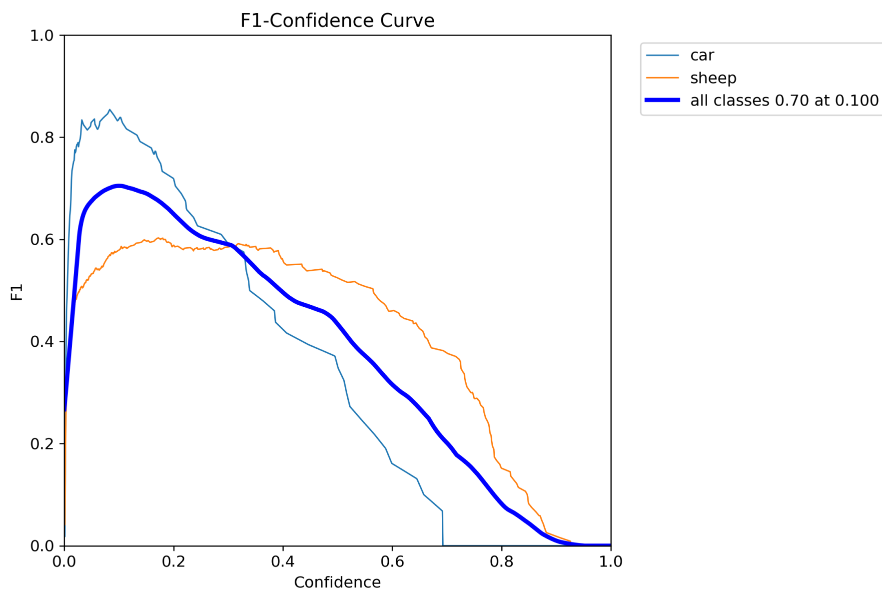

Figure 439. precision_over_recall, yolov8n, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

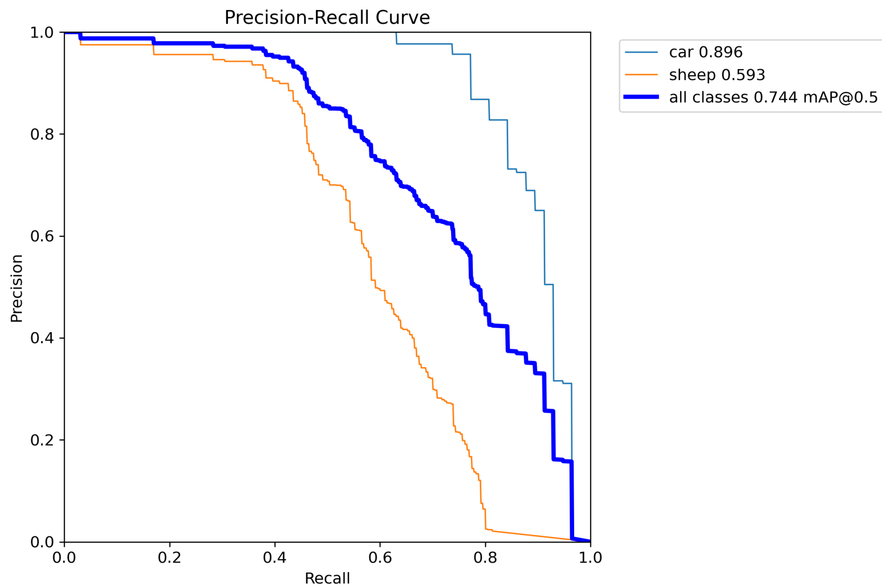

Figure 440. precision_over_confidence, yolov8n, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

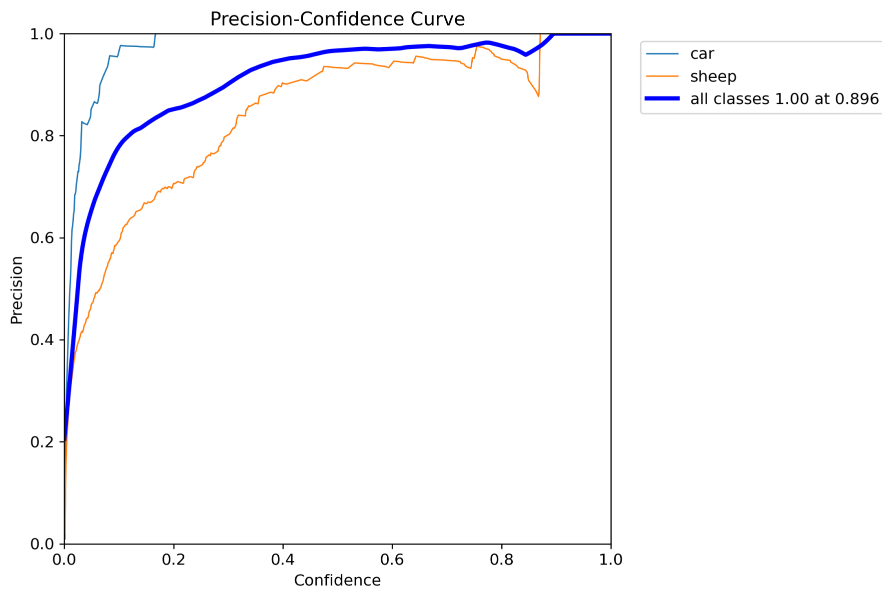

Figure 441. recall_over_confidence, yolov8n, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

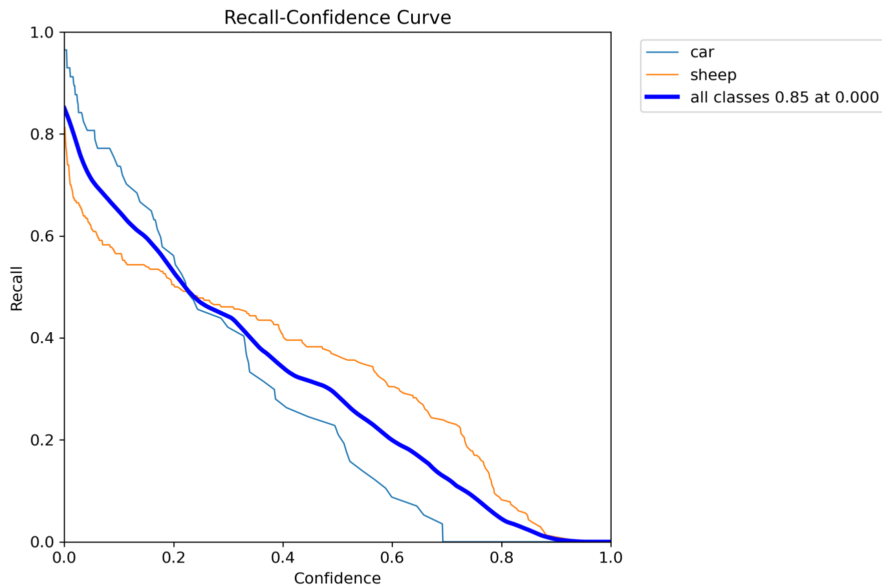

Figure 442. confusion_matrix, yolov8n, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

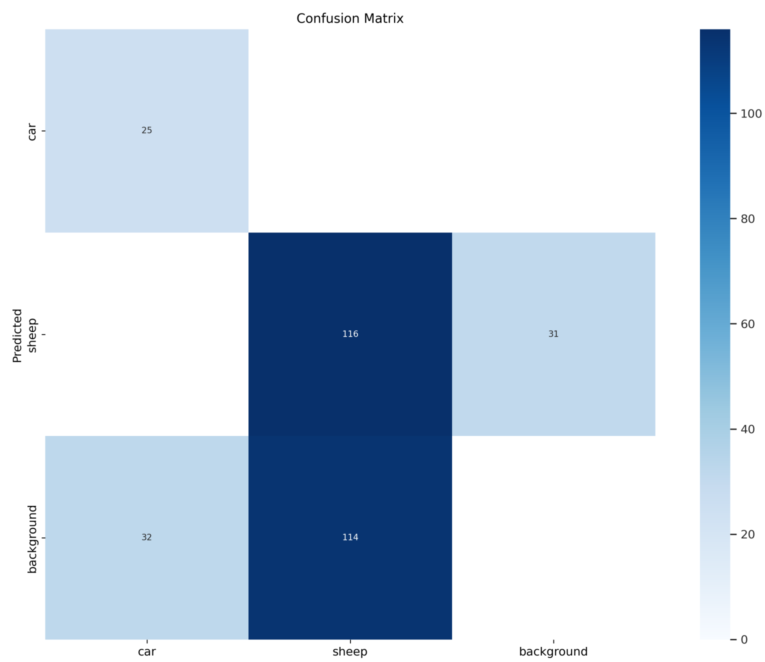

Figure 443. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

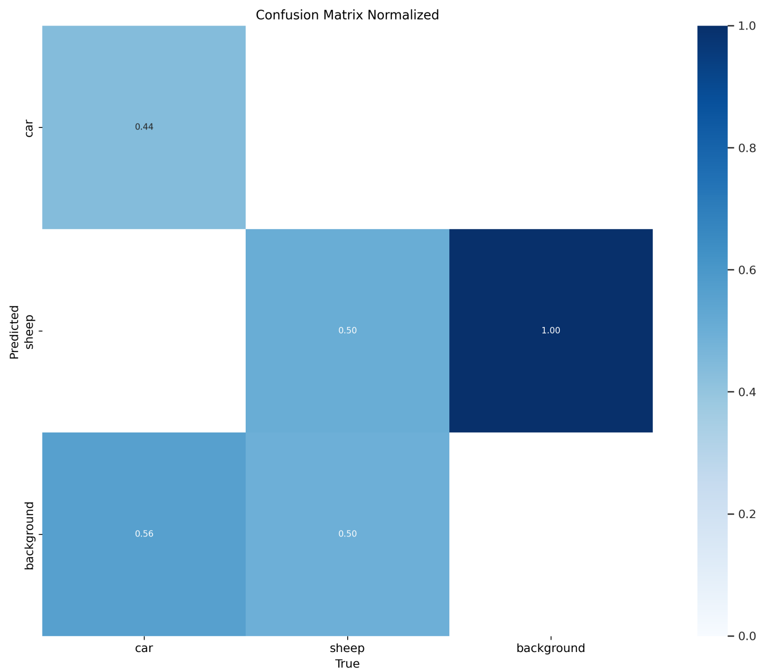

Figure 444. f1_over_confidence, yolov8n, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

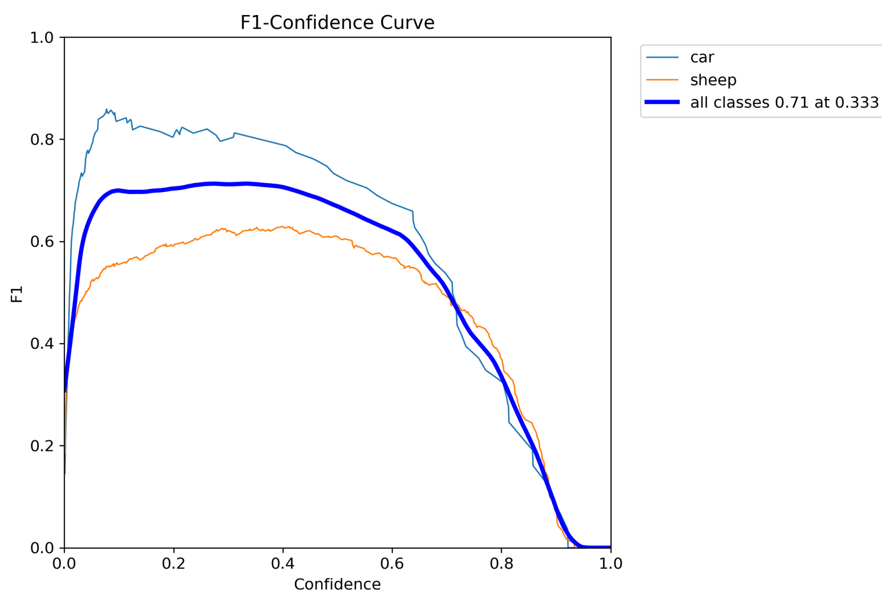

Figure 445. precision_over_recall, yolov8n, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

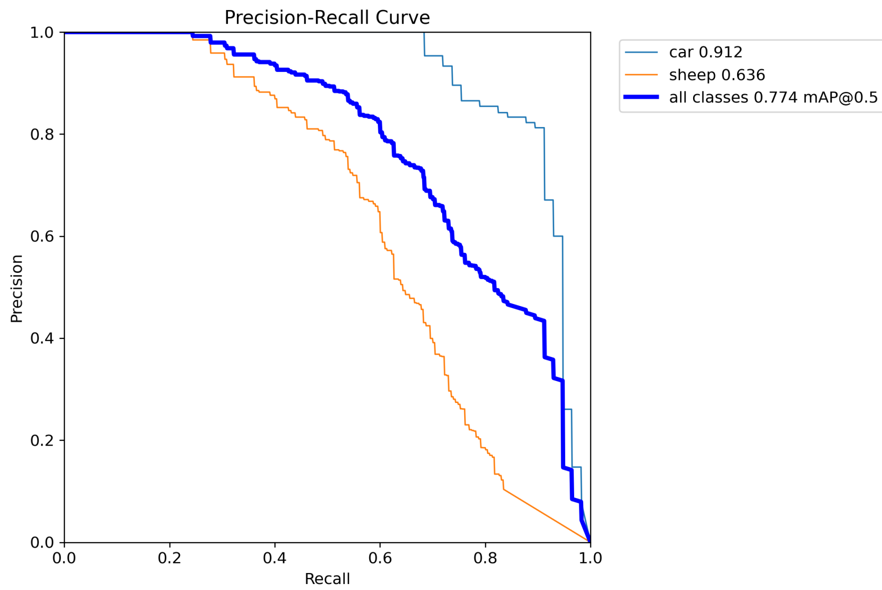

Figure 446. precision_over_confidence, yolov8n, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

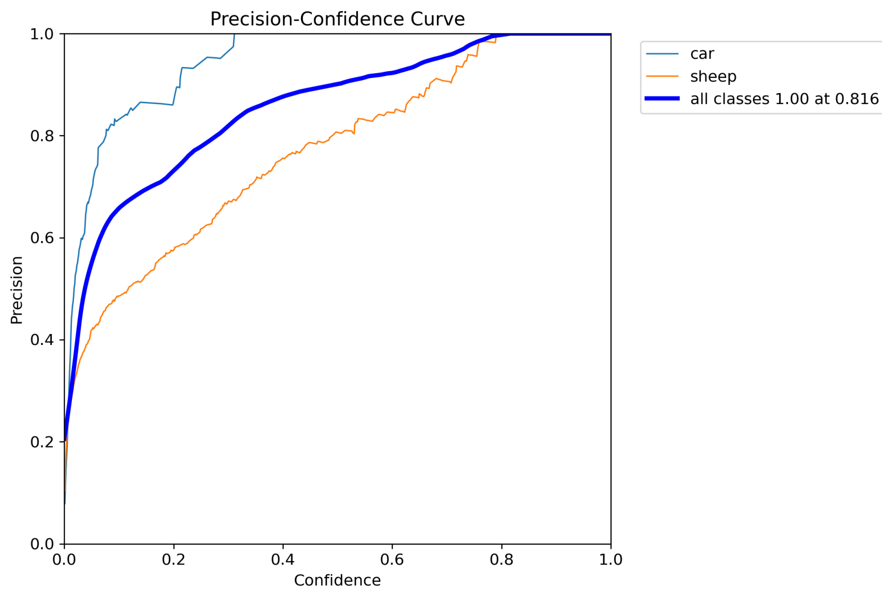

Figure 447. recall_over_confidence, yolov8n, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

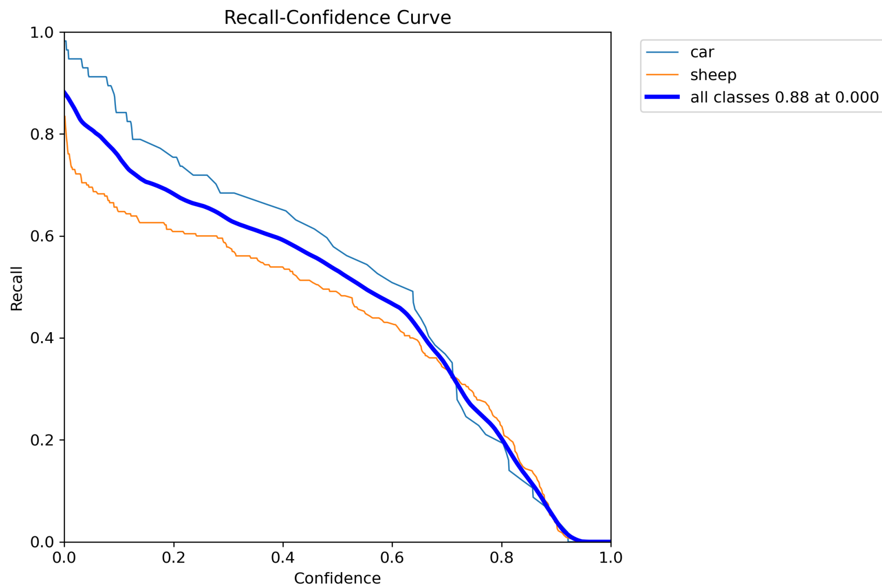

Figure 448. confusion_matrix, yolov8n, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

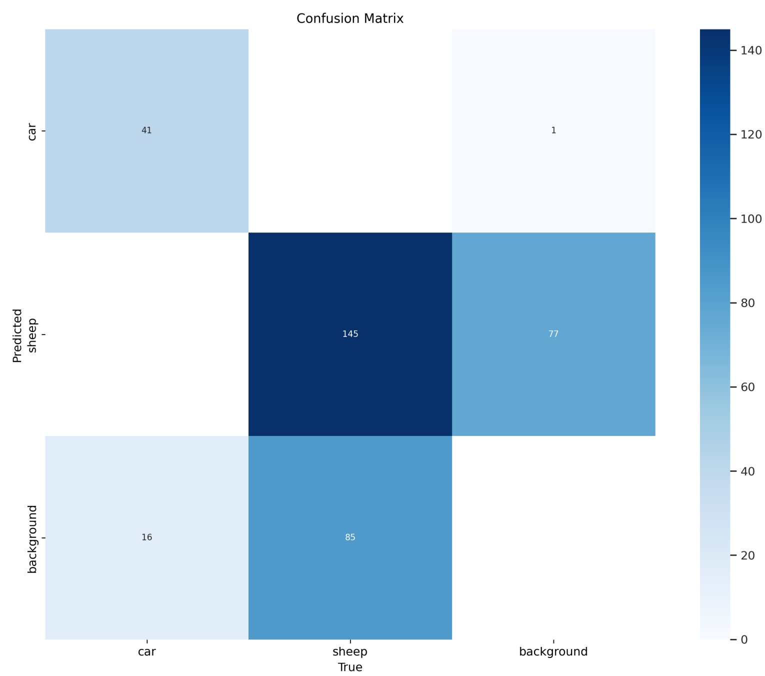

Figure 449. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

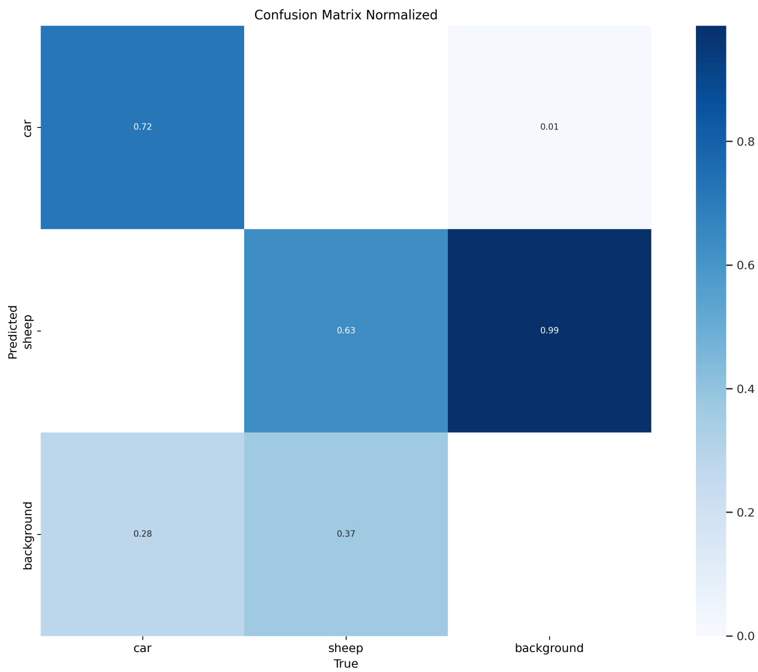

Figure 450. f1_over_confidence, yolov8n, pre-trained=False, epochs=50, data=duomo, hyperparameter-tuned=False

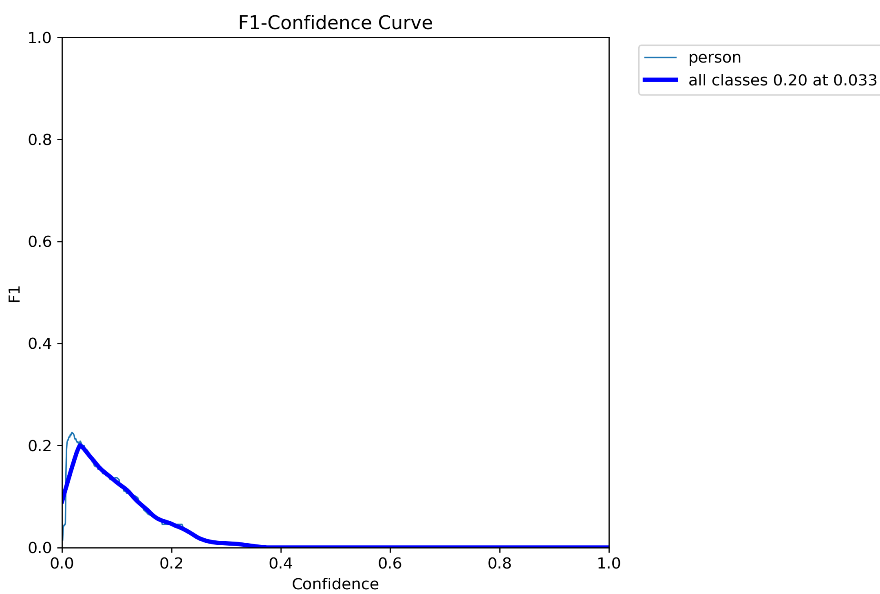

Figure 451. precision_over_recall, yolov8n, pre-trained=False, epochs=50, data=duomo, hyperparameter-tuned=False

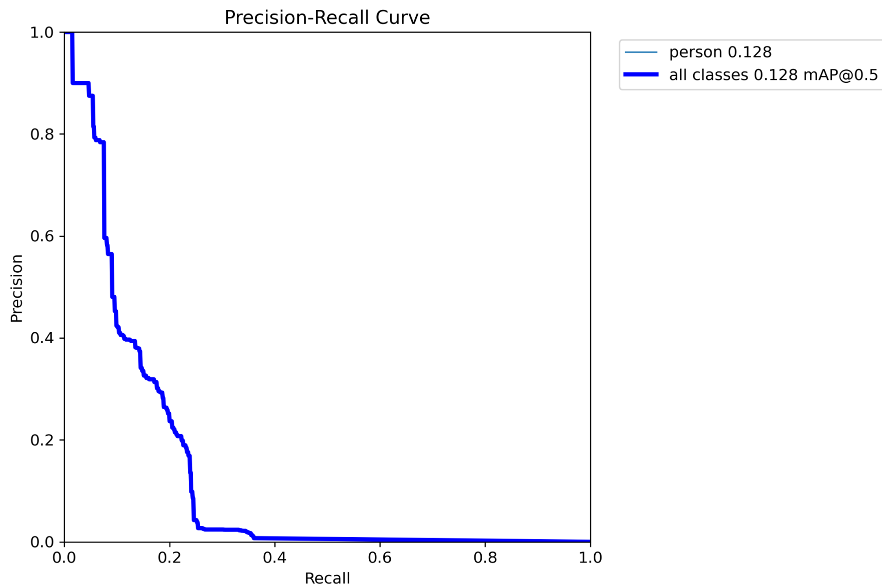

Figure 452. precision_over_confidence, yolov8n, pre-trained=False, epochs=50, data=duomo, hyperparameter-tuned=False

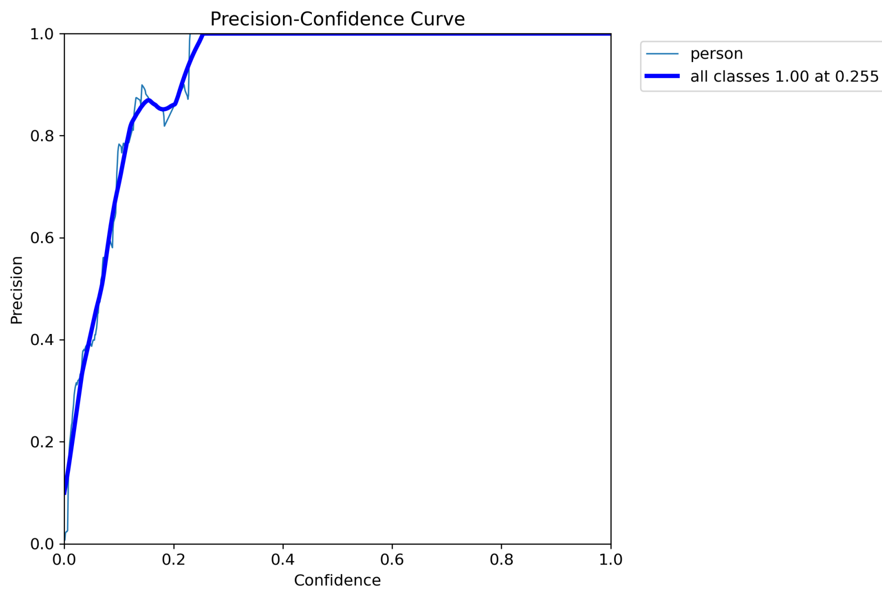

Figure 453. recall_over_confidence, yolov8n, pre-trained=False, epochs=50, data=duomo, hyperparameter-tuned=False

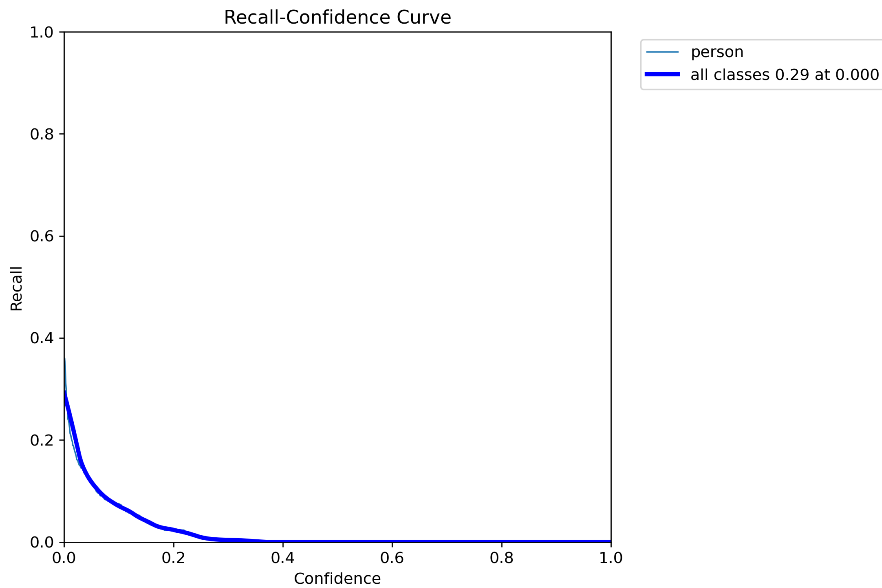

Figure 454. confusion_matrix, yolov8n, pre-trained=False, epochs=50, data=duomo, hyperparameter-tuned=False

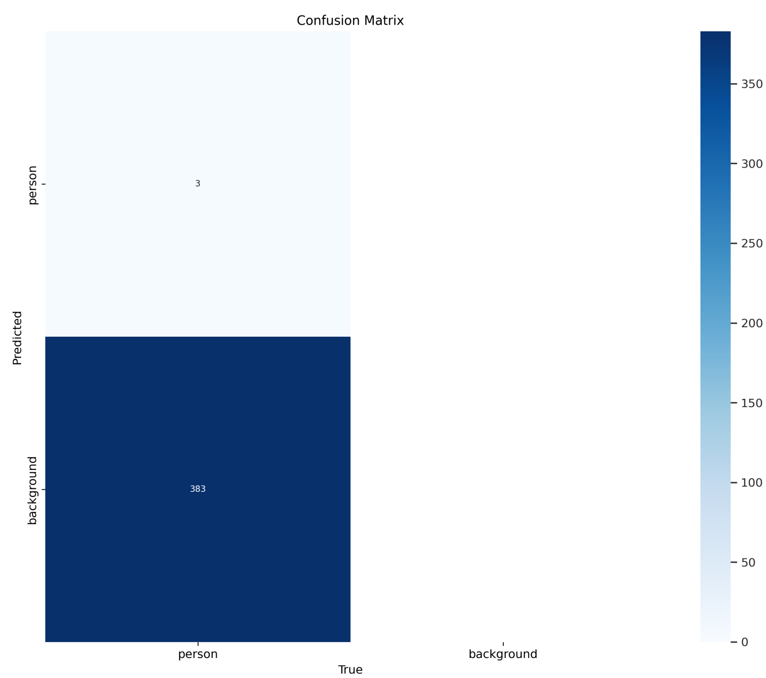

Figure 455. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=50, data=duomo, hyperparameter-tuned=False

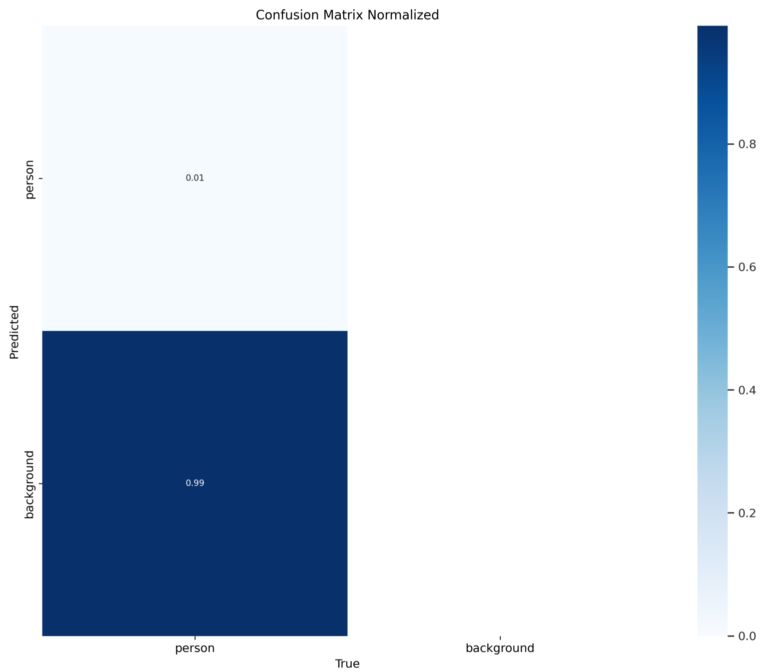

Figure 456. f1_over_confidence, yolov8n, pre-trained=False, epochs=100, data=duomo, hyperparameter-tuned=False

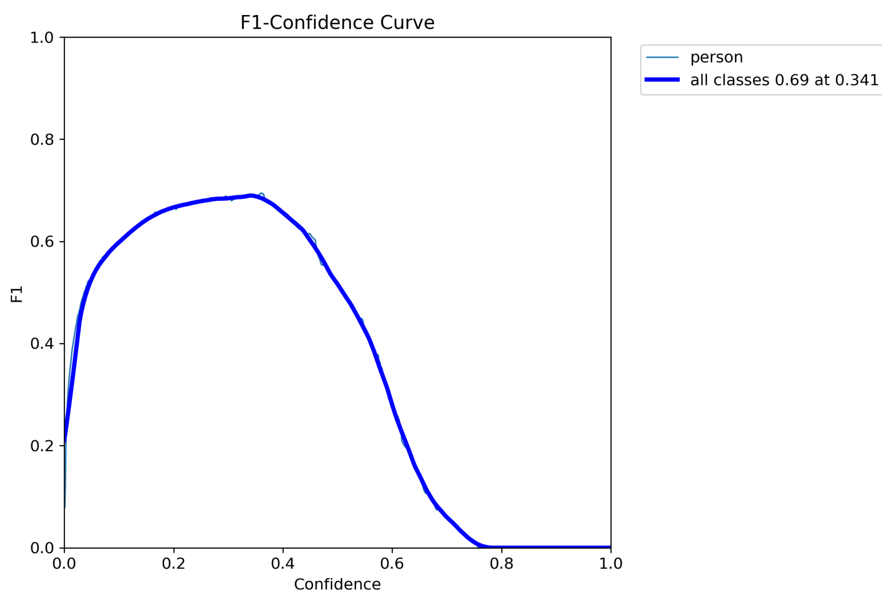

Figure 457. precision_over_recall, yolov8n, pre-trained=False, epochs=100, data=duomo, hyperparameter-tuned=False

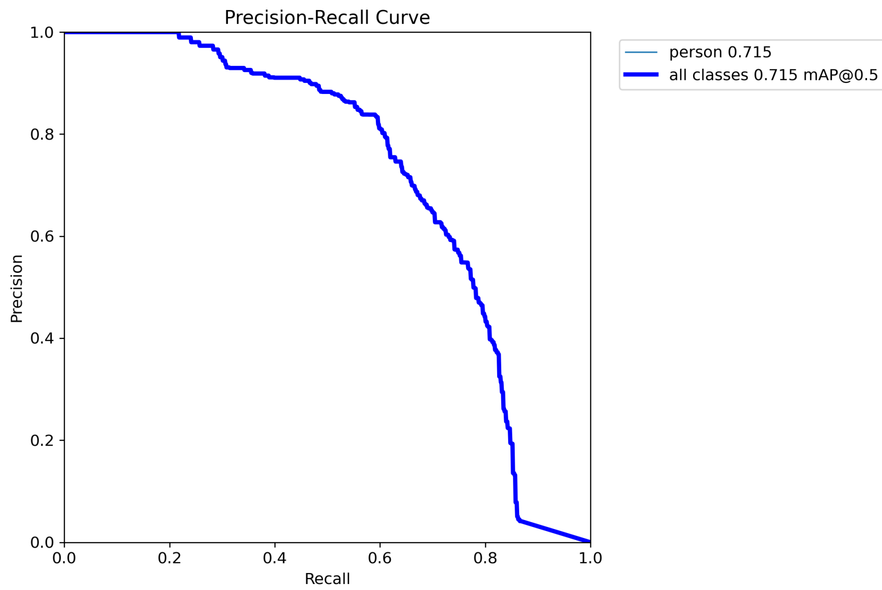

Figure 458. precision_over_confidence, yolov8n, pre-trained=False, epochs=100, data=duomo, hyperparameter-tuned=False

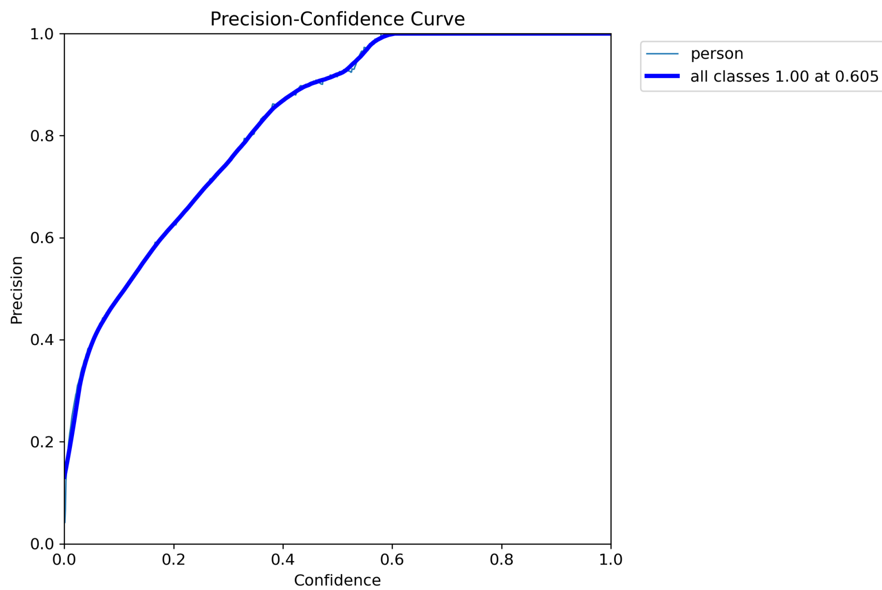

Figure 459. recall_over_confidence, yolov8n, pre-trained=False, epochs=100, data=duomo, hyperparameter-tuned=False

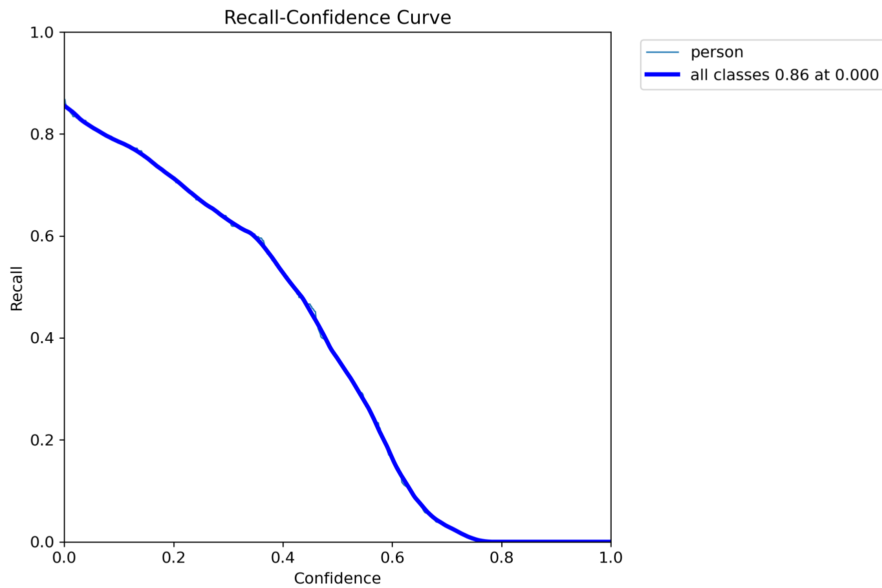

Figure 460. confusion_matrix, yolov8n, pre-trained=False, epochs=100, data=duomo, hyperparameter-tuned=False

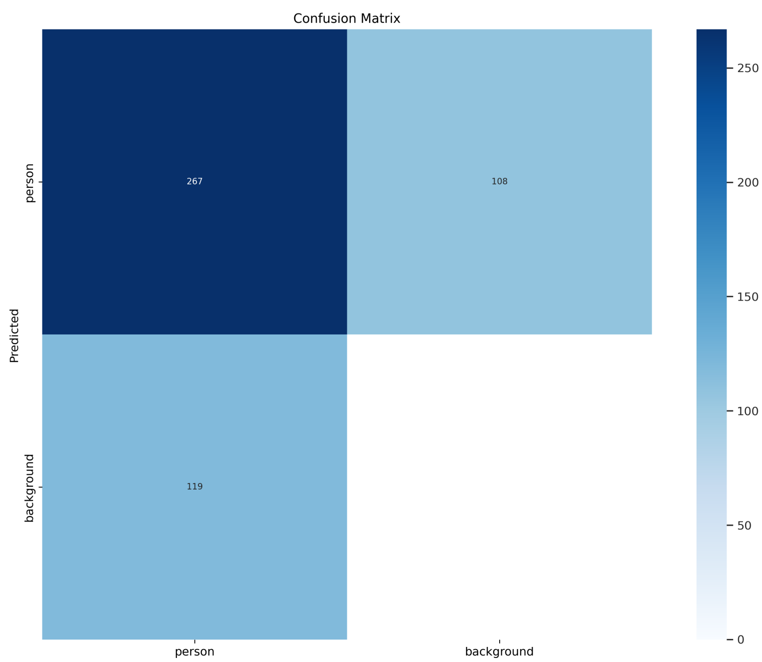

Figure 461. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=100, data=duomo, hyperparameter-tuned=False

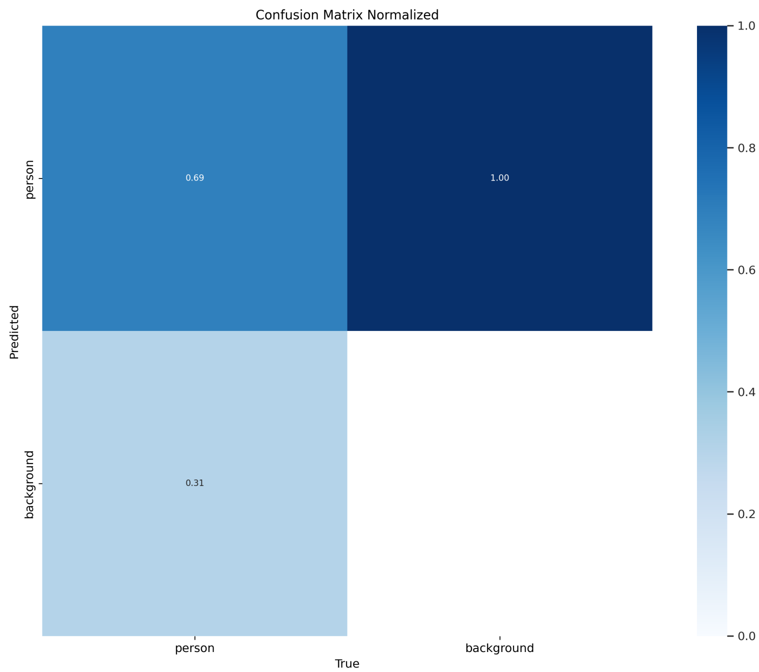

Figure 462. f1_over_confidence, yolov8n, pre-trained=False, epochs=150, data=duomo, hyperparameter-tuned=False

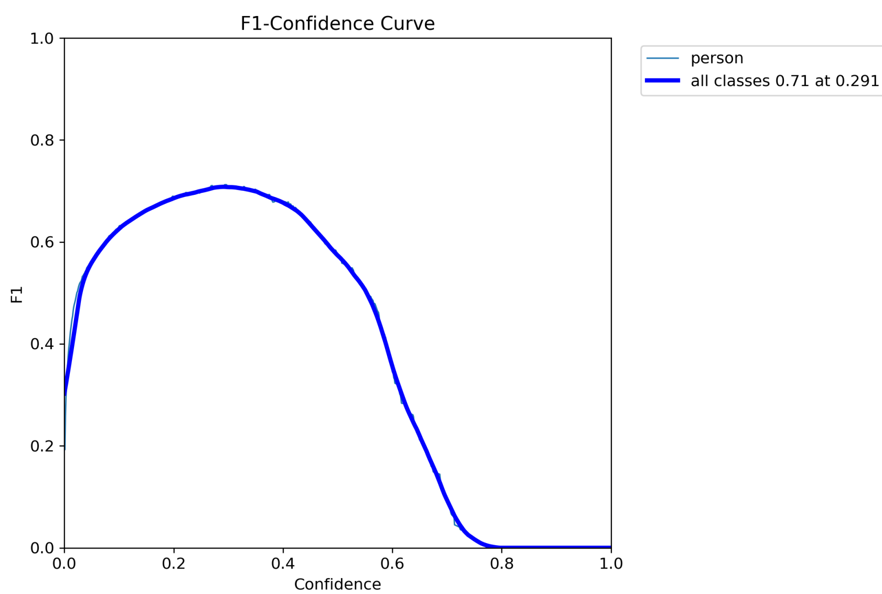

Figure 463. precision_over_recall, yolov8n, pre-trained=False, epochs=150, data=duomo, hyperparameter-tuned=False

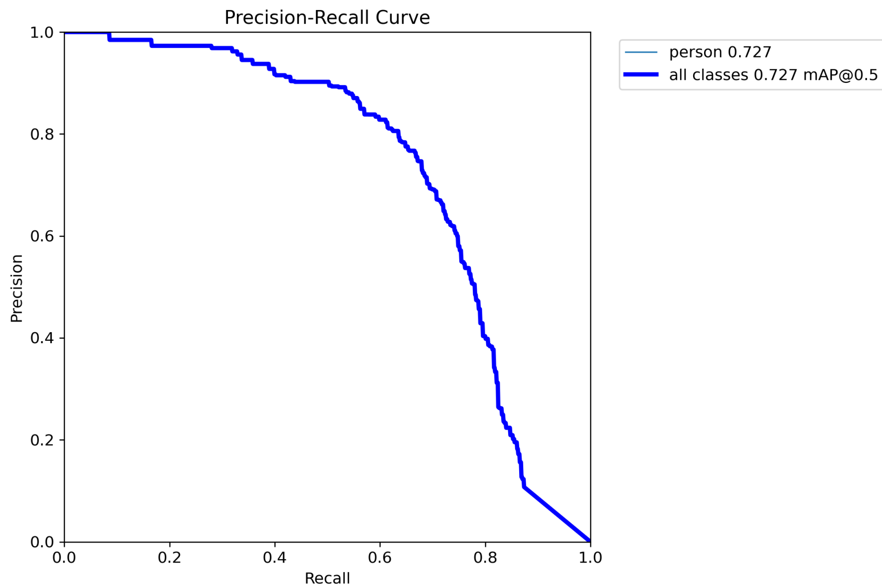

Figure 464. precision_over_confidence, yolov8n, pre-trained=False, epochs=150, data=duomo, hyperparameter-tuned=False

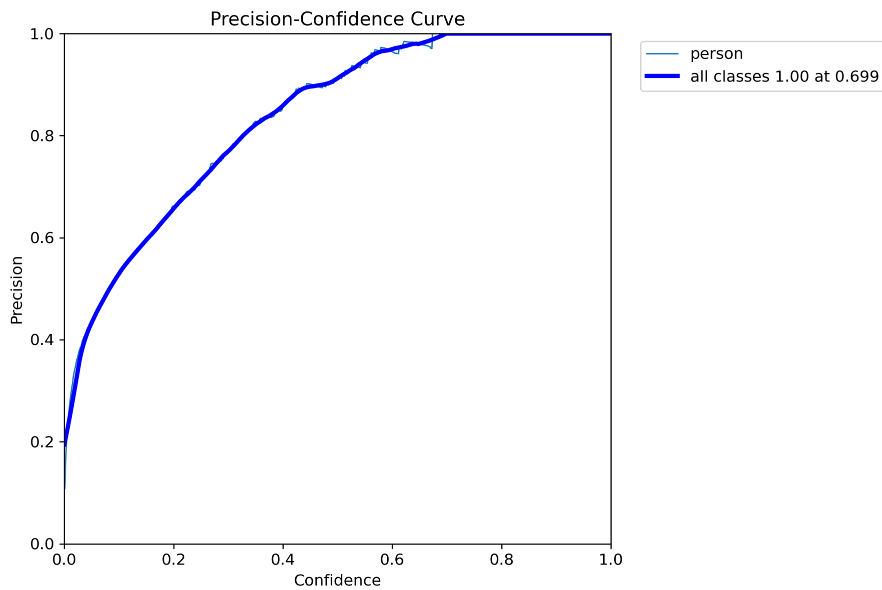

Figure 465. recall_over_confidence, yolov8n, pre-trained=False, epochs=150, data=duomo, hyperparameter-tuned=False

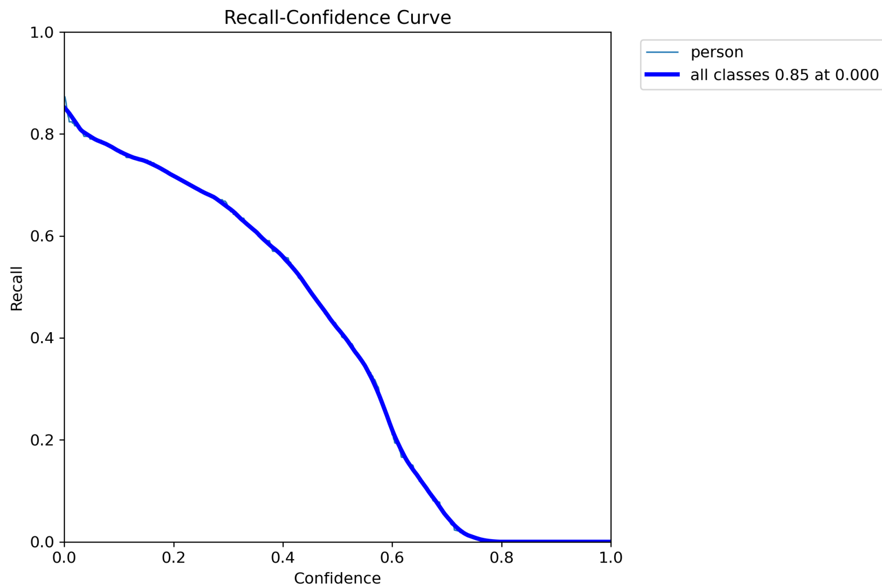

Figure 466. confusion_matrix, yolov8n, pre-trained=False, epochs=150, data=duomo, hyperparameter-tuned=False

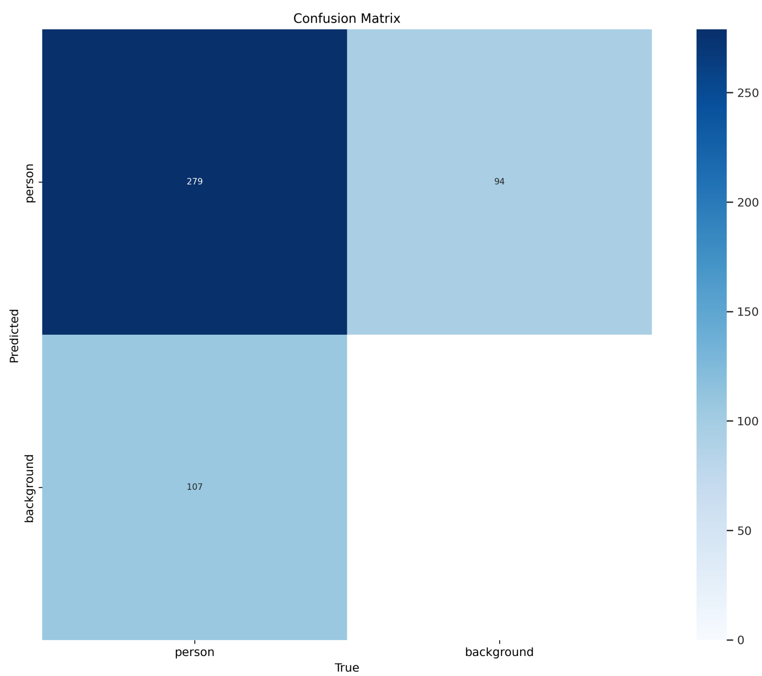

Figure 467. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=150, data=duomo, hyperparameter-tuned=False

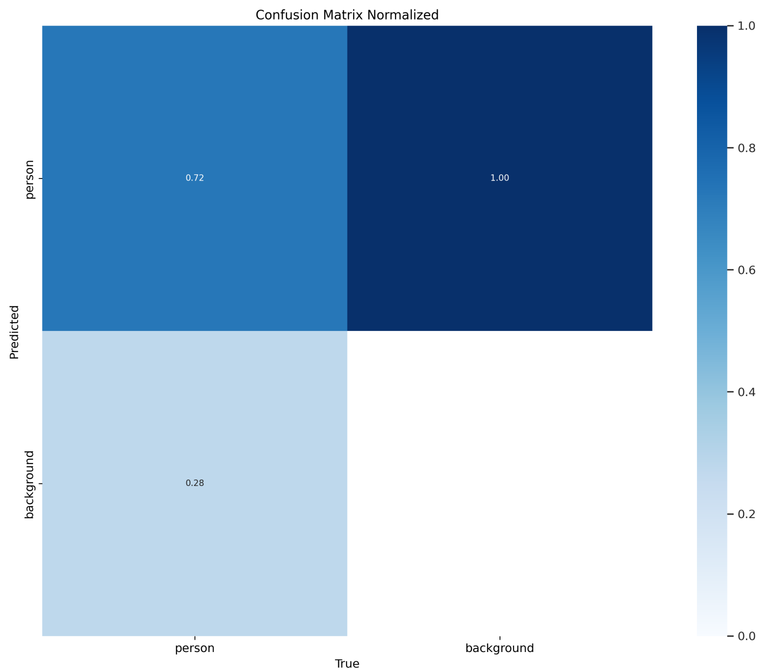

Figure 468. f1_over_confidence, yolov8n, pre-trained=False, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=False

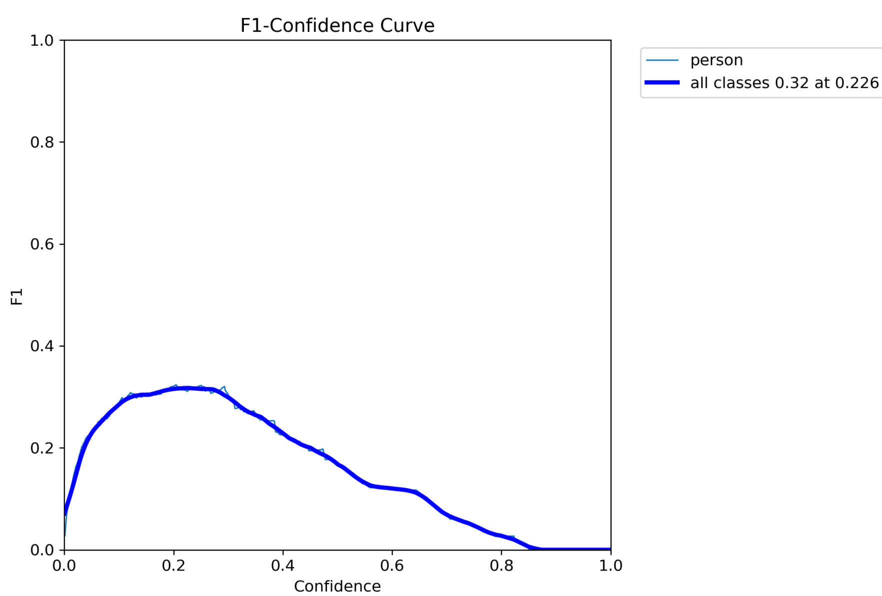

Figure 469. precision_over_recall, yolov8n, pre-trained=False, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=False

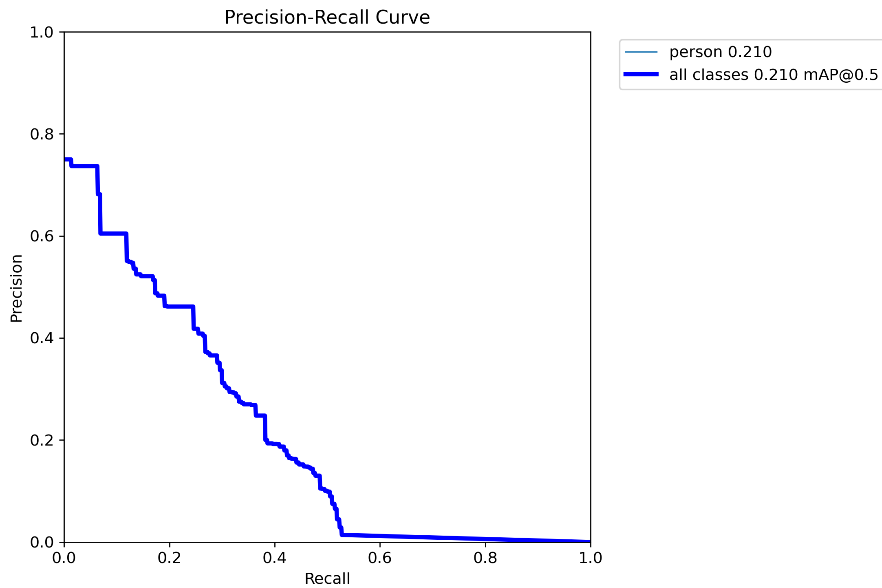

Figure 470. precision_over_confidence, yolov8n, pre-trained=False, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=False

