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Deep Learning for Detecting Amphoras in Ancient Shipwrecks

by

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Bachelor Thesis in Computer Science

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Abstract

Consider this a separate document, although it is submitted together with the rest. The abstract aims at another audience than the rest of the proposal. It is directed at the final decision maker or generalist, who typically is not an expert at all in your field, but more a manager kind of person. Thus, don't go into any technical description in the abstract, but use it to motivate the work and to highlight the importance of your project.

(target size: 15-20 lines)

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1 Introduction

1.1 Motivation

1.1.1 Relevance of Amphoras

1.1.2 Computer Vision for Underwater Object Detection

1.2 Deep Learning

1.2.1 Artifical Neural Networks (ANN)

1.2.2 Convultional Neural Networks (CNN)

1.2.3 Deep Learning for Computer Vision

1.2.4 Deep Learning vs. Traditional Computer Vision

1.3 Object Detection

Define object detection and introduce the sliding CNN approach.

1.3.1 Fully Convolutional Networks (FCN)

1.3.2 General Object Detection Framework Components

Region Proposals

Network Predictions

Non-Maximum Suppression (NMS)

Metrics

1.3.3 Region-Based Convultional Neural Networks (R-CNN)

R-CNN

Faster R-CNN

Faster R-CNN

1.3.4 Single Shot Detector (SSD)

1.3.5 You Only Look Once (YOLO)

YOLO

YOLOv2

YOLOv3

YOLOv4

YOLOv5

2 Related Work

3 Data and Methods

This is the technical core of the thesis. Here you lay out your how you answered your research question, you specify your design of experiments or simulations, point out difficulties that you encountered, etc.

(target size: 5-10 pages)

3.1 Data

3.2 Model

3.3 Model Training

4 Evaluation

This section discusses criteria that are used to evaluate the research results. Make sure your results can be used to published research results, i.e., to the already known state-of-the-art.

(target size: 5-10 pages)

Number	Description
7	A lucky number in Western culture
8	A lucky number in Chinese and other Asian cultures
42	Answer to the ultimate question of life, the universe, and everything
404	Not found

Table 1: Useless insights I gained with no further meaning

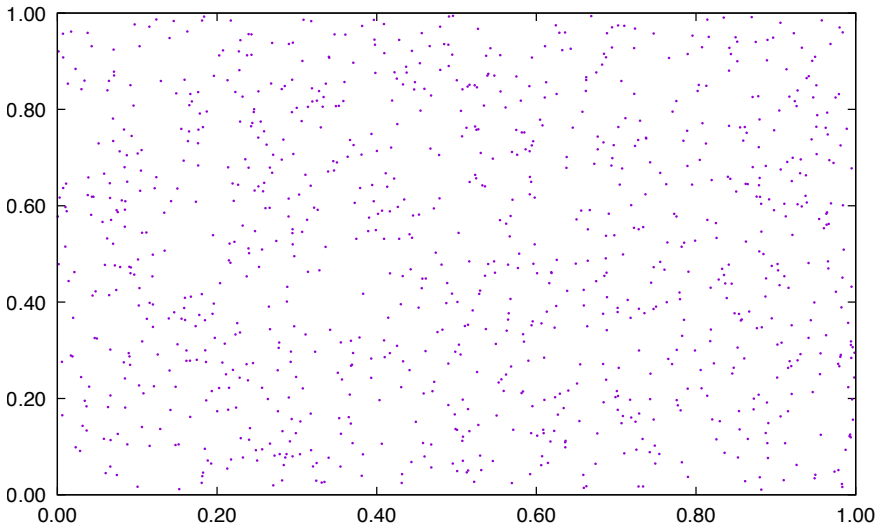

Figure 1: Many dots distributed over a two dimensional unit space without any discernible pattern or deeper meaning

4.1 Visual Evaluation

4.2 Metric Evaluation

5 Conclusions

Summarize the main aspects and results of the research project. Provide an answer to the research questions stated earlier.

(target size: 1/2 page)

6 Future Work

[1]

References

[1] Aurélien Géron. *Hands-on machine learning with Scikit-Learn, Keras, and TensorFlow: Concepts, tools, and techniques to build intelligent systems*. O'Reilly Media, 2019.