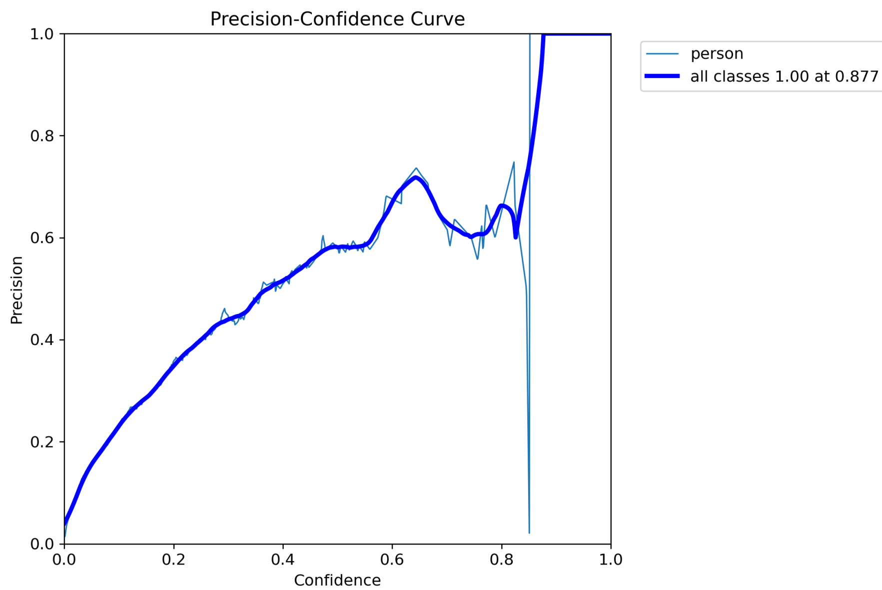

Figure 471. recall_over_confidence, yolov8n, pre-trained=False, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=False

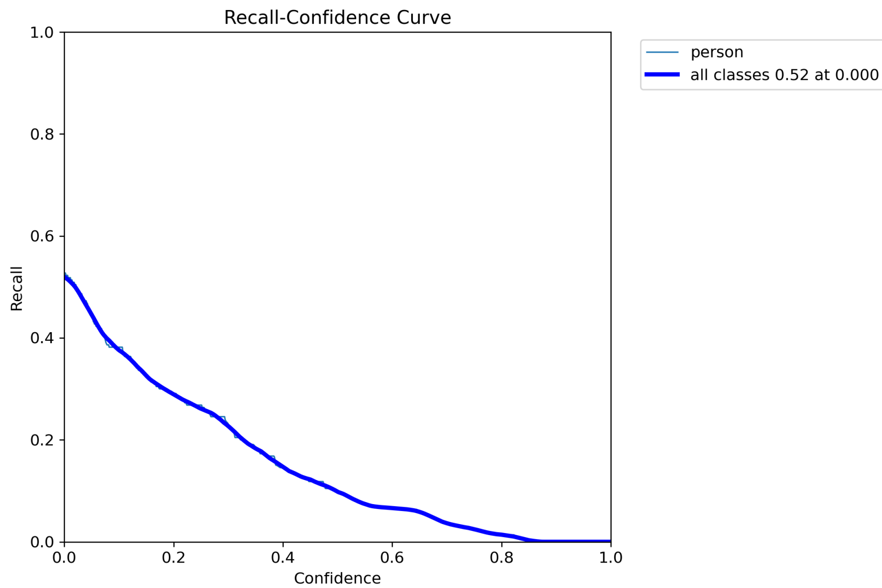

Figure 472. confusion_matrix, yolov8n, pre-trained=False, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=False

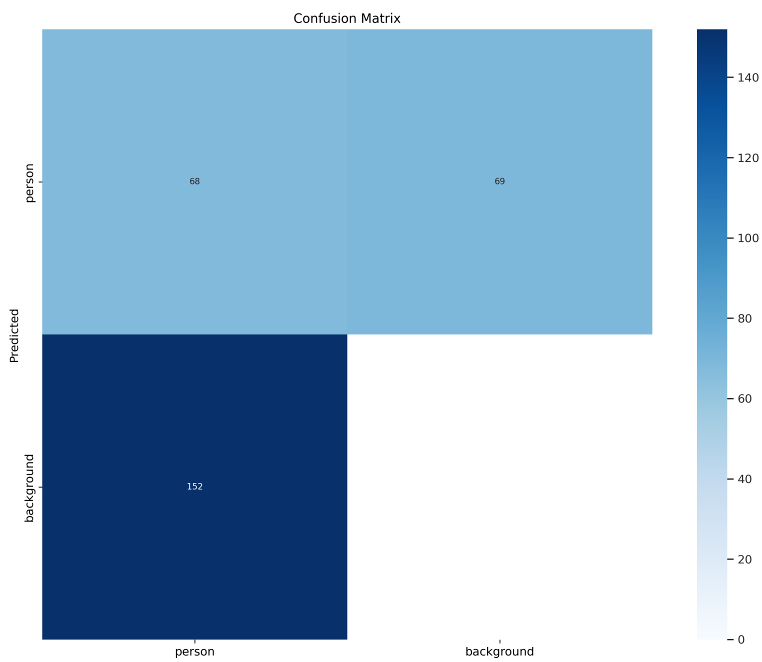

Figure 473. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=False

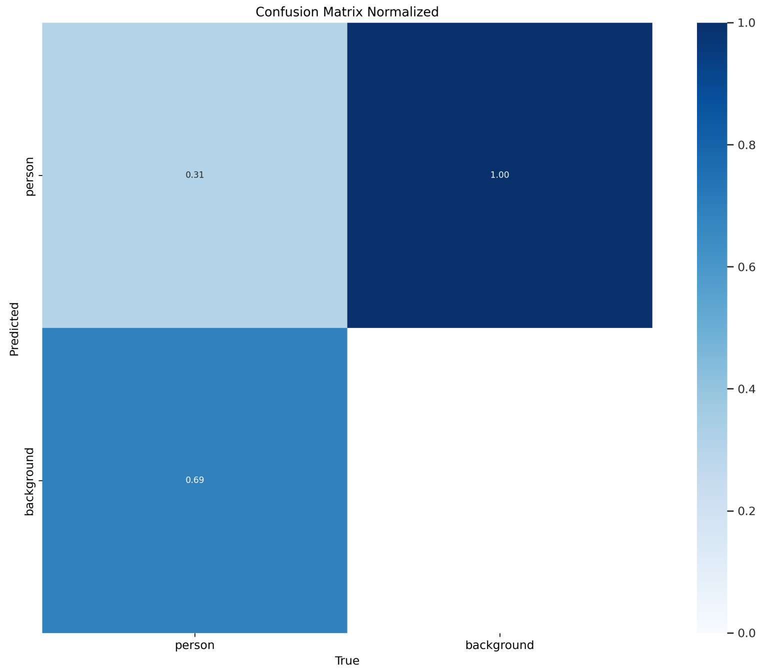

Figure 478. confusion_matrix, yolov8n, pre-trained=False, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=False

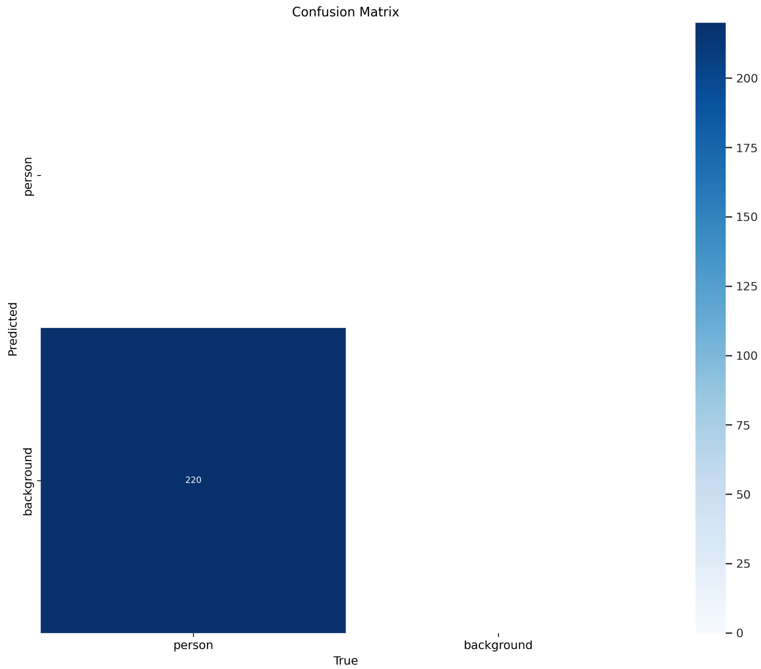

Figure 479. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=False

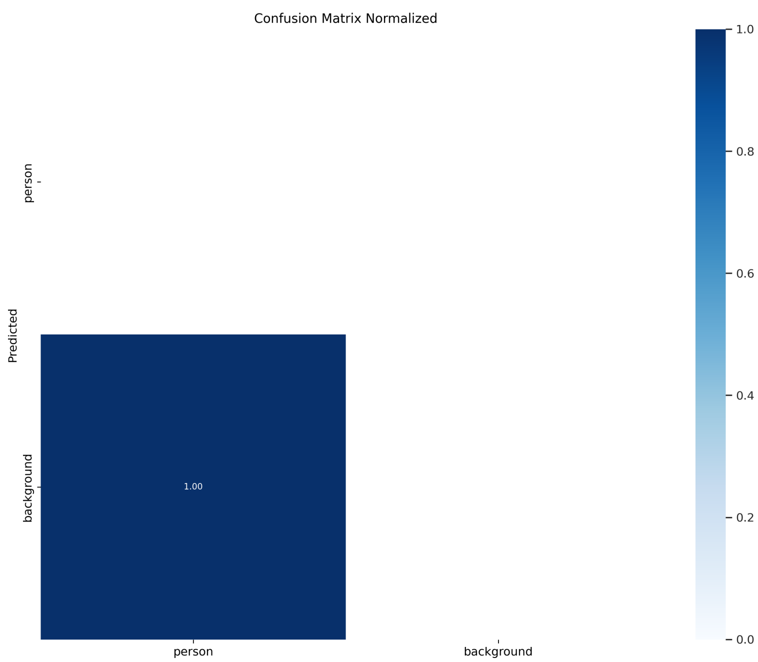

Figure 480. f1_over_confidence, yolov8n, pre-trained=False, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=False

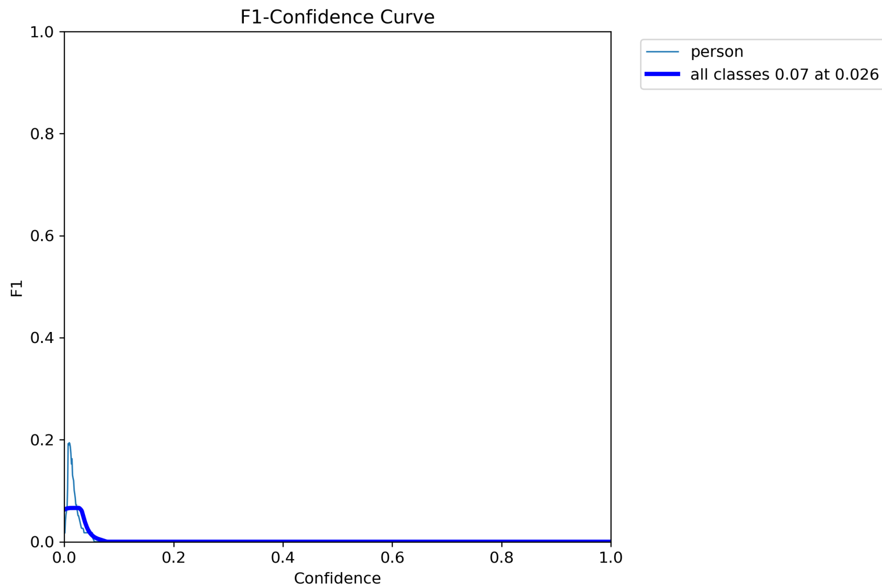

Figure 481. precision_over_recall, yolov8n, pre-trained=False, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=False

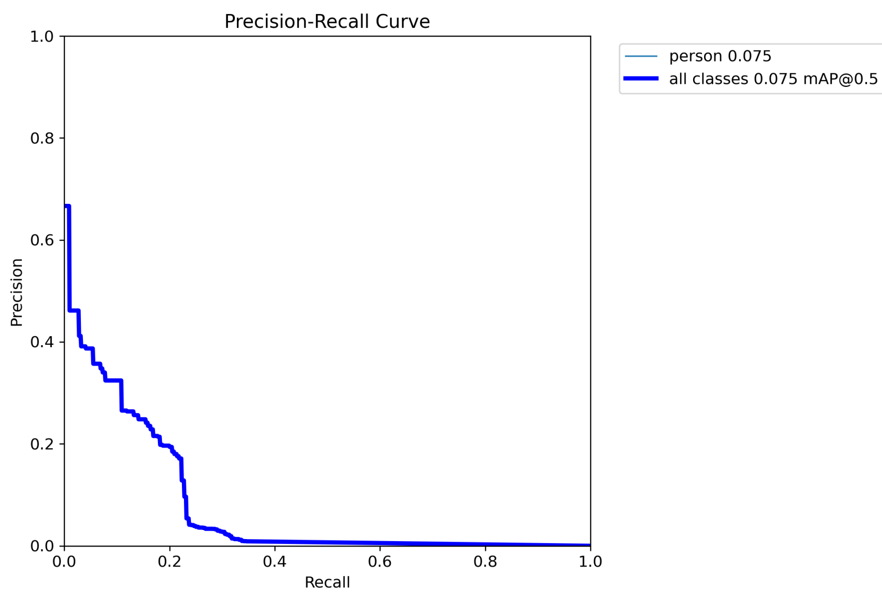

Figure 482. precision_over_confidence, yolov8n, pre-trained=False, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=False

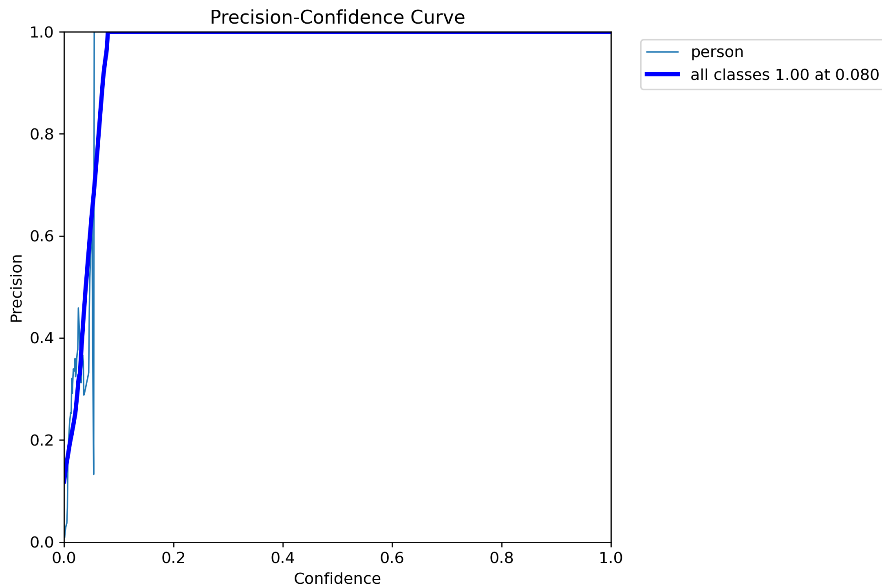

Figure 483. recall_over_confidence, yolov8n, pre-trained=False, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=False

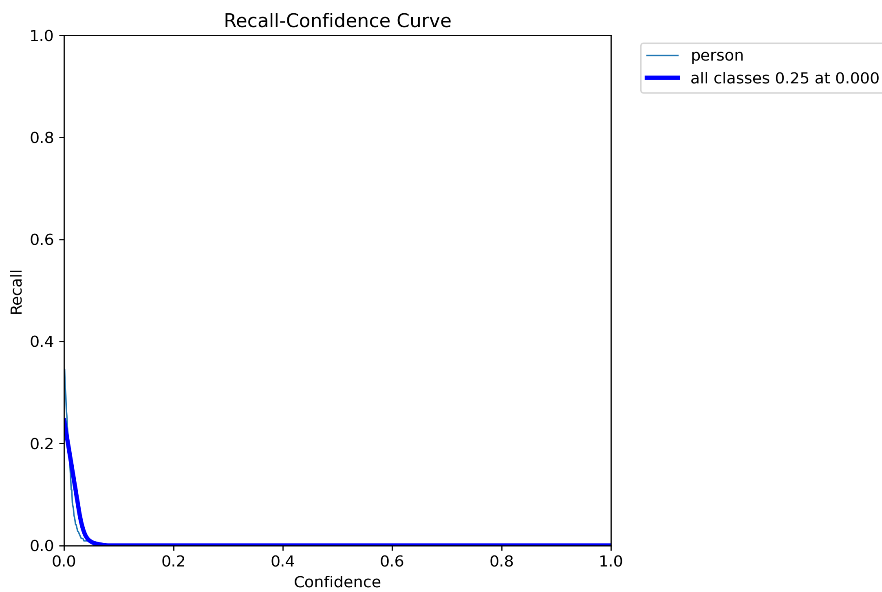

Figure 484. confusion_matrix, yolov8n, pre-trained=False, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=False

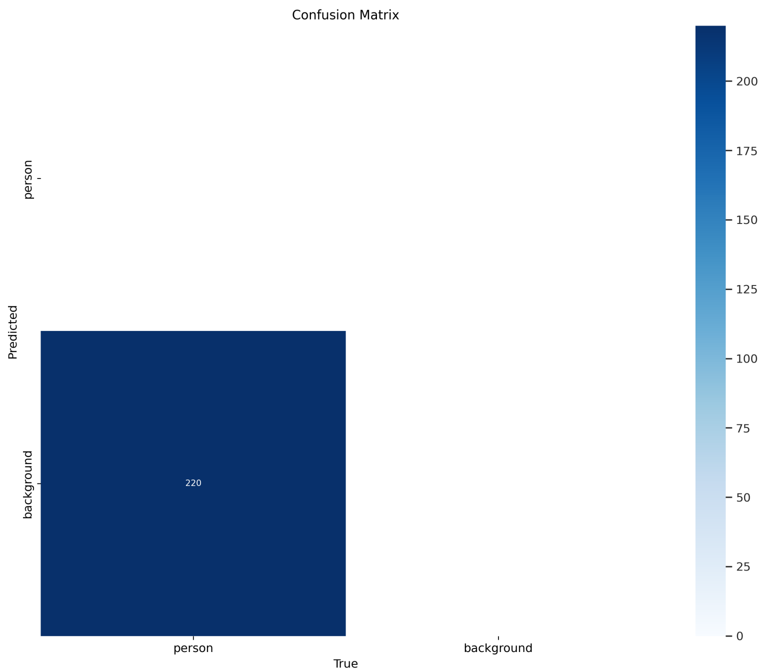

Figure 485. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=False

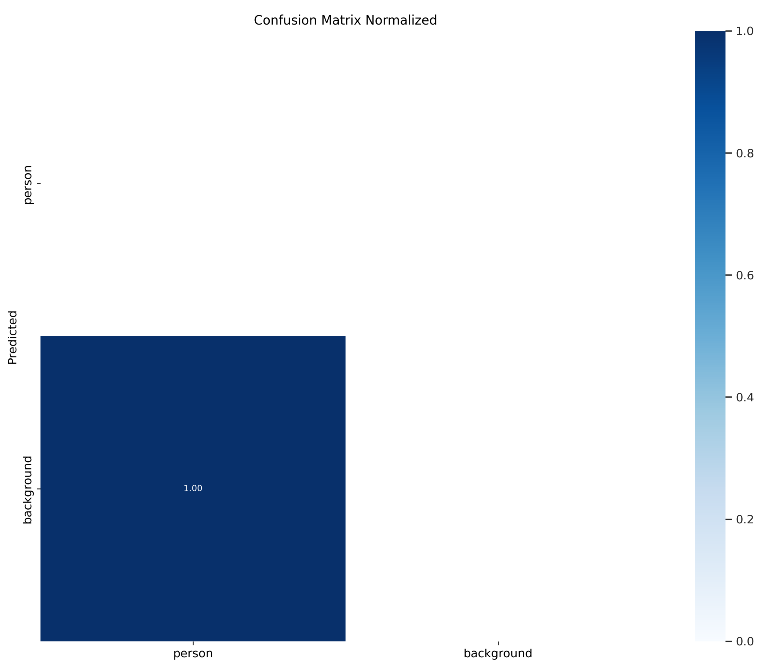

Figure 490. confusion_matrix, yolov8n, pre-trained=False, epochs=50, data=keskvaljak, hyperparameter-tuned=False

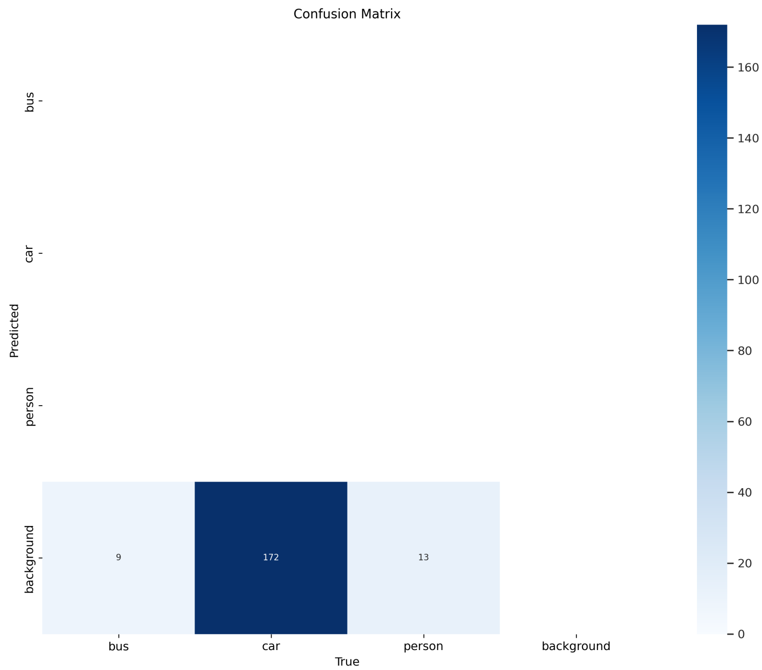

Figure 491. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=50, data=keskvaljak, hyperparameter-tuned=False

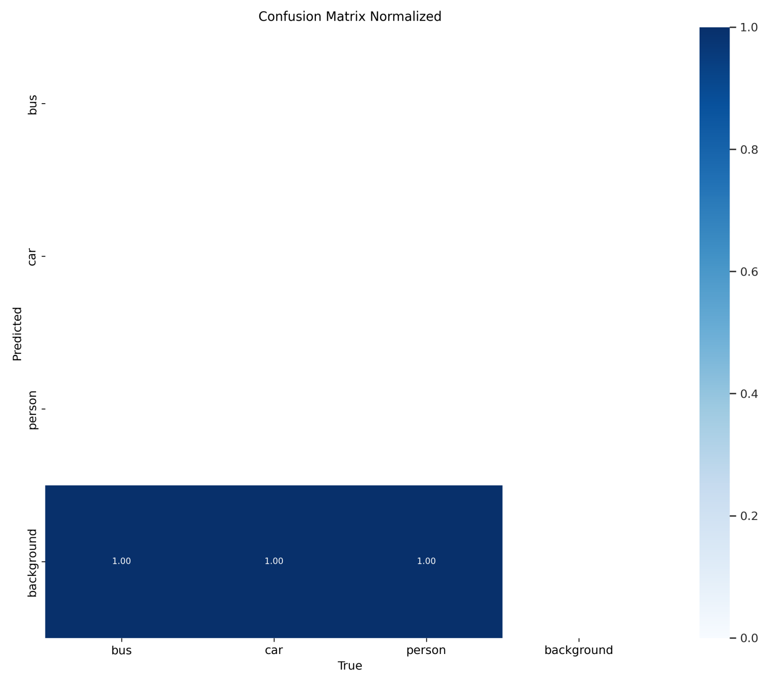

Figure 496. confusion_matrix, yolov8n, pre-trained=False, epochs=100, data=keskvaljak, hyperparameter-tuned=False

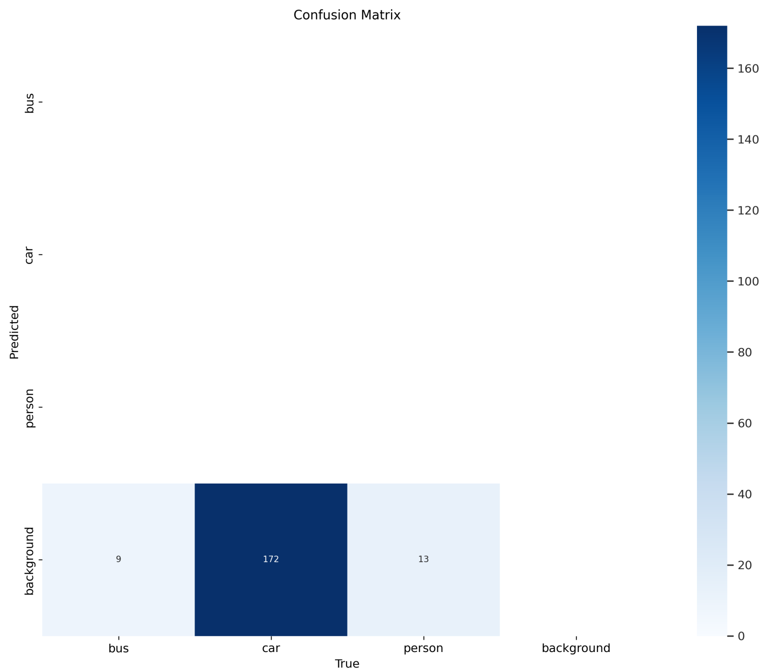

Figure 497. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=100, data=keskvaljak, hyperparameter-tuned=False

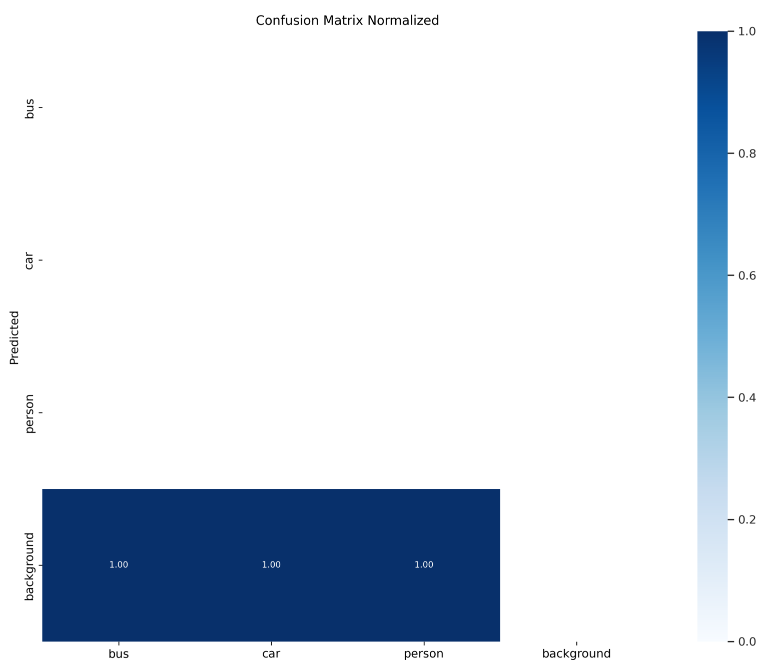

Figure 498. f1_over_confidence, yolov8n, pre-trained=False, epochs=150, data=keskvaljak, hyperparameter-tuned=False

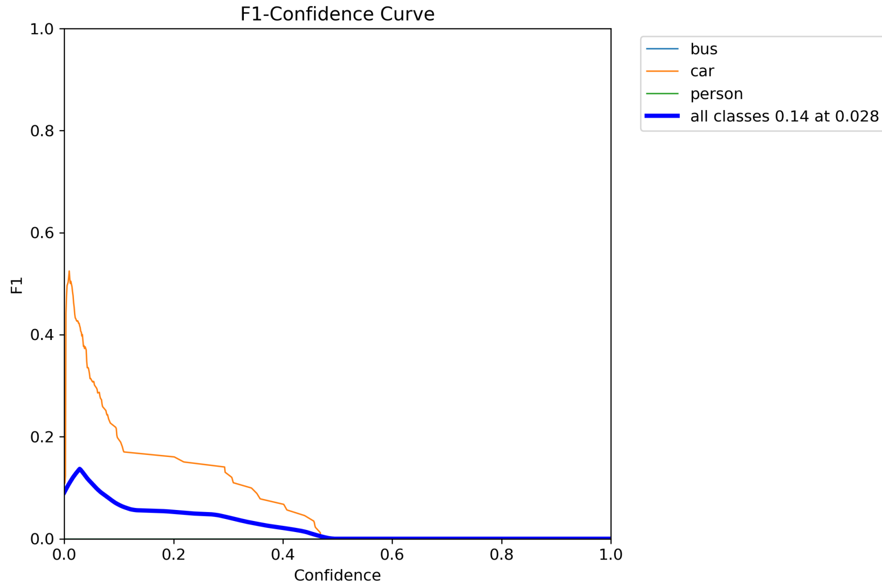

Figure 499. precision_over_recall, yolov8n, pre-trained=False, epochs=150, data=keskvaljak, hyperparameter-tuned=False

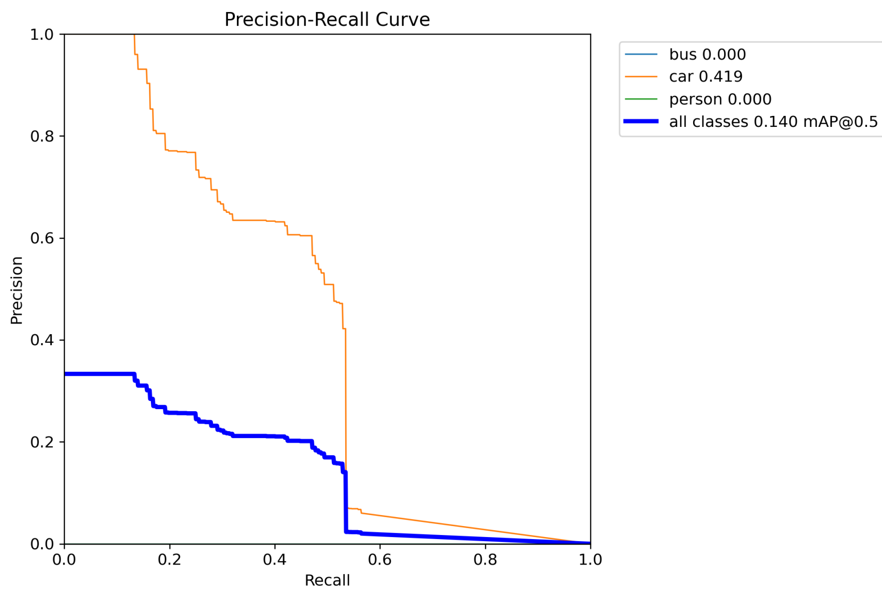

Figure 500. precision_over_confidence, yolov8n, pre-trained=False, epochs=150, data=keskvaljak, hyperparameter-tuned=False

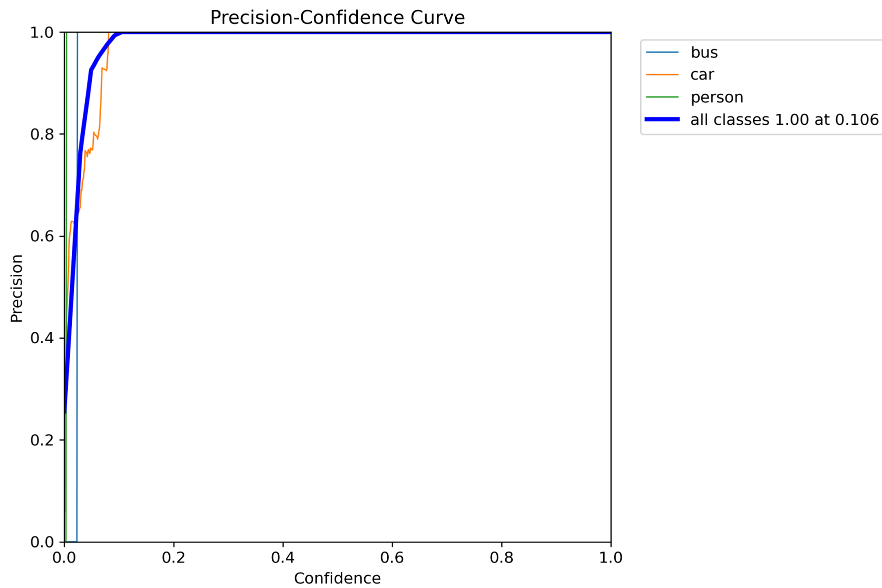

Figure 501. recall_over_confidence, yolov8n, pre-trained=False, epochs=150, data=keskvaljak, hyperparameter-tuned=False

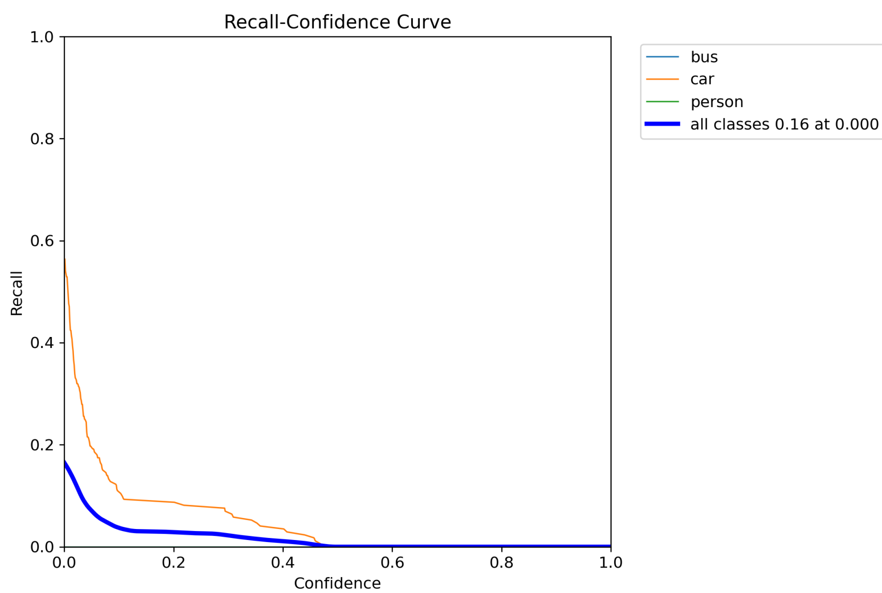

Figure 502. confusion_matrix, yolov8n, pre-trained=False, epochs=150, data=keskvaljak, hyperparameter-tuned=False

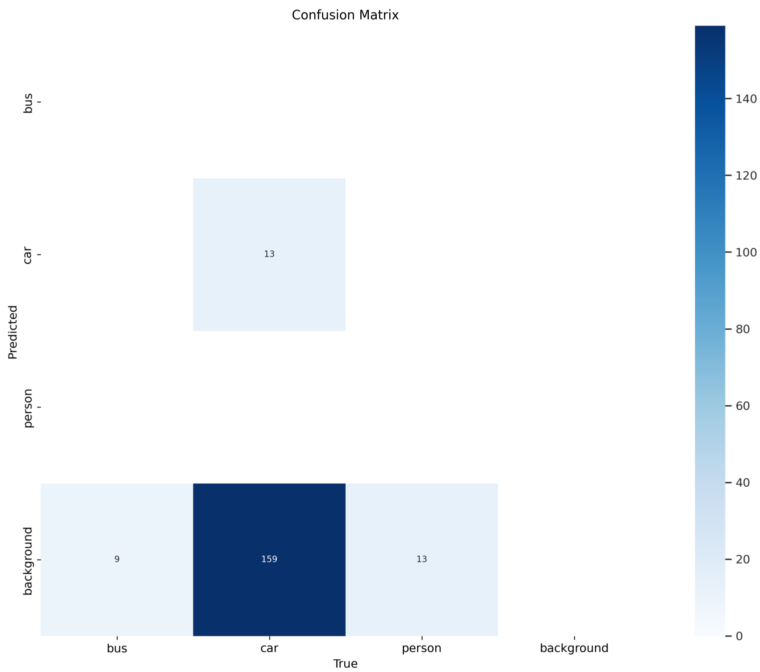

Figure 503. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=150, data=keskvaljak, hyperparameter-tuned=False

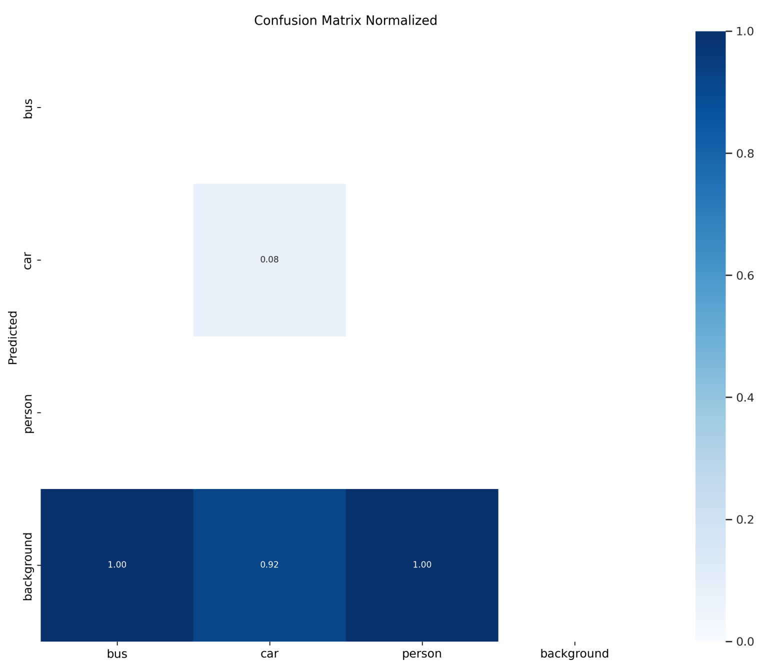

Figure 508. confusion_matrix, yolov8n, pre-trained=False, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=False

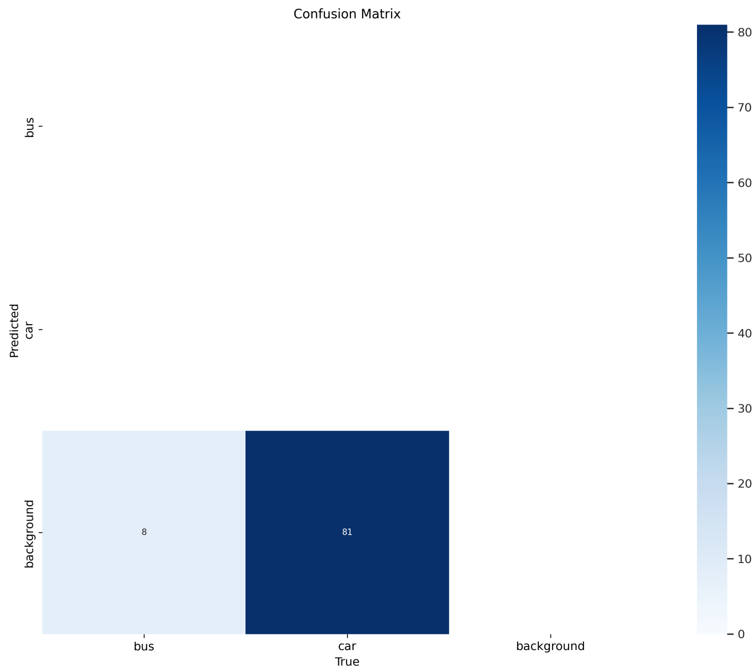

Figure 509. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=False

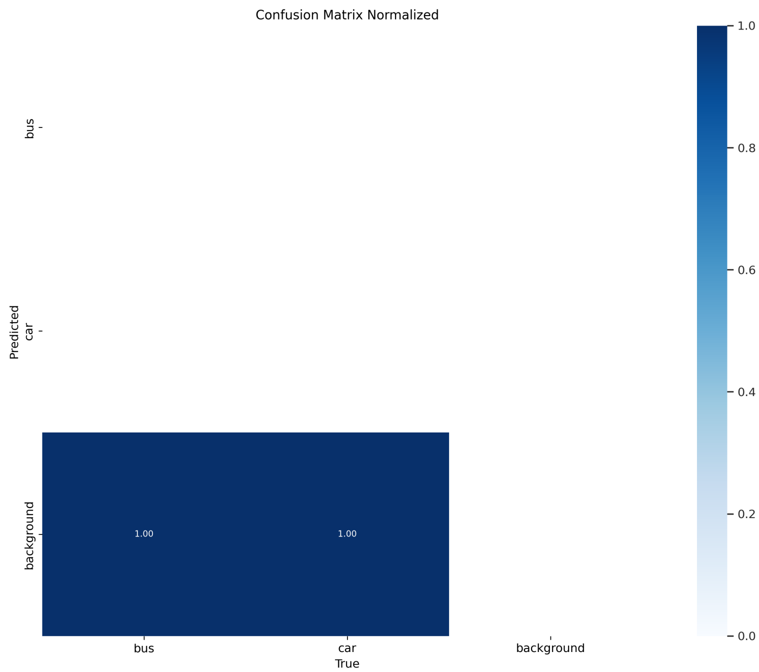

Figure 514. confusion_matrix, yolov8n, pre-trained=False, epochs=100, data=kielce_university_of_technology, hyperparameter-tuned=False

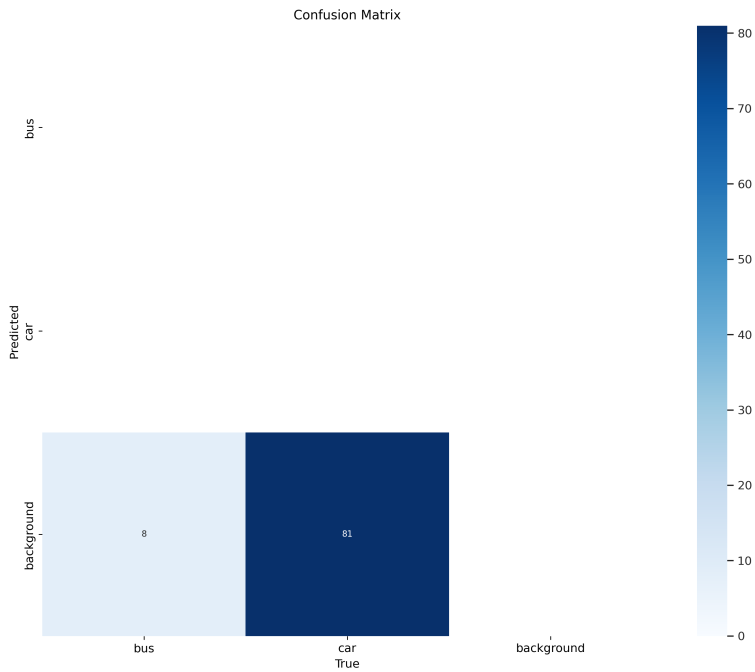

Figure 515. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=100, data=kielce_university_of_technology, hyperparameter-tuned=False

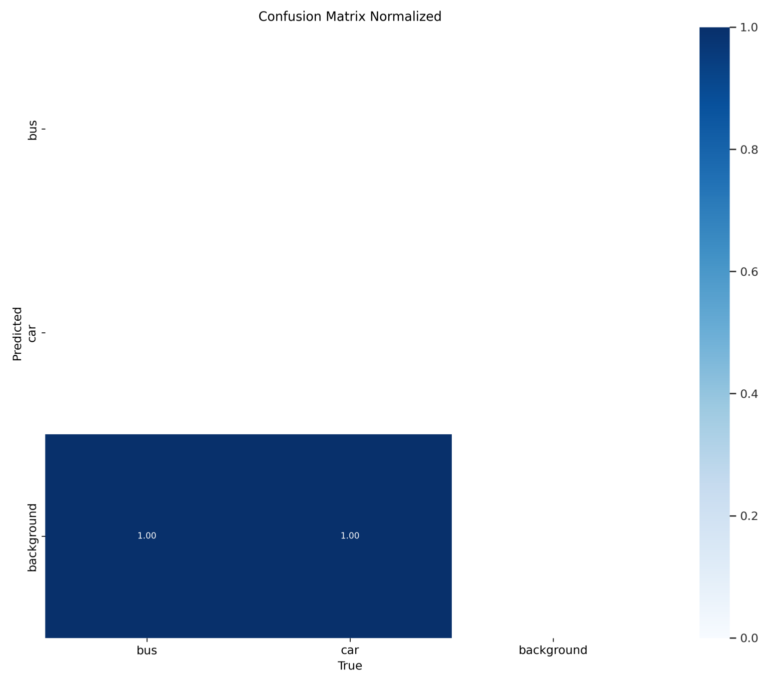

Figure 516. f1_over_confidence, yolov8n, pre-trained=False, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=False

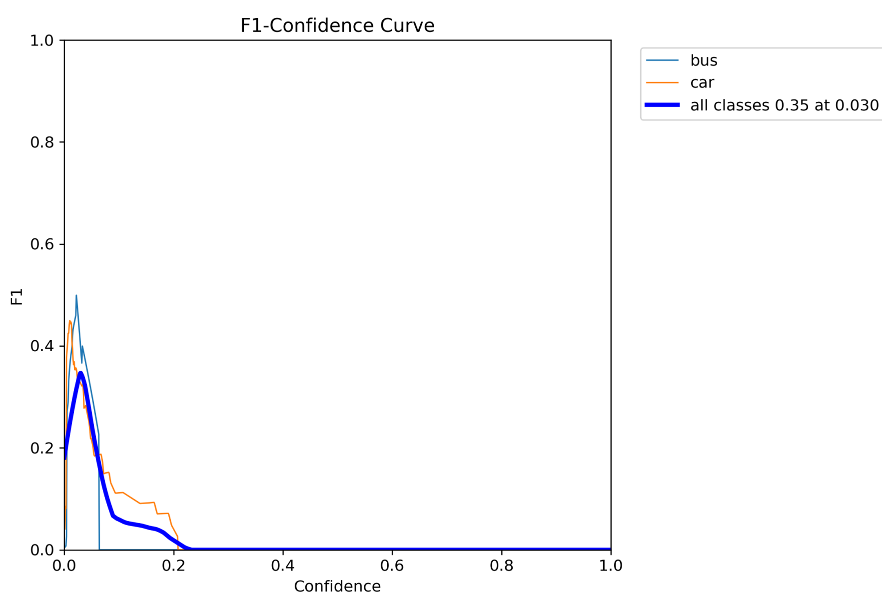

Figure 517. precision_over_recall, yolov8n, pre-trained=False, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=False

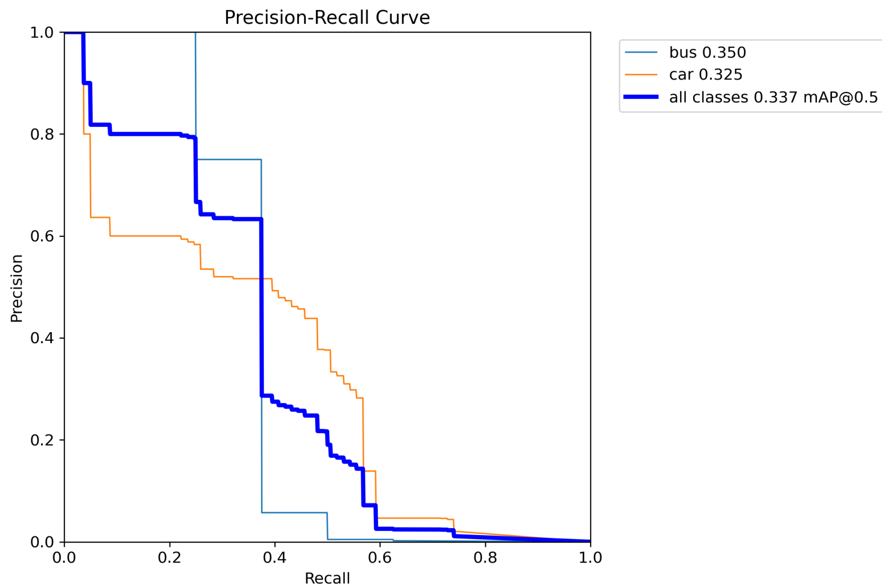

Figure 518. precision_over_confidence, yolov8n, pre-trained=False, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=False

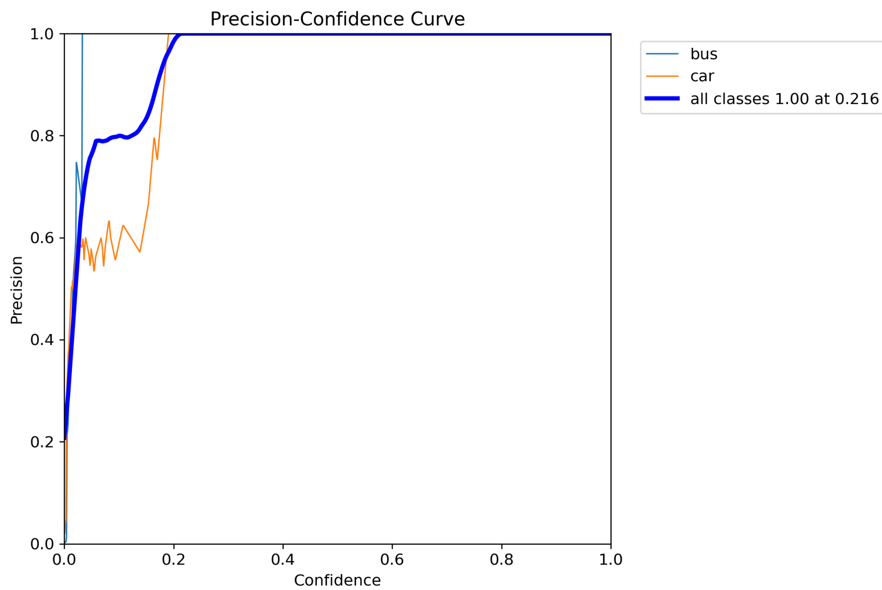

Figure 519. recall_over_confidence, yolov8n, pre-trained=False, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=False

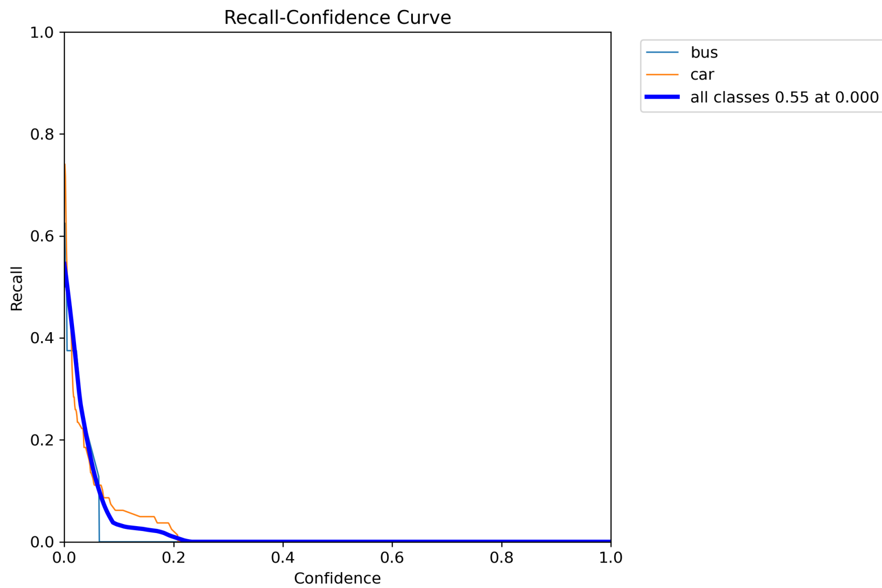

Figure 520. confusion_matrix, yolov8n, pre-trained=False, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=False

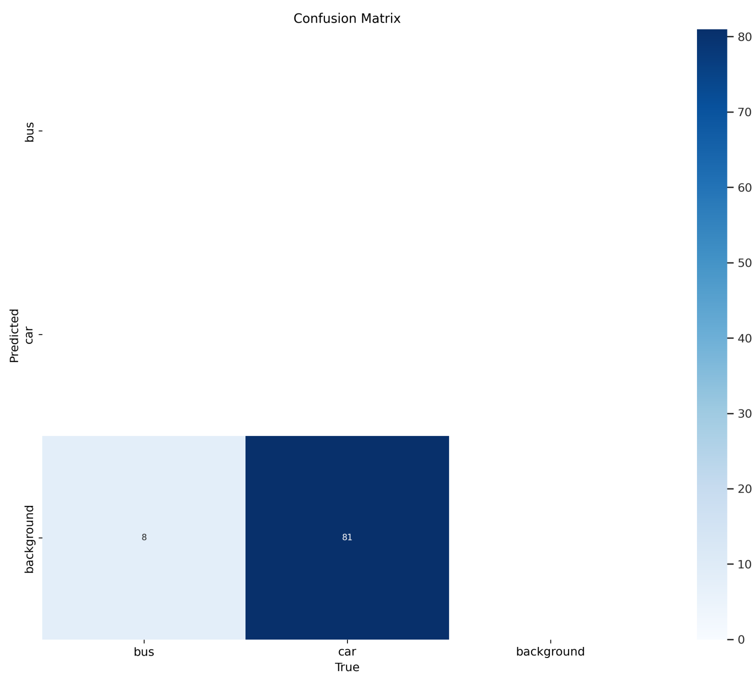

Figure 521. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=150, data=kielce_university_of_technology, hyperparameter-

tuned=False

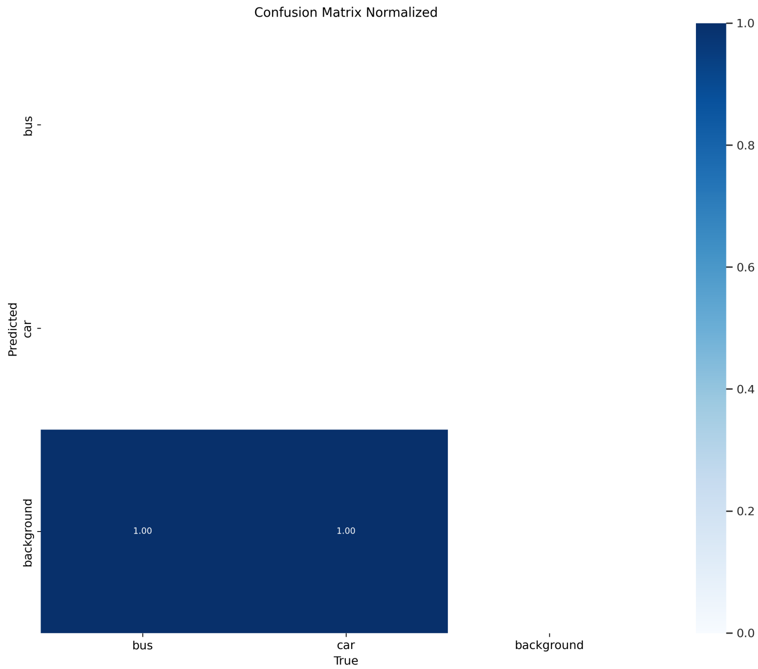

Figure 526. confusion_matrix, yolov8n, pre-trained=False, epochs=50, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

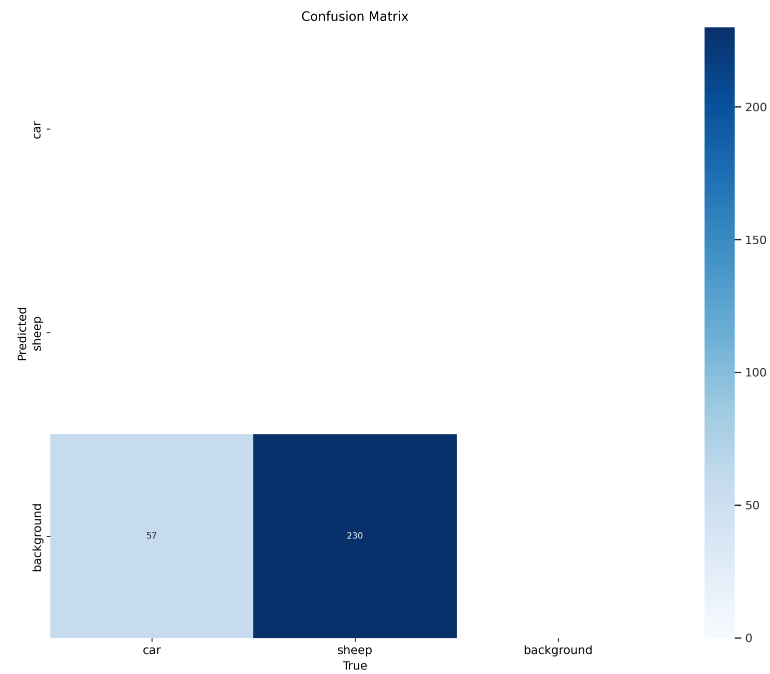

Figure 527. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=50, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

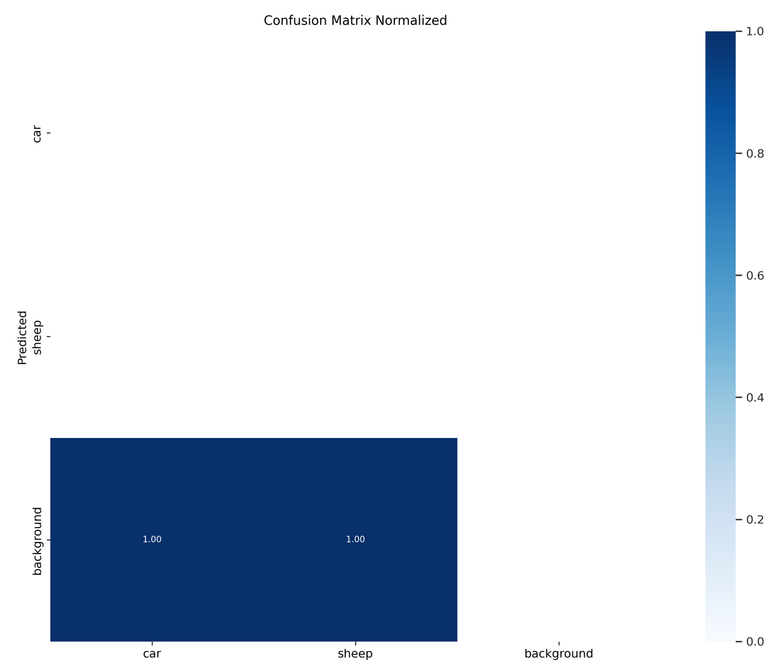

Figure 528. f1_over_confidence, yolov8n, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

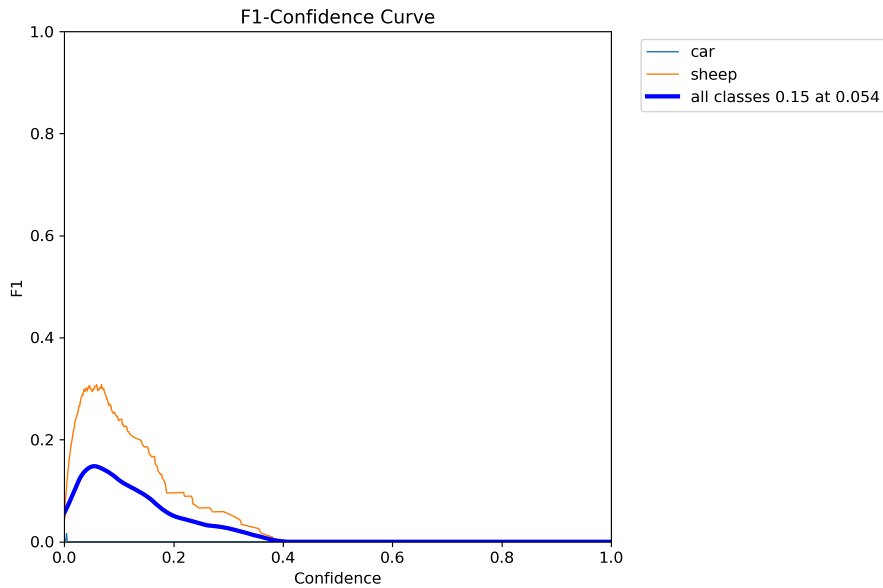

Figure 529. precision_over_recall, yolov8n, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

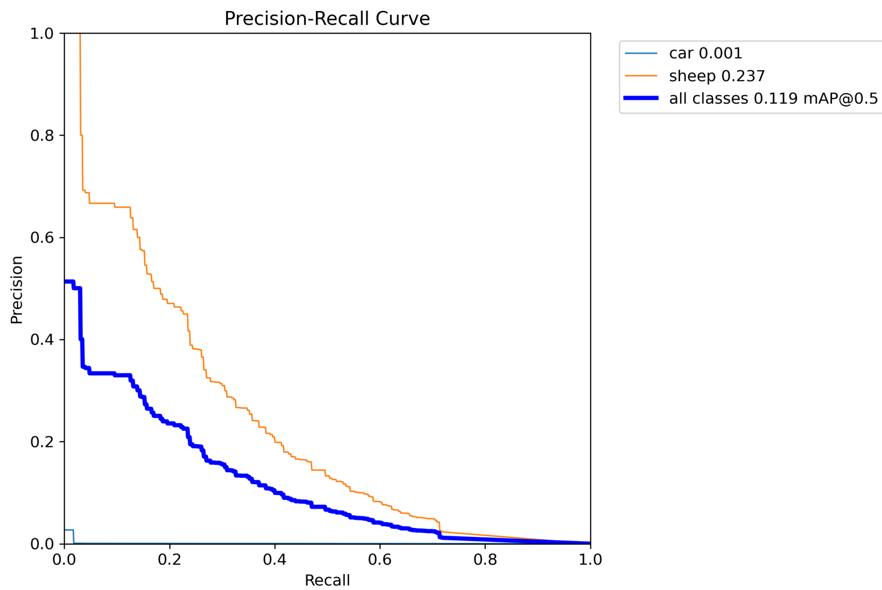

Figure 530. precision_over_confidence, yolov8n, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

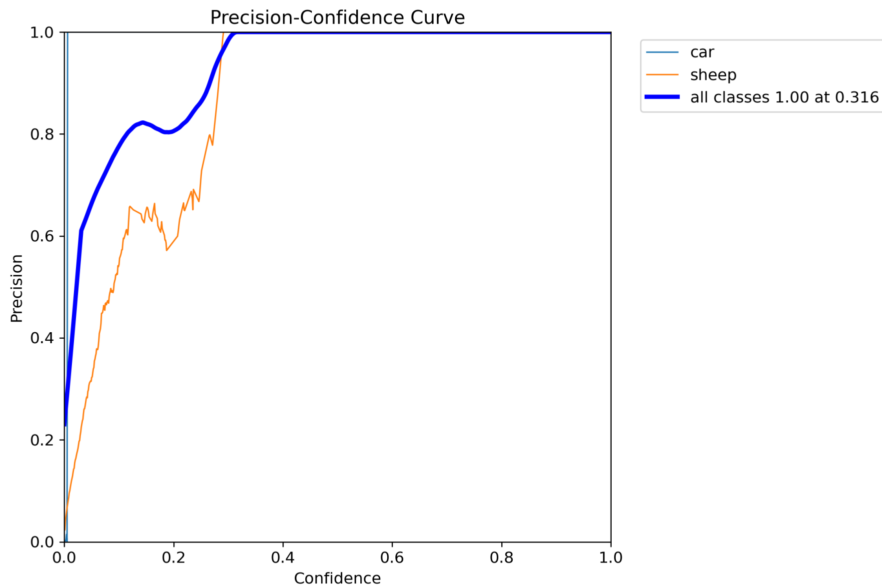

Figure 531. recall_over_confidence, yolov8n, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

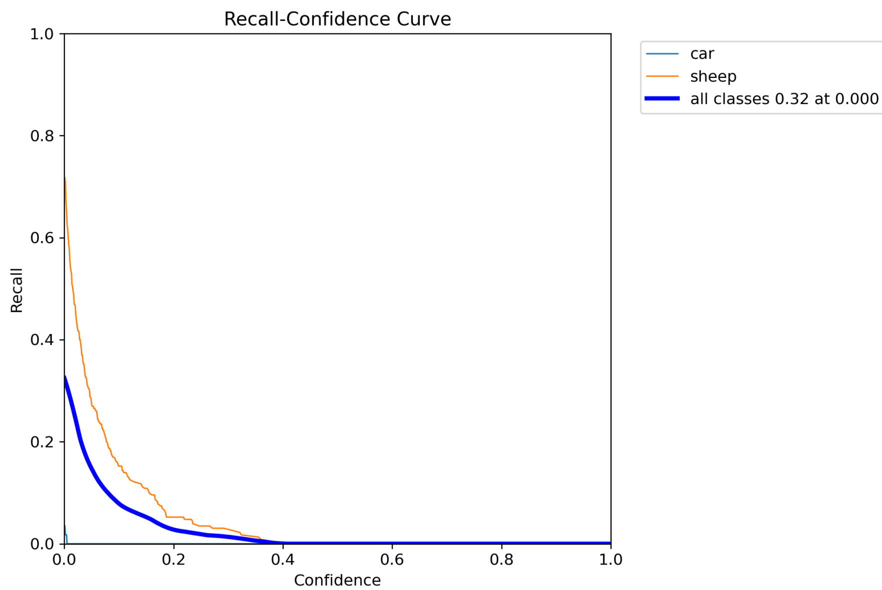

Figure 532. confusion_matrix, yolov8n, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

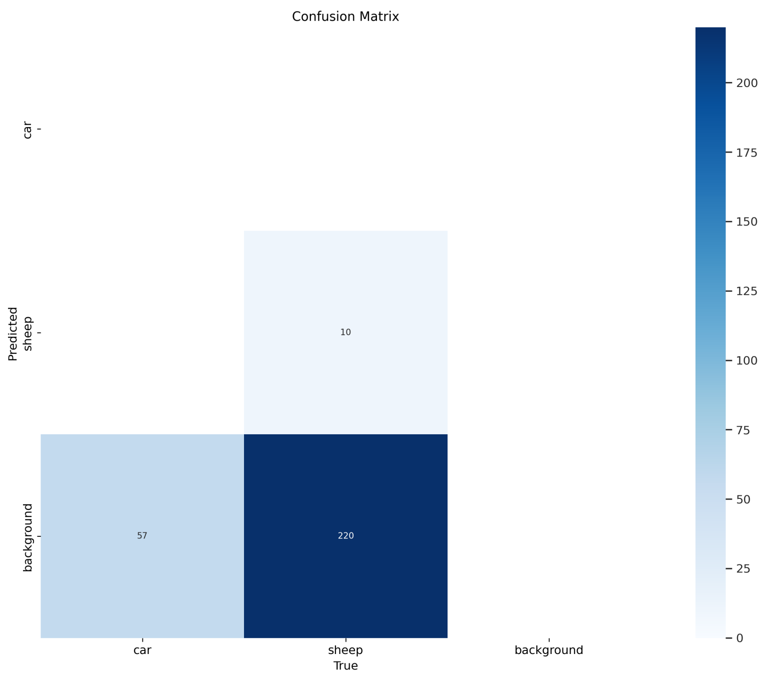

Figure 533. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

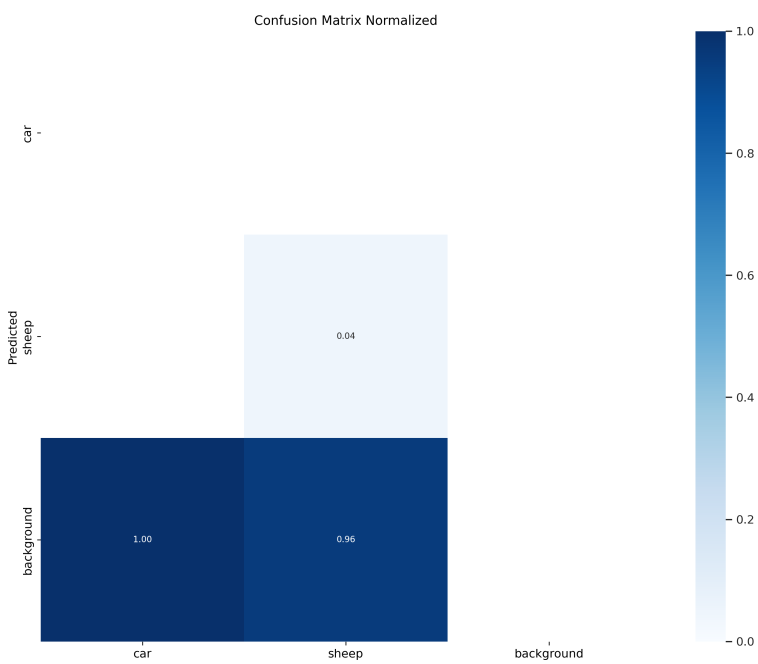

Figure 534. f1_over_confidence, yolov8n, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

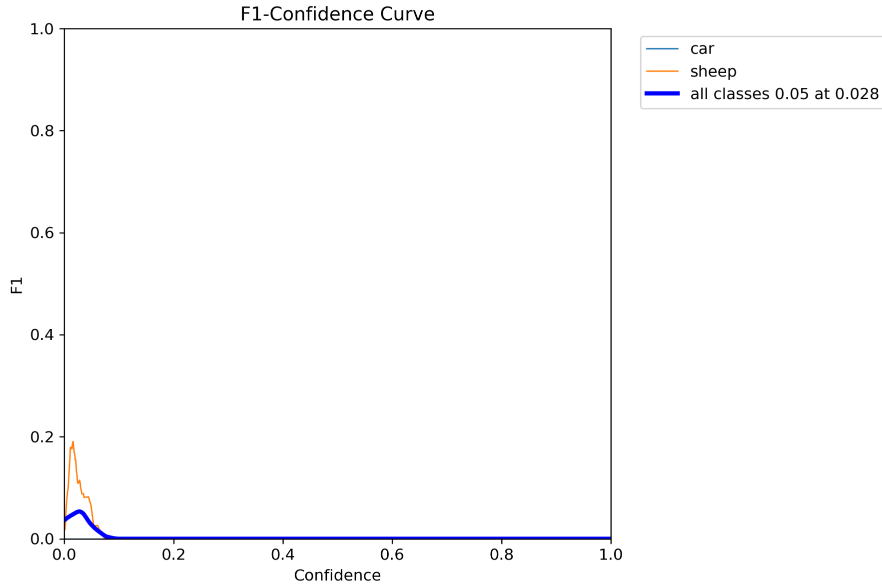

Figure 535. precision_over_recall, yolov8n, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

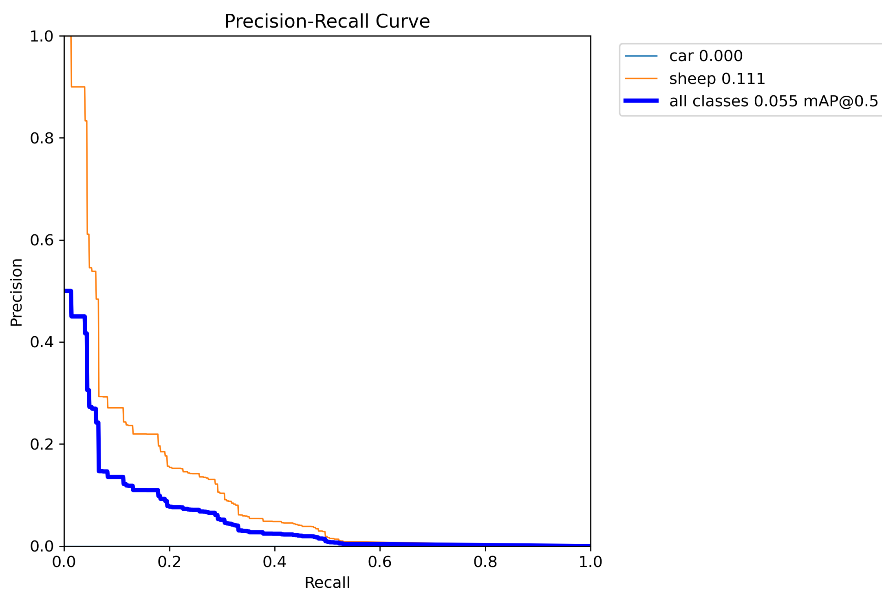

Figure 536. precision_over_confidence, yolov8n, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

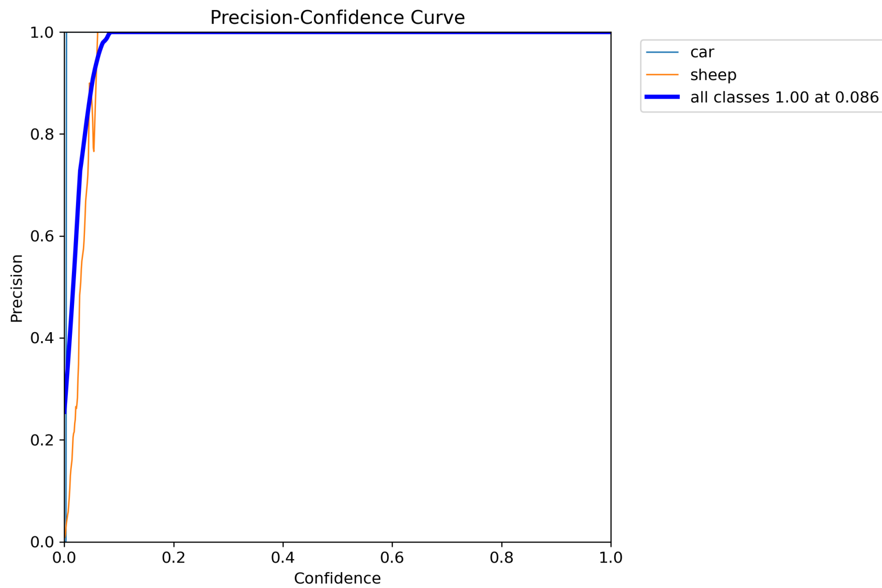

Figure 537. recall_over_confidence, yolov8n, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

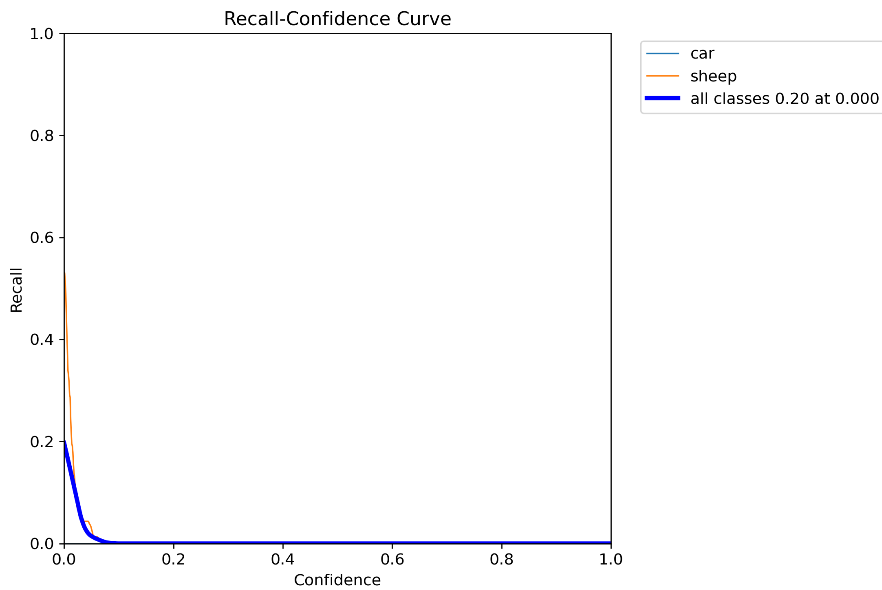

Figure 538. confusion_matrix, yolov8n, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

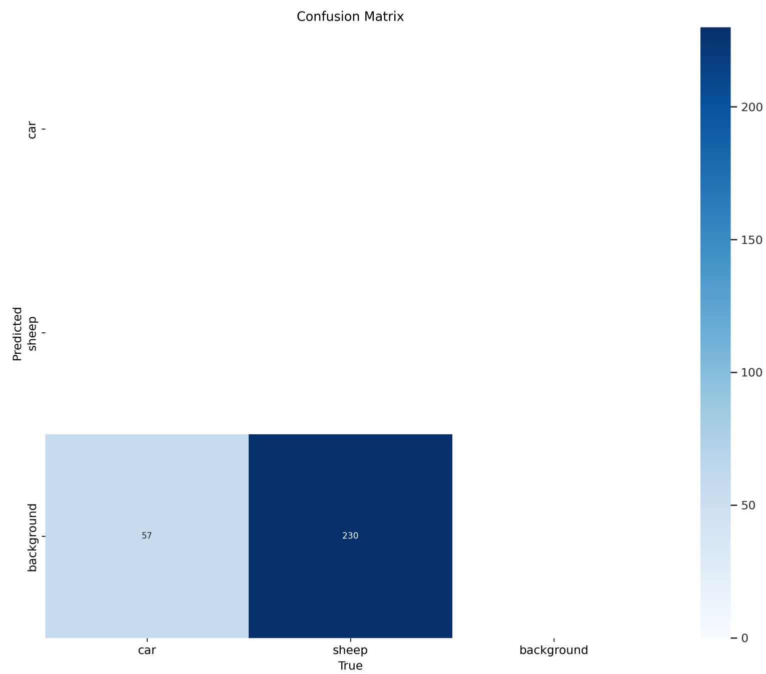

Figure 539. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

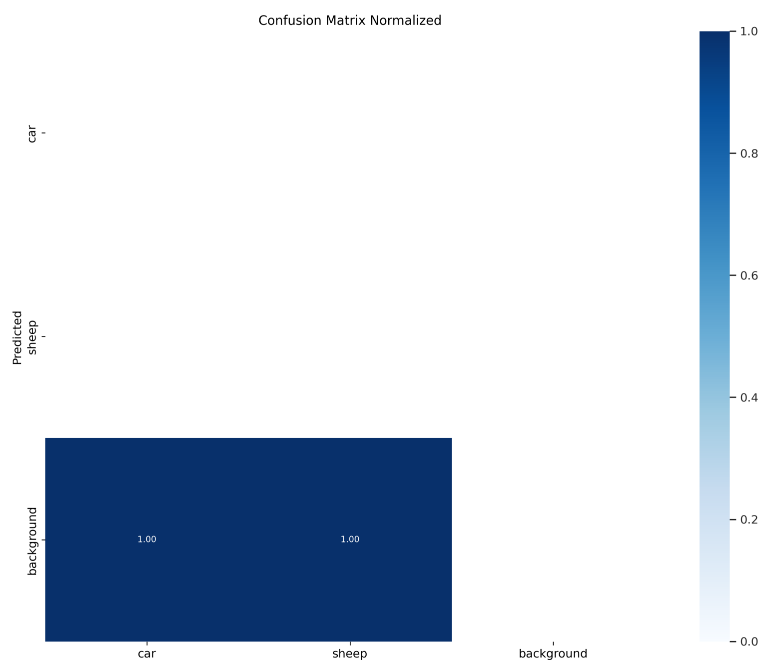

Figure 540. f1_over_confidence, yolov8n, pre-trained=True, epochs=50, data=duomo, hyperparameter-tuned=True

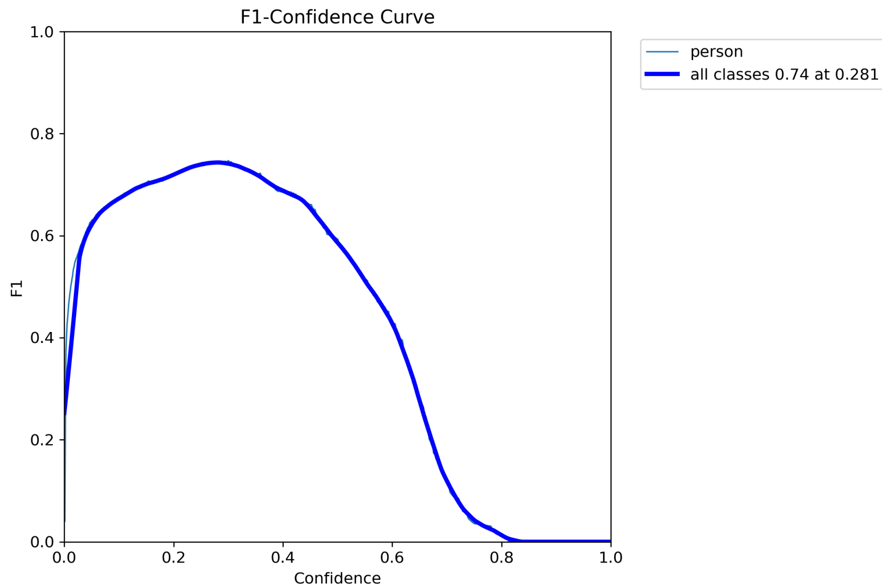

Figure 541. precision_over_recall, yolov8n, pre-trained=True, epochs=50, data=duomo, hyperparameter-tuned=True

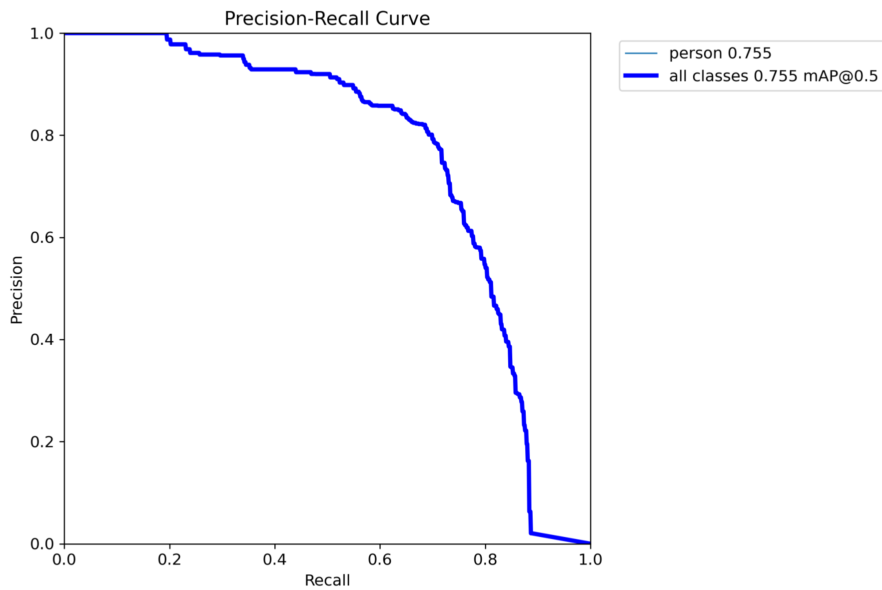

Figure 542. precision_over_confidence, yolov8n, pre-trained=True, epochs=50, data=duomo, hyperparameter-tuned=True

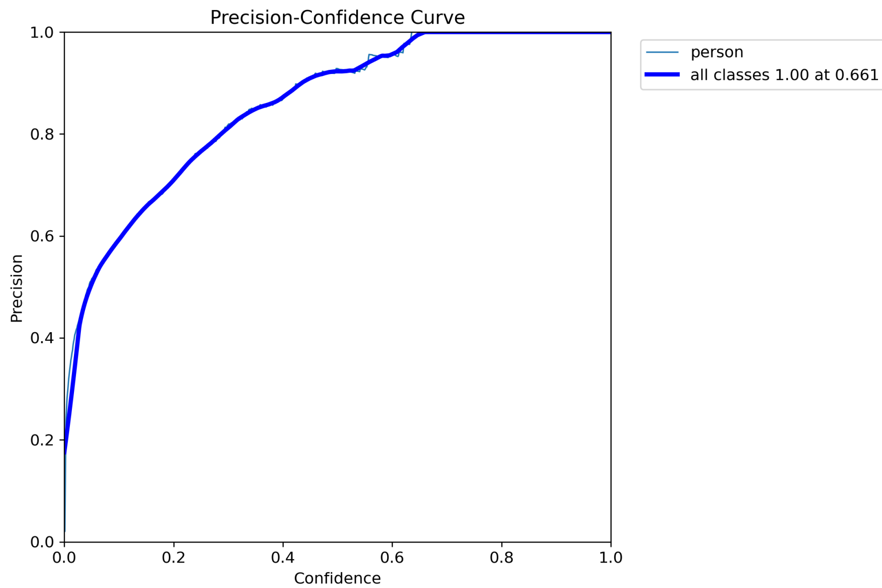

Figure 543. recall_over_confidence, yolov8n, pre-trained=True, epochs=50, data=duomo, hyperparameter-tuned=True

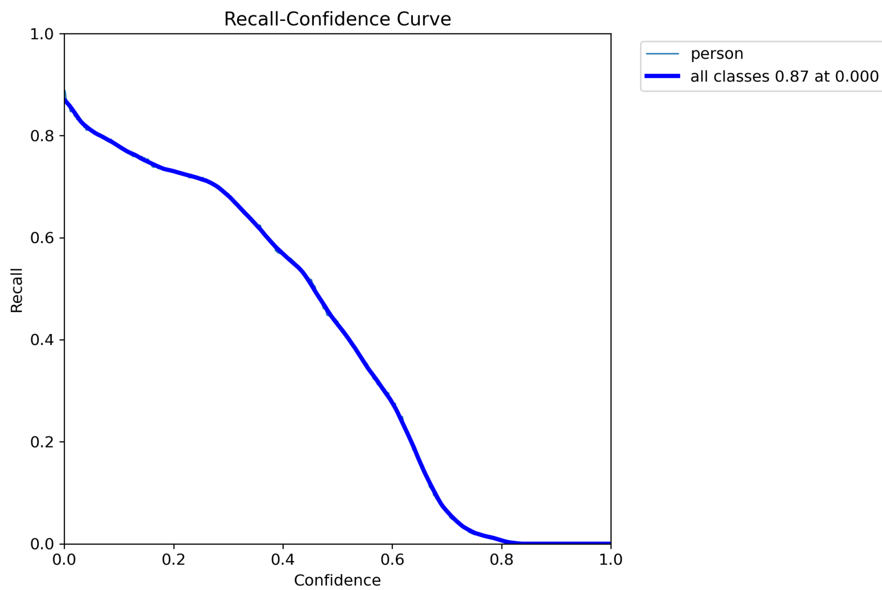

Figure 544. confusion_matrix, yolov8n, pre-trained=True, epochs=50, data=duomo, hyperparameter-tuned=True

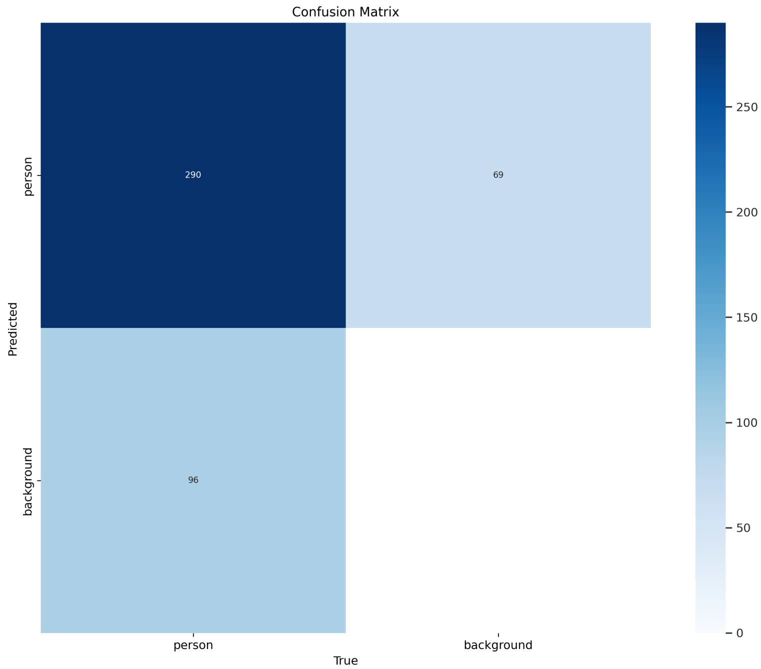

Figure 545. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=50, data=duomo, hyperparameter-tuned=True

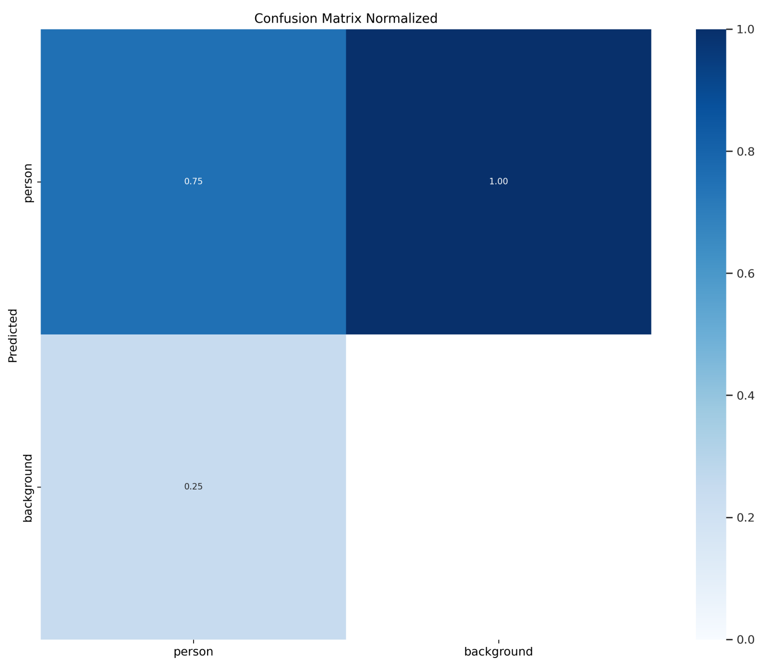

Figure 546. f1_over_confidence, yolov8n, pre-trained=True, epochs=100, data=duomo, hyperparameter-tuned=True

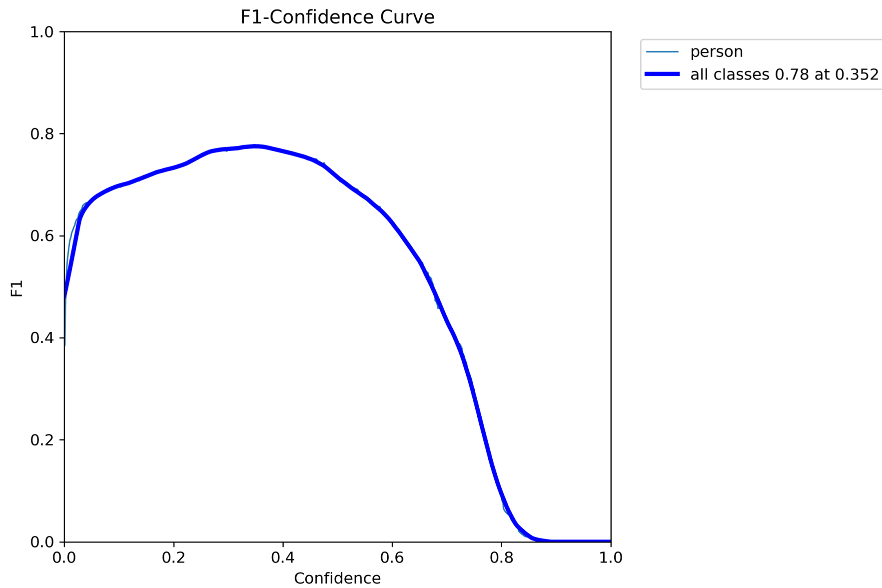

Figure 547. precision_over_recall, yolov8n, pre-trained=True, epochs=100, data=duomo, hyperparameter-tuned=True

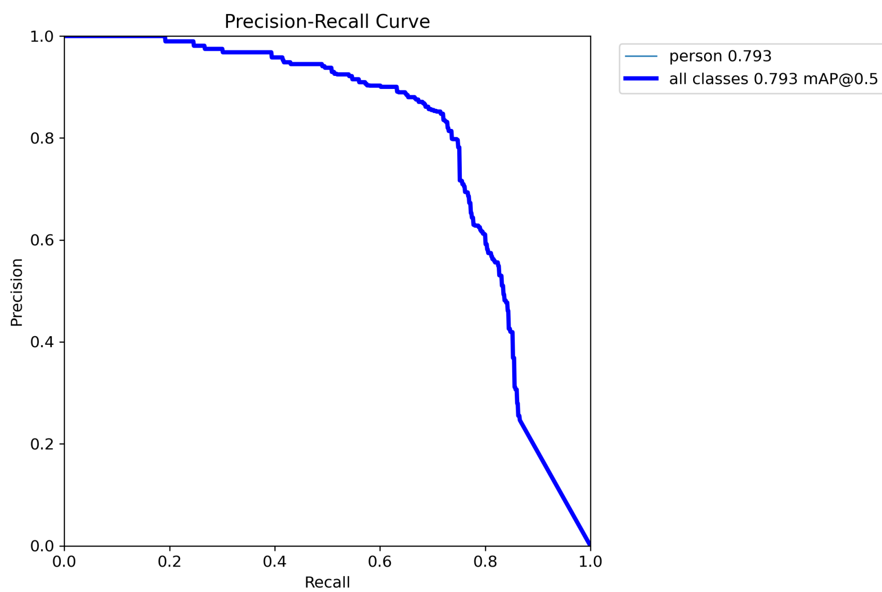

Figure 548. precision_over_confidence, yolov8n, pre-trained=True, epochs=100, data=duomo, hyperparameter-tuned=True

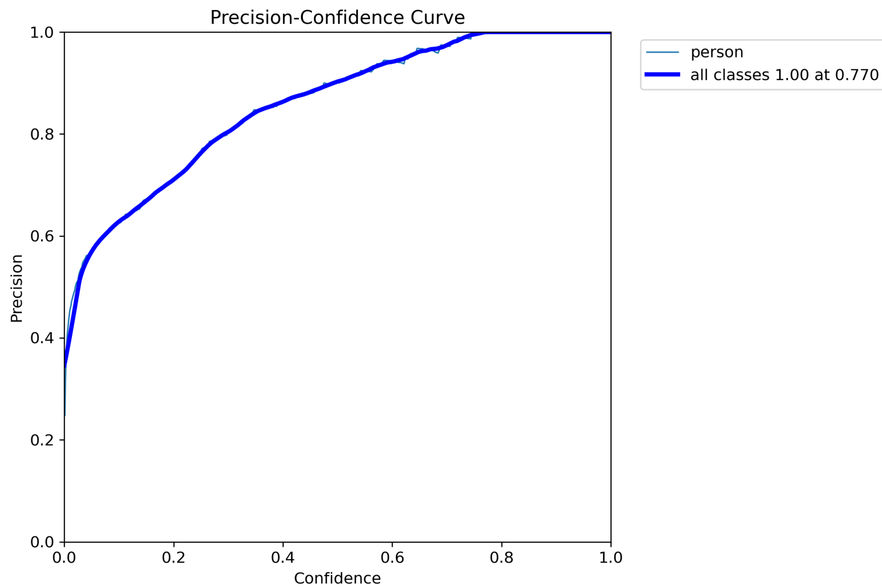

Figure 549. recall_over_confidence, yolov8n, pre-trained=True, epochs=100, data=duomo, hyperparameter-tuned=True

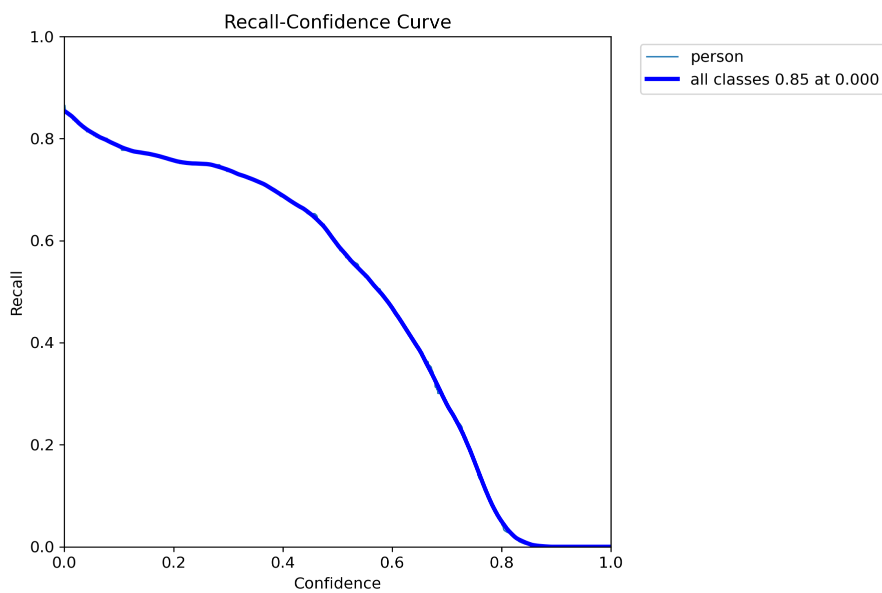

Figure 550. confusion_matrix, yolov8n, pre-trained=True, epochs=100, data=duomo, hyperparameter-tuned=True

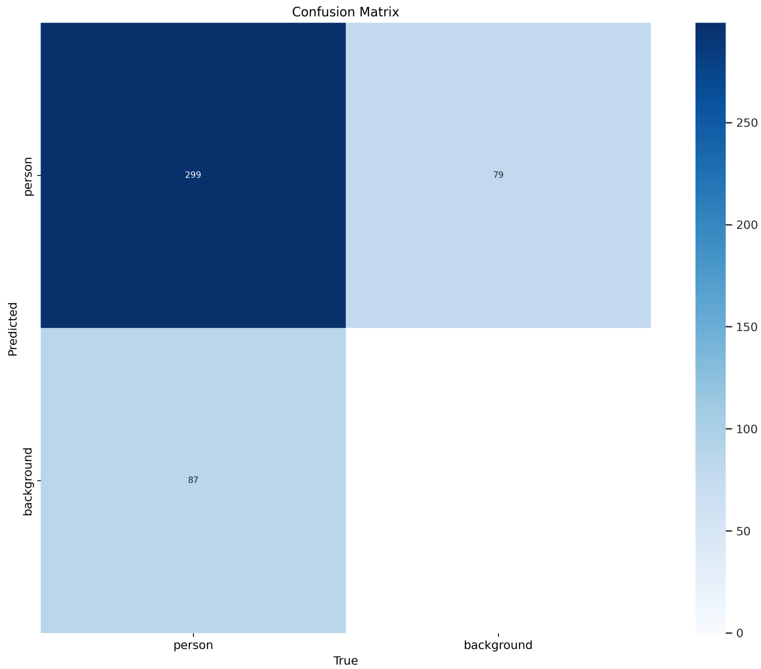

Figure 551. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=100, data=duomo, hyperparameter-tuned=True

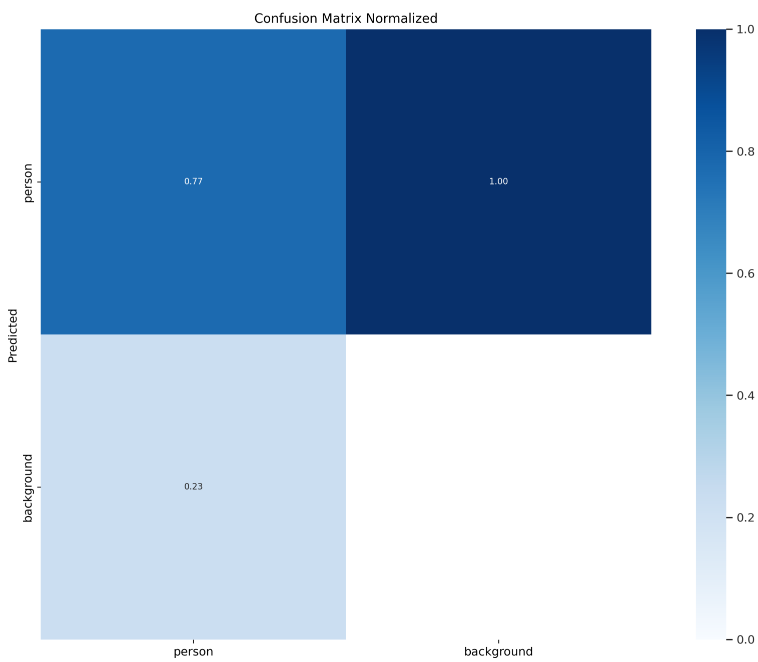

Figure 552. f1_over_confidence, yolov8n, pre-trained=True, epochs=150, data=duomo, hyperparameter-tuned=True

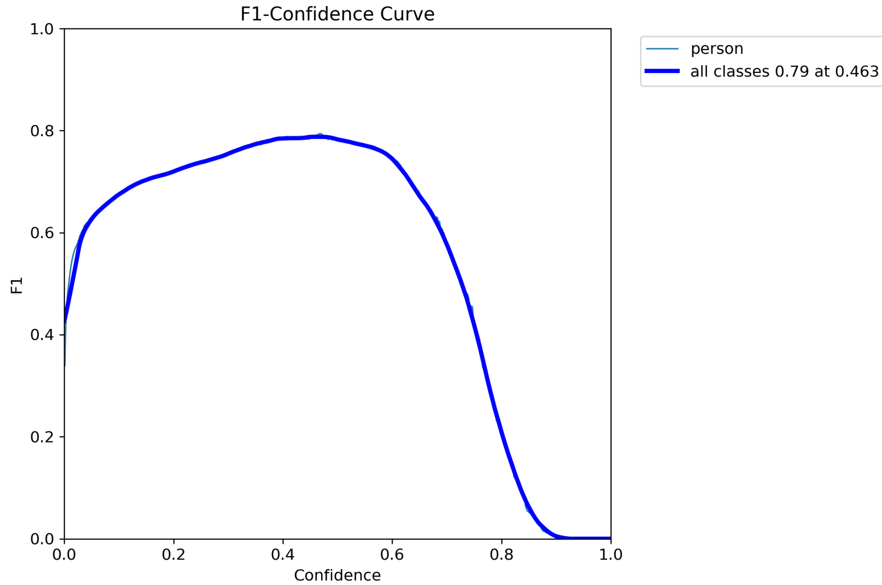

Figure 553. precision_over_recall, yolov8n, pre-trained=True, epochs=150, data=duomo, hyperparameter-tuned=True

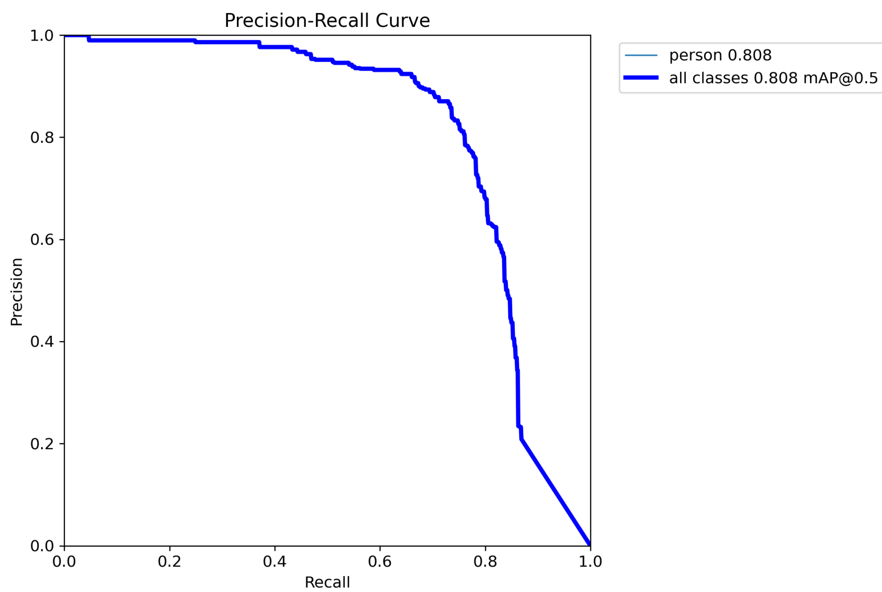

Figure 554. precision_over_confidence, yolov8n, pre-trained=True, epochs=150, data=duomo, hyperparameter-tuned=True

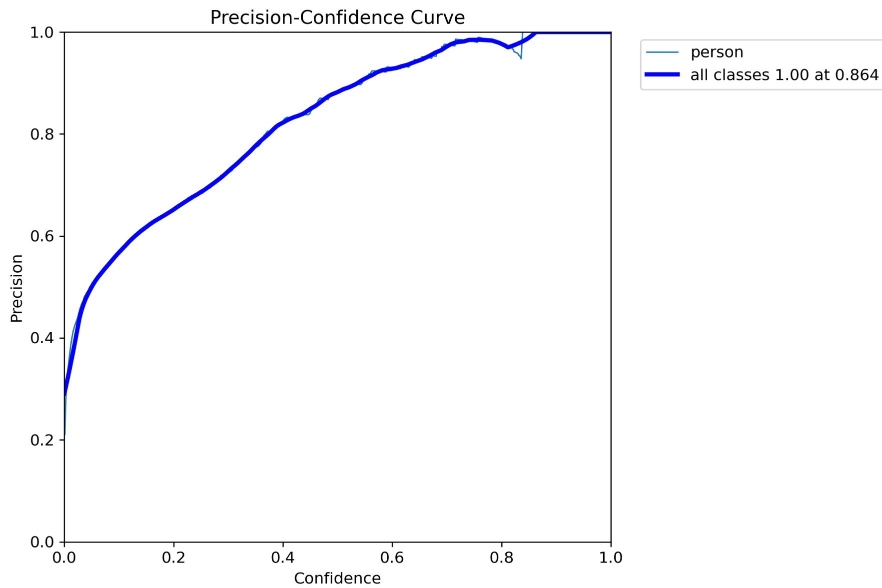

Figure 555. recall_over_confidence, yolov8n, pre-trained=True, epochs=150, data=duomo, hyperparameter-tuned=True

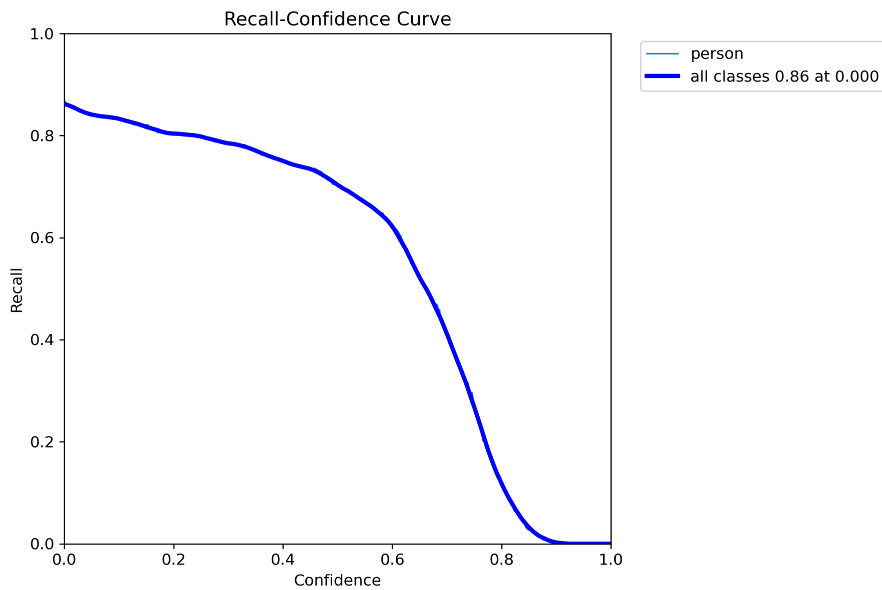

Figure 556. confusion_matrix, yolov8n, pre-trained=True, epochs=150, data=duomo, hyperparameter-tuned=True

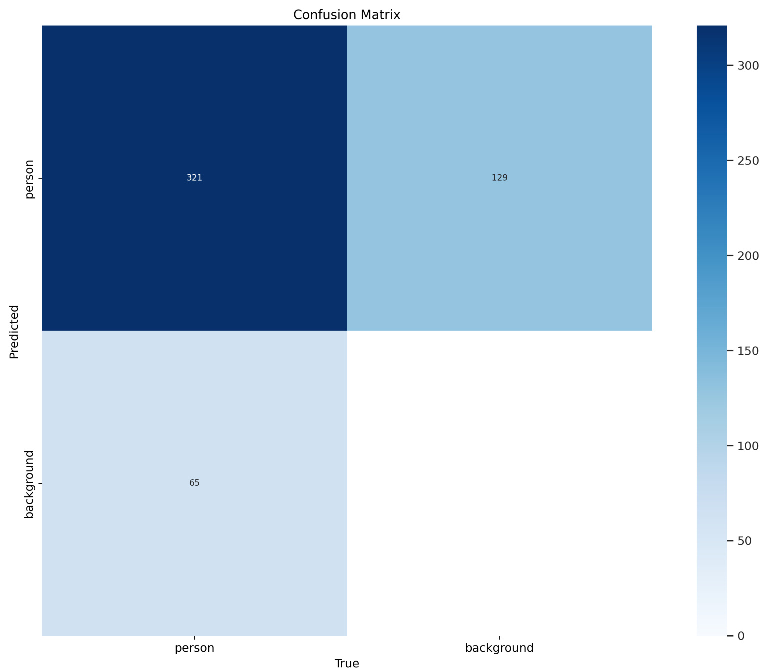

Figure 557. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=150, data=duomo, hyperparameter-tuned=True

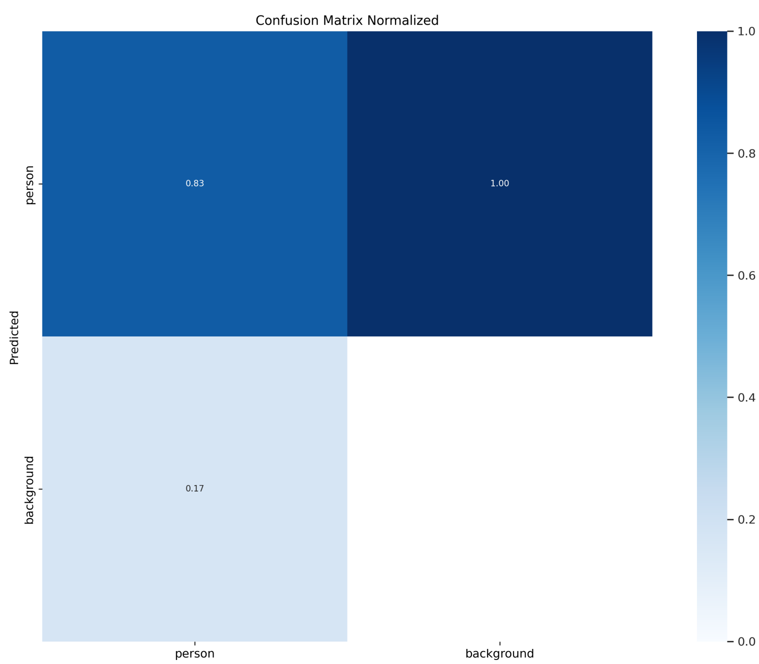

Figure 558. f1_over_confidence, yolov8n, pre-trained=True, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=True

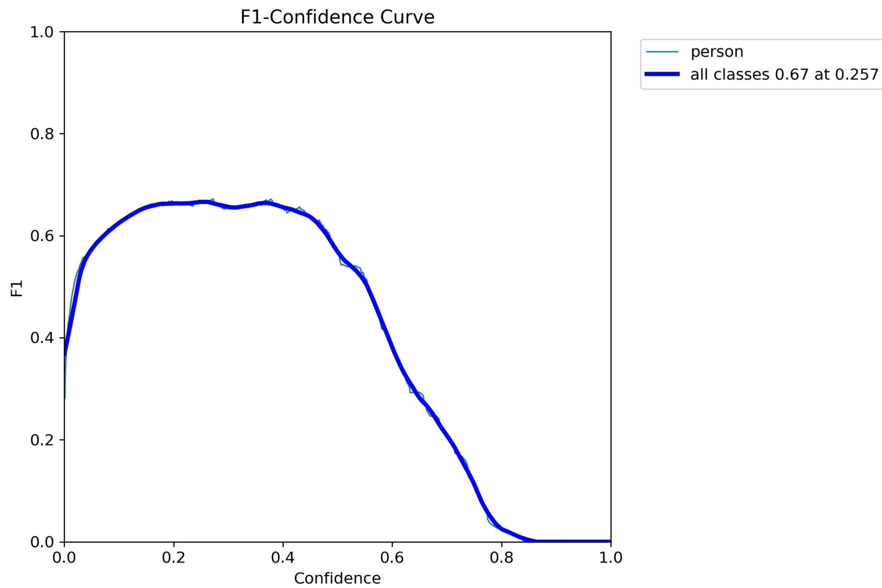

Figure 559. precision_over_recall, yolov8n, pre-trained=True, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=True

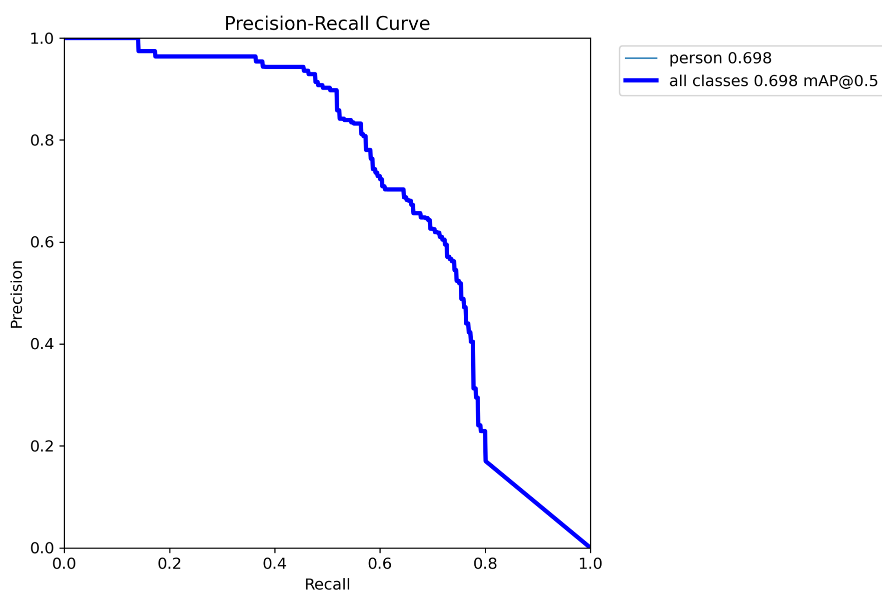

Figure 560. precision_over_confidence, yolov8n, pre-trained=True, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=True

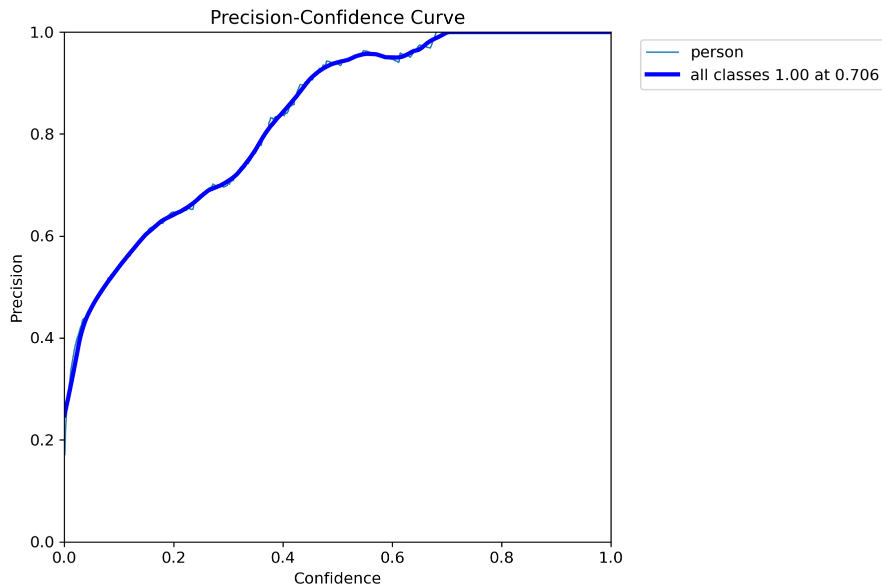

Figure 561. recall_over_confidence, yolov8n, pre-trained=True, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=True

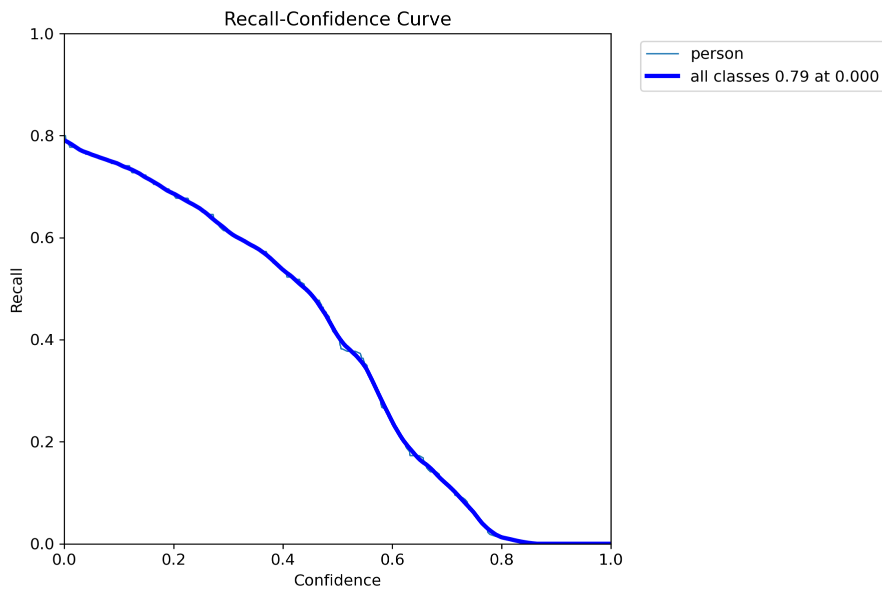

Figure 562. confusion_matrix, yolov8n, pre-trained=True, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=True

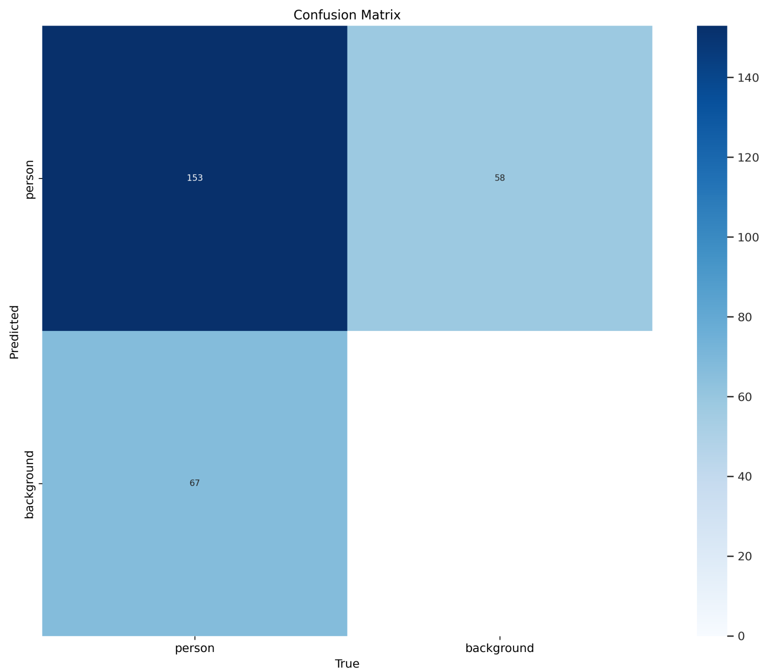

Figure 563. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=True

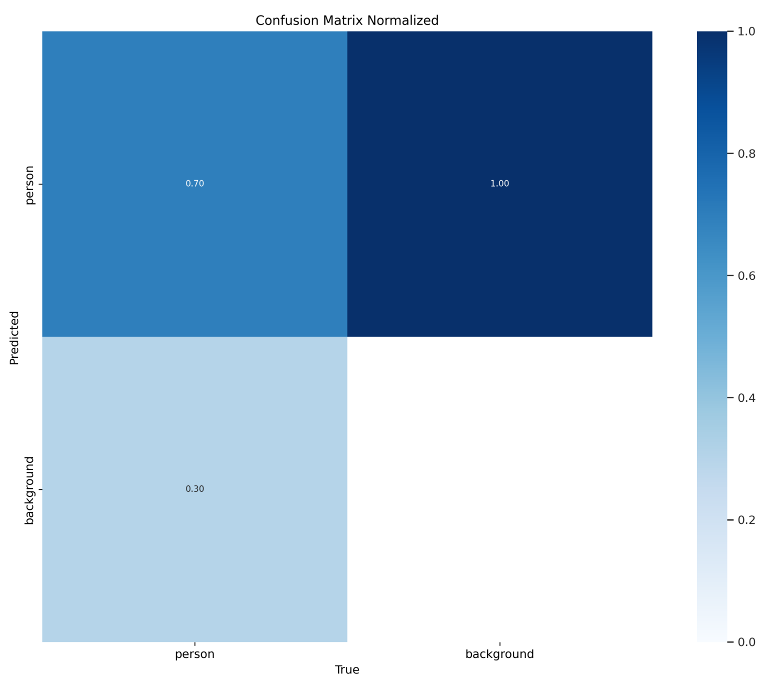

Figure 564. f1_over_confidence, yolov8n, pre-trained=True, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=True

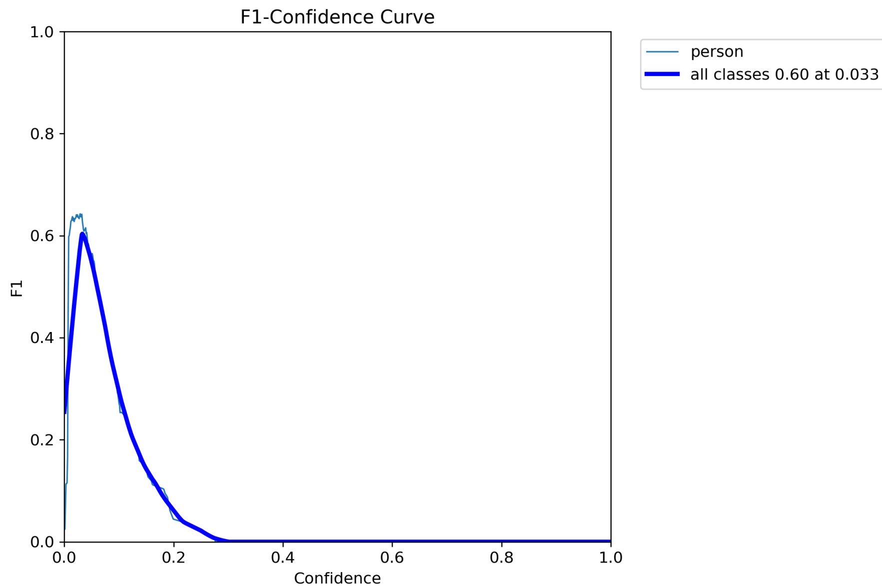

Figure 565. precision_over_recall, yolov8n, pre-trained=True, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=True

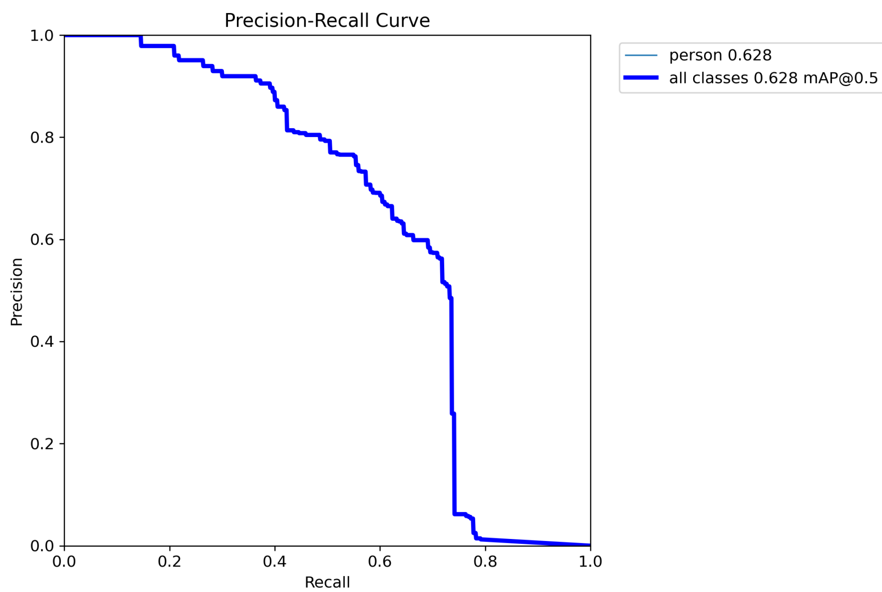

Figure 566. precision_over_confidence, yolov8n, pre-trained=True, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=True

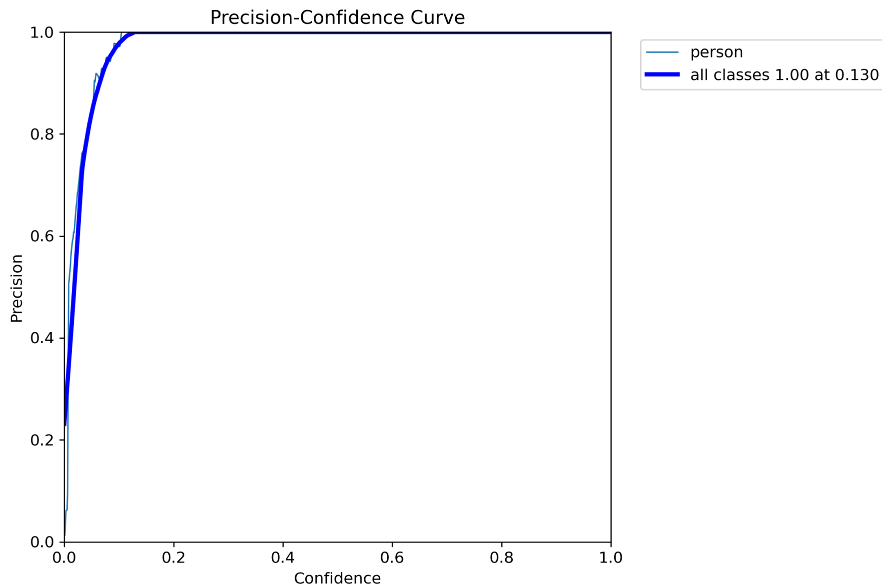

Figure 567. recall_over_confidence, yolov8n, pre-trained=True, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=True

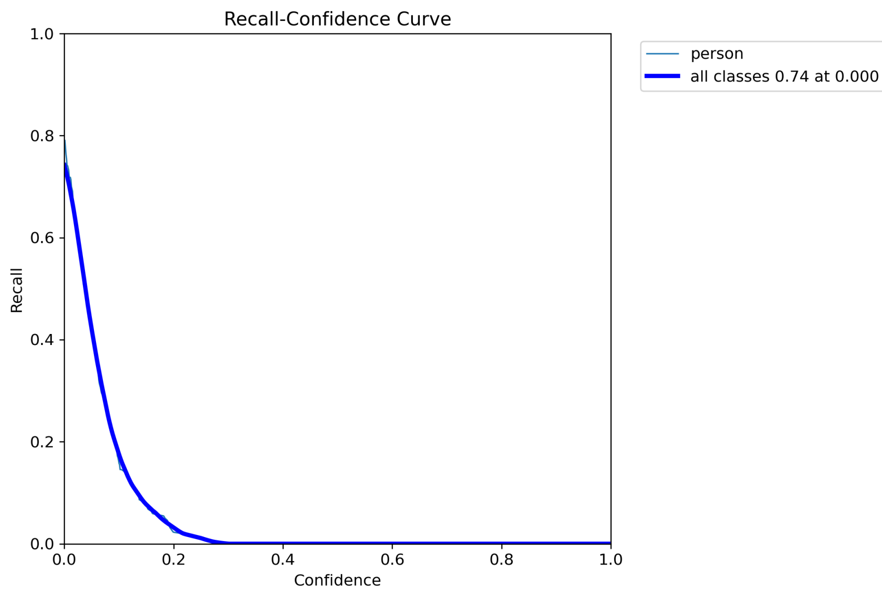

Figure 568. confusion_matrix, yolov8n, pre-trained=True, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=True

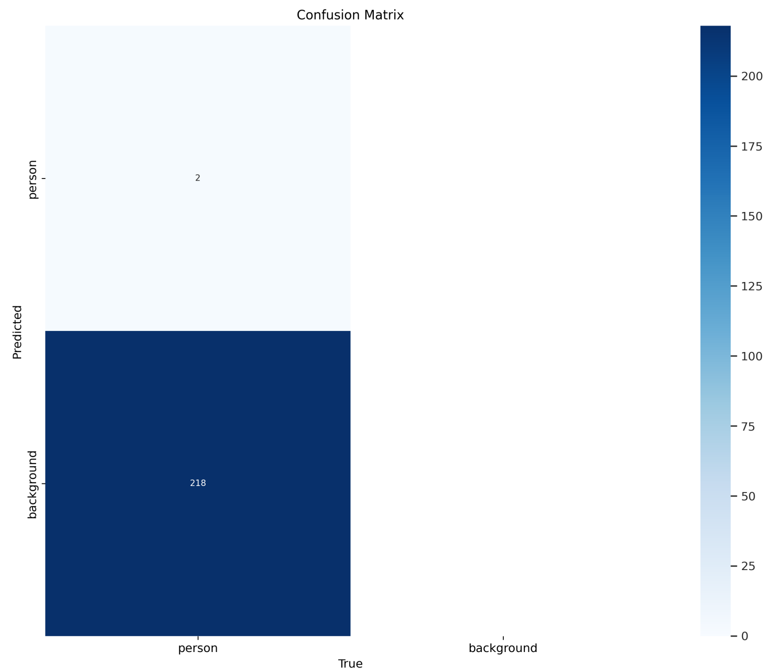

Figure 569. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=True

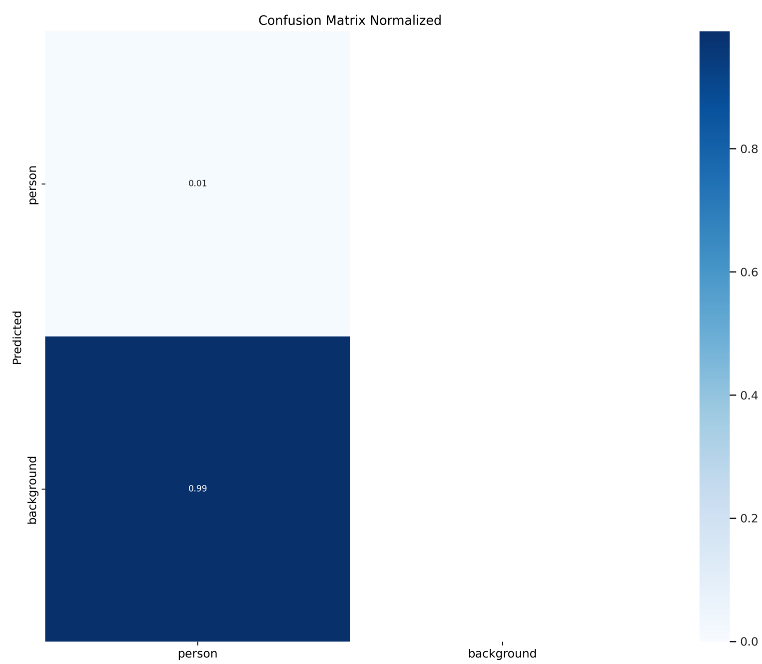

Figure 570. f1_over_confidence, yolov8n, pre-trained=True, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=True

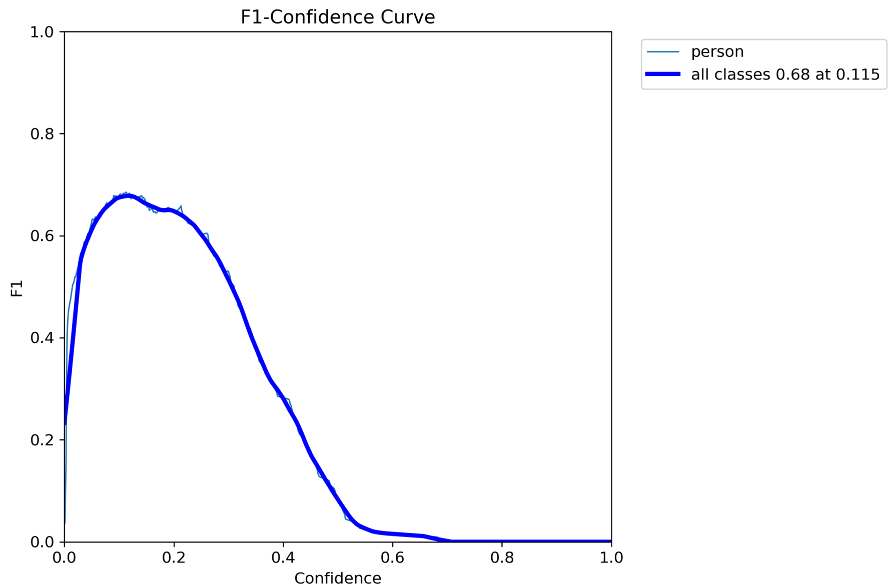

Figure 571. precision_over_recall, yolov8n, pre-trained=True, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=True

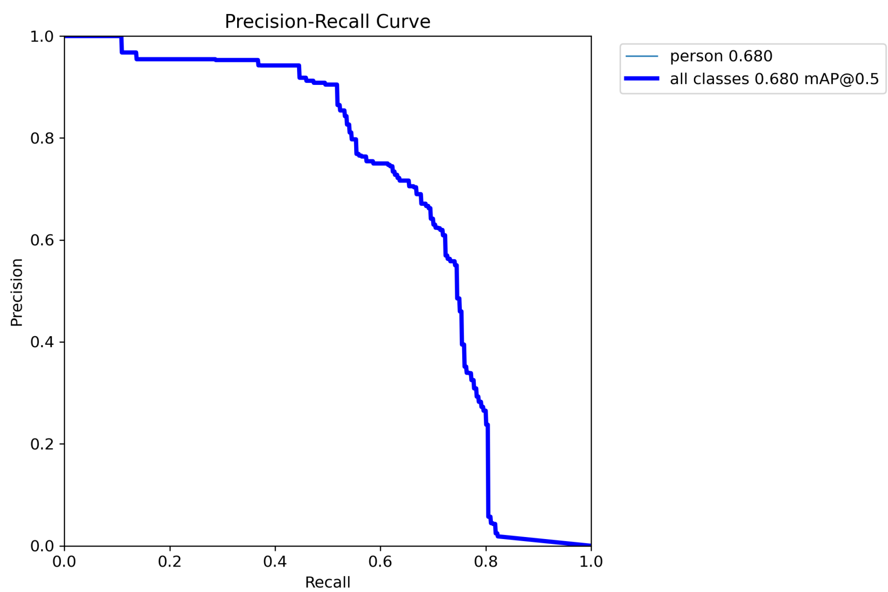

Figure 572. precision_over_confidence, yolov8n, pre-trained=True, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=True

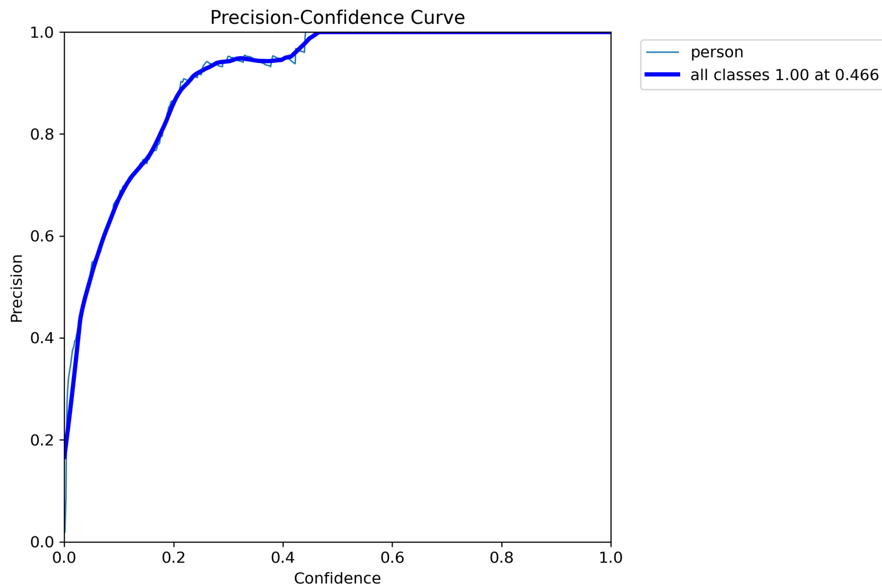

Figure 573. recall_over_confidence, yolov8n, pre-trained=True, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=True

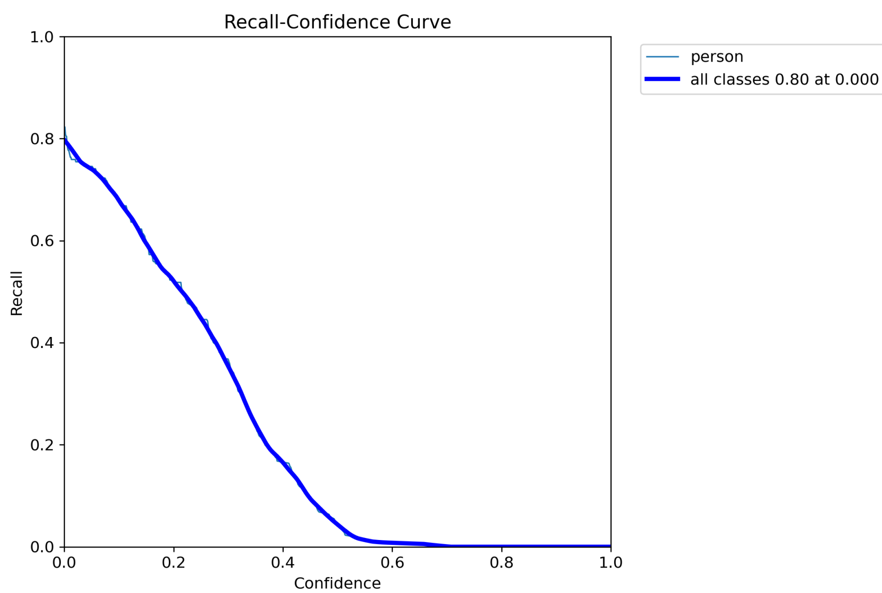

Figure 574. confusion_matrix, yolov8n, pre-trained=True, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=True

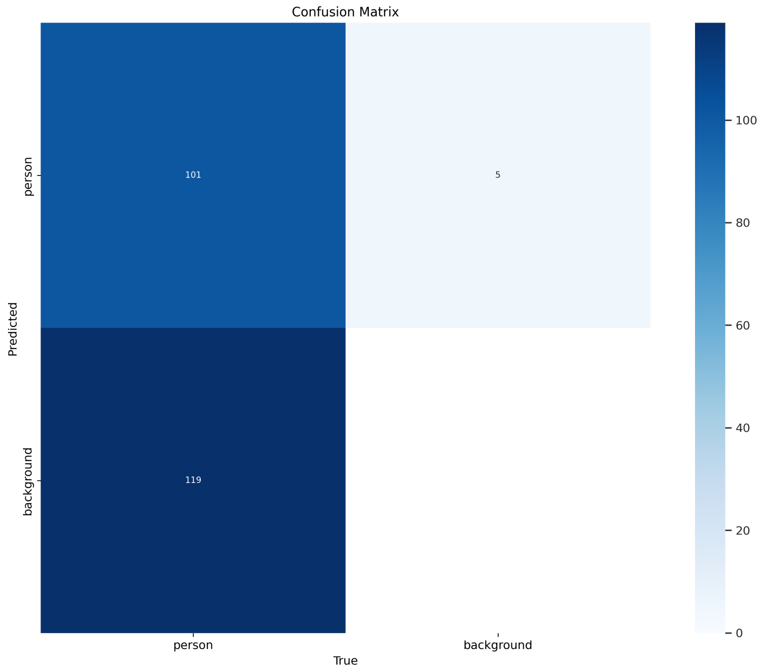

Figure 575. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=True

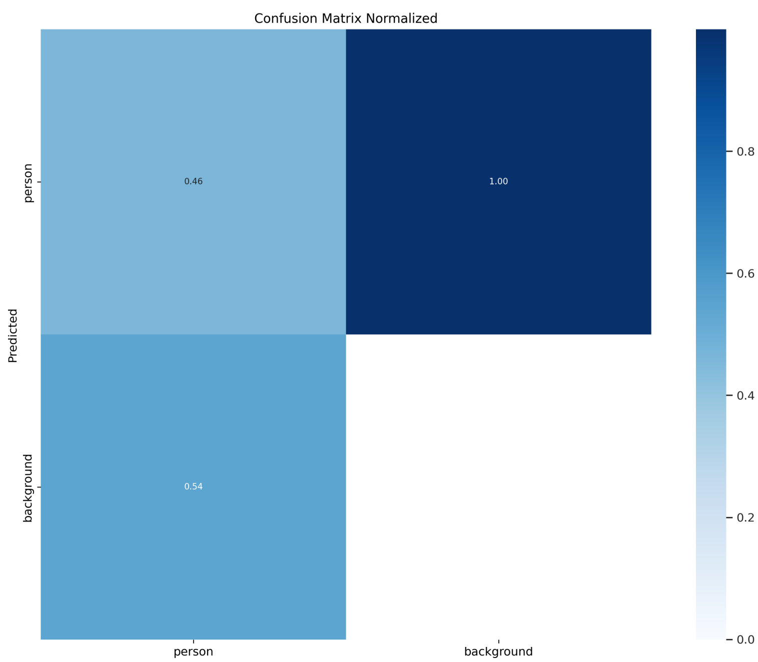

Figure 576. f1_over_confidence, yolov8n, pre-trained=True, epochs=50, data=keskvaljak, hyperparameter-tuned=True

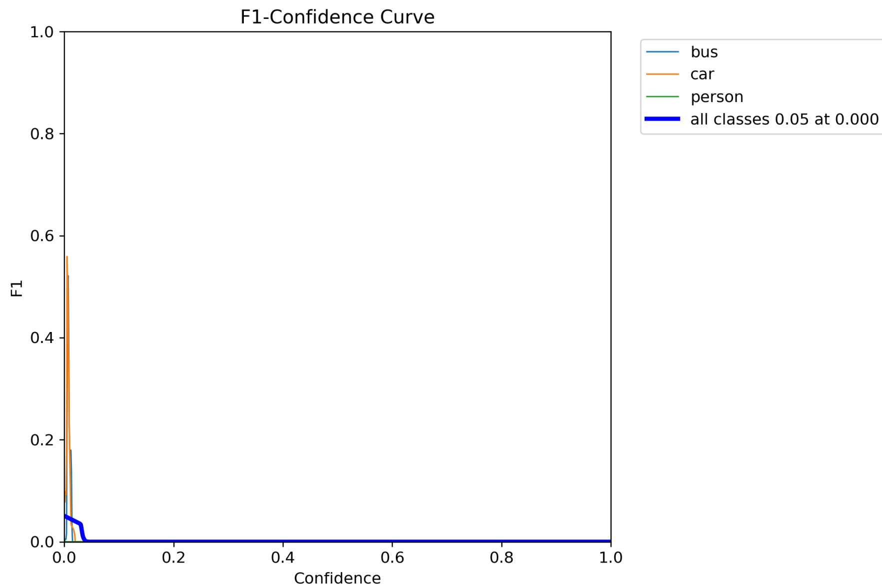

Figure 577. precision_over_recall, yolov8n, pre-trained=True, epochs=50, data=keskvaljak, hyperparameter-tuned=True

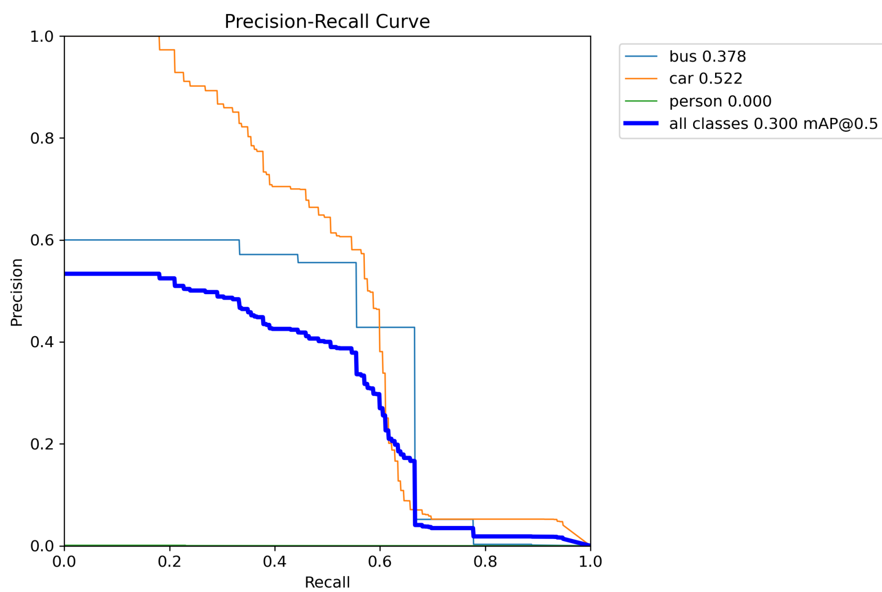

Figure 578. precision_over_confidence, yolov8n, pre-trained=True, epochs=50, data=keskvaljak, hyperparameter-tuned=True

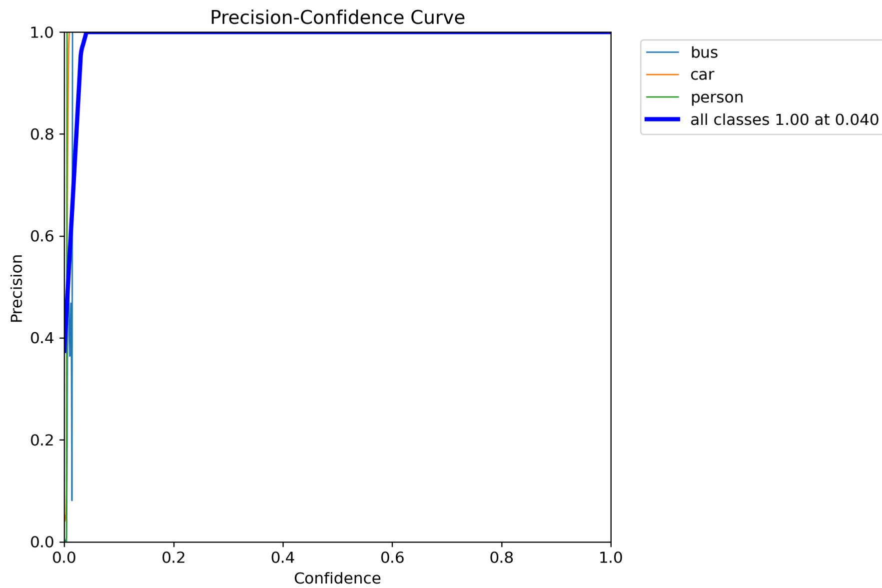

Figure 579. recall_over_confidence, yolov8n, pre-trained=True, epochs=50, data=keskvaljak, hyperparameter-tuned=True

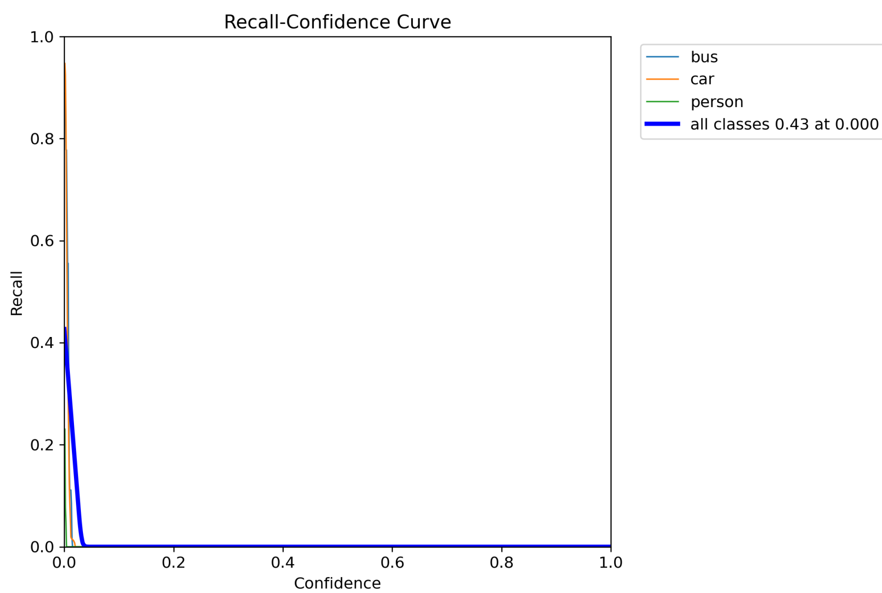

Figure 580. confusion_matrix, yolov8n, pre-trained=True, epochs=50, data=keskvaljak, hyperparameter-tuned=True

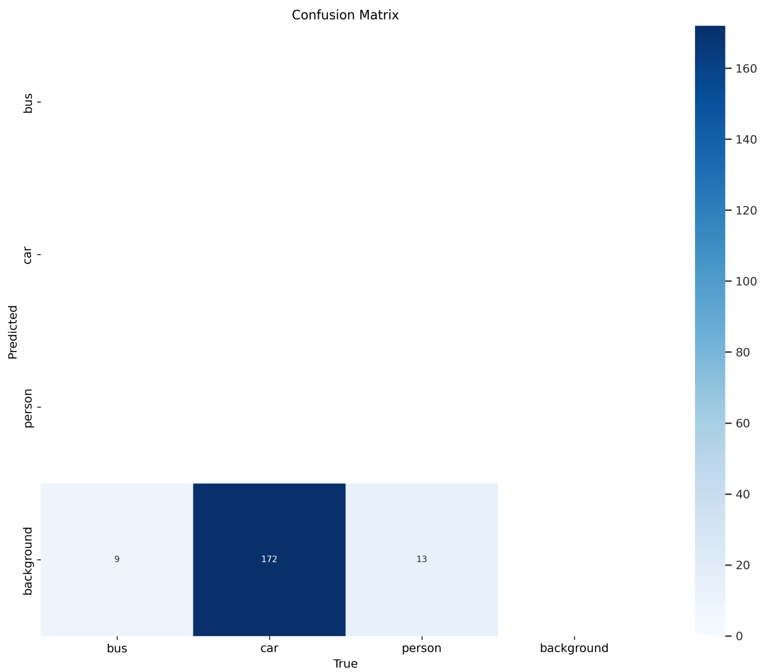

Figure 581. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=50, data=keskvaljak, hyperparameter-tuned=True

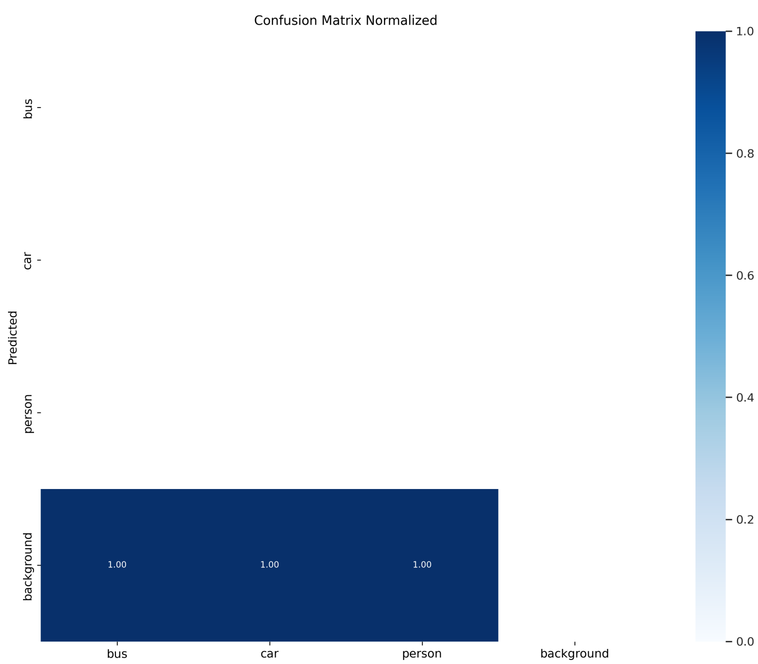

Figure 582. f1_over_confidence, yolov8n, pre-trained=True, epochs=100, data=keskvaljak, hyperparameter-tuned=True

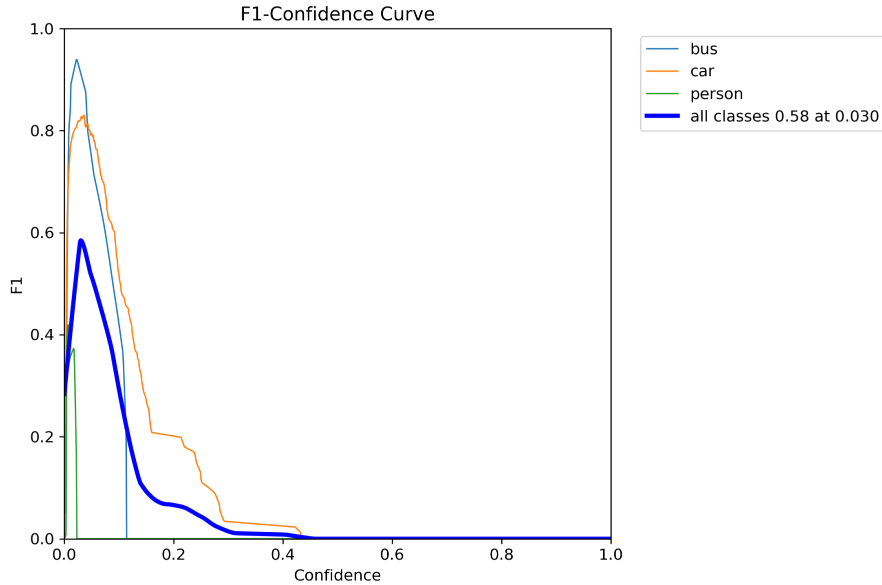

Figure 583. precision_over_recall, yolov8n, pre-trained=True, epochs=100, data=keskvaljak, hyperparameter-tuned=True

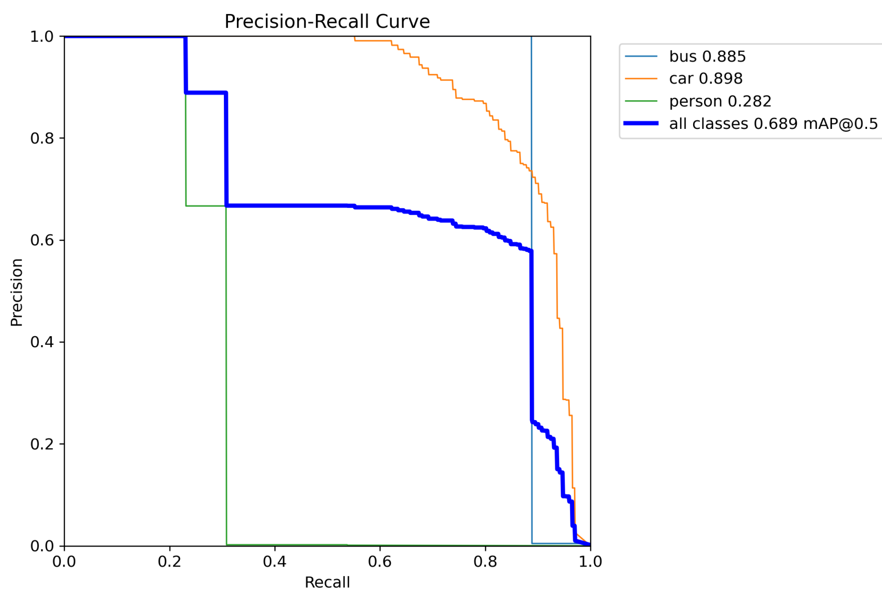

Figure 584. precision_over_confidence, yolov8n, pre-trained=True, epochs=100, data=keskvaljak, hyperparameter-tuned=True

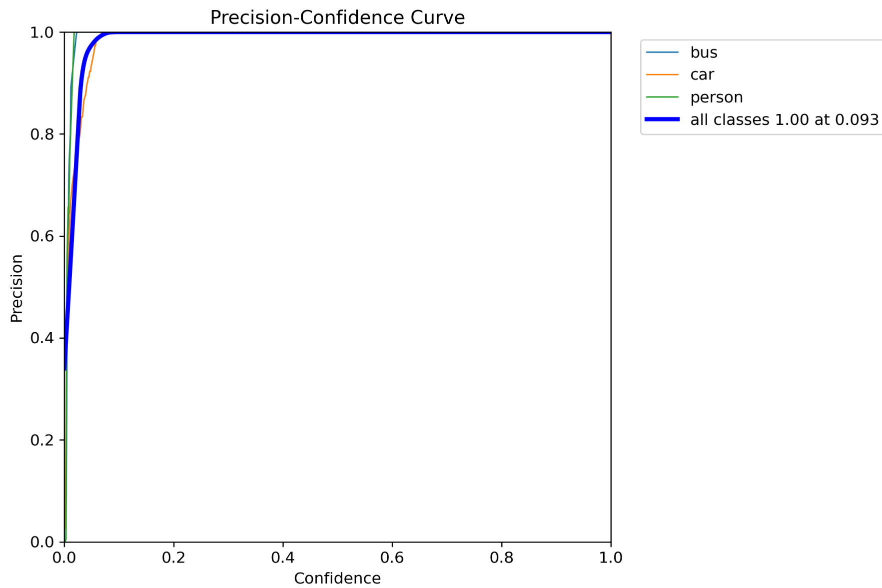

Figure 585. recall_over_confidence, yolov8n, pre-trained=True, epochs=100, data=keskvaljak, hyperparameter-tuned=True

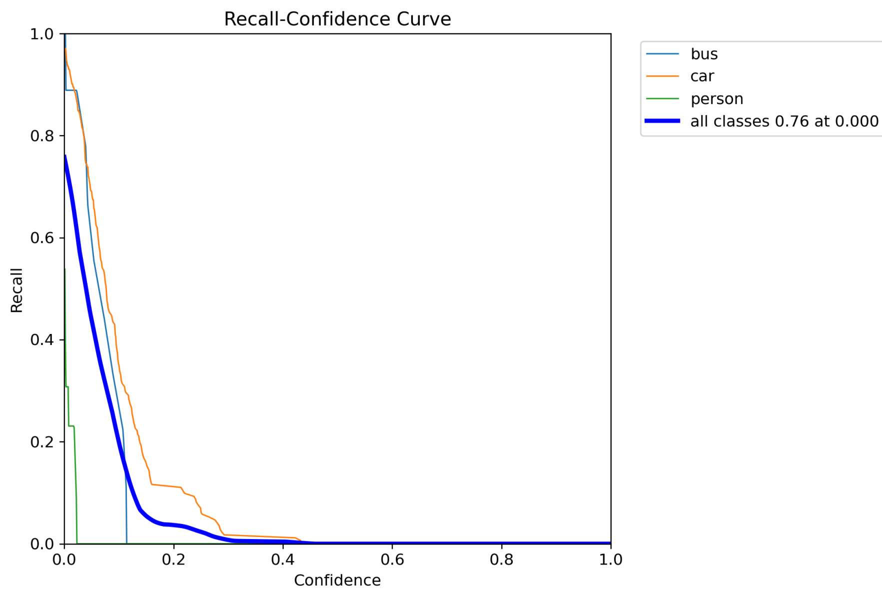

Figure 586. confusion_matrix, yolov8n, pre-trained=True, epochs=100, data=keskvaljak, hyperparameter-tuned=True

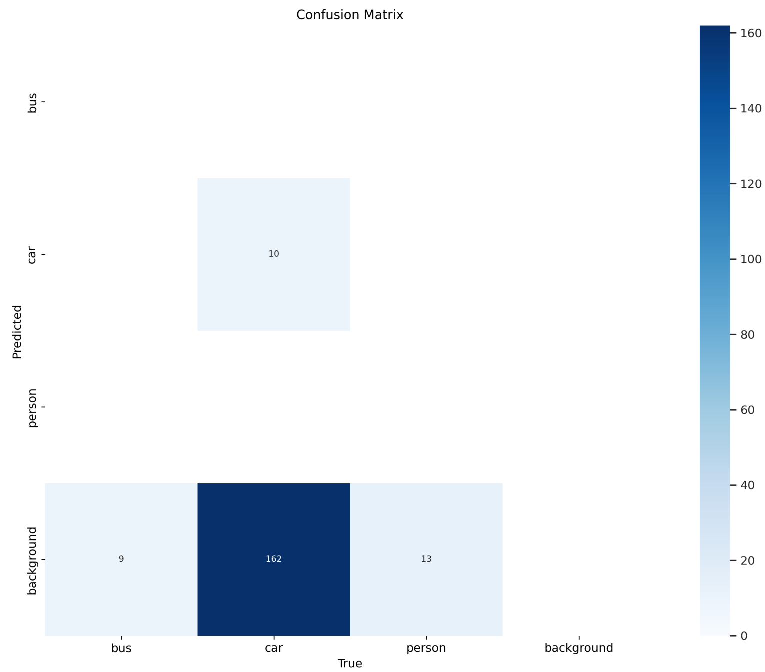

Figure 587. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=100, data=keskvaljak, hyperparameter-tuned=True

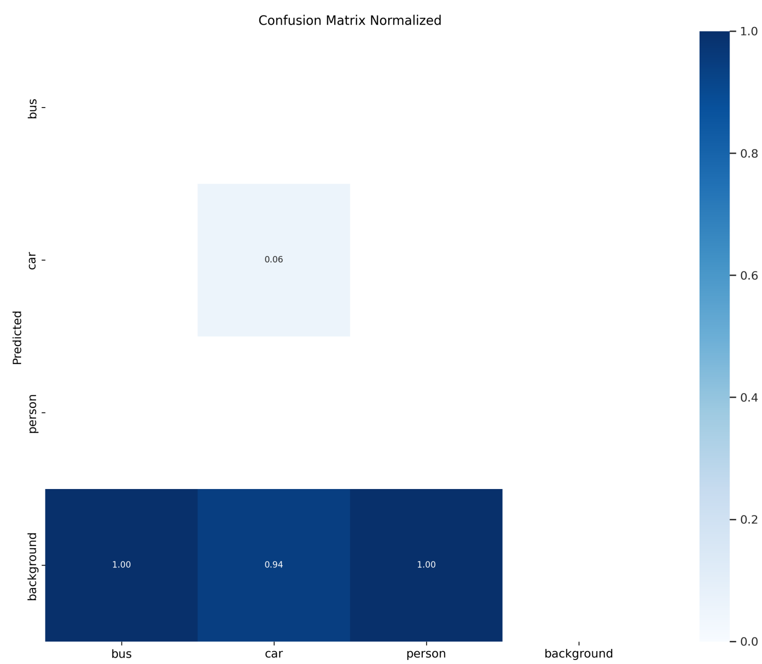

Figure 588. f1_over_confidence, yolov8n, pre-trained=True, epochs=150, data=keskvaljak, hyperparameter-tuned=True

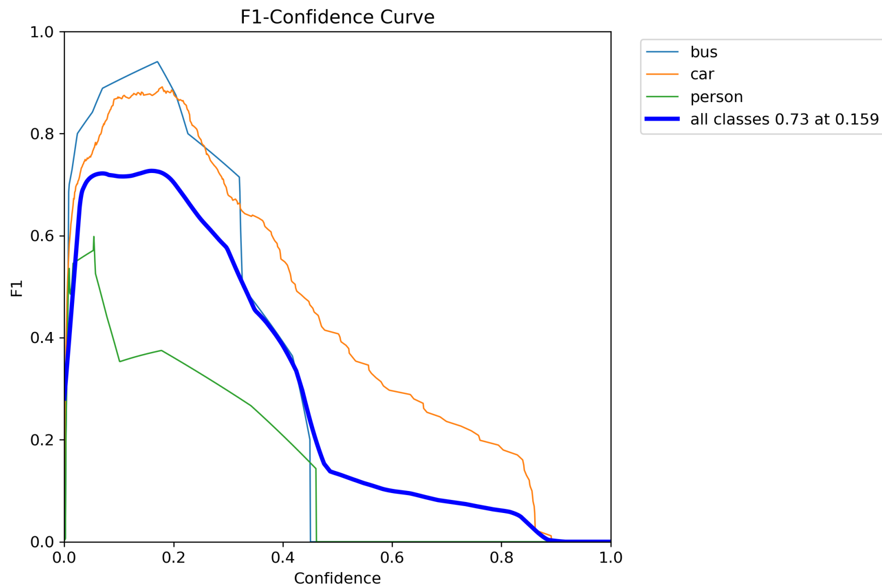

Figure 589. precision_over_recall, yolov8n, pre-trained=True, epochs=150, data=keskvaljak, hyperparameter-tuned=True

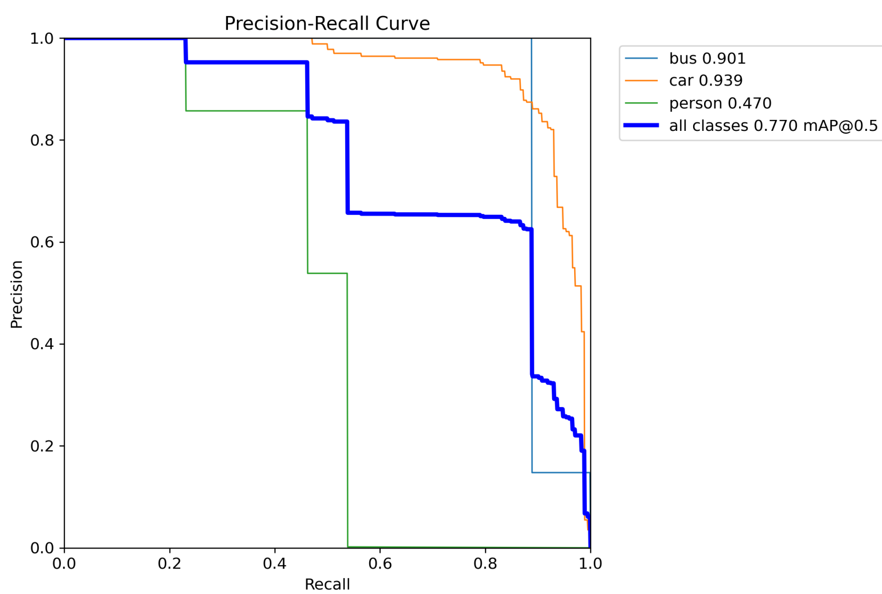

Figure 590. precision_over_confidence, yolov8n, pre-trained=True, epochs=150, data=keskvaljak, hyperparameter-tuned=True

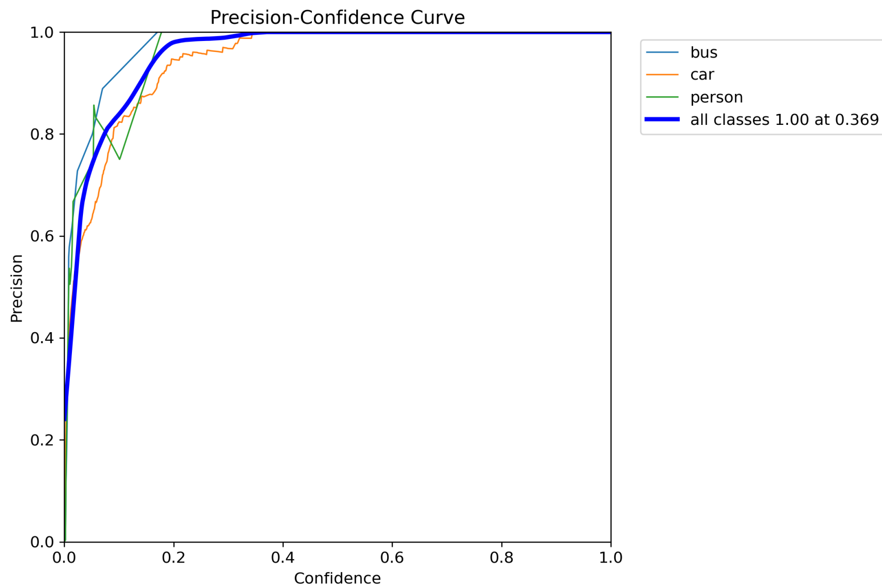

Figure 591. recall_over_confidence, yolov8n, pre-trained=True, epochs=150, data=keskvaljak, hyperparameter-tuned=True

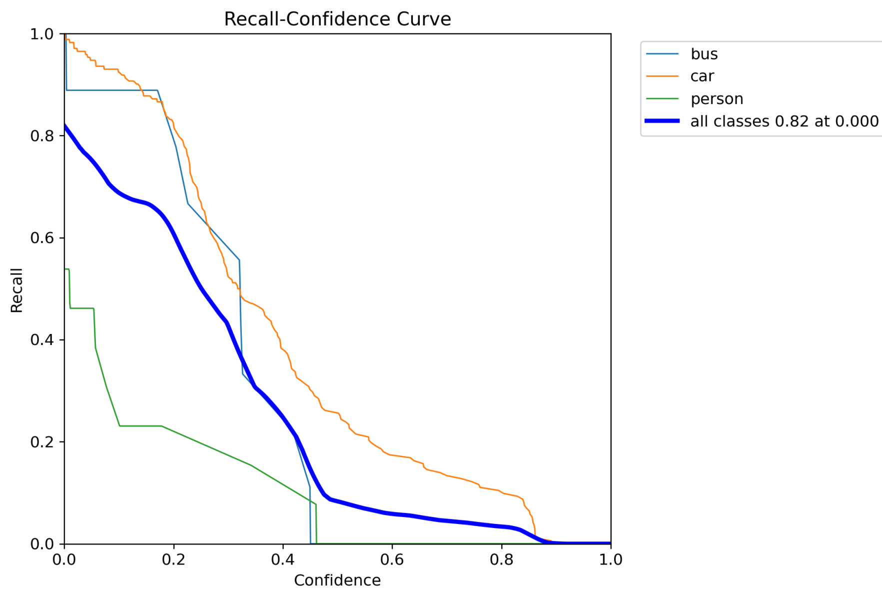

Figure 592. confusion_matrix, yolov8n, pre-trained=True, epochs=150, data=keskvaljak, hyperparameter-tuned=True

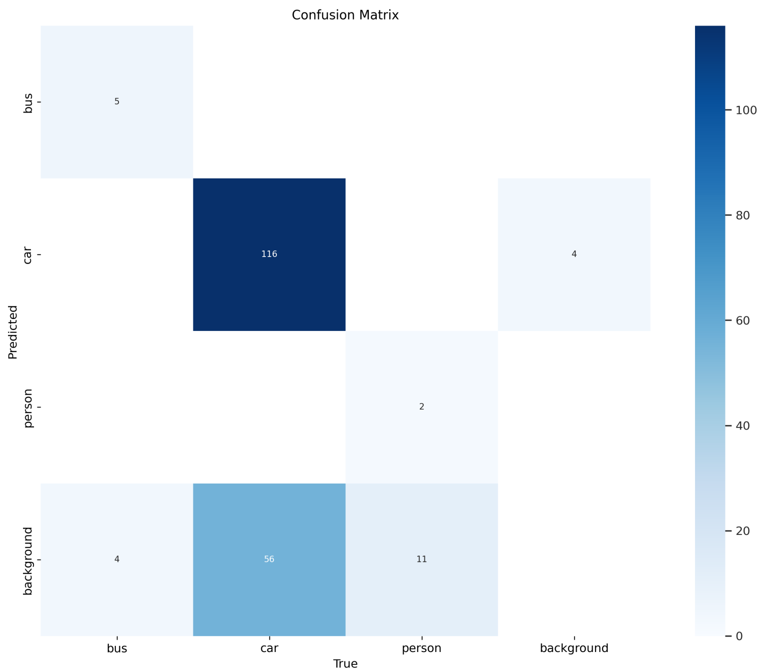

Figure 593. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=150, data=keskvaljak, hyperparameter-tuned=True

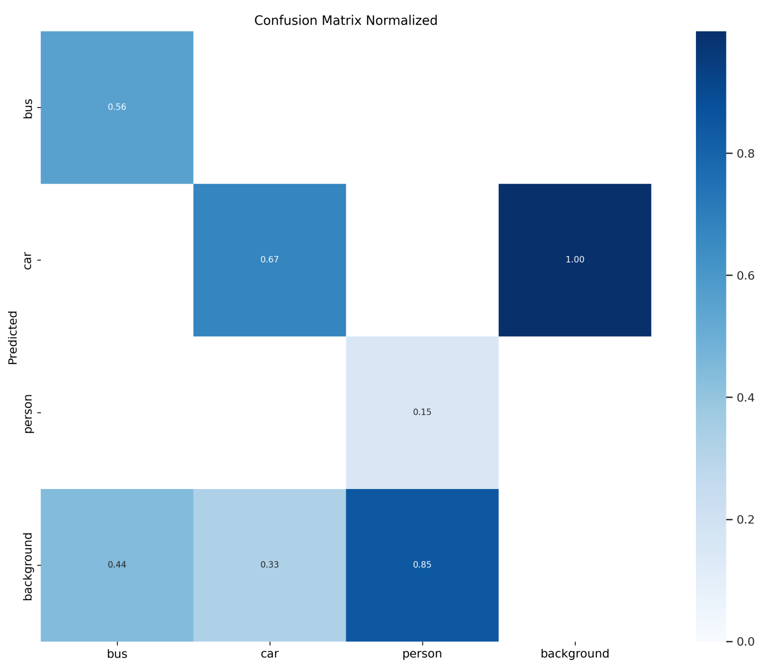

Figure 594. f1_over_confidence, yolov8n, pre-trained=True, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=True

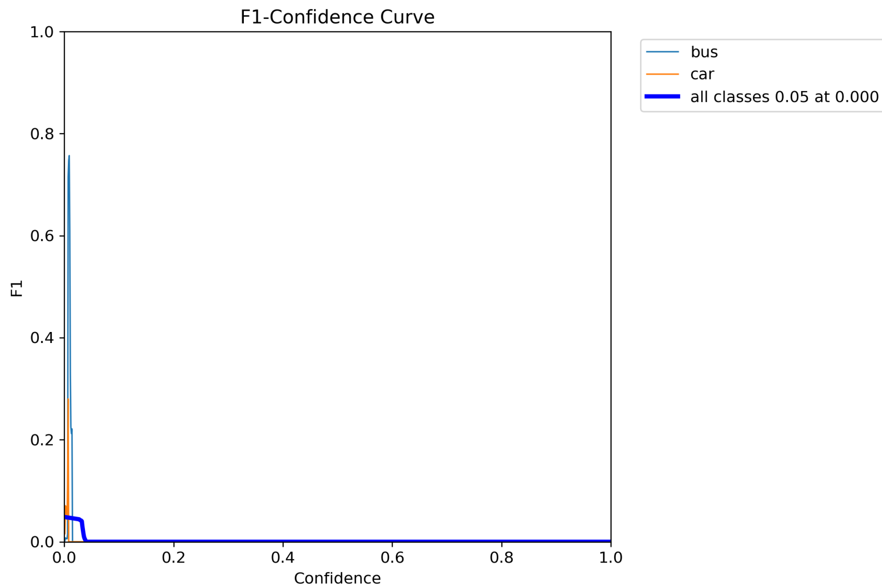

Figure 595. precision_over_recall, yolov8n, pre-trained=True, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=True

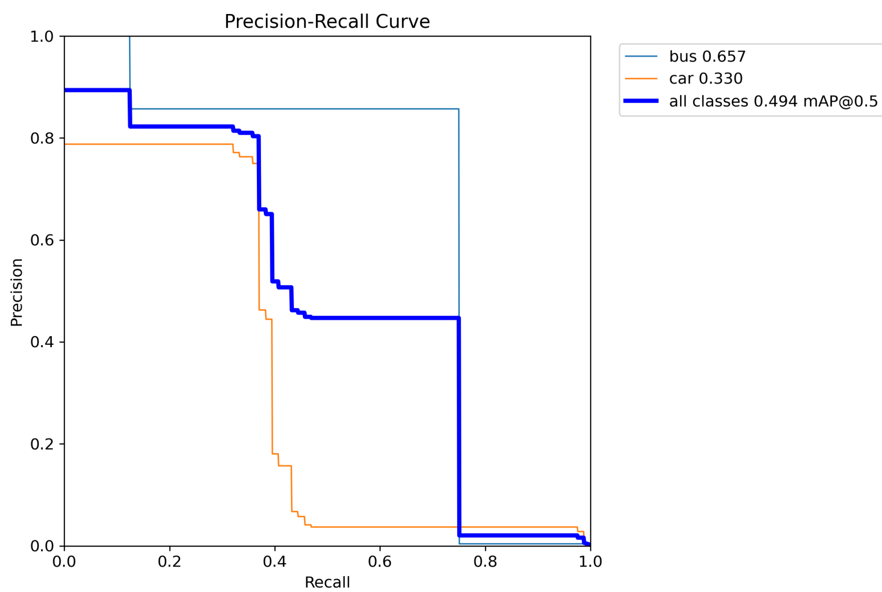

Figure 596. precision_over_confidence, yolov8n, pre-trained=True, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=True

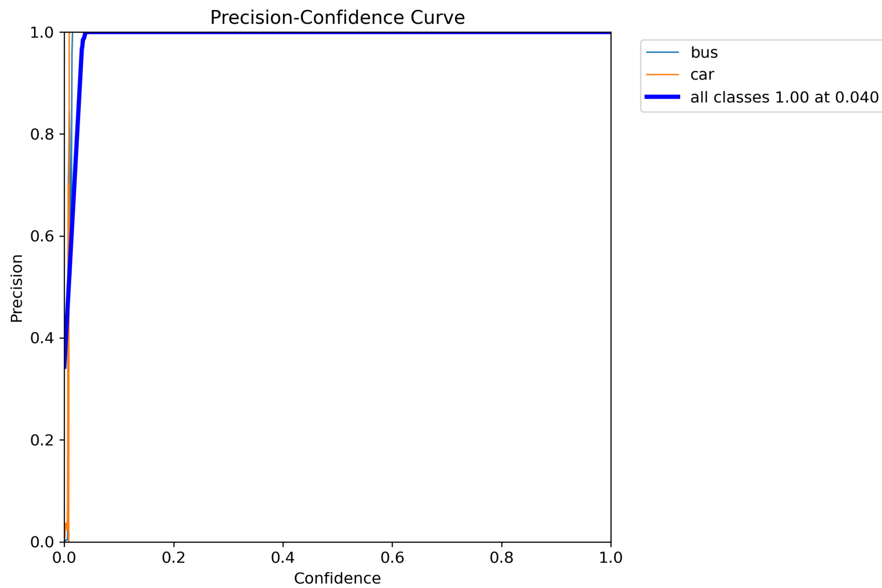

Figure 597. recall_over_confidence, yolov8n, pre-trained=True, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=True

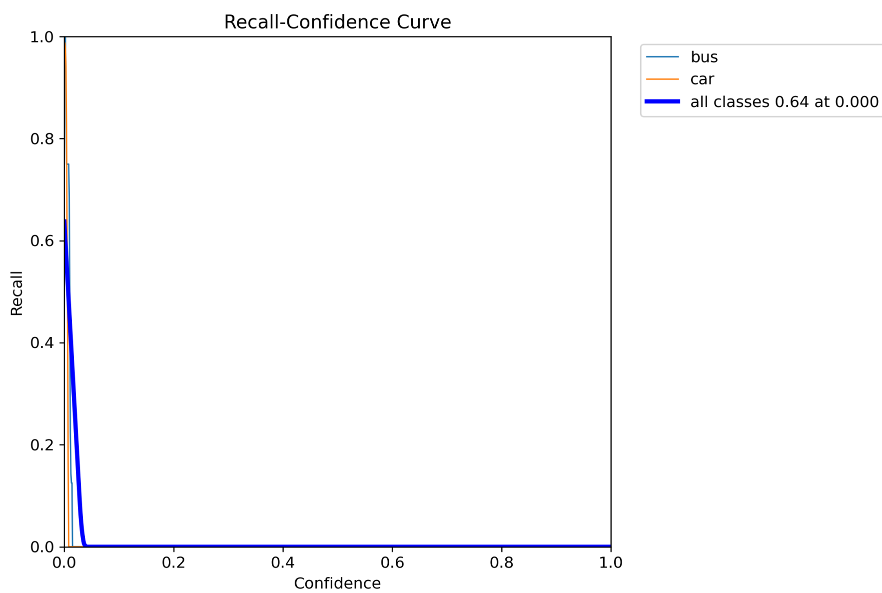

Figure 598. confusion_matrix, yolov8n, pre-trained=True, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=True

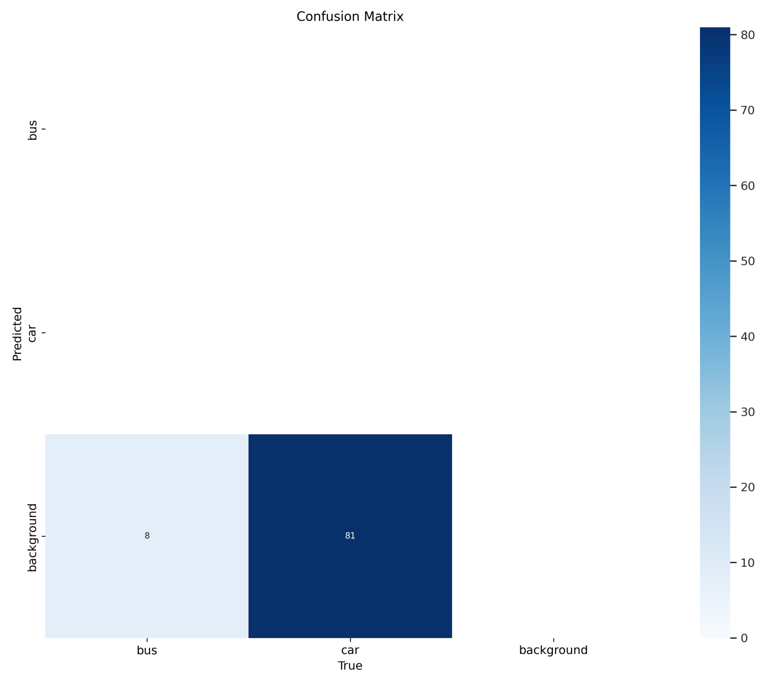

Figure 599. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=True

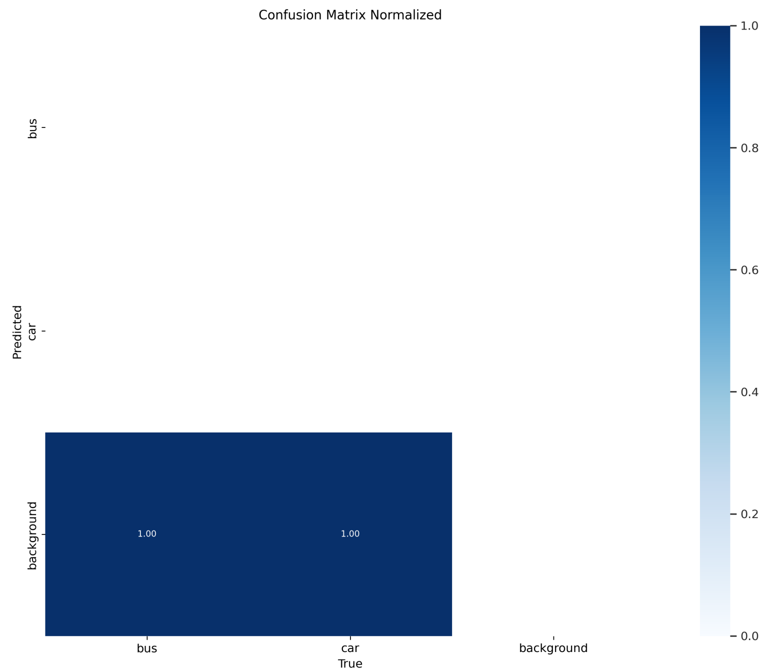

Figure 600. f1_over_confidence, yolov8n, pre-trained=True, epochs=100, data=kielce_university_of_technology, hyperparameter-tuned=True

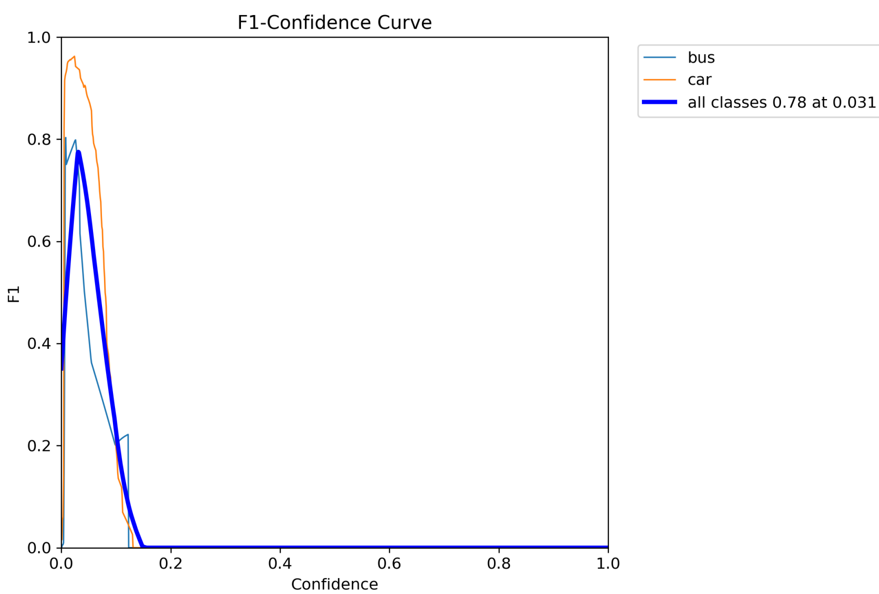

Figure 601. precision_over_recall, yolov8n, pre-trained=True, epochs=100, data=kielce_university_of_technology, hyperparameter-tuned=True

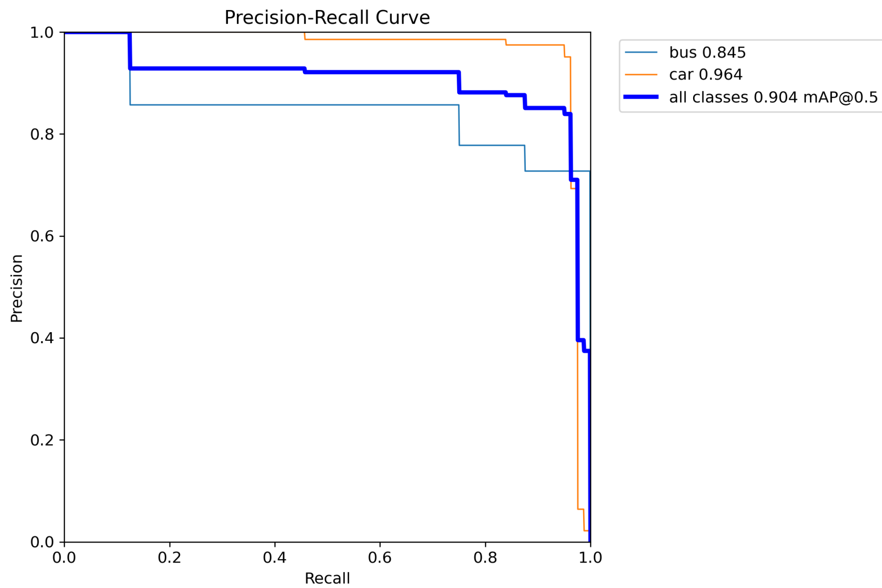

Figure 602. precision_over_confidence, yolov8n, pre-trained=True, epochs=100, data=kielce_university_of_technology, hyperparameter-tuned=True

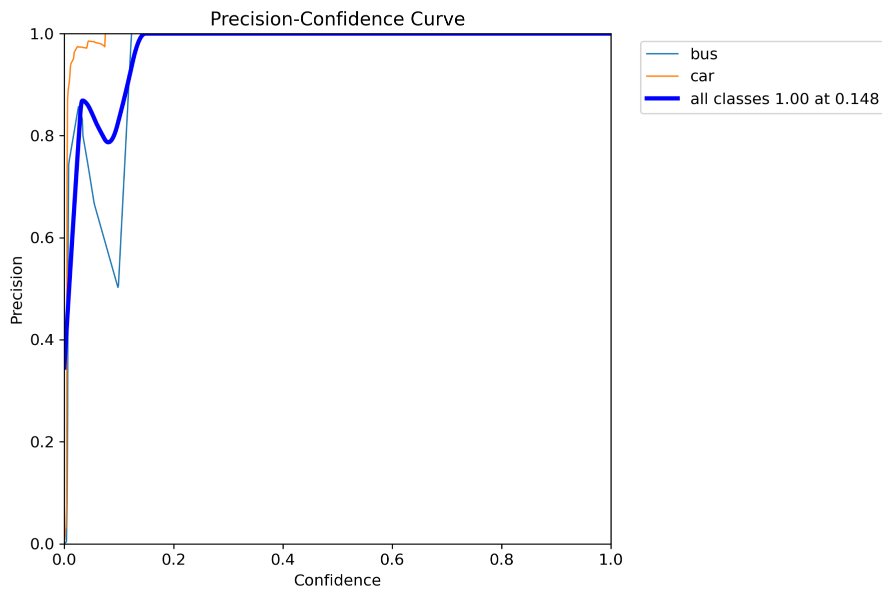

Figure 603. recall_over_confidence, yolov8n, pre-trained=True, epochs=100, data=kielce_university_of_technology, hyperparameter-tuned=True

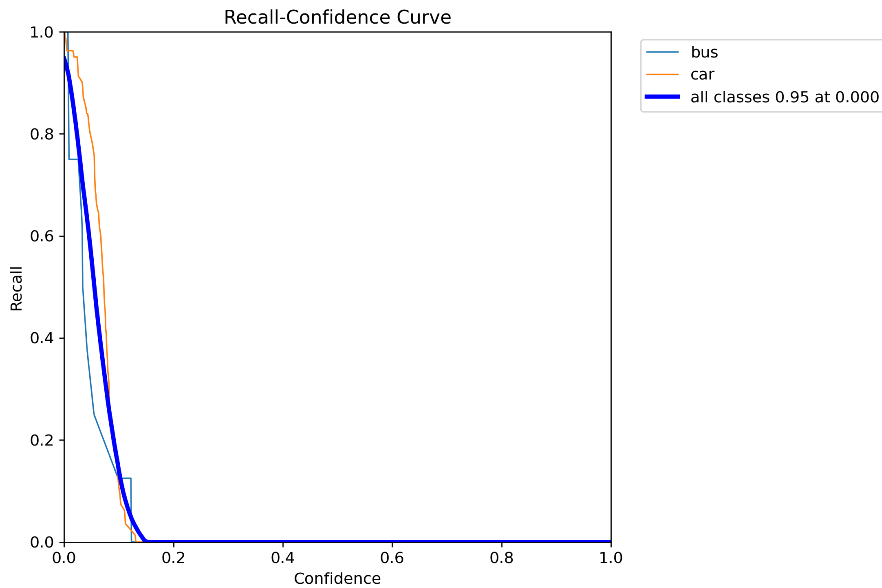

Figure 604. confusion_matrix, yolov8n, pre-trained=True, epochs=100, data=kielce_university_of_technology, hyperparameter-tuned=True

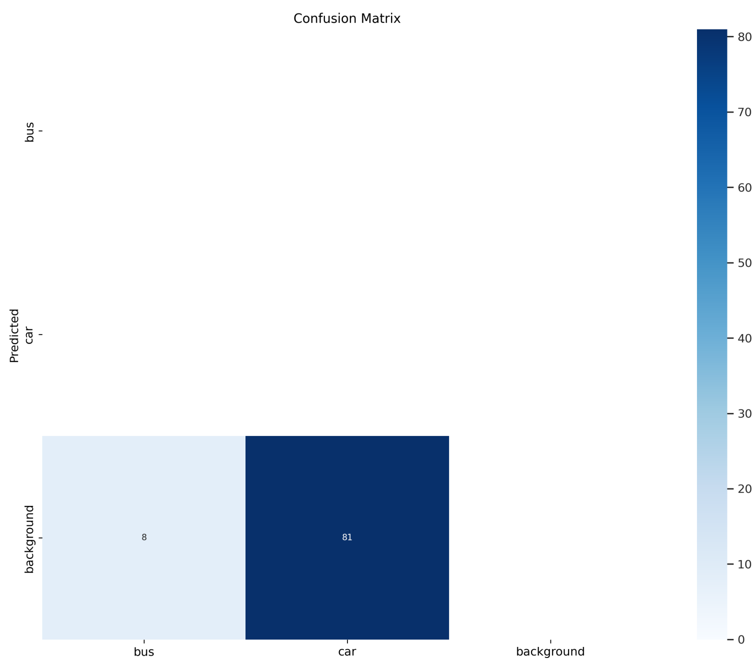

Figure 605. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=100, data=kielce_university_of_technology, hyperparameter-

tuned=True

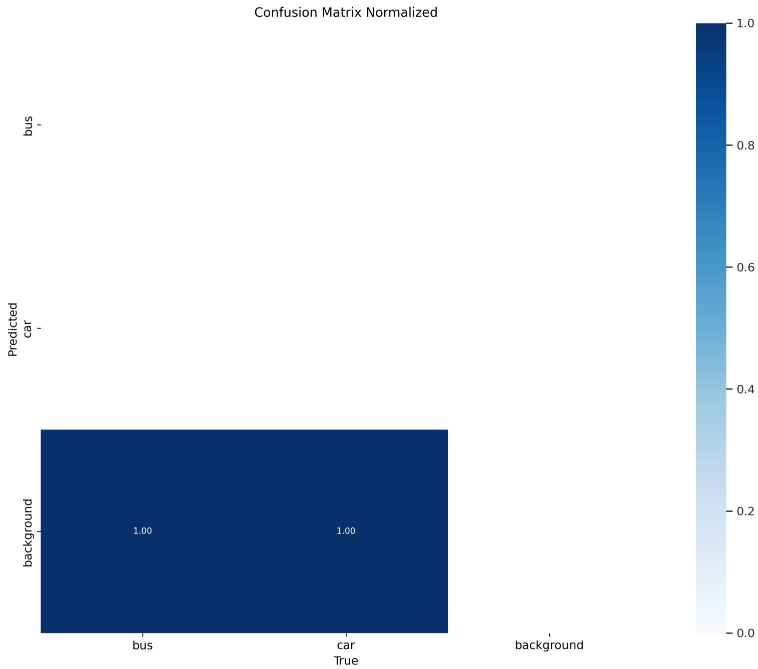

Figure 606. f1_over_confidence, yolov8n, pre-trained=True, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=True

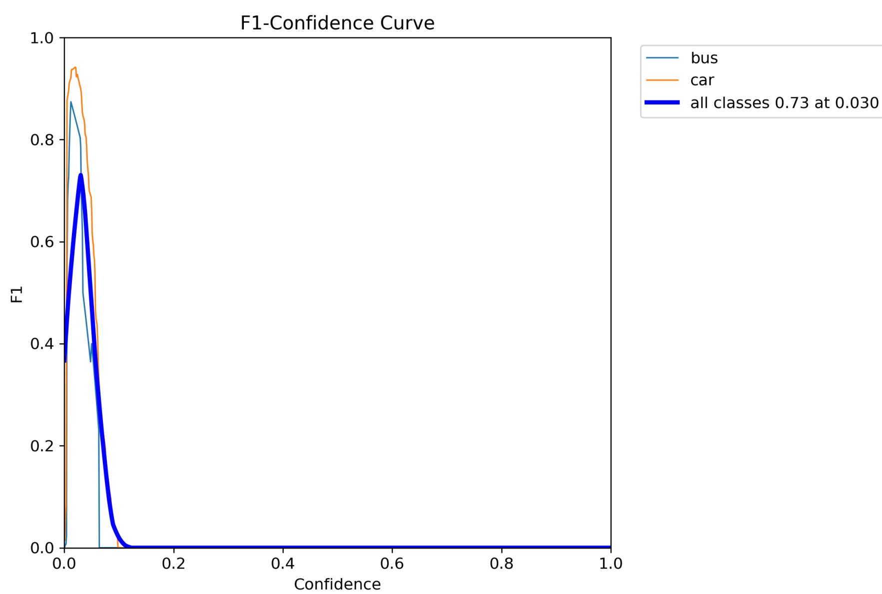

Figure 607. precision_over_recall, yolov8n, pre-trained=True, epochs=150,

data=kielce_university_of_technology, hyperparameter-tuned=True

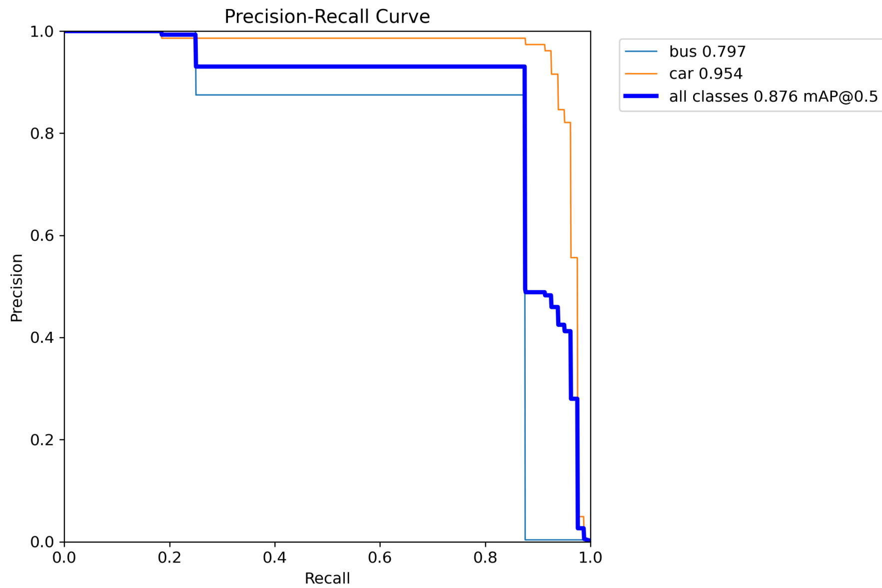

Figure 608. precision_over_confidence, yolov8n, pre-trained=True, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=True

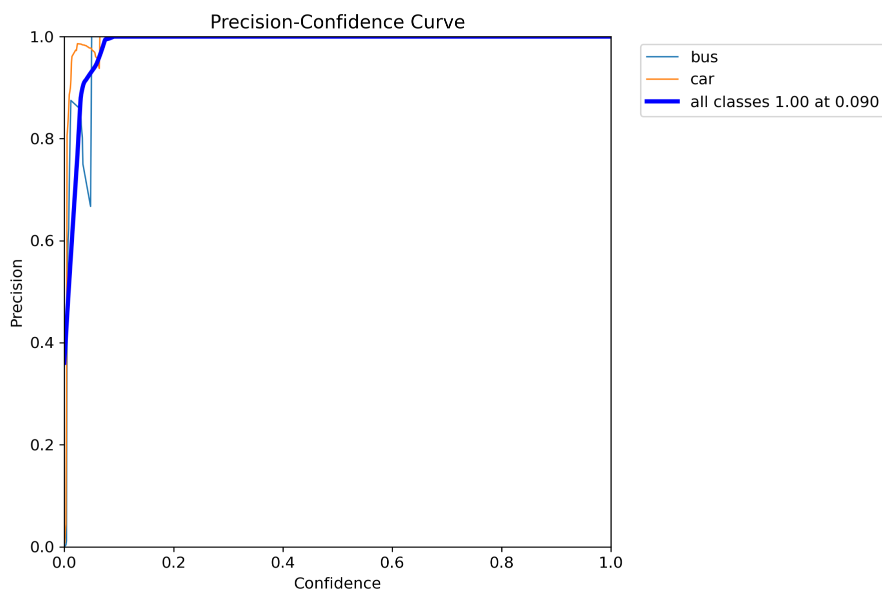

Figure 609. recall_over_confidence, yolov8n, pre-trained=True, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=True

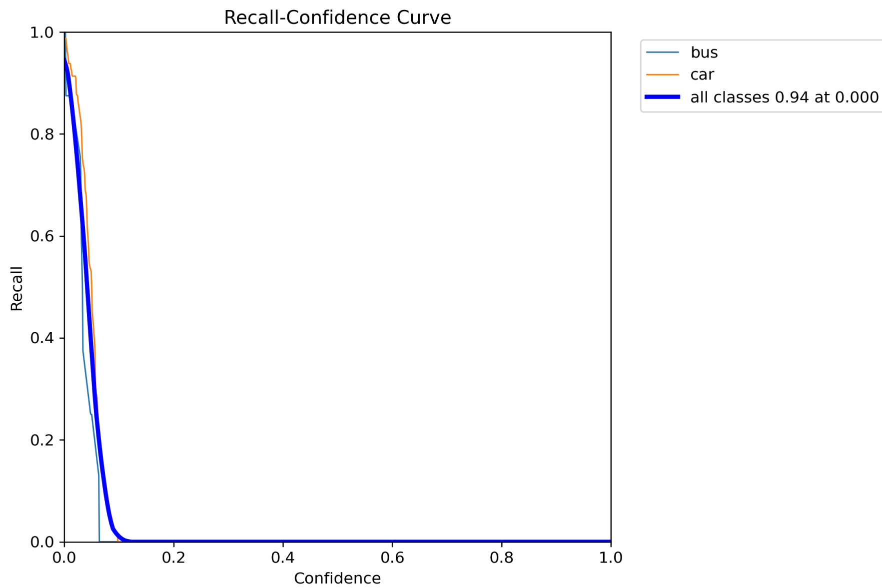

Figure 610. confusion_matrix, yolov8n, pre-trained=True, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=True

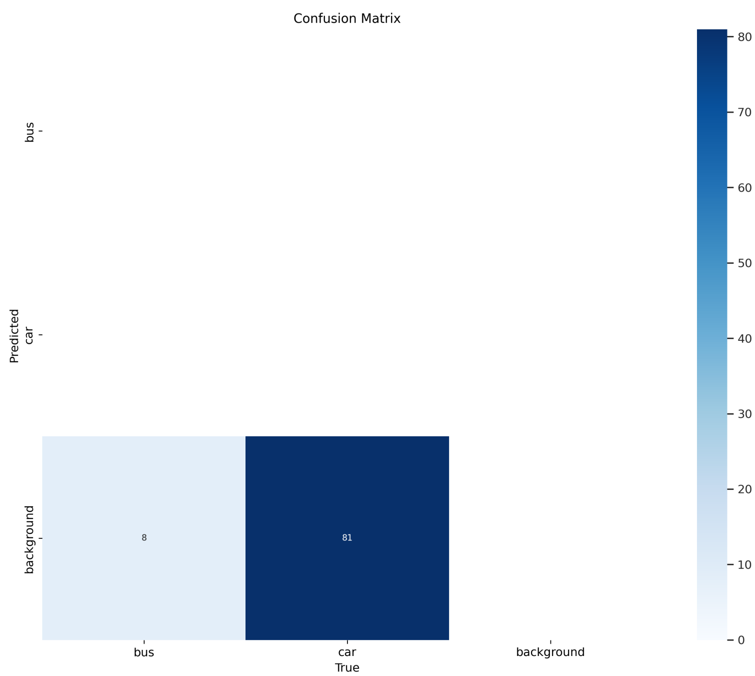

Figure 611. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=150, data=kielce_university_of_technology, hyperparameter-

tuned=True

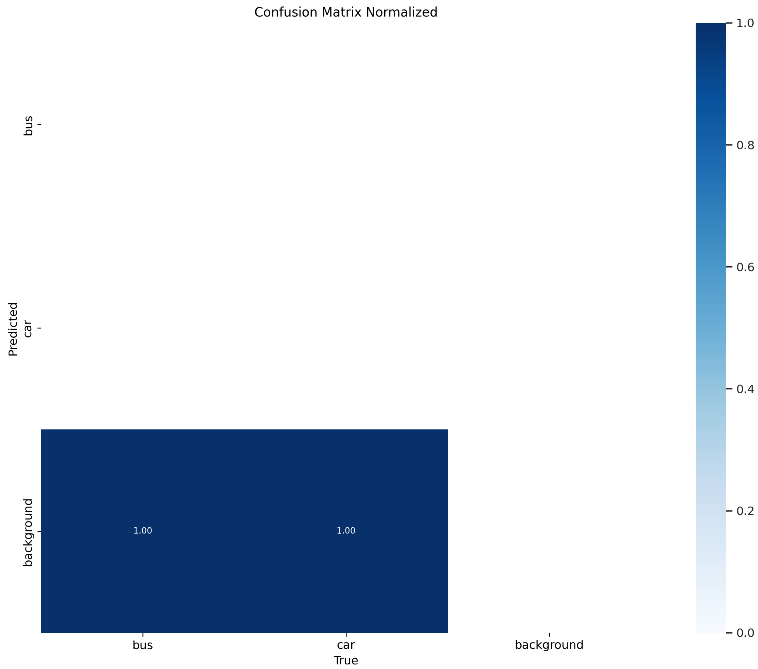

Figure 612. f1_over_confidence, yolov8n, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

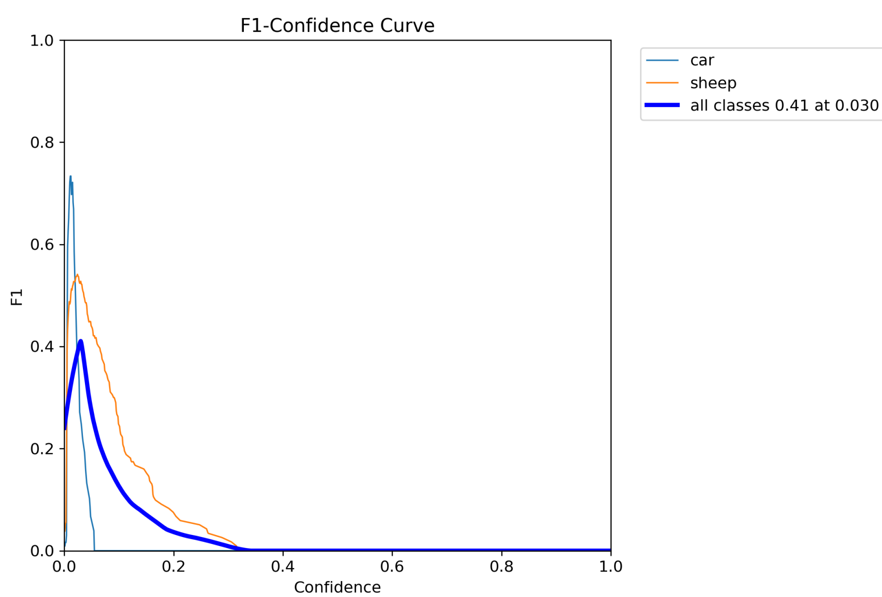

Figure 613. precision_over_recall, yolov8n, pre-trained=True, epochs=50,

data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

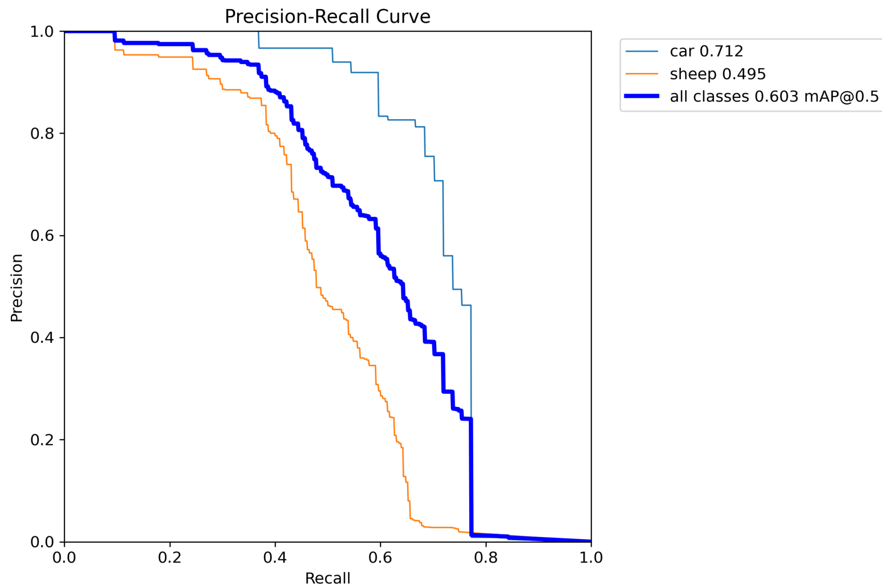

Figure 614. precision_over_confidence, yolov8n, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

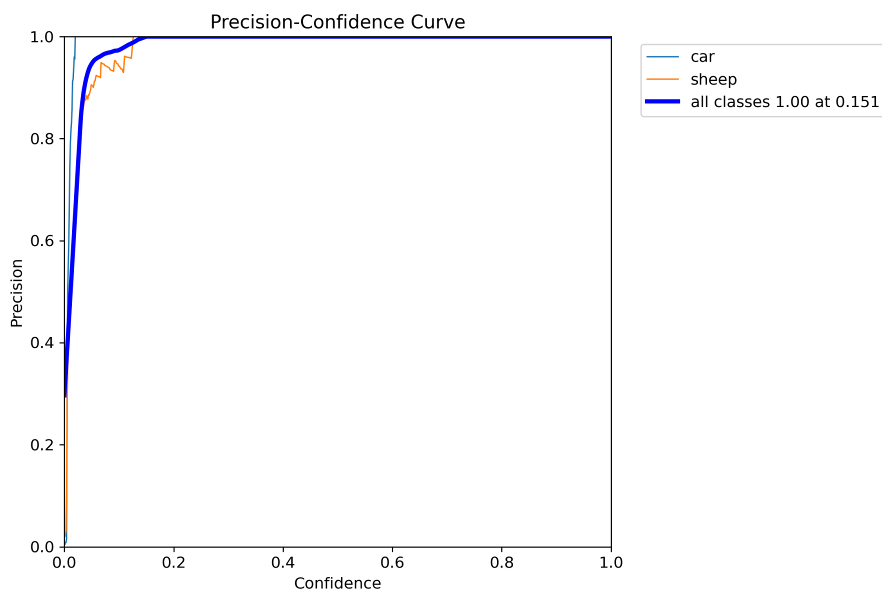

Figure 615. recall_over_confidence, yolov8n, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

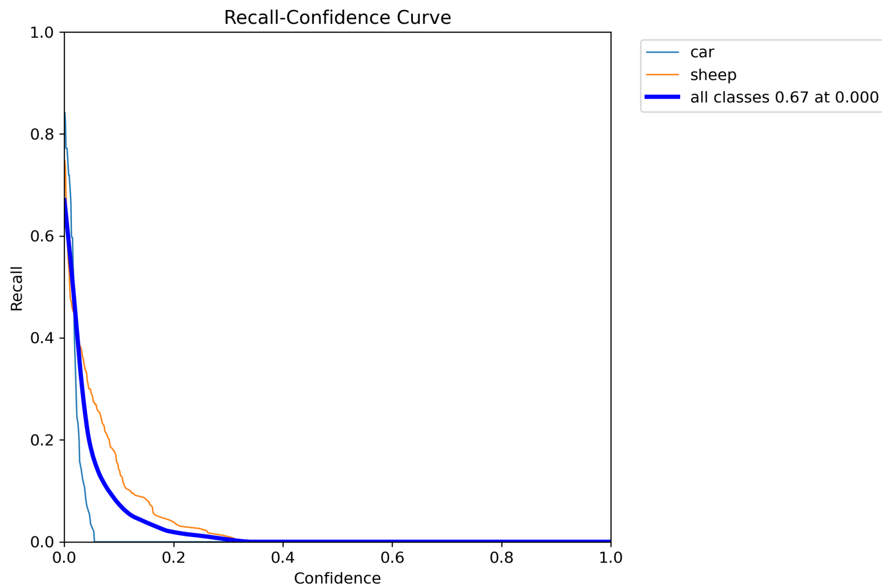

Figure 616. confusion_matrix, yolov8n, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

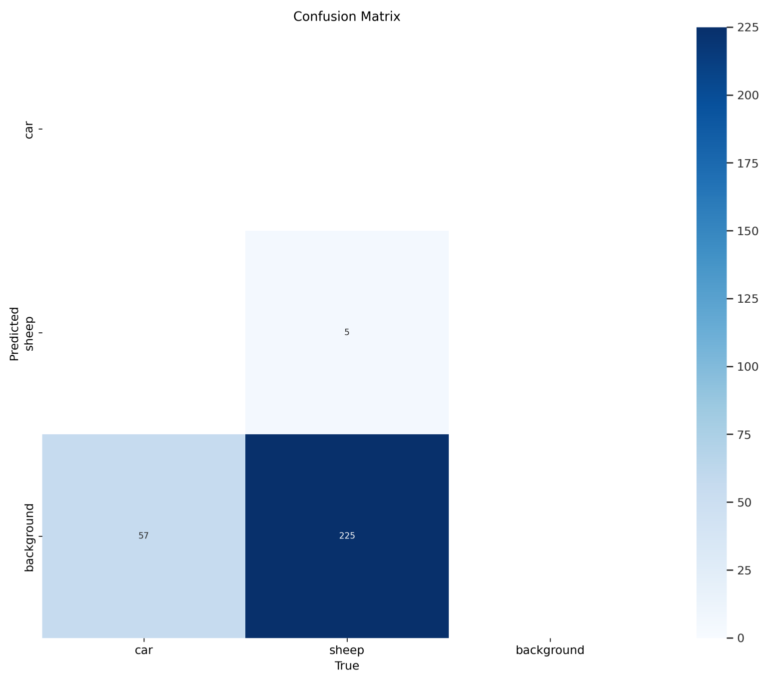

Figure 617. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=50, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

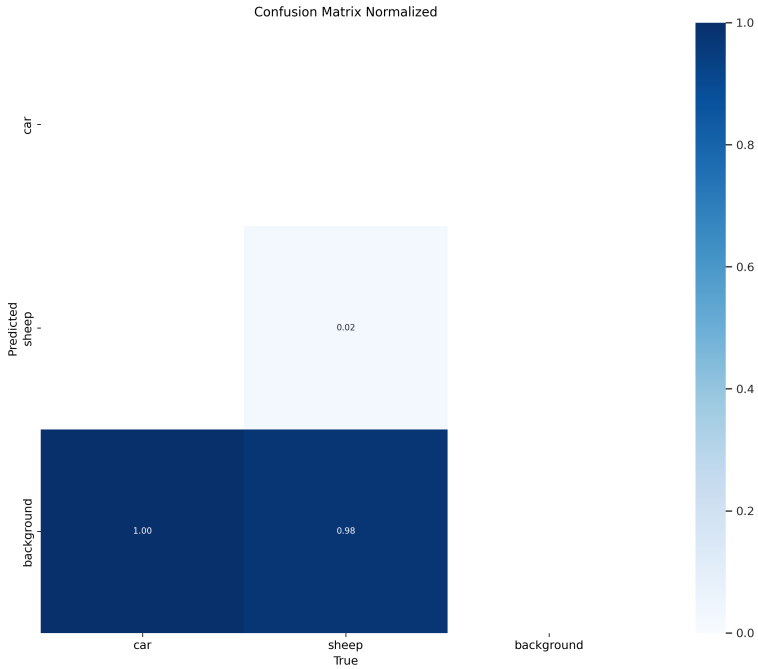

Figure 618. f1_over_confidence, yolov8n, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

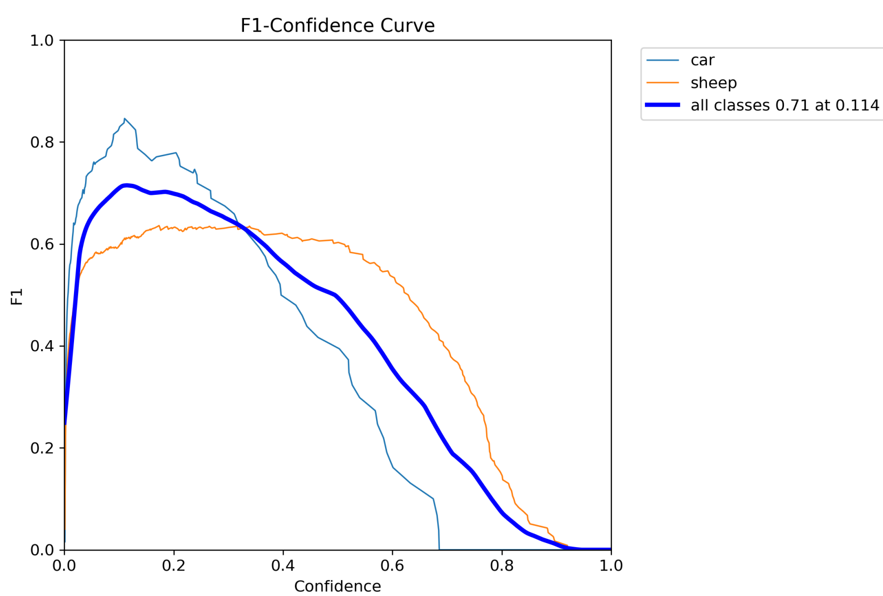

Figure 619. precision_over_recall, yolov8n, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

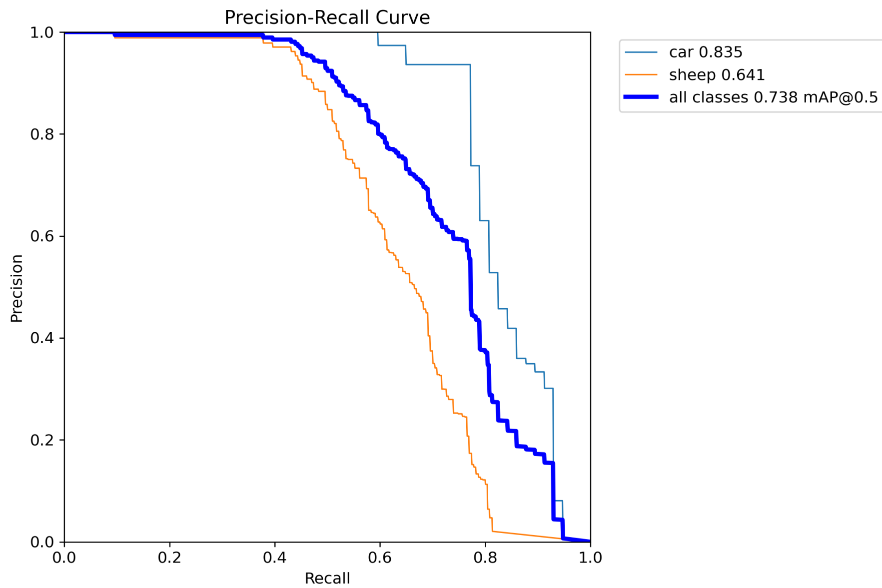

Figure 620. precision_over_confidence, yolov8n, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

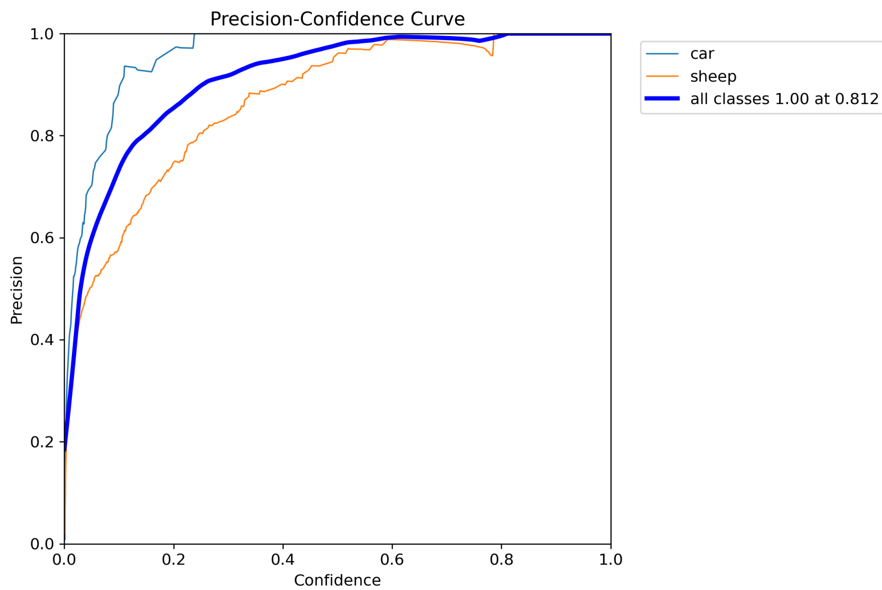

Figure 621. recall_over_confidence, yolov8n, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

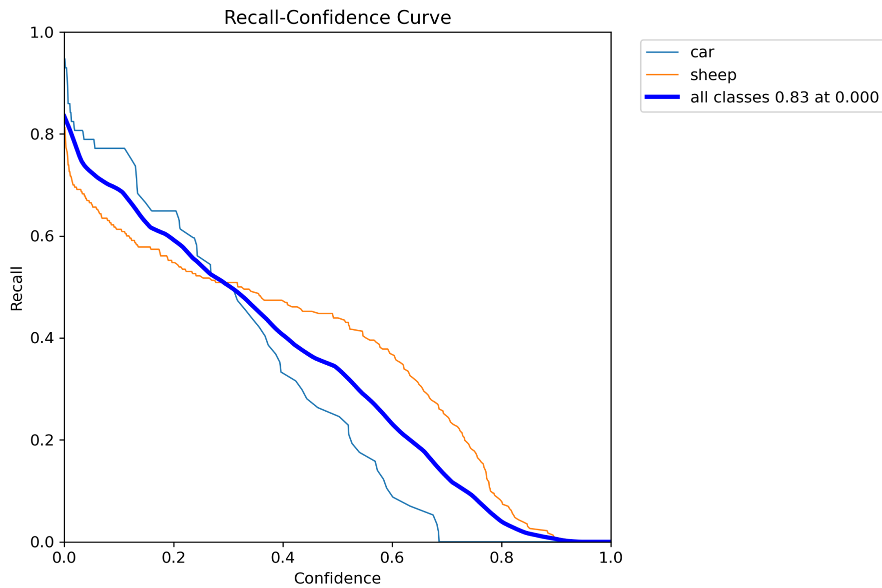

Figure 622. confusion_matrix, yolov8n, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

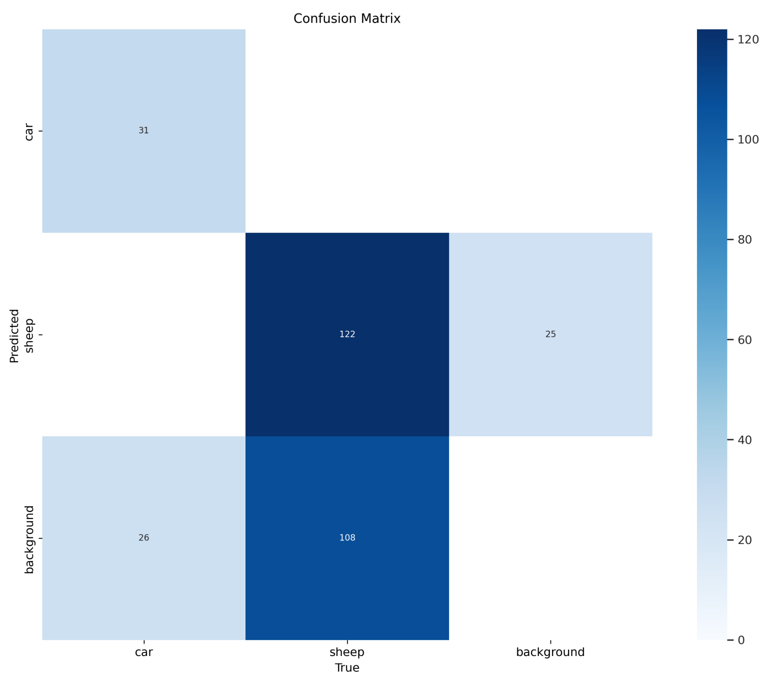

Figure 623. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

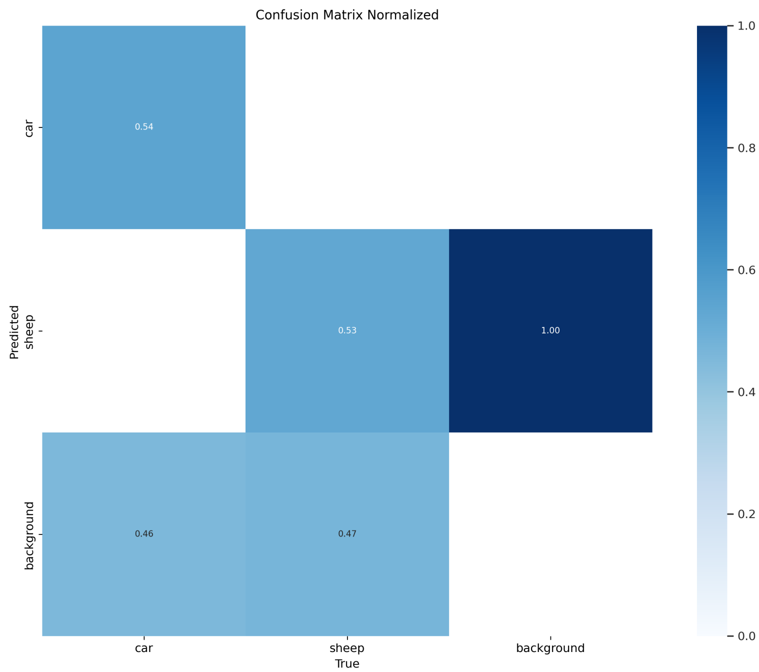

Figure 624. f1_over_confidence, yolov8n, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

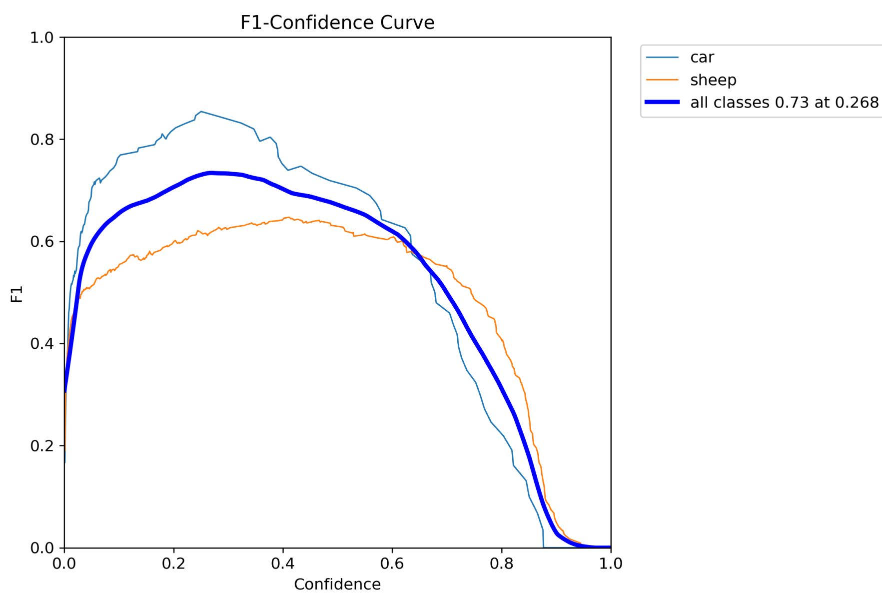

Figure 625. precision_over_recall, yolov8n, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

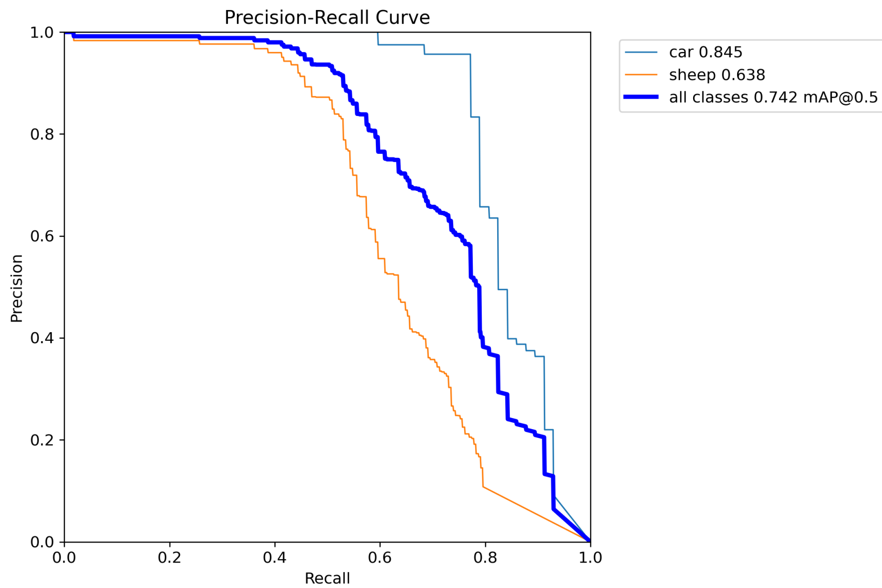

Figure 626. precision_over_confidence, yolov8n, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

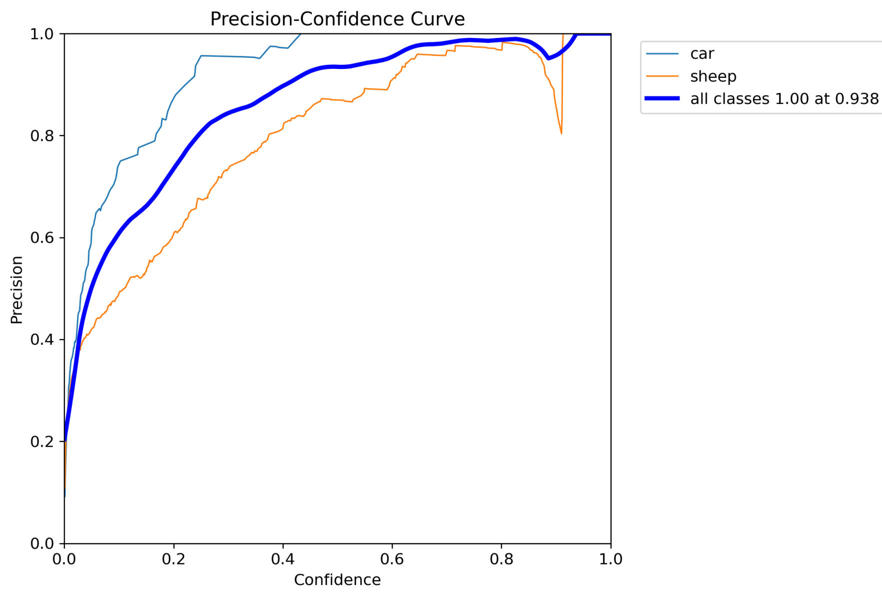

Figure 627. recall_over_confidence, yolov8n, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

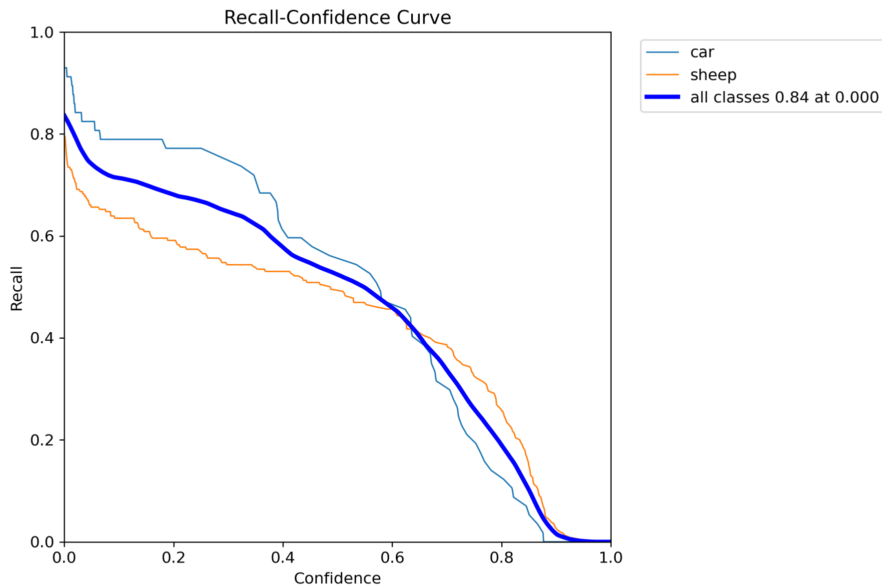

Figure 628. confusion_matrix, yolov8n, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

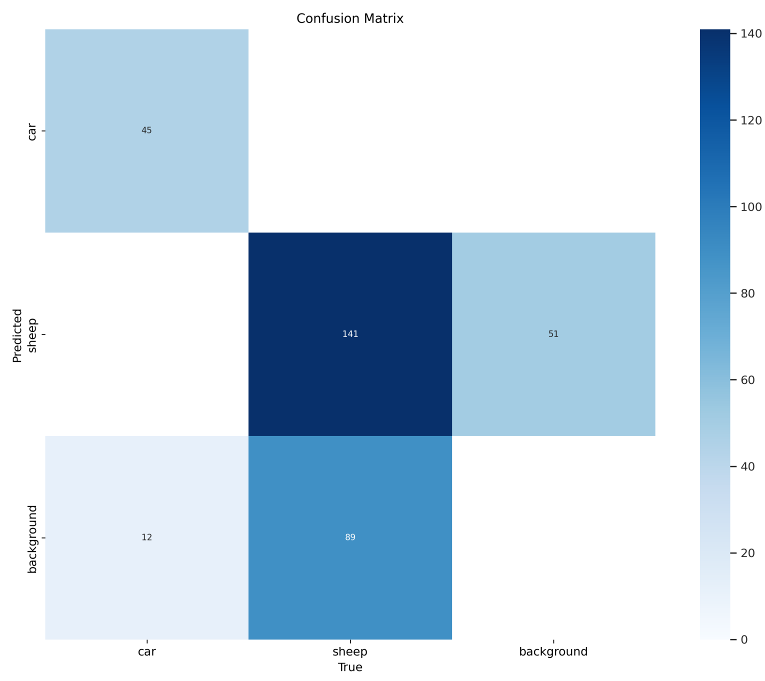

Figure 629. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

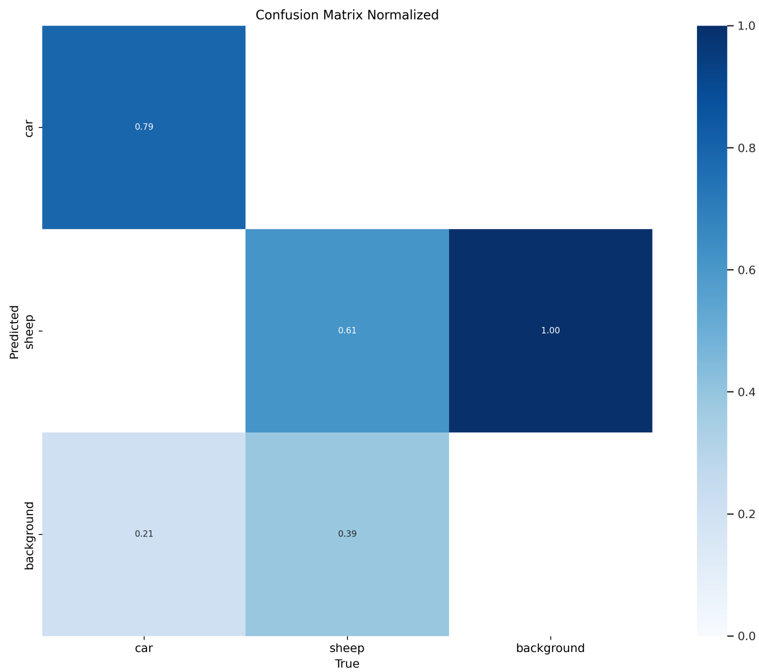

Figure 630. f1_over_confidence, yolov8n, pre-trained=False, epochs=50, data=duomo, hyperparameter-tuned=True

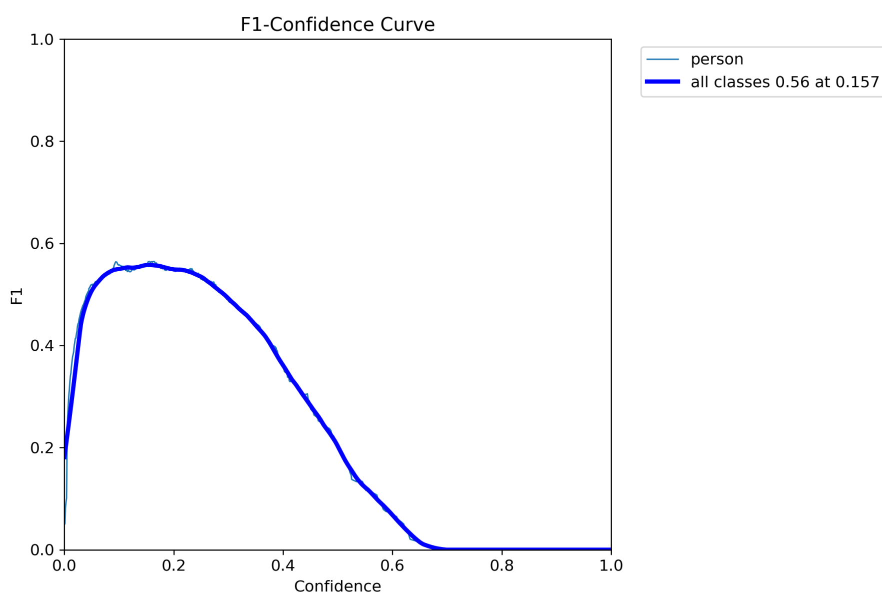

Figure 631. precision_over_recall, yolov8n, pre-trained=False, epochs=50, data=duomo, hyperparameter-tuned=True

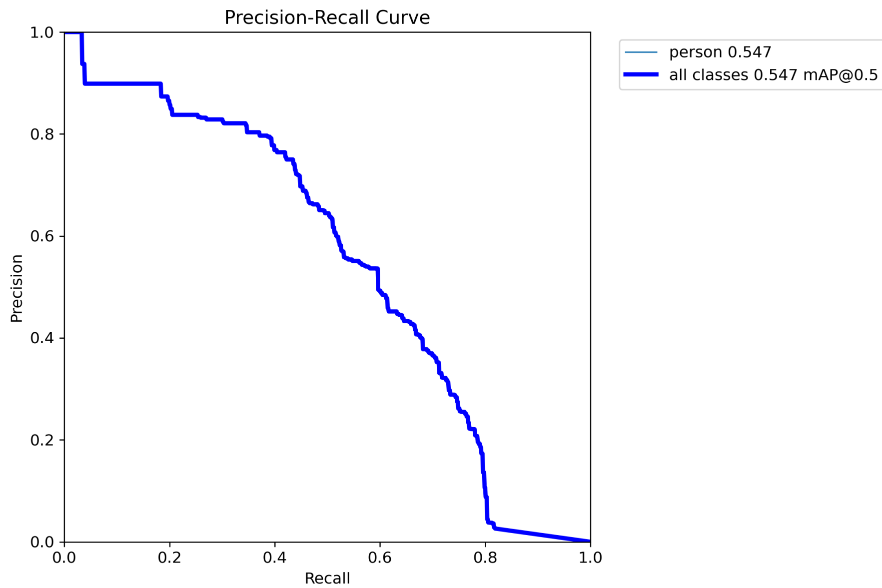

Figure 632. precision_over_confidence, yolov8n, pre-trained=False, epochs=50, data=duomo, hyperparameter-tuned=True

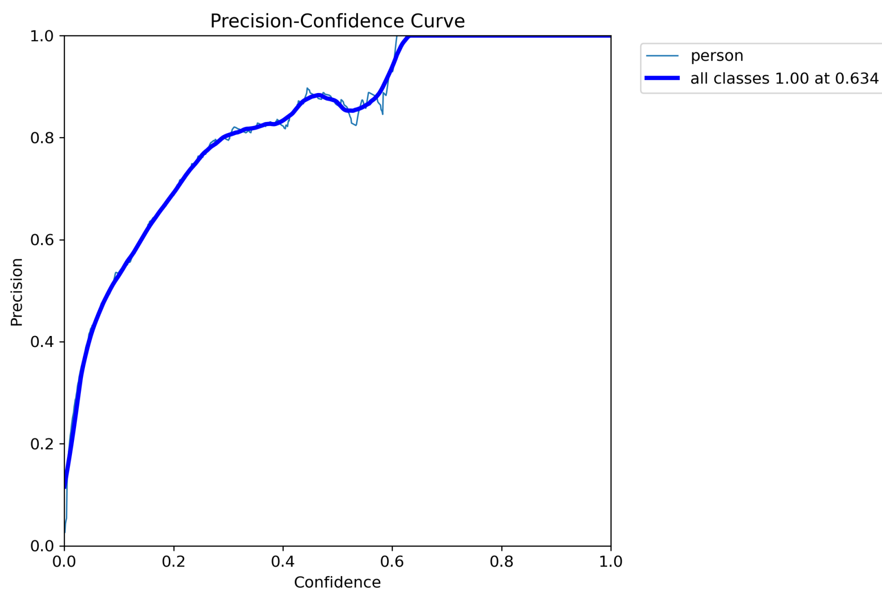

Figure 633. recall_over_confidence, yolov8n, pre-trained=False, epochs=50, data=duomo, hyperparameter-tuned=True

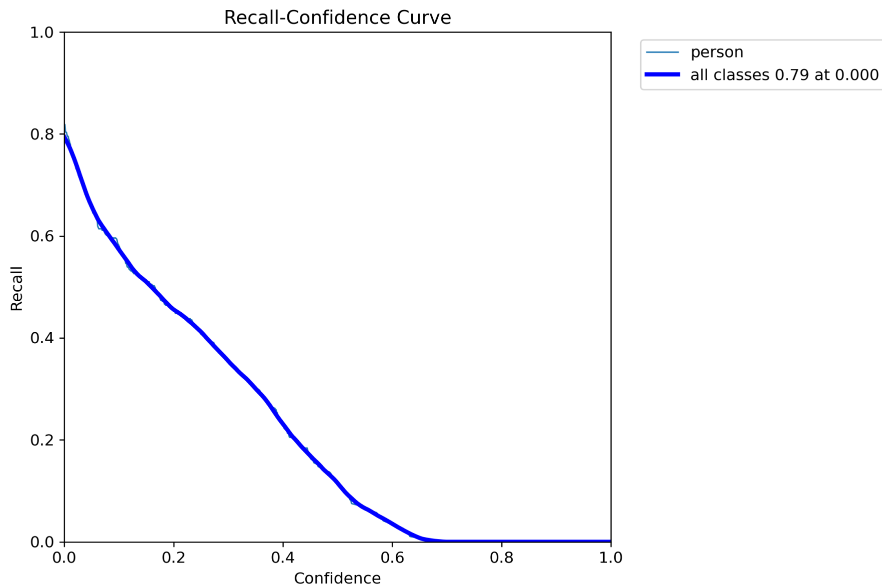

Figure 634. confusion_matrix, yolov8n, pre-trained=False, epochs=50, data=duomo, hyperparameter-tuned=True

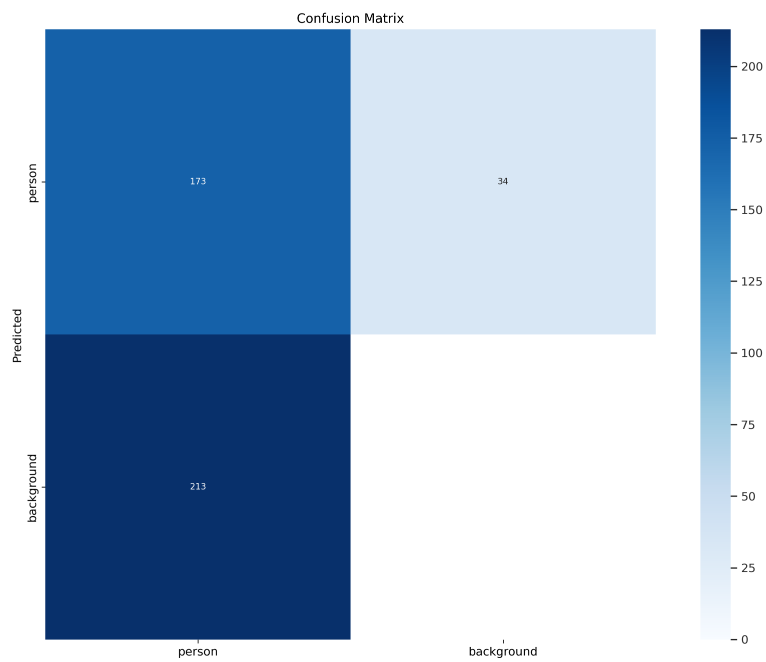

Figure 635. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=50, data=duomo, hyperparameter-tuned=True

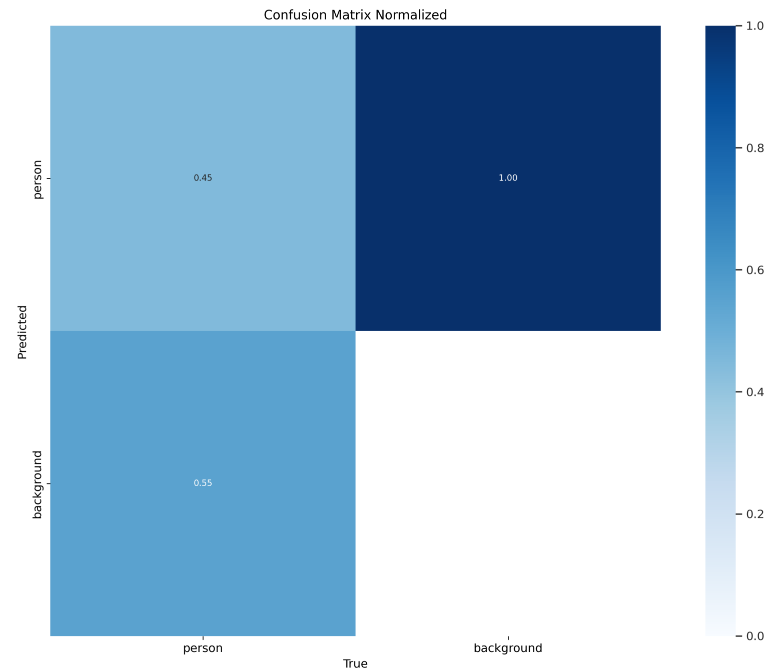

Figure 636. f1_over_confidence, yolov8n, pre-trained=False, epochs=100, data=duomo, hyperparameter-tuned=True

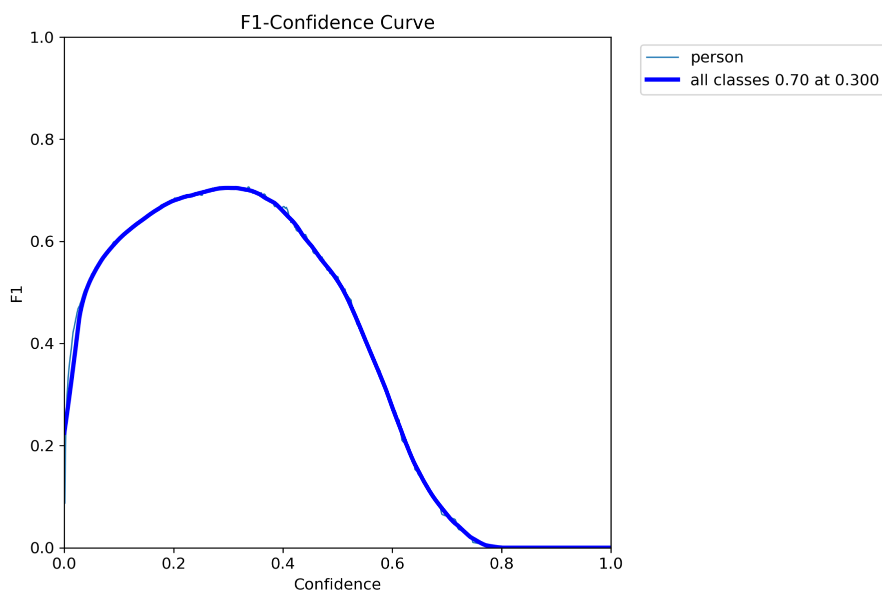

Figure 637. precision_over_recall, yolov8n, pre-trained=False, epochs=100, data=duomo, hyperparameter-tuned=True

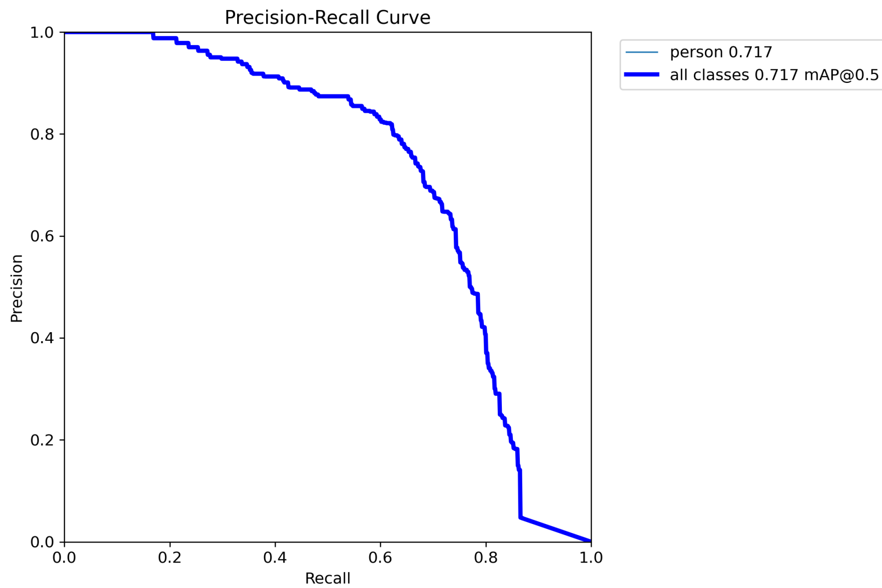

Figure 638. precision_over_confidence, yolov8n, pre-trained=False, epochs=100, data=duomo, hyperparameter-tuned=True

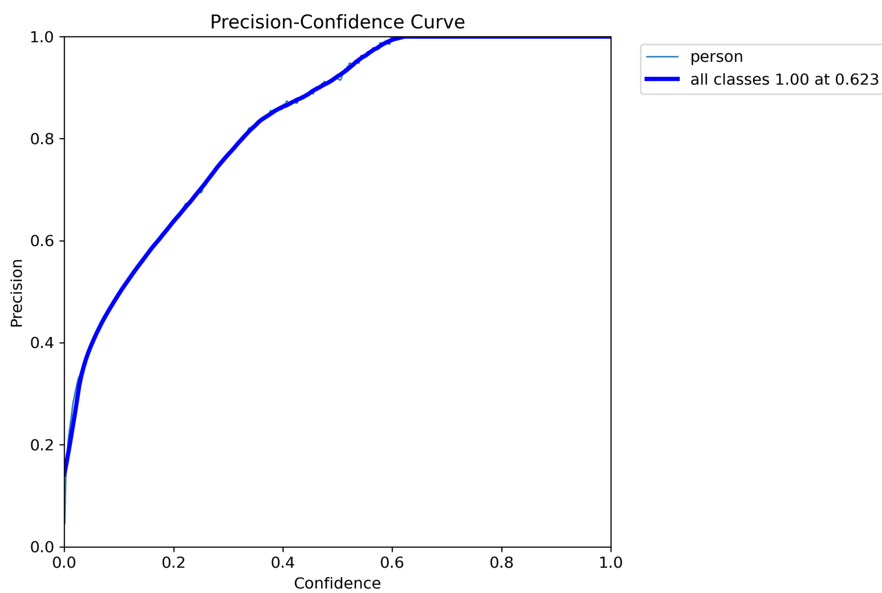

Figure 639. recall_over_confidence, yolov8n, pre-trained=False, epochs=100, data=duomo, hyperparameter-tuned=True

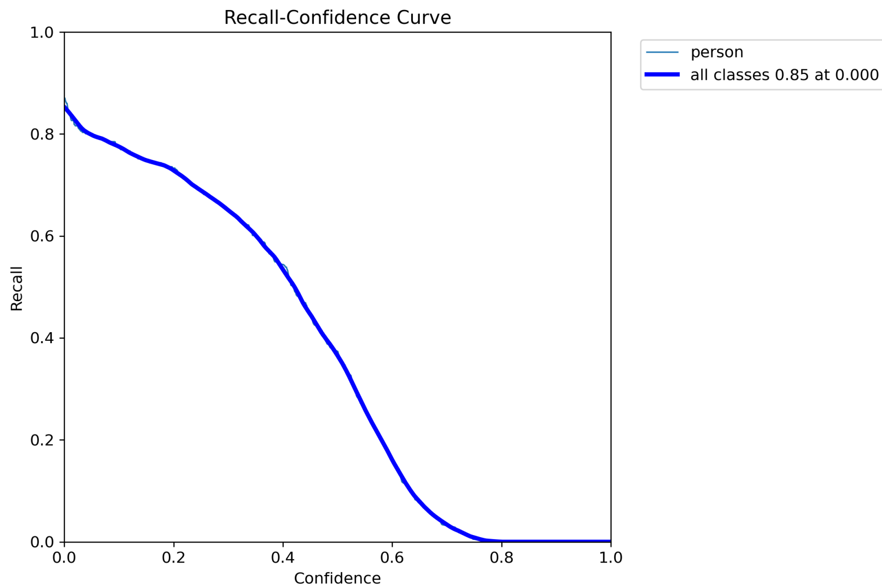

Figure 640. confusion_matrix, yolov8n, pre-trained=False, epochs=100, data=duomo, hyperparameter-tuned=True

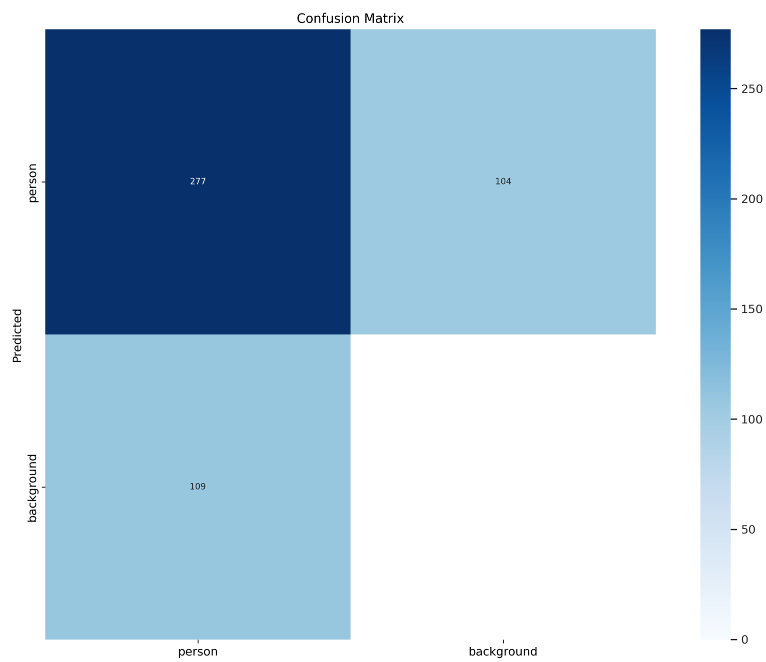

Figure 641. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=100, data=duomo, hyperparameter-tuned=True

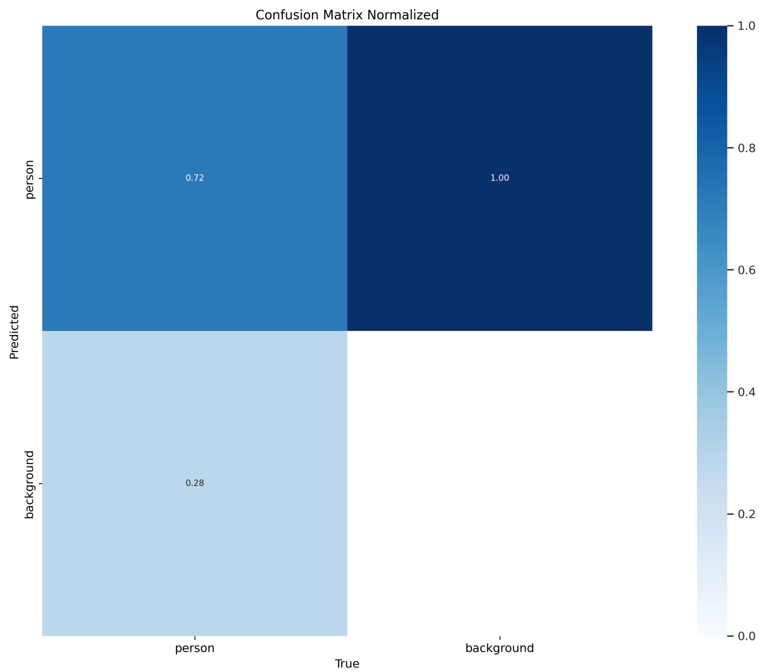

Figure 642. f1_over_confidence, yolov8n, pre-trained=False, epochs=150, data=duomo, hyperparameter-tuned=True

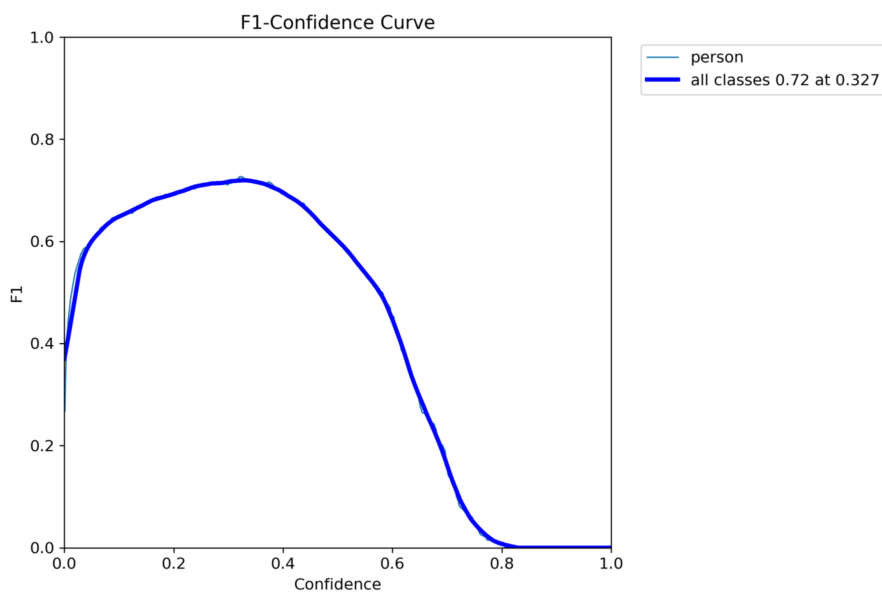

Figure 643. precision_over_recall, yolov8n, pre-trained=False, epochs=150, data=duomo, hyperparameter-tuned=True

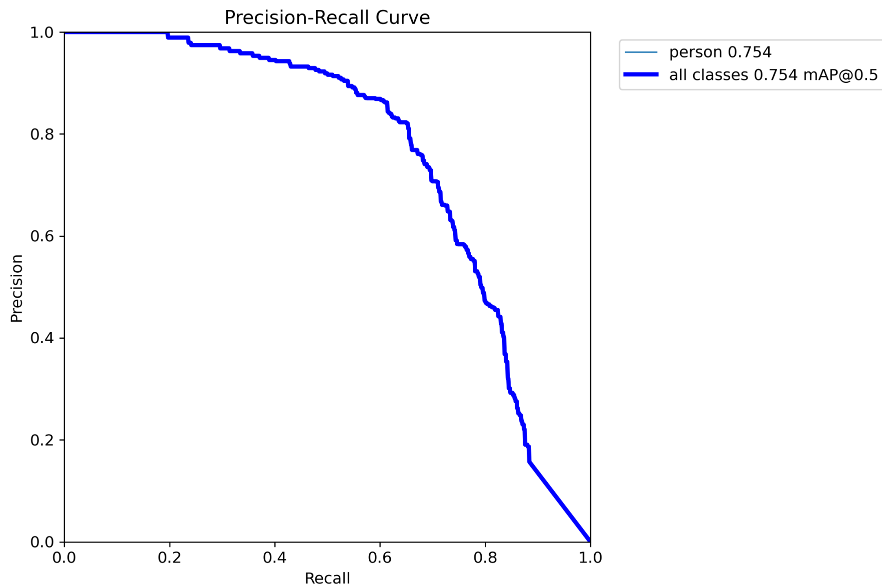

Figure 644. precision_over_confidence, yolov8n, pre-trained=False, epochs=150, data=duomo, hyperparameter-tuned=True

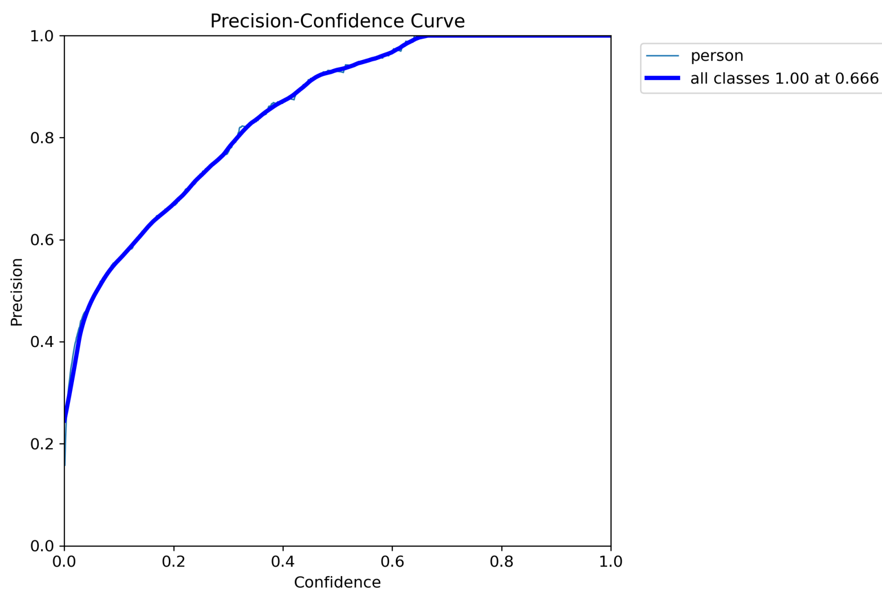

Figure 645. recall_over_confidence, yolov8n, pre-trained=False, epochs=150, data=duomo, hyperparameter-tuned=True

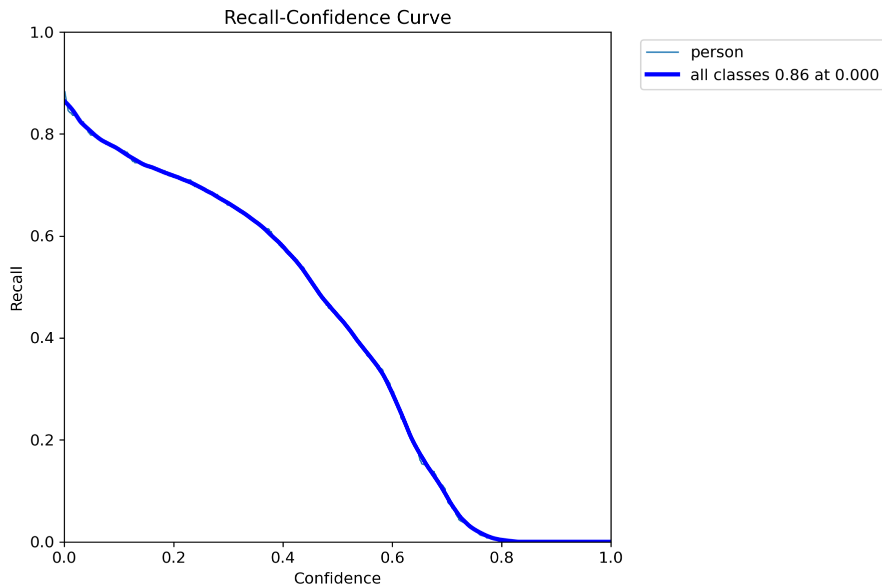

Figure 646. confusion_matrix, yolov8n, pre-trained=False, epochs=150, data=duomo, hyperparameter-tuned=True

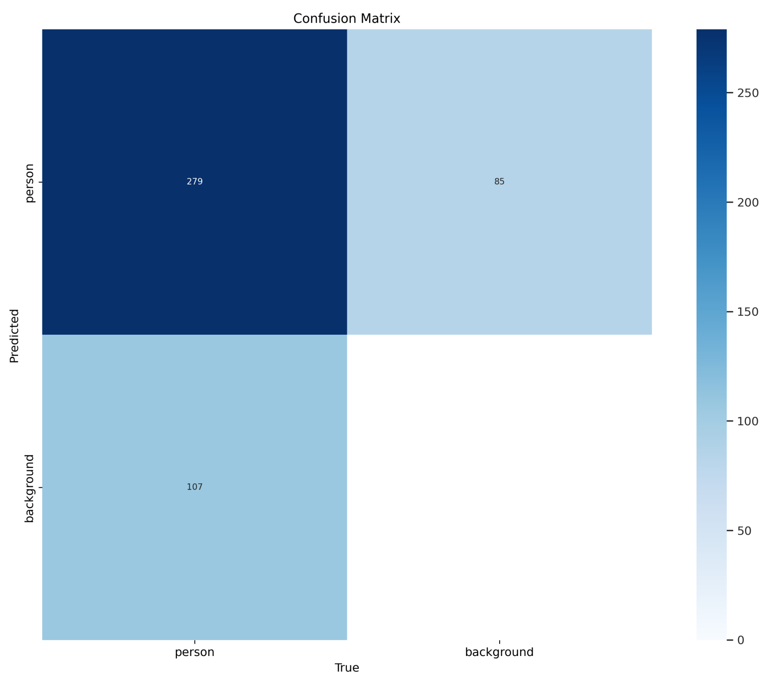

Figure 647. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=150, data=duomo, hyperparameter-tuned=True

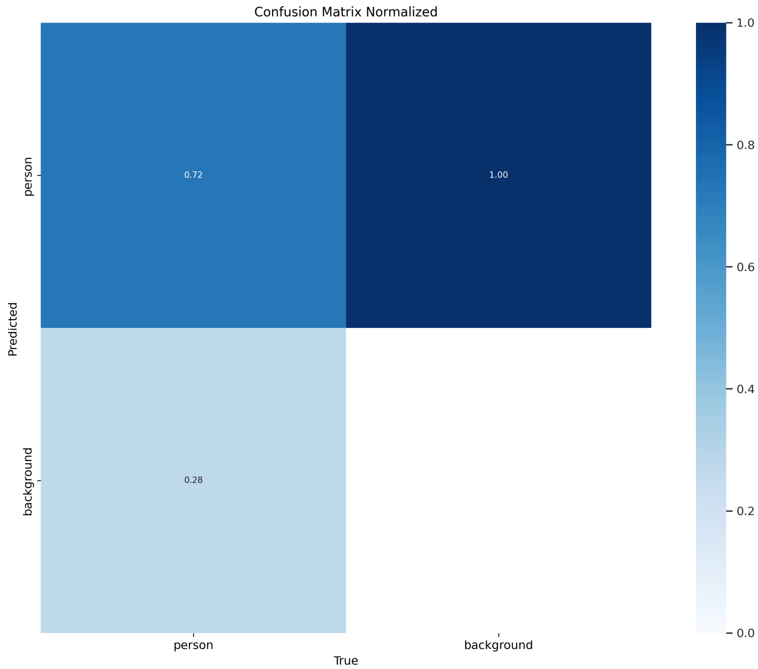

Figure 648. f1__over__confidence, yolov8n, pre-trained=False, epochs=50, data=hadji__dimitar__square, hyperparameter-tuned=True

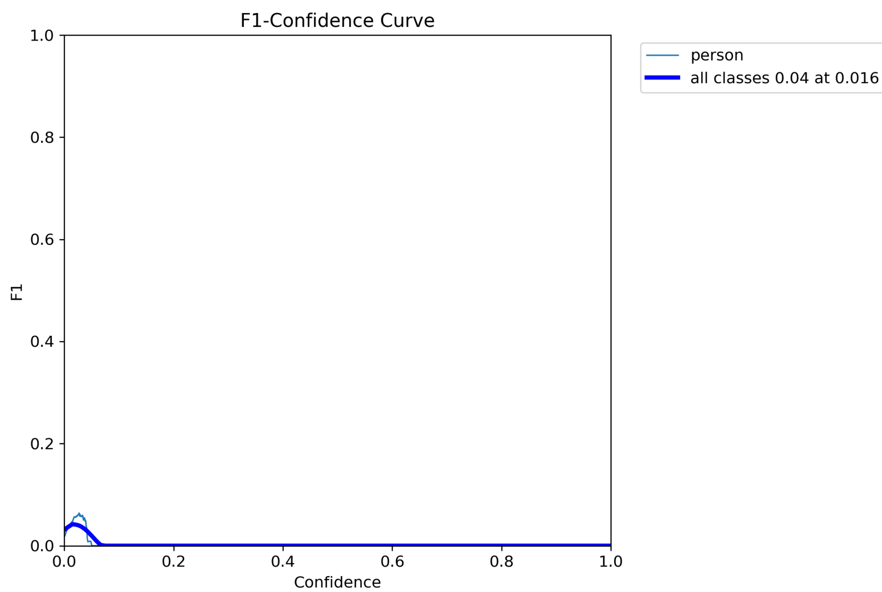

Figure 649. precision__over__recall, yolov8n, pre-trained=False, epochs=50, data=hadji__dimitar__square, hyperparameter-tuned=True

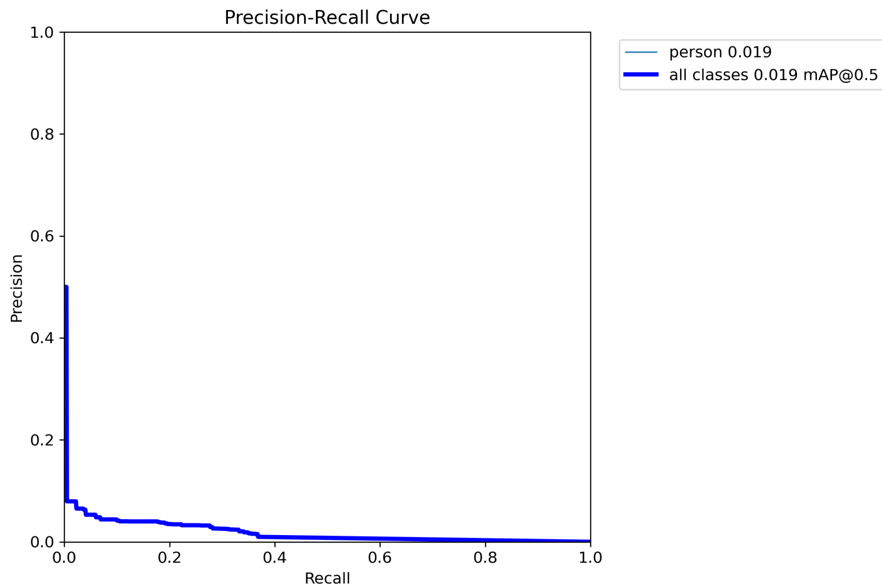

Figure 650. precision_over_confidence, yolov8n, pre-trained=False, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=True

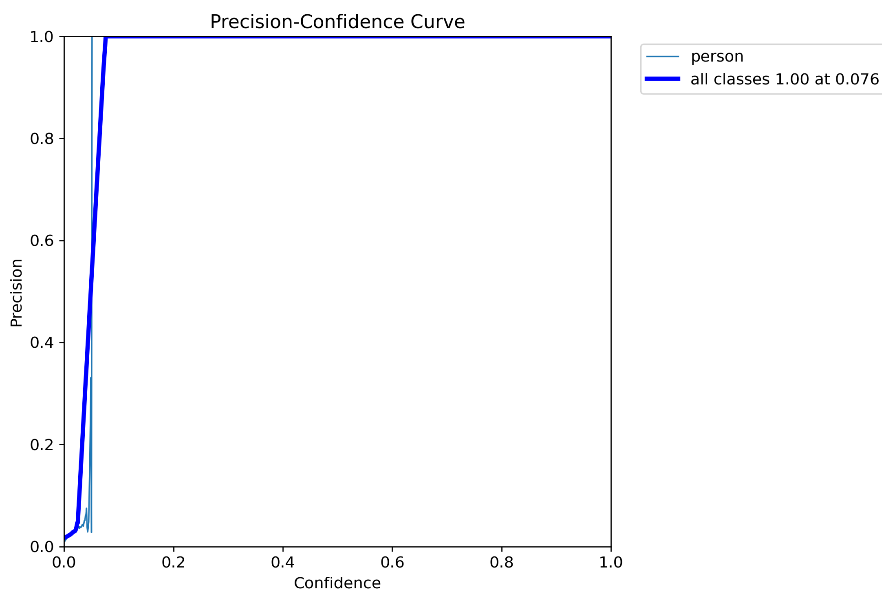

Figure 651. recall_over_confidence, yolov8n, pre-trained=False, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=True

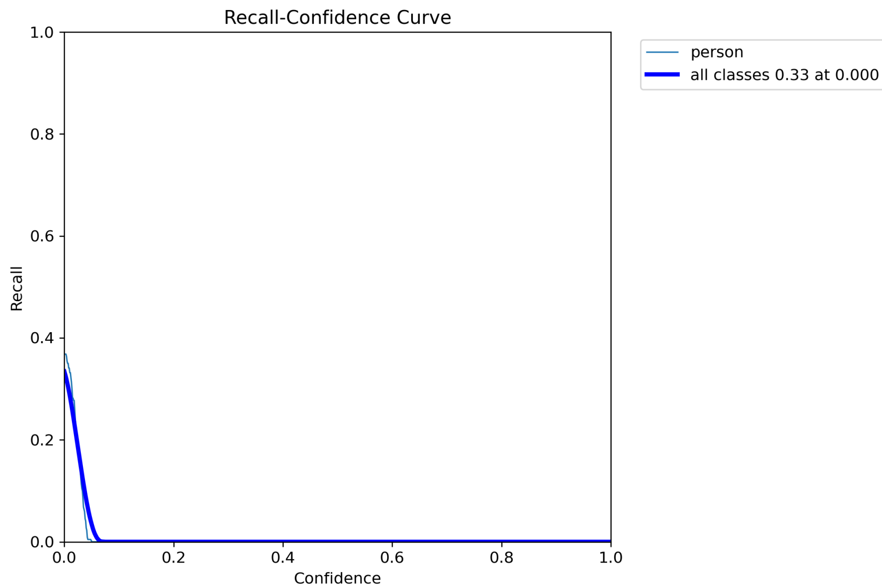

Figure 652. confusion_matrix, yolov8n, pre-trained=False, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=True

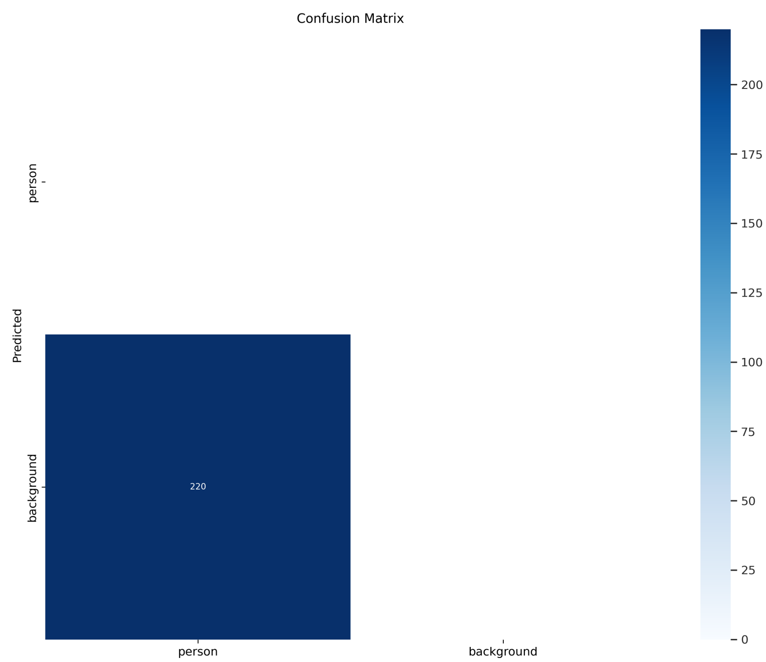

Figure 653. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=50, data=hadji_dimitar_square, hyperparameter-tuned=True

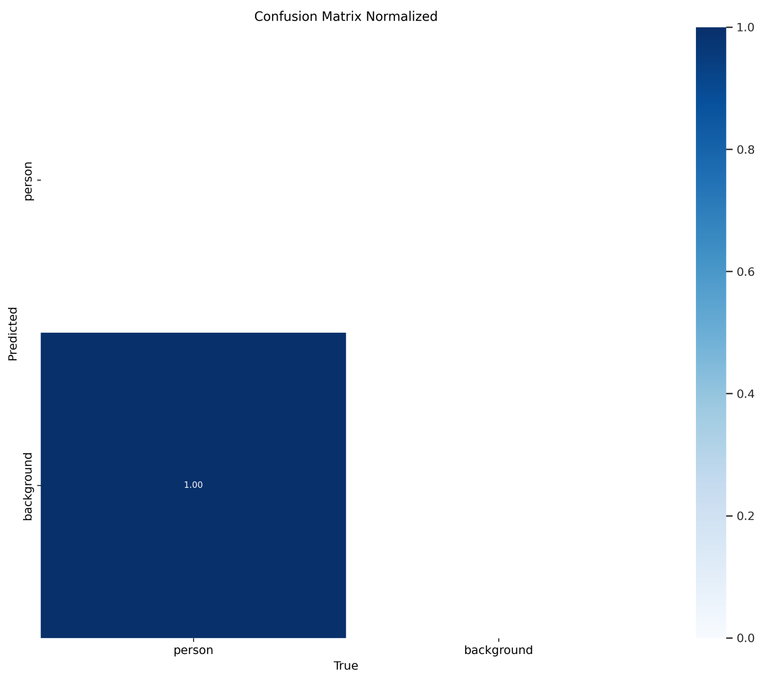

Figure 658. confusion_matrix, yolov8n, pre-trained=False, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=True

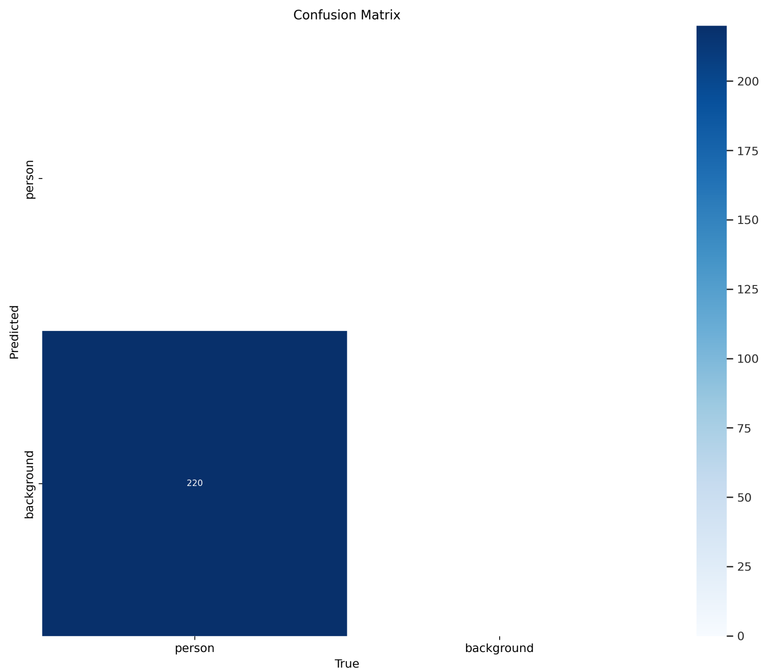

Figure 659. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=100, data=hadji_dimitar_square, hyperparameter-tuned=True

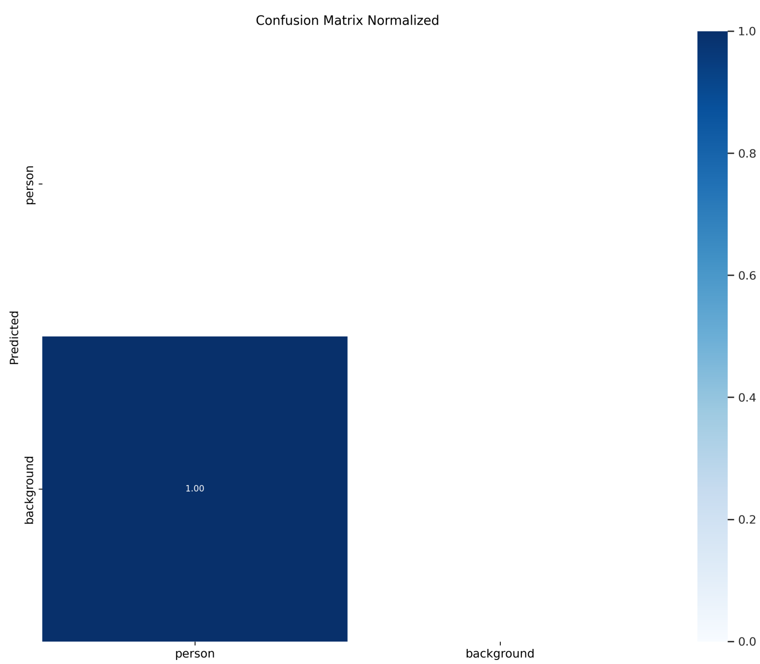

Figure 664. confusion_matrix, yolov8n, pre-trained=False, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=True

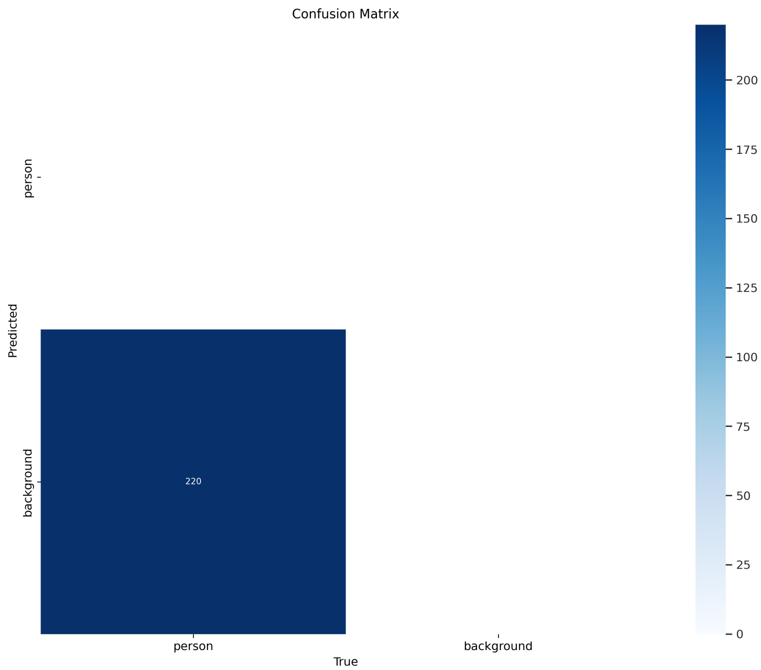

Figure 665. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=150, data=hadji_dimitar_square, hyperparameter-tuned=True

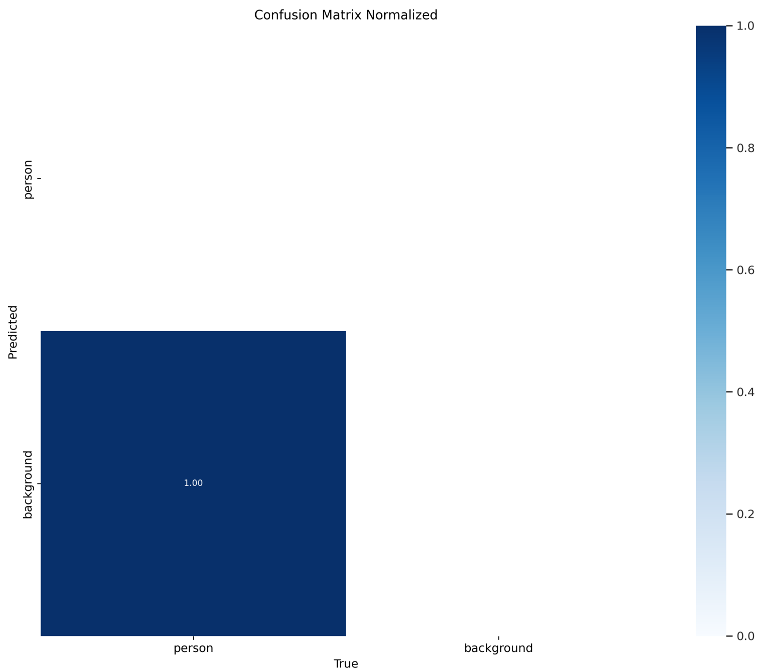

Figure 670. confusion_matrix, yolov8n, pre-trained=False, epochs=50, data=keskvaljak, hyperparameter-tuned=True

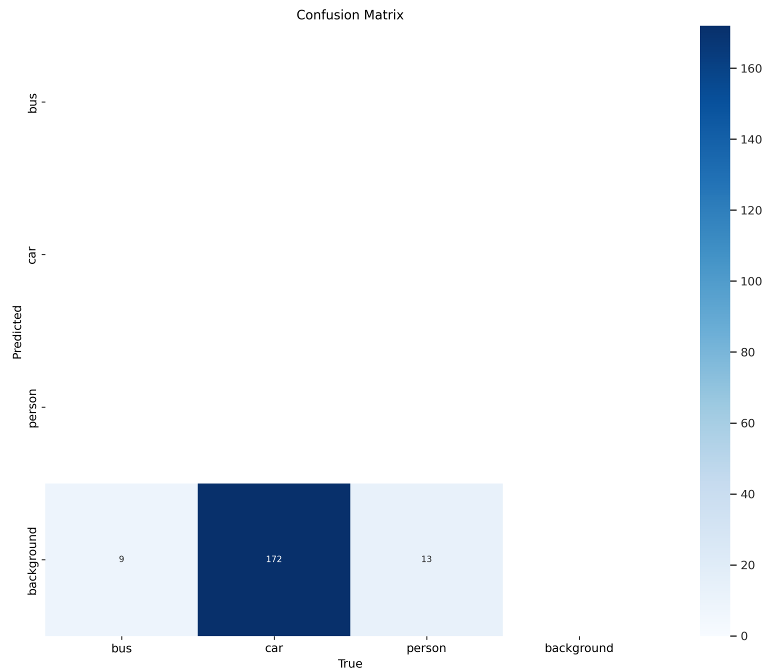

Figure 671. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=50, data=keskvaljak, hyperparameter-tuned=True

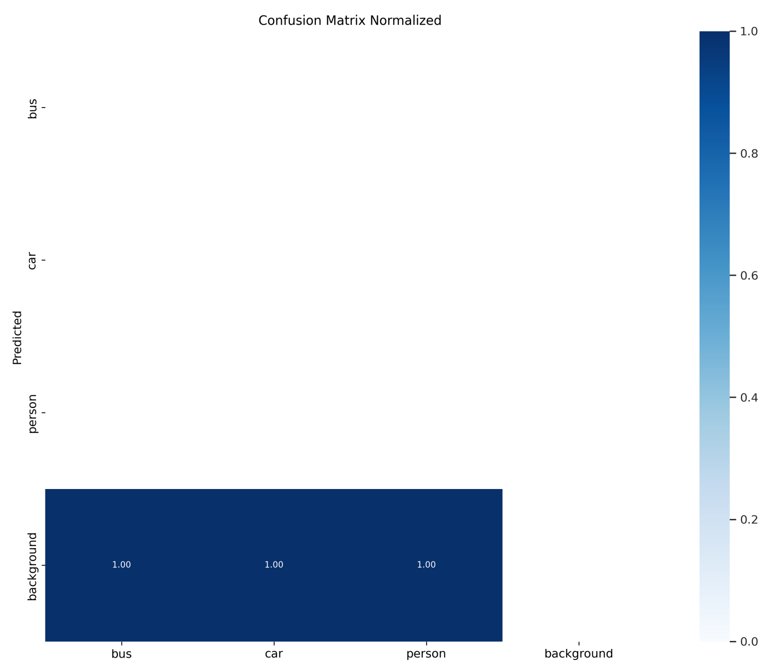

Figure 676. confusion_matrix, yolov8n, pre-trained=False, epochs=100, data=keskvaljak, hyperparameter-tuned=True

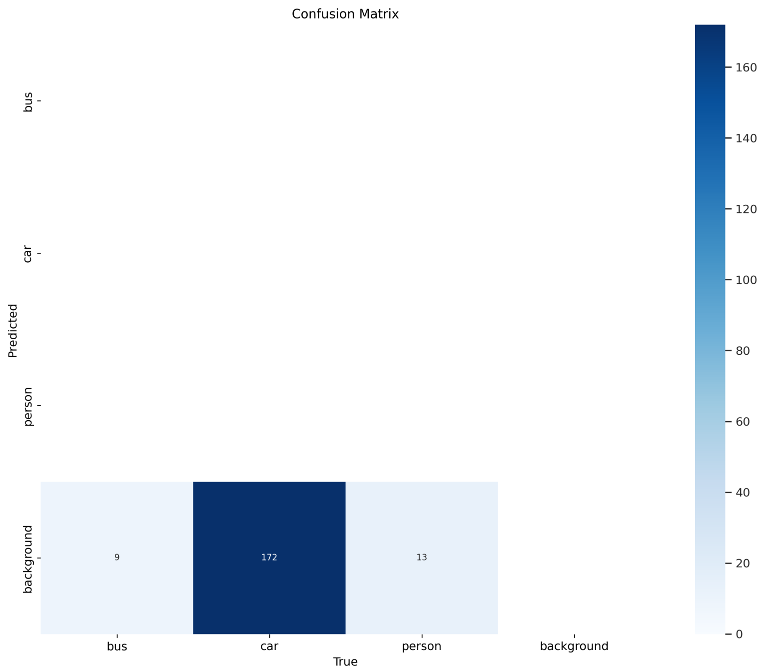

Figure 677. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=100, data=keskvaljak, hyperparameter-tuned=True

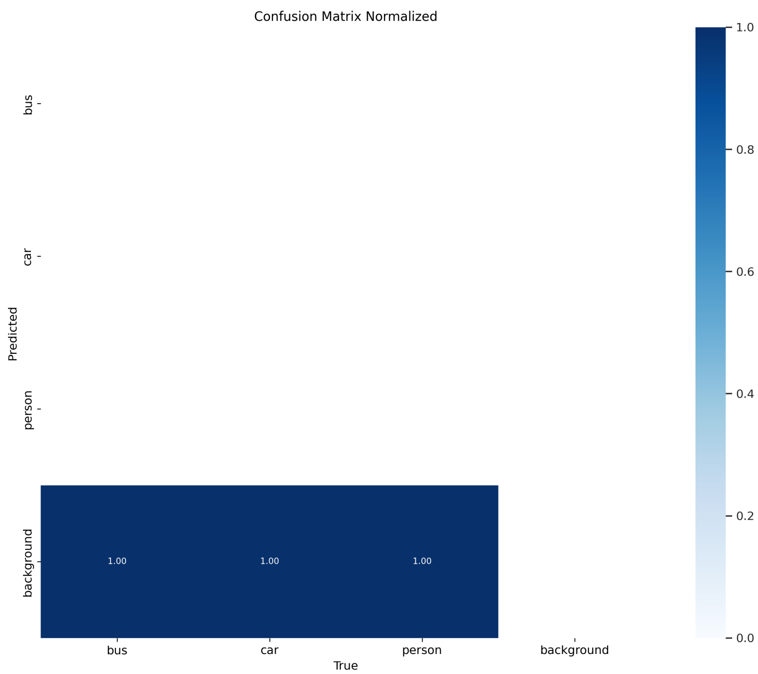

Figure 682. confusion_matrix, yolov8n, pre-trained=False, epochs=150, data=keskvaljak, hyperparameter-tuned=True

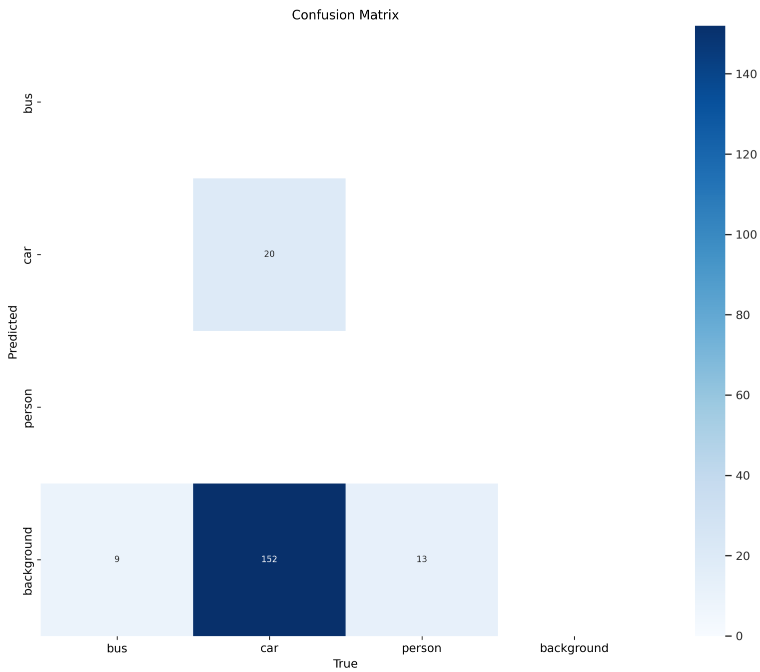

Figure 683. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=150, data=keskvaljak, hyperparameter-tuned=True

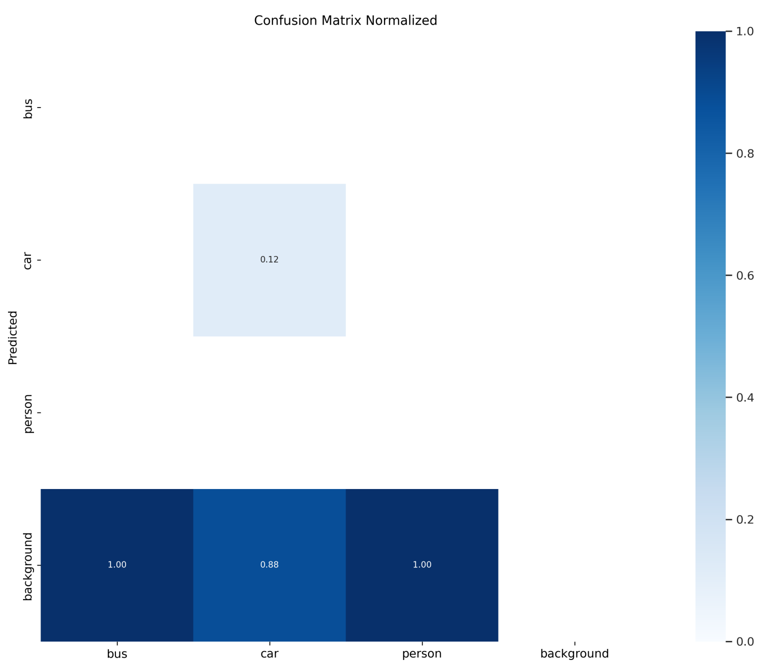

Figure 688. confusion_matrix, yolov8n, pre-trained=False, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=True

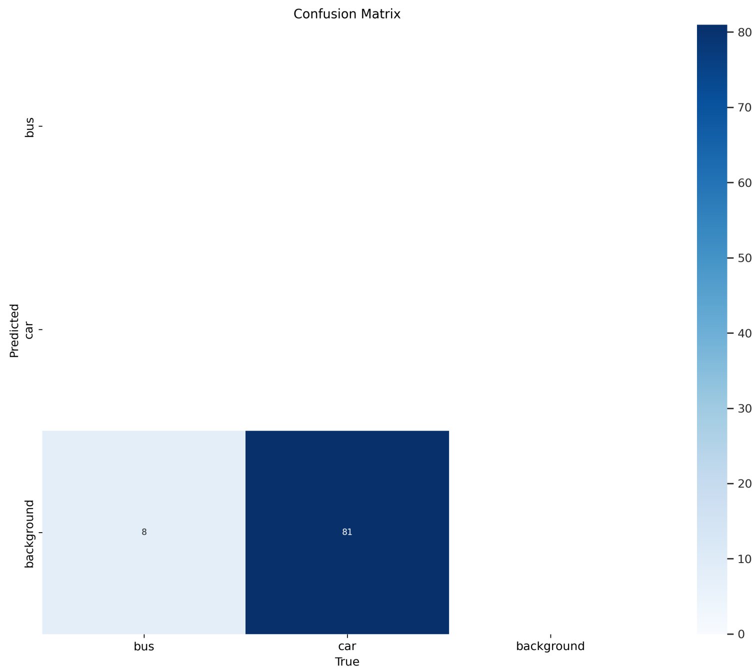

Figure 689. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=50, data=kielce_university_of_technology, hyperparameter-tuned=True

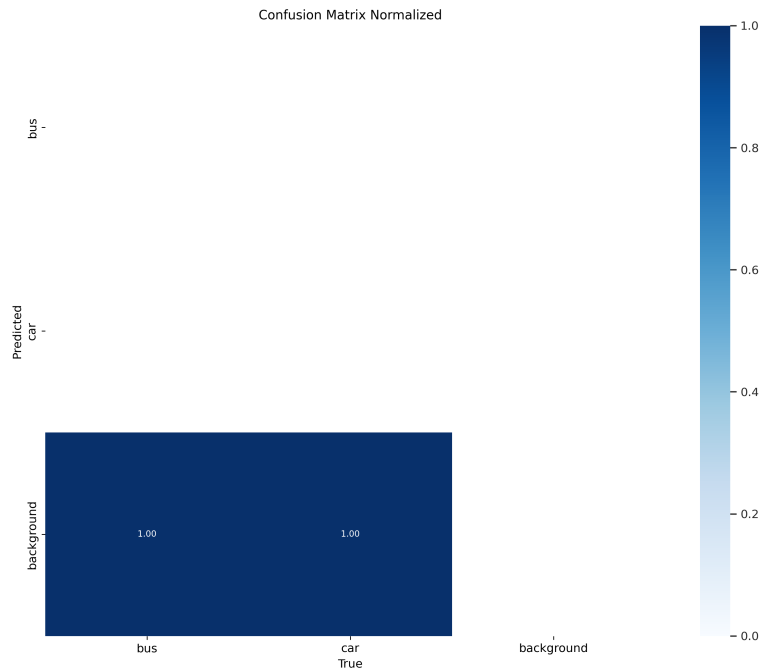

Figure 694. confusion_matrix, yolov8n, pre-trained=False, epochs=100, data=kielce_university_of_technology, hyperparameter-tuned=True

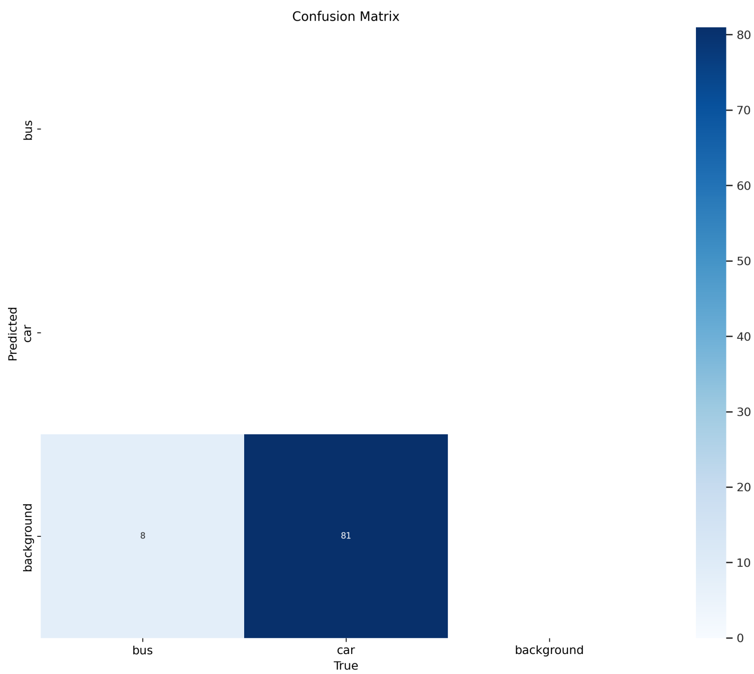

Figure 695. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=100, data=kielce_university_of_technology, hyperparameter-tuned=True

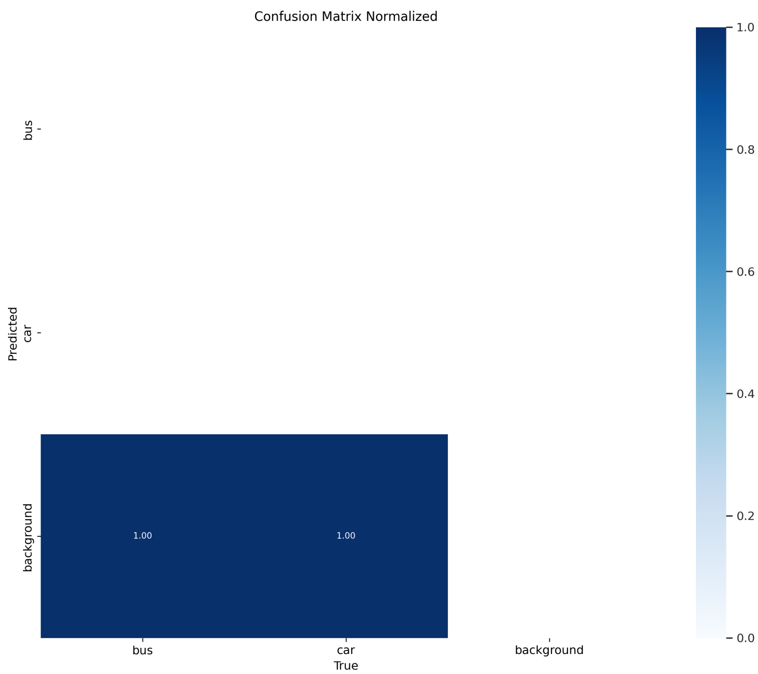

Figure 696. f1_over_confidence, yolov8n, pre-trained=False, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=True

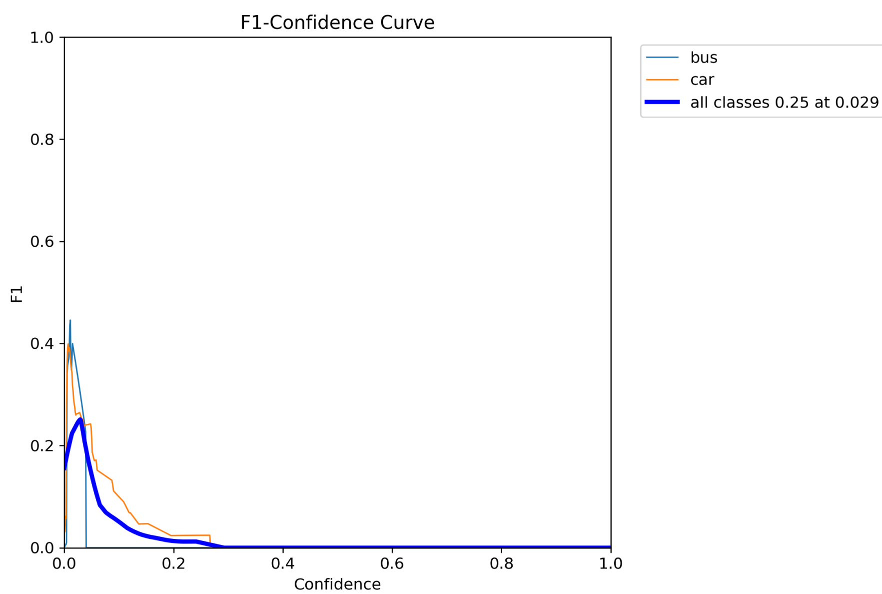

Figure 697. precision_over_recall, yolov8n, pre-trained=False, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=True

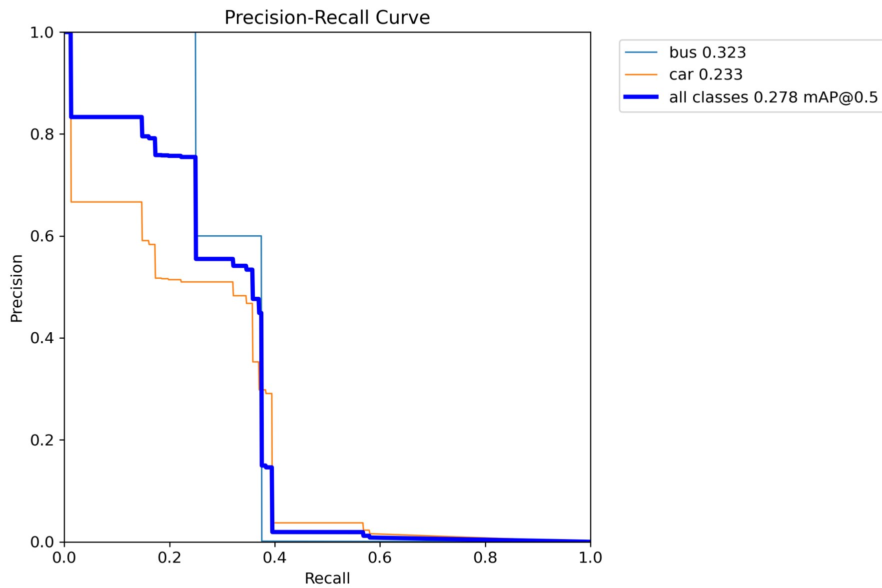

Figure 698. precision_over_confidence, yolov8n, pre-trained=False, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=True

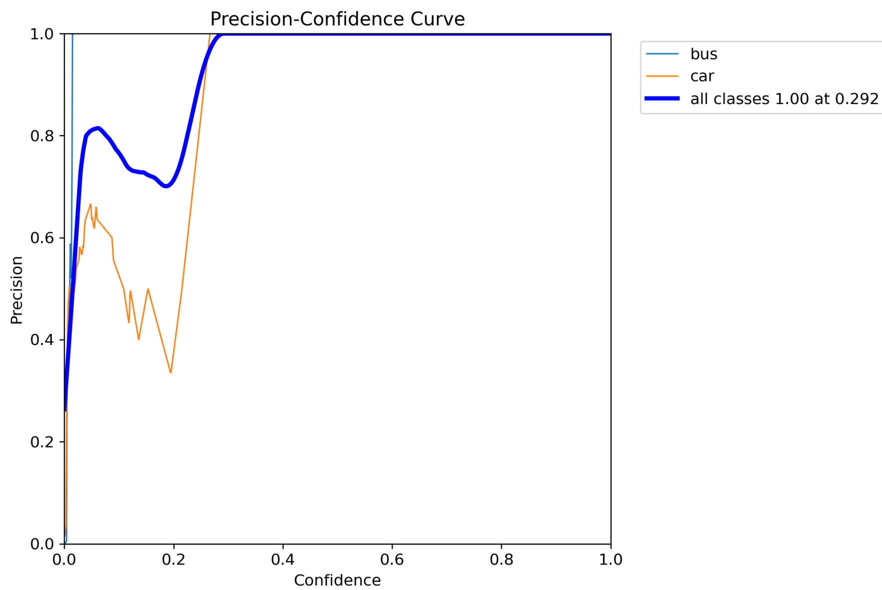

Figure 699. recall_over_confidence, yolov8n, pre-trained=False, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=True

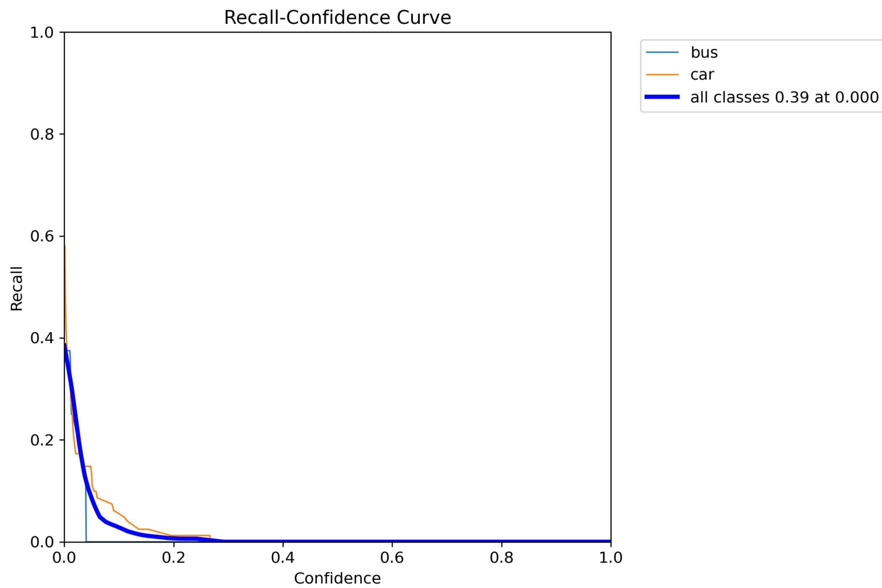

Figure 700. confusion_matrix, yolov8n, pre-trained=False, epochs=150, data=kielce_university_of_technology, hyperparameter-tuned=True

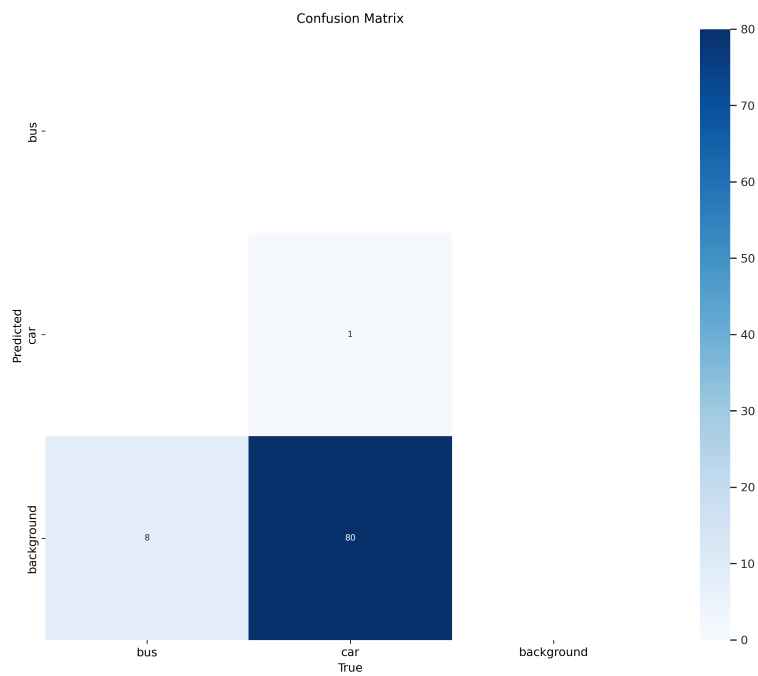

Figure 701. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=150, data=kielce_university_of_technology, hyperparameter-

tuned=True

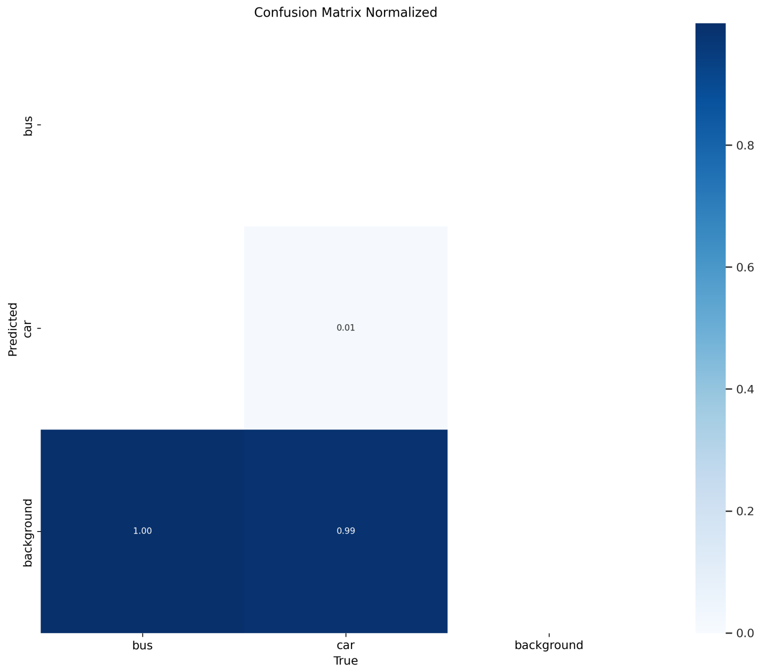

Figure 706. confusion_matrix, yolov8n, pre-trained=False, epochs=50, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

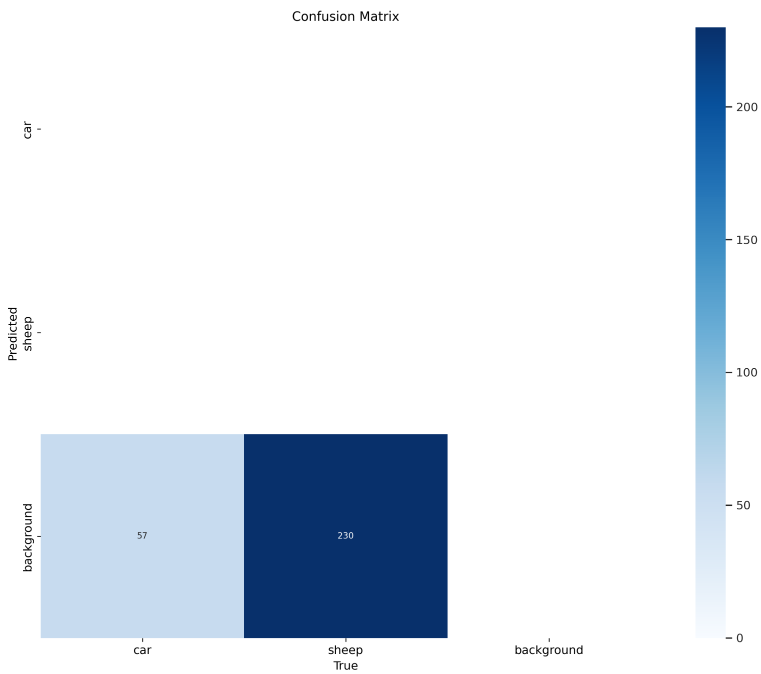

Figure 707. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=50, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

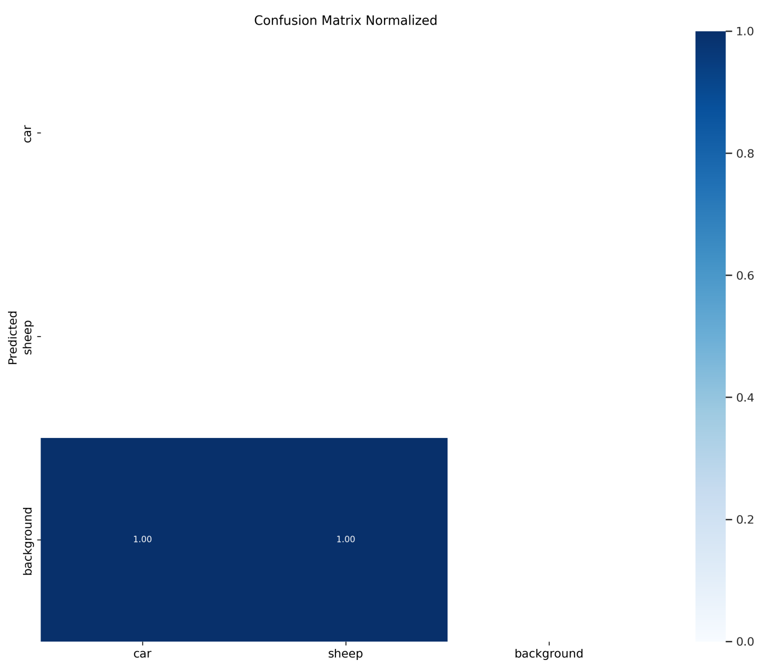

Figure 708. f1_over_confidence, yolov8n, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

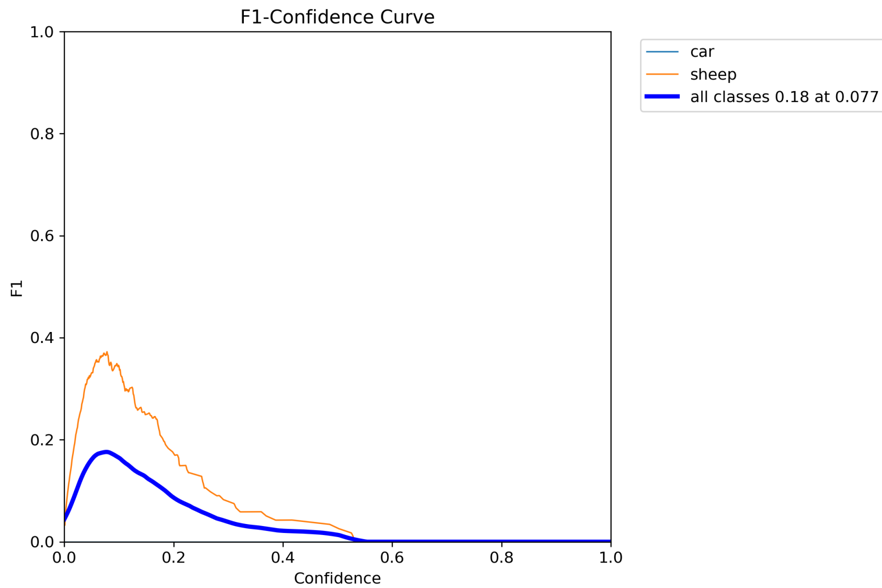

Figure 709. precision_over_recall, yolov8n, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

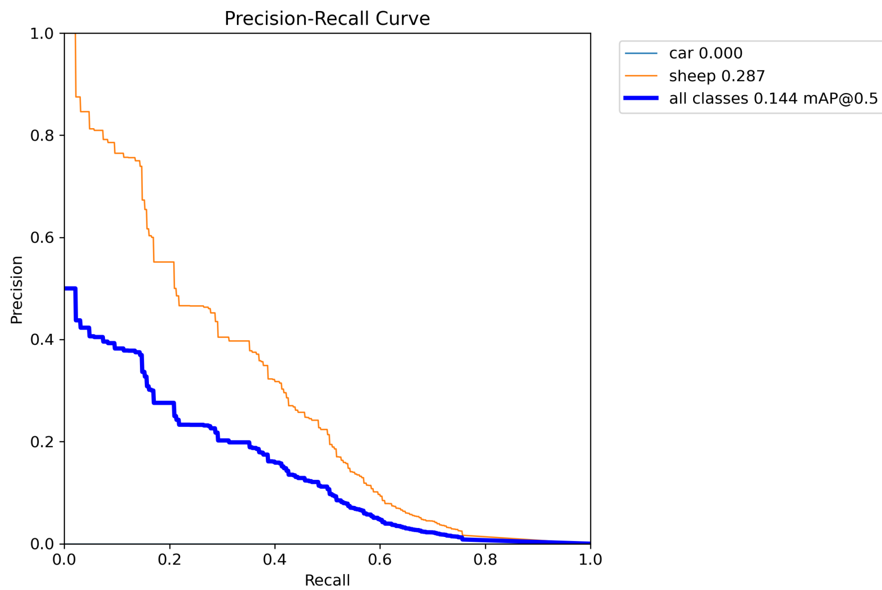

Figure 710. precision_over_confidence, yolov8n, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

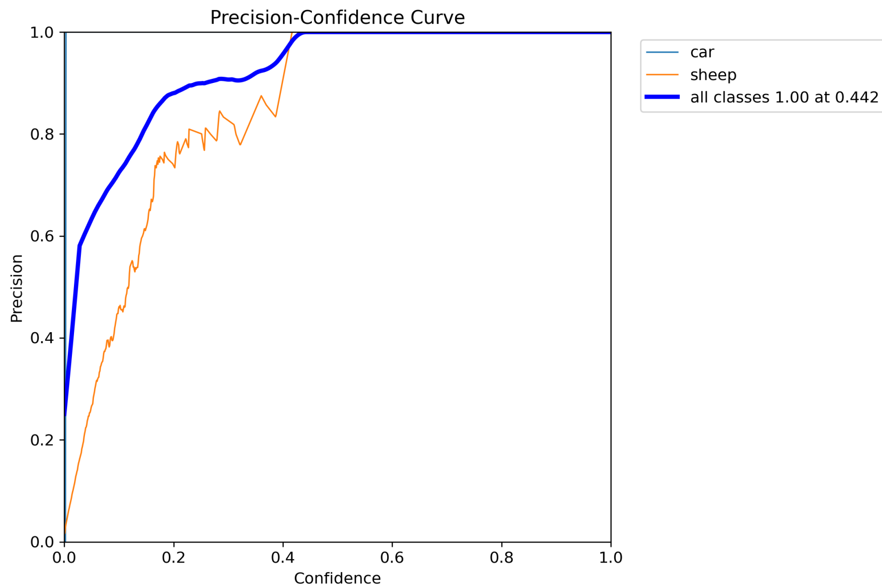

Figure 711. recall_over_confidence, yolov8n, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

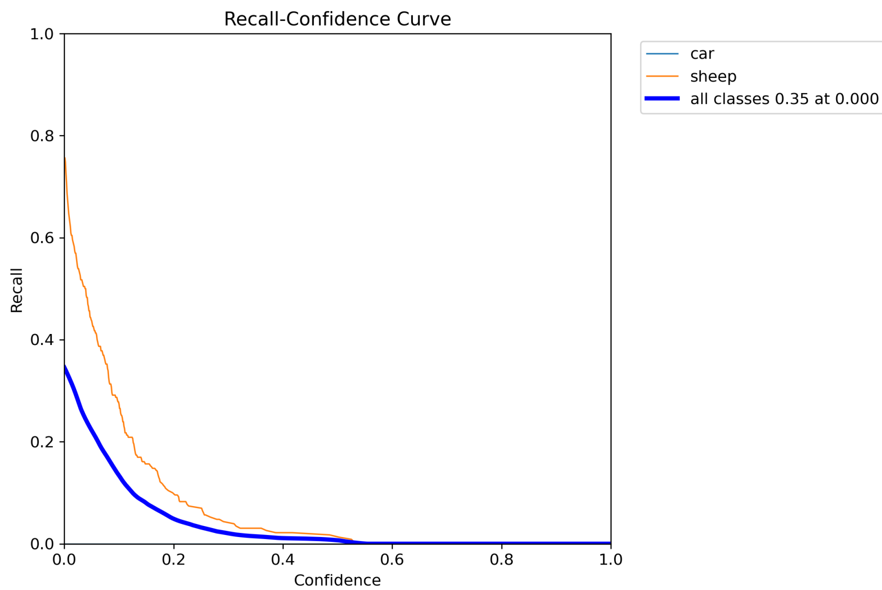

Figure 712. confusion_matrix, yolov8n, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

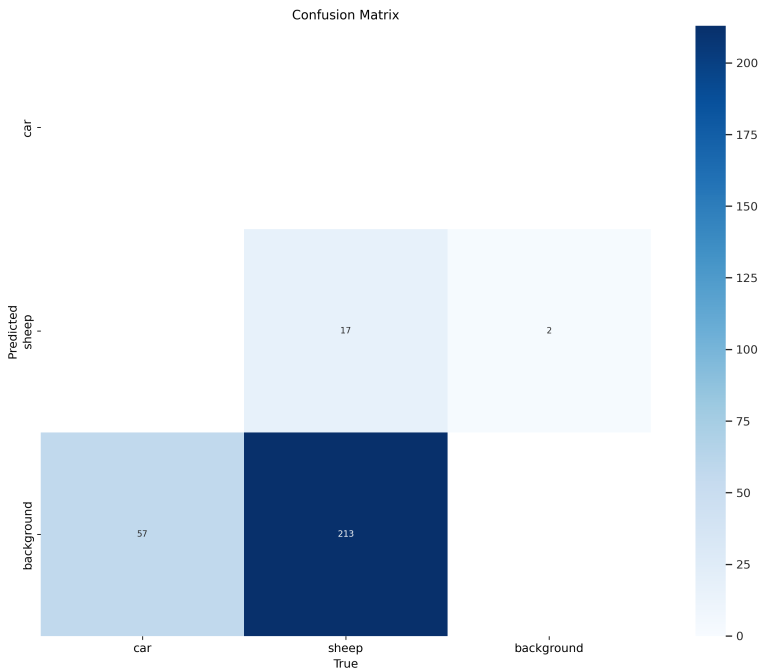

Figure 713. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=100, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

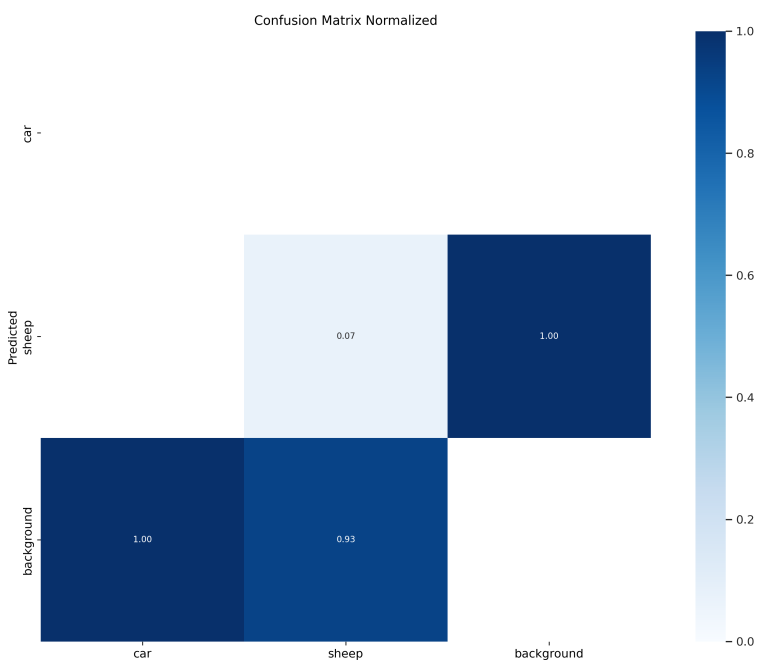

Figure 714. f1_over_confidence, yolov8n, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

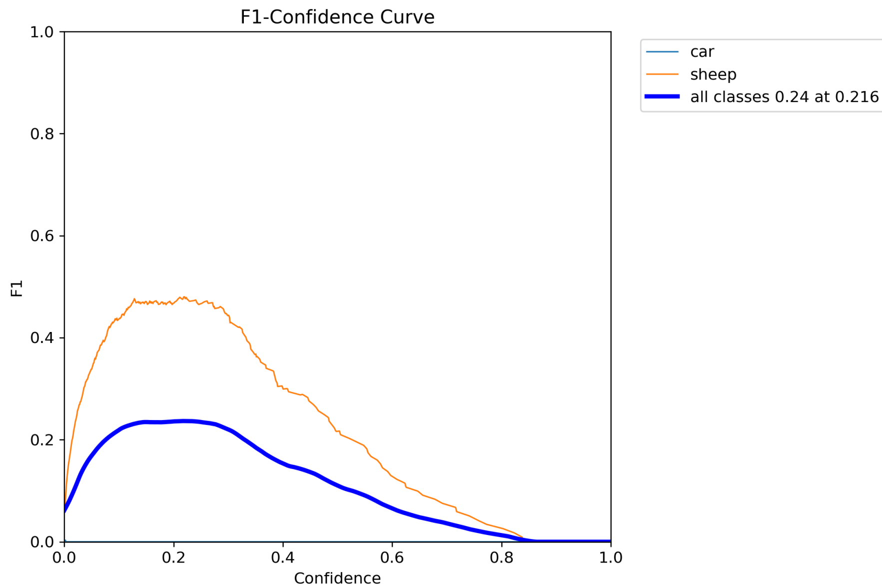

Figure 715. precision_over_recall, yolov8n, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

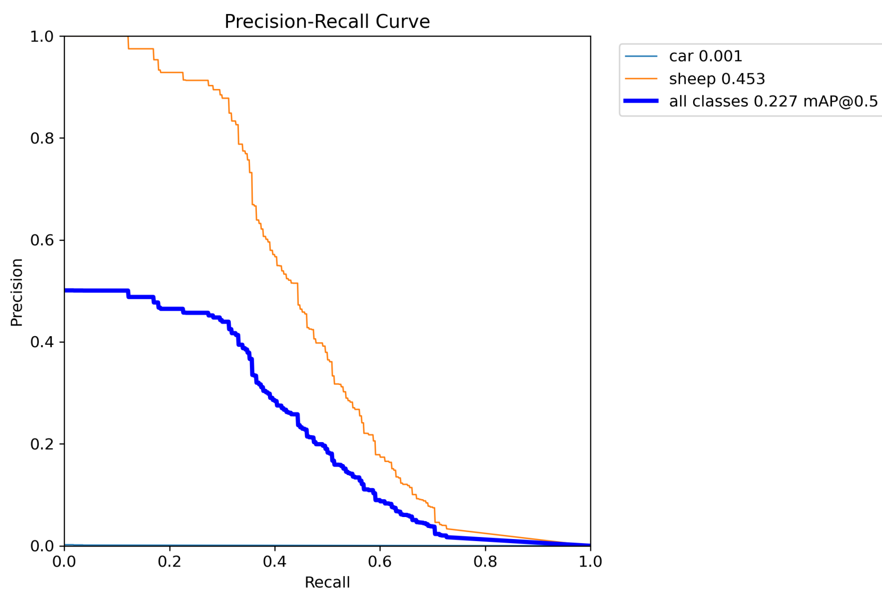

Figure 716. precision_over_confidence, yolov8n, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

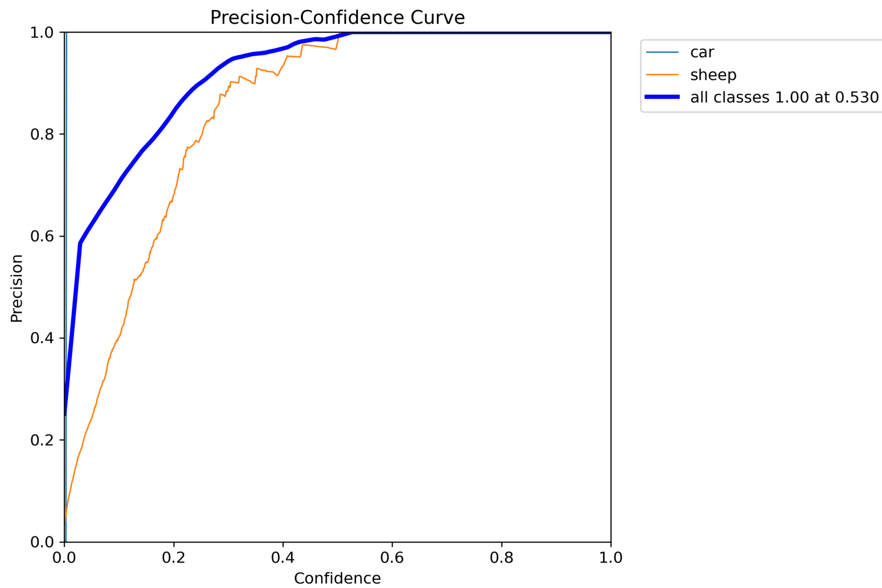

Figure 717. recall_over_confidence, yolov8n, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

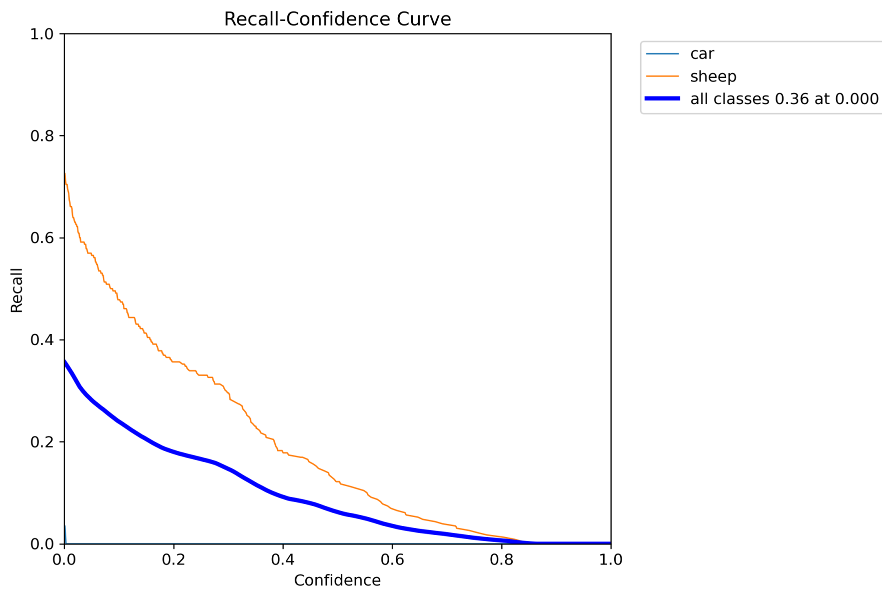

Figure 718. confusion_matrix, yolov8n, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

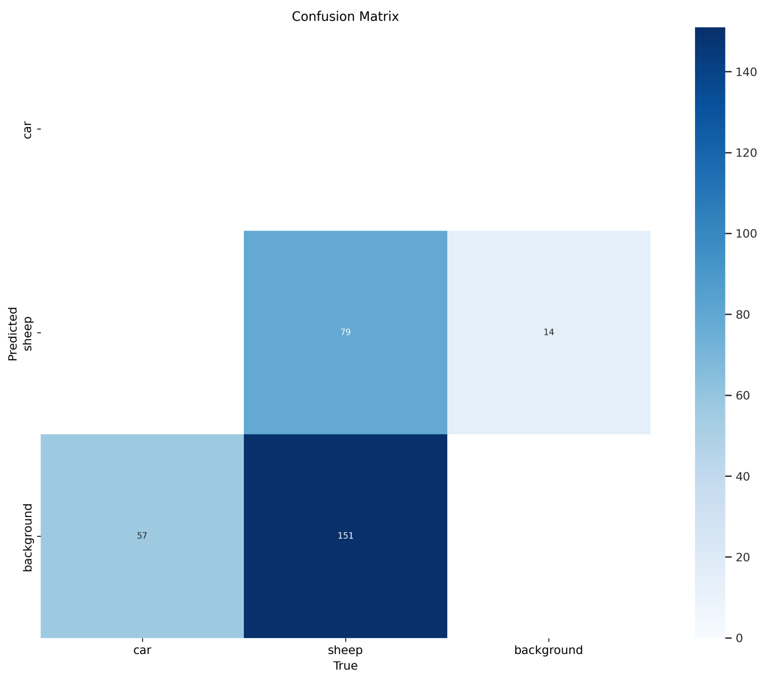

Figure 719. confusion_matrix_normalized, yolov8n, pre-trained=False, epochs=150, data=toggenburg_alpaca_ranch, hyperparameter-tuned=True

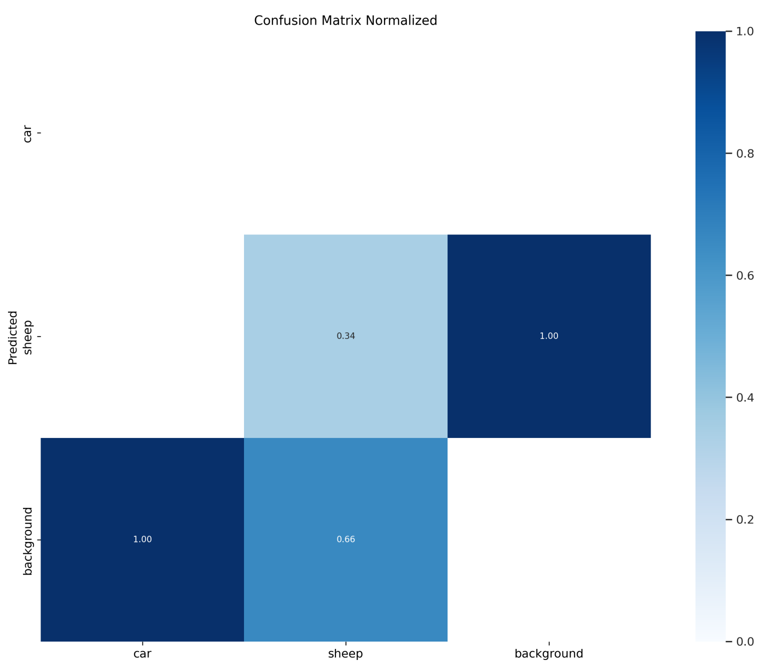

Figure 720. f1_over_confidence, yolov8n, pre-trained=True, epochs=0, data=duomo, hyperparameter-tuned=False

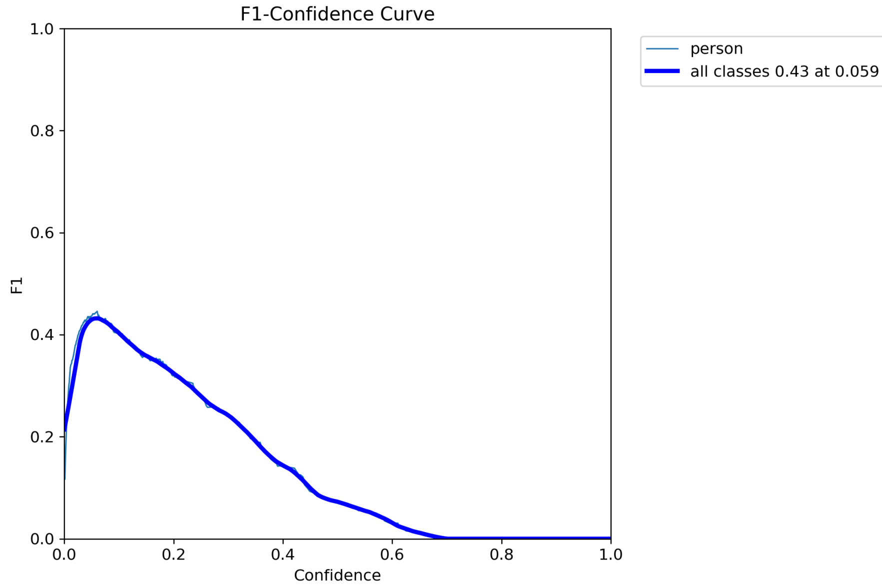

Figure 721. precision_over_recall, yolov8n, pre-trained=True, epochs=0, data=duomo, hyperparameter-tuned=False

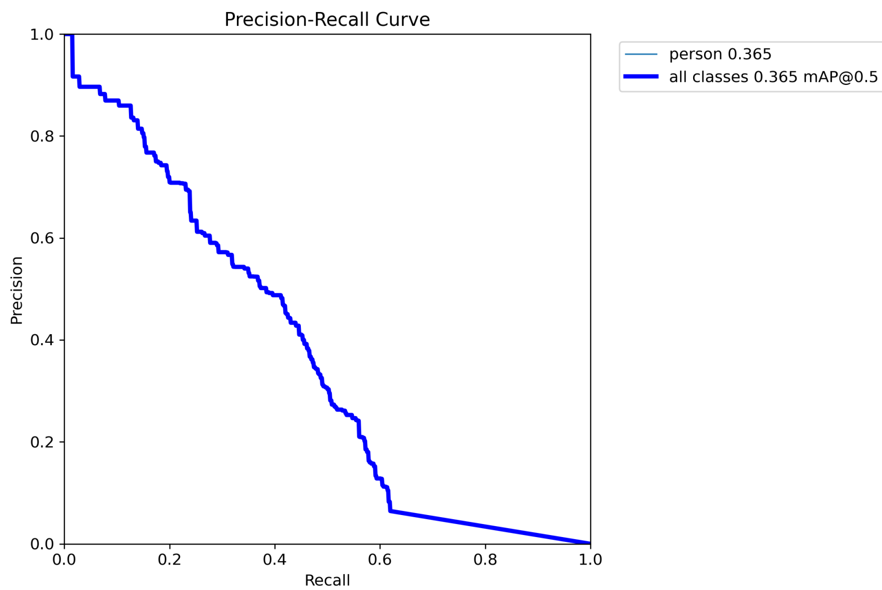

Figure 722. precision_over_confidence, yolov8n, pre-trained=True, epochs=0, data=duomo, hyperparameter-tuned=False

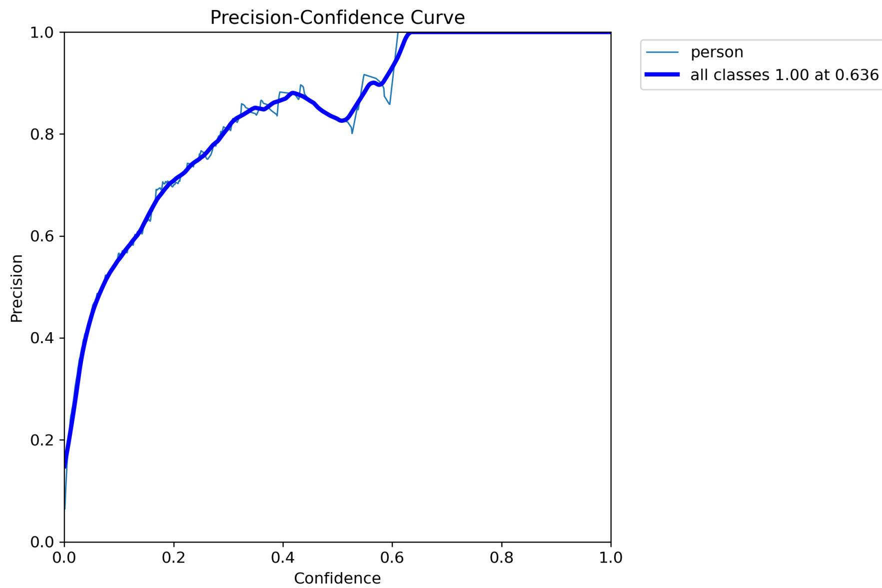

Figure 723. recall_over_confidence, yolov8n, pre-trained=True, epochs=0, data=duomo, hyperparameter-tuned=False

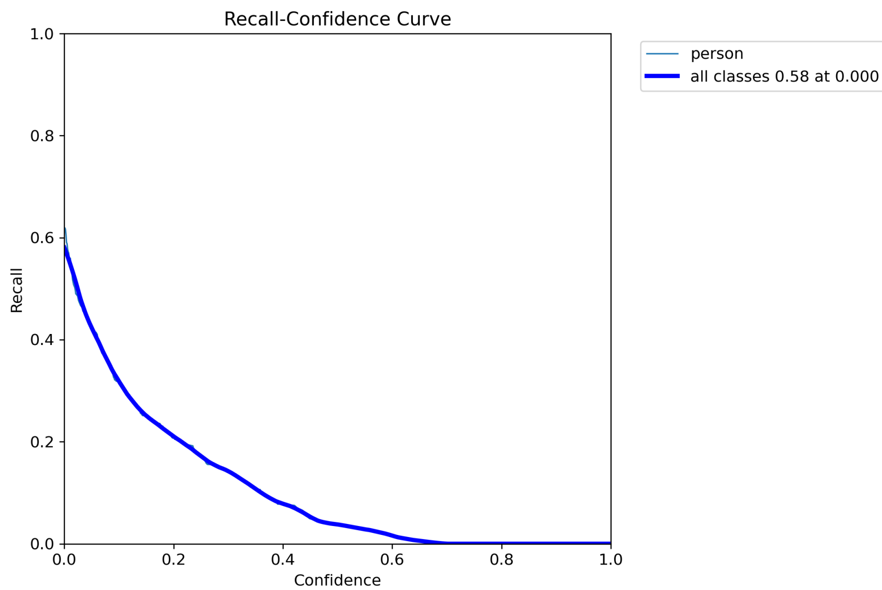

Figure 724. confusion_matrix, yolov8n, pre-trained=True, epochs=0, data=duomo, hyperparameter-tuned=False

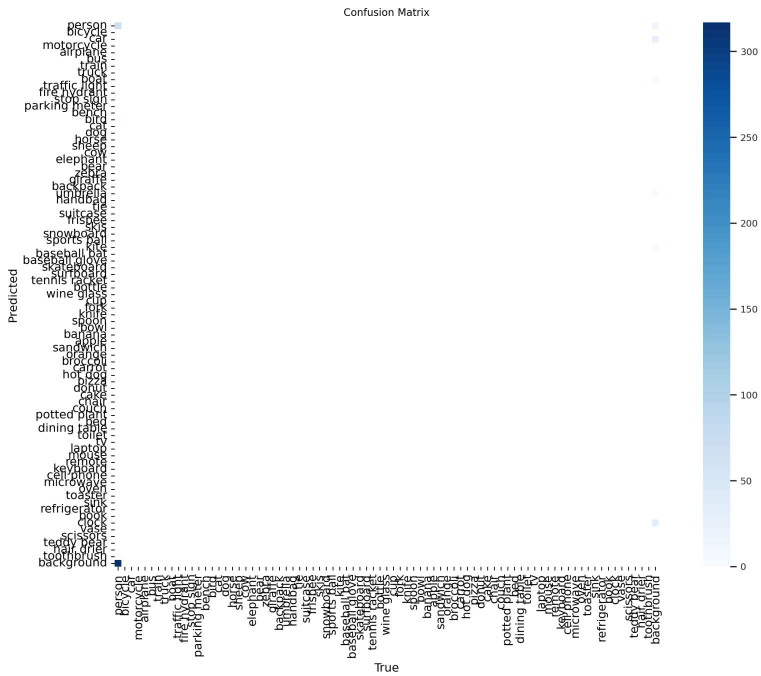

Figure 725. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=0, data=duomo, hyperparameter-tuned=False

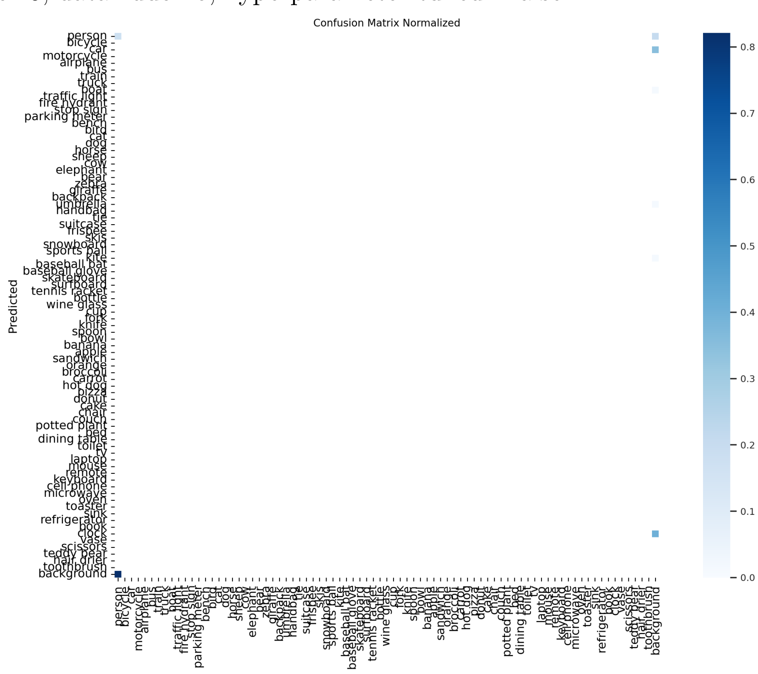

Figure 726. f1_over_confidence, yolov8n, pre-trained=True, epochs=0, data=hadji_dimitar_square, hyperparameter-tuned=False

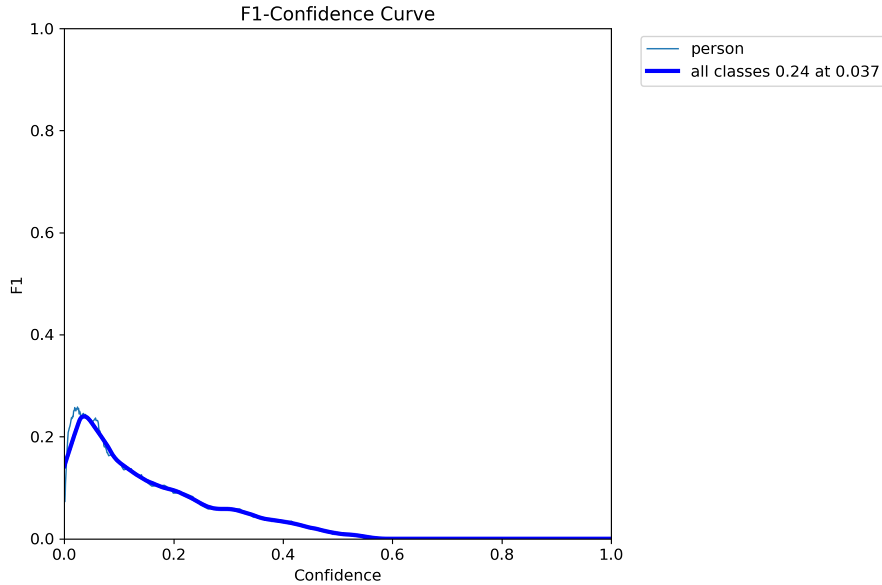

Figure 727. precision_over_recall, yolov8n, pre-trained=True, epochs=0, data=hadji_dimitar_square, hyperparameter-tuned=False

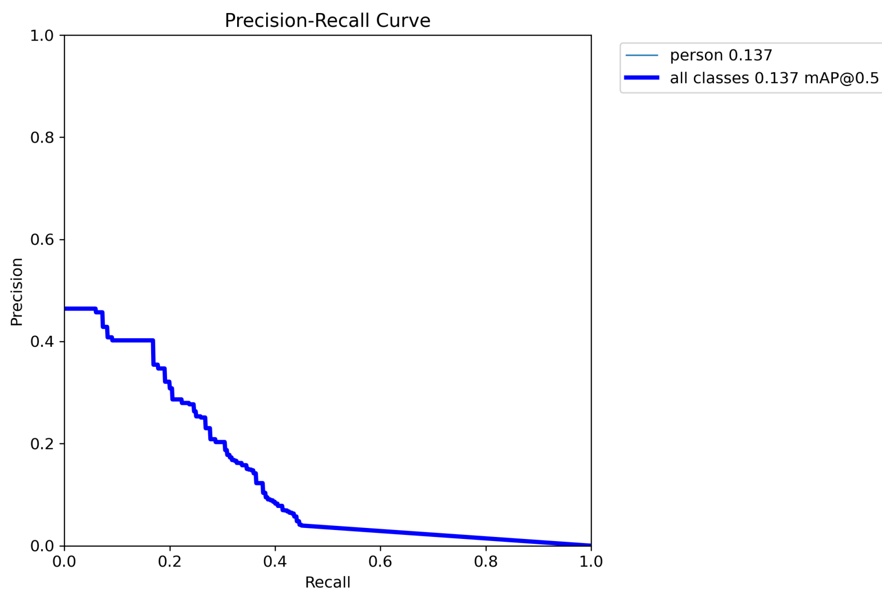

Figure 728. precision_over_confidence, yolov8n, pre-trained=True, epochs=0, data=hadji_dimitar_square, hyperparameter-tuned=False

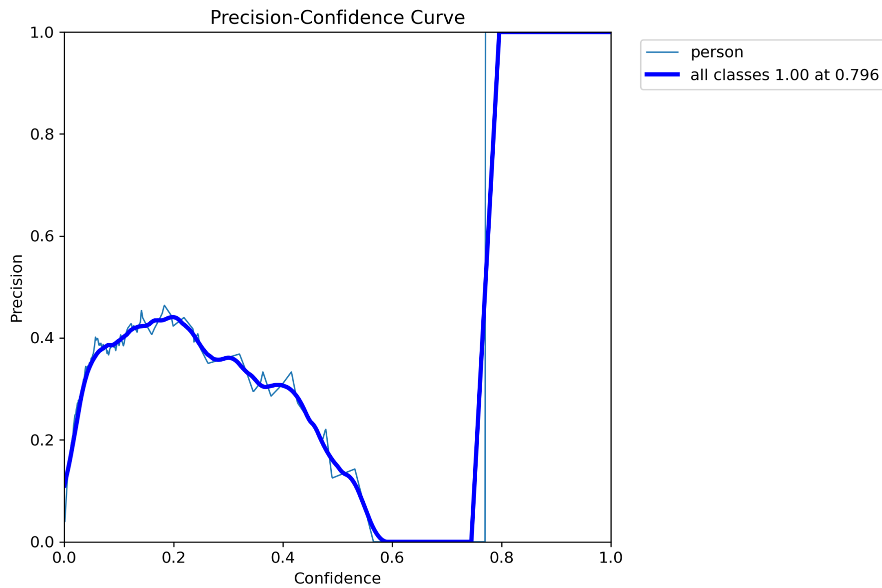

Figure 729. recall_over_confidence, yolov8n, pre-trained=True, epochs=0, data=hadji_dimitar_square, hyperparameter-tuned=False

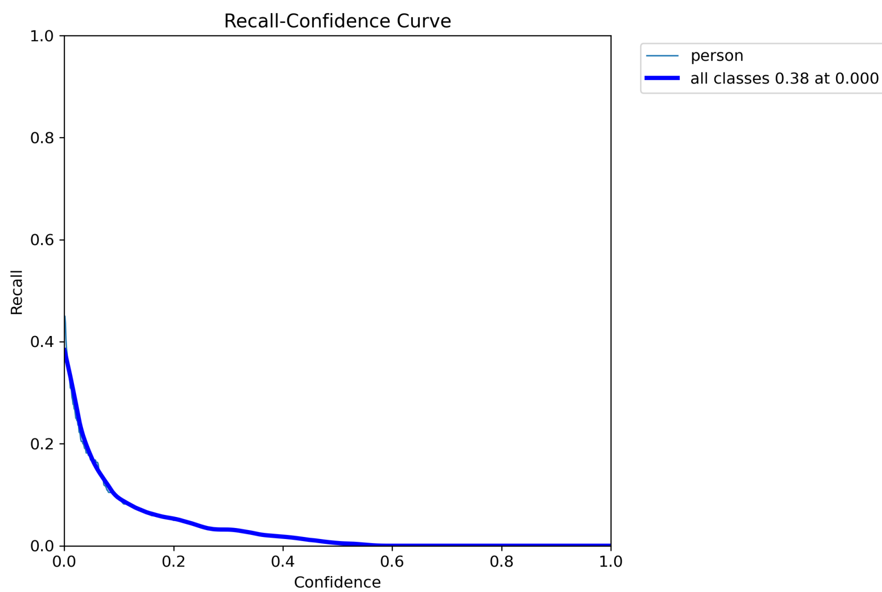

Figure 730. confusion_matrix, yolov8n, pre-trained=True, epochs=0, data=hadji_dimitar_square, hyperparameter-tuned=False

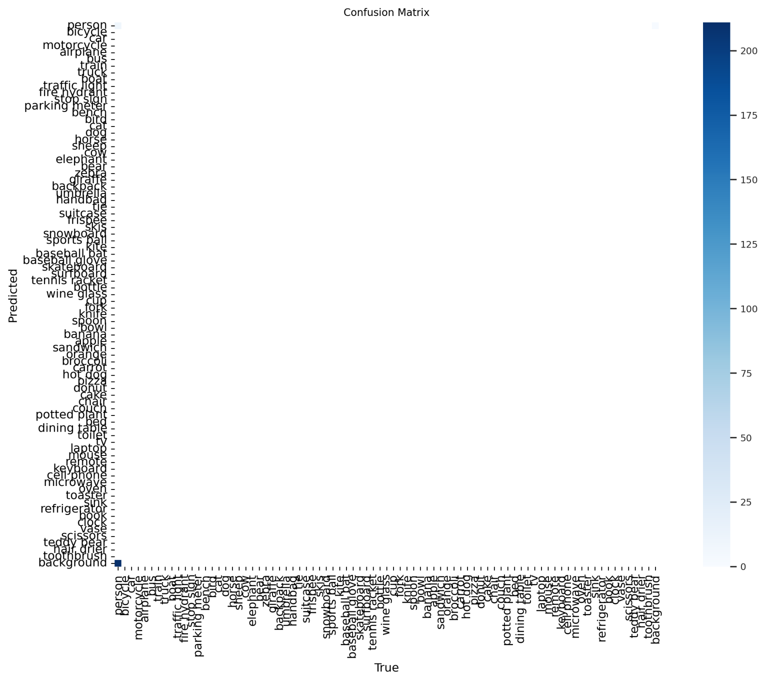

Figure 731. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=0, data=hadji_dimitar_square, hyperparameter-tuned=False

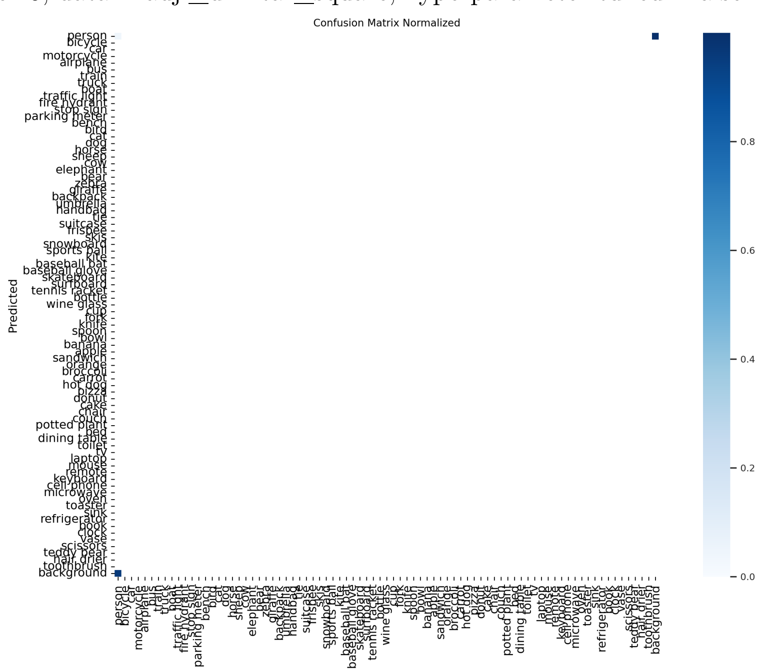

Figure 732. f1_over_confidence, yolov8n, pre-trained=True, epochs=0, data=keskvaljak, hyperparameter-tuned=False

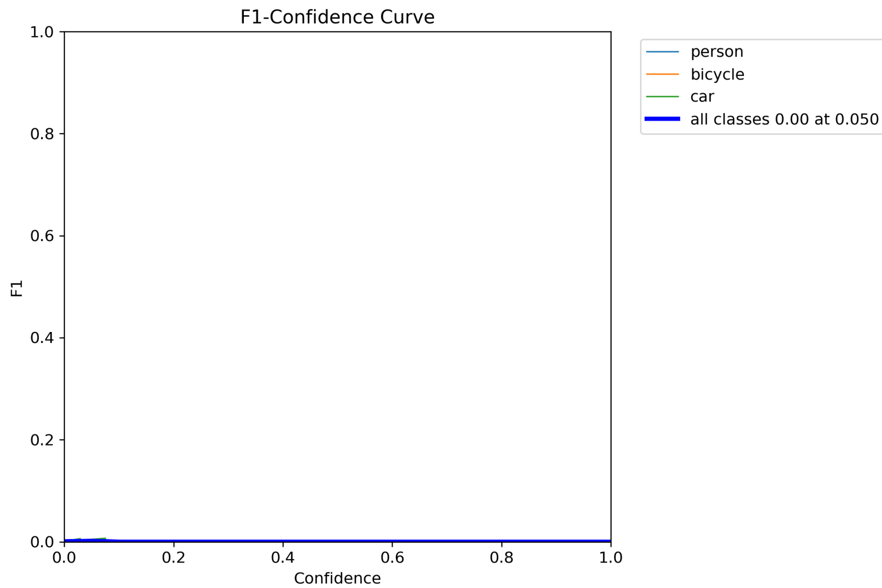

Figure 733. precision_over_recall, yolov8n, pre-trained=True, epochs=0, data=keskvaljak, hyperparameter-tuned=False

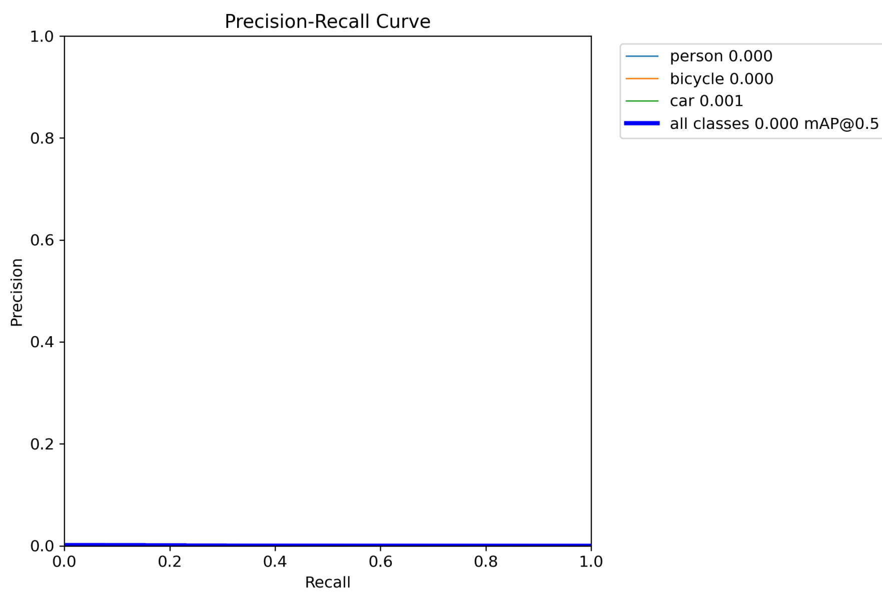

Figure 734. precision_over_confidence, yolov8n, pre-trained=True, epochs=0, data=keskvaljak, hyperparameter-tuned=False

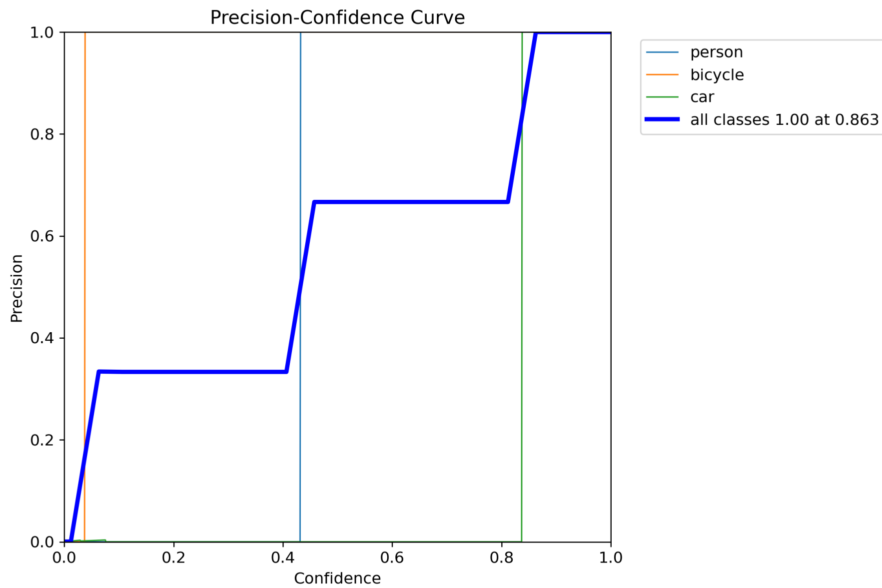

Figure 735. recall_over_confidence, yolov8n, pre-trained=True, epochs=0, data=keskvaljak, hyperparameter-tuned=False

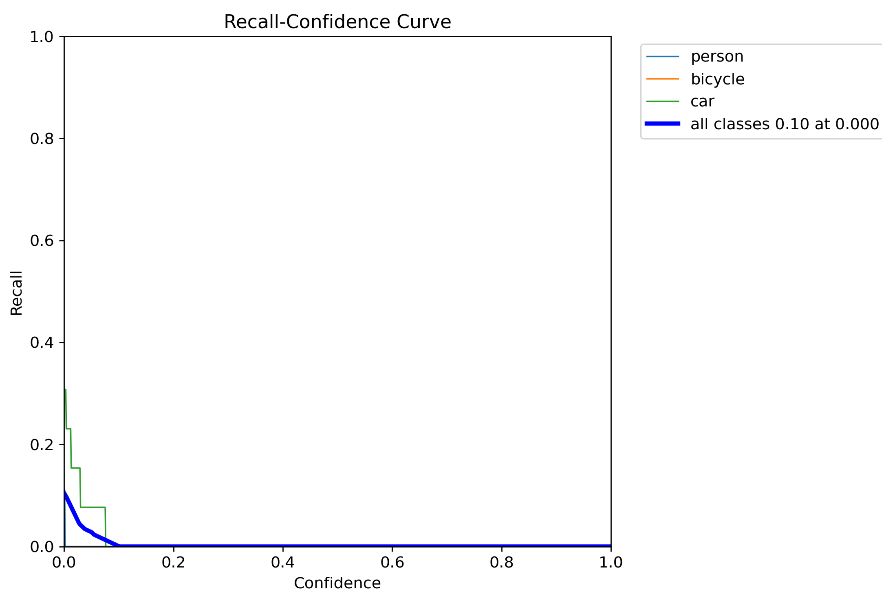

Figure 736. confusion_matrix, yolov8n, pre-trained=True, epochs=0, data=keskvaljak, hyperparameter-tuned=False

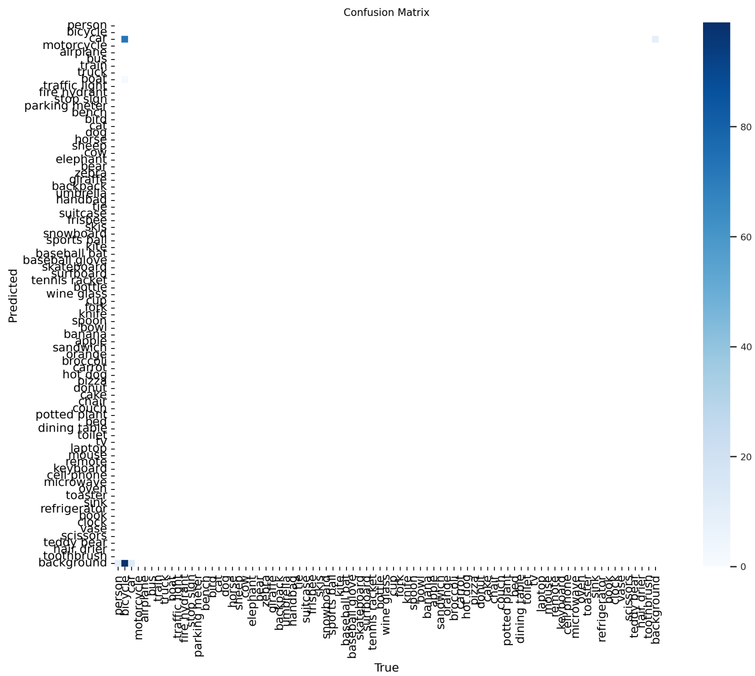

Figure 737. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=0, data=keskvaljak, hyperparameter-tuned=False

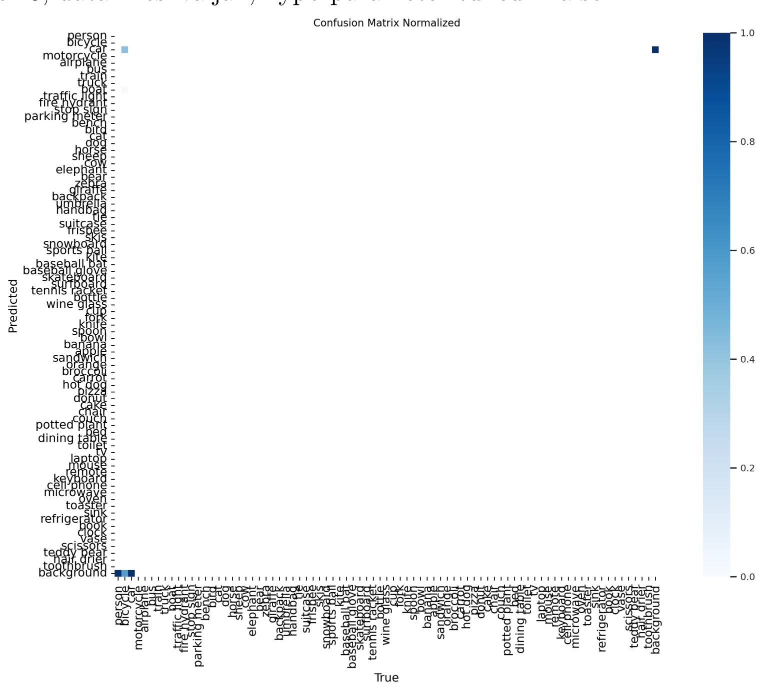

Figure 738. f1_over_confidence, yolov8n, pre-trained=True, epochs=0, data=kielce_university_of_technology, hyperparameter-tuned=False

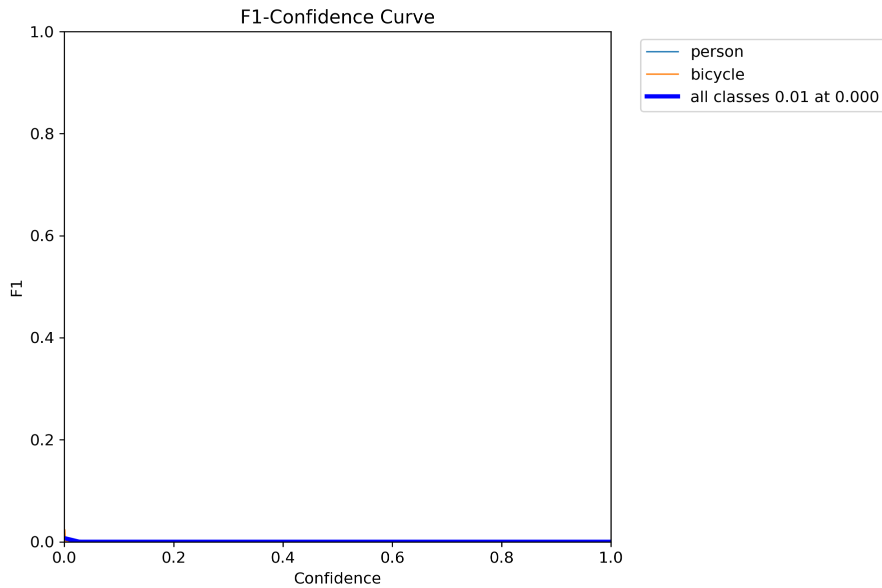

Figure 739. precision_over_recall, yolov8n, pre-trained=True, epochs=0, data=kielce_university_of_technology, hyperparameter-tuned=False

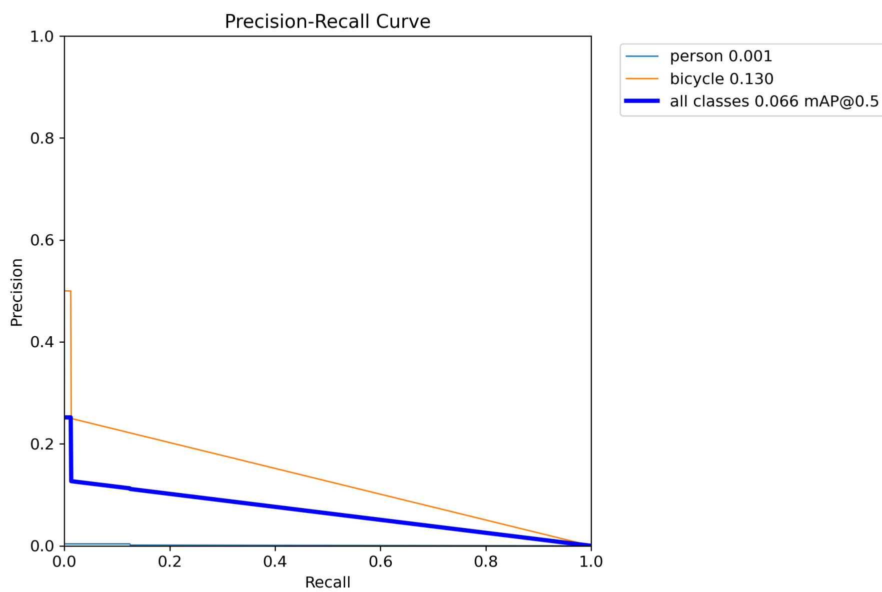

Figure 740. precision_over_confidence, yolov8n, pre-trained=True, epochs=0, data=kielce_university_of_technology, hyperparameter-tuned=False

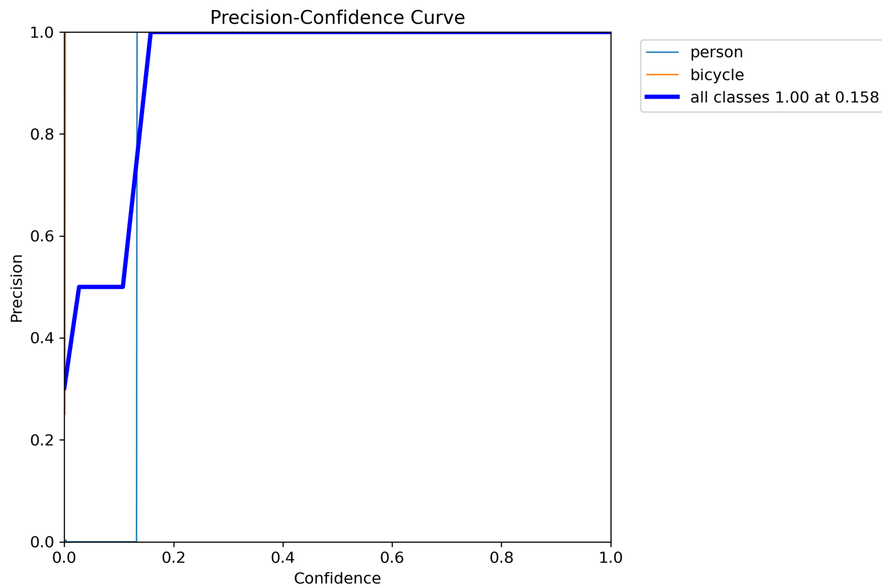

Figure 741. recall_over_confidence, yolov8n, pre-trained=True, epochs=0, data=kielce_university_of_technology, hyperparameter-tuned=False

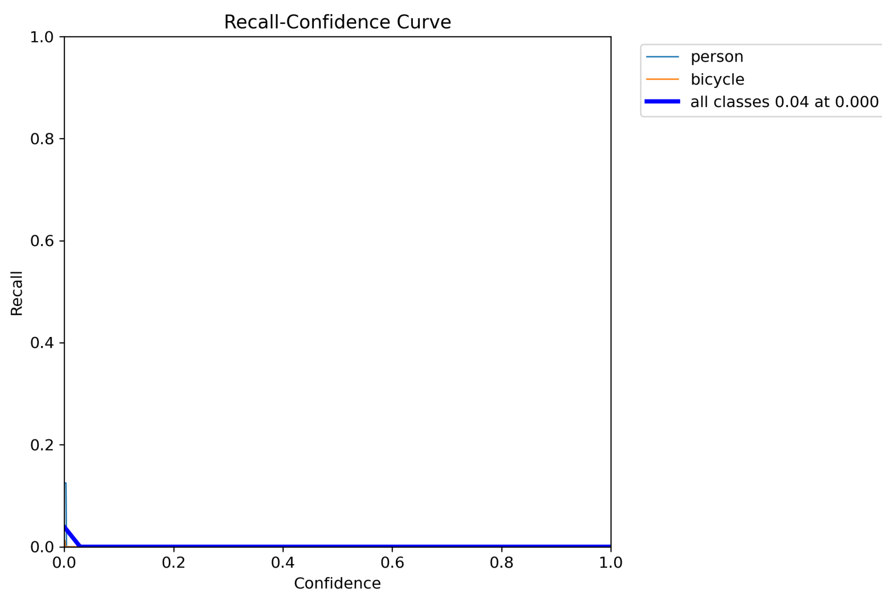

Figure 742. confusion_matrix, yolov8n, pre-trained=True, epochs=0, data=kielce_university_of_technology, hyperparameter-tuned=False

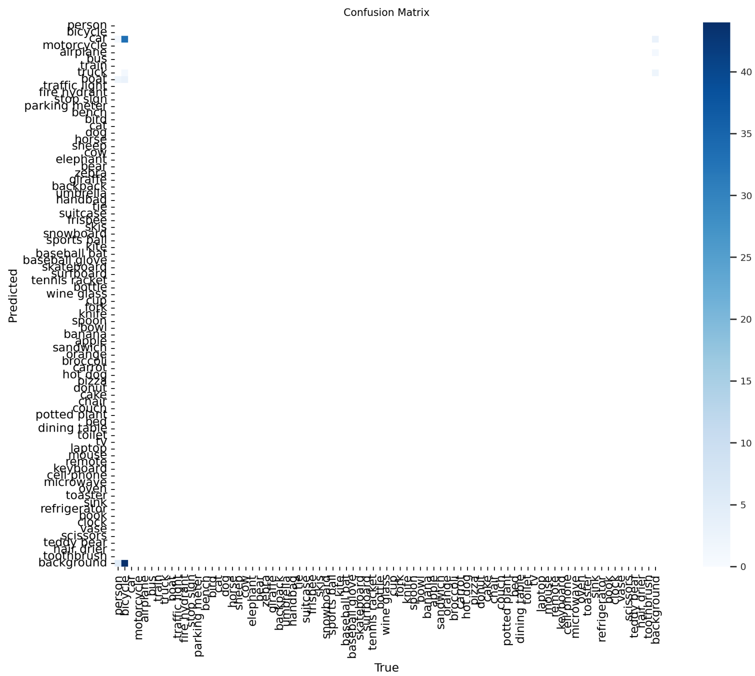

Figure 744. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=0, data=kielce_university_of_technology, hyperparameter-tuned=False

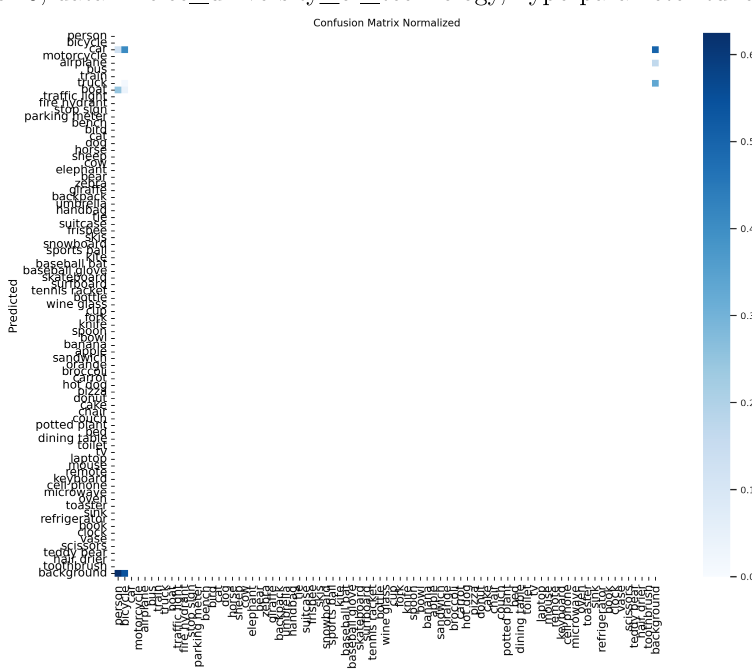

Figure 745. f1_over_confidence, yolov8n, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

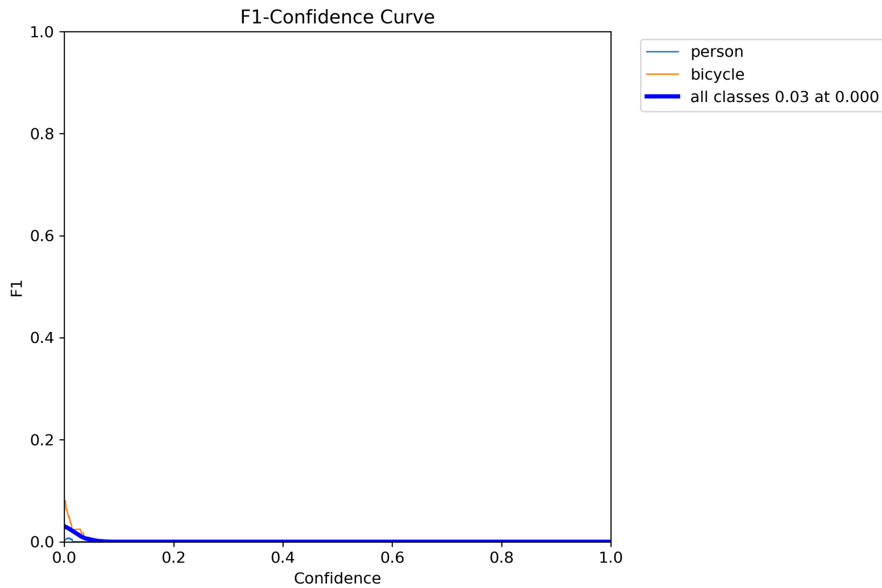

Figure 746. precision_over_recall, yolov8n, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

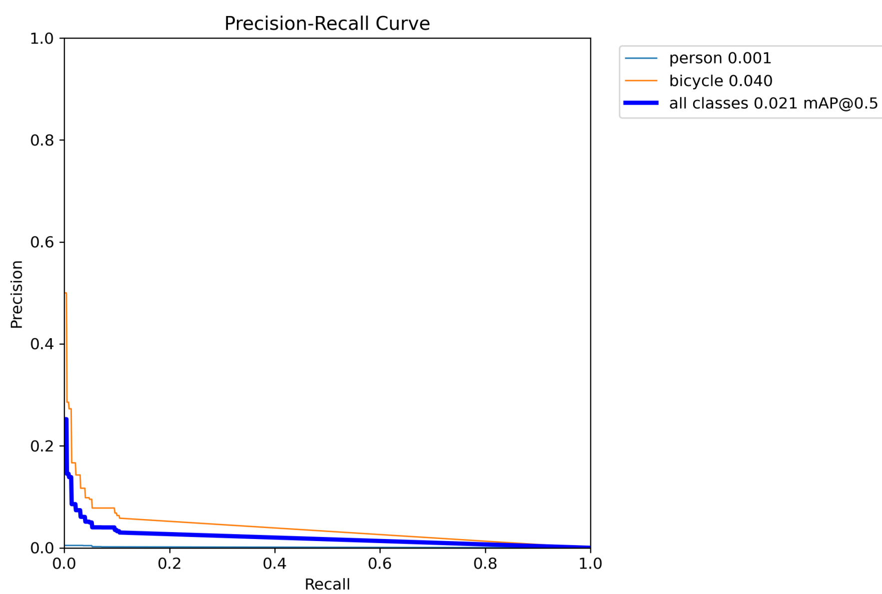

Figure 747. precision_over_confidence, yolov8n, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

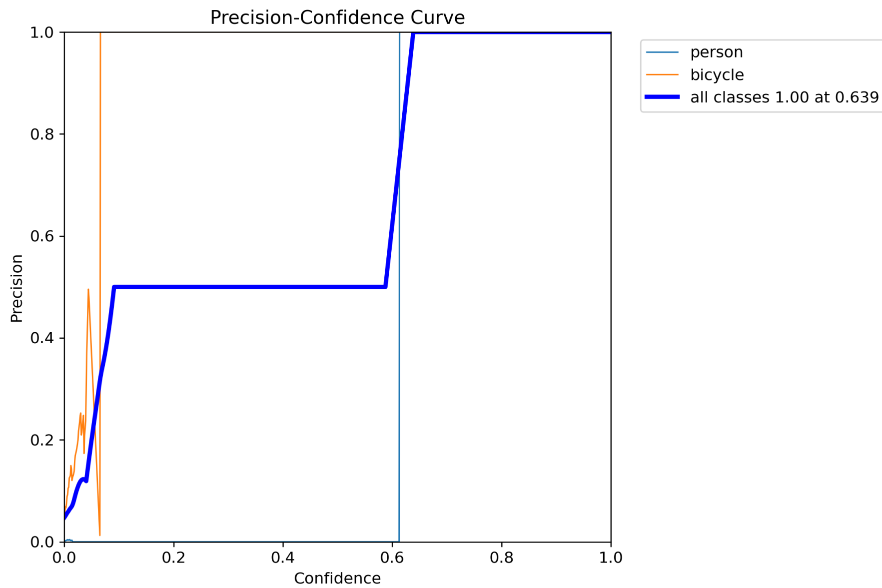

Figure 748. recall_over_confidence, yolov8n, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

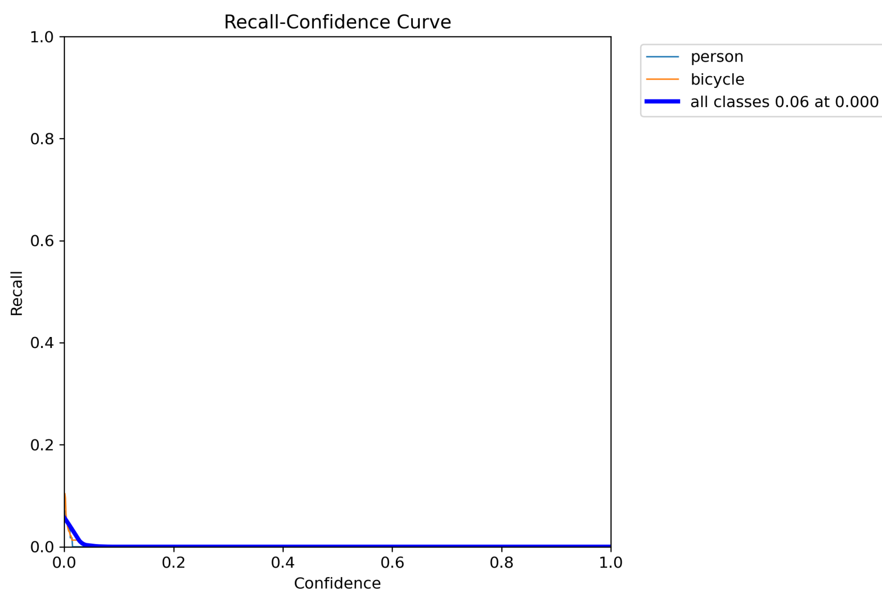

Figure 749. confusion_matrix, yolov8n, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False

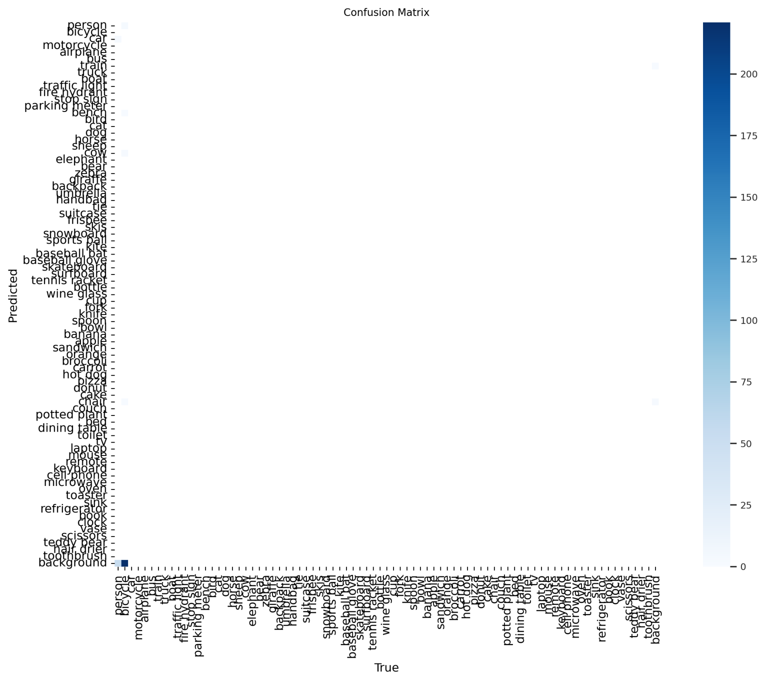

Figure 750. confusion_matrix_normalized, yolov8n, pre-trained=True, epochs=0, data=toggenburg_alpaca_ranch, hyperparameter-tuned=False