

UNIVERSITY OF MÜNSTER
DEPARTMENT OF INFORMATION SYSTEMS

Title

SEMINAR THESIS

in the context of the seminar

MORE THAN MEETS THE A-EYE: REFLECTING HUMAN VISION IN
ARTIFICIAL INTELLIGENCE

submitted by

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Submission Date	4.12.2025

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1 Introduction

1.1 Motivation and Context

1.2 Research Gap

2 Theoretical Background

2.1 Image Segmentation

Image segmentation is the process of dividing an image into different regions by grouping pixels and assigning each pixel a label. This step is an important part of many computer vision applications, such as detecting tumors in medical images or identifying pedestrians in autonomous driving. According to human visual perception, the identified regions are non-overlapping and meaningful - however, defining what exactly counts as a “meaningful” region can be difficult, as human perception is subjective and object boundaries are not always clear (Yu et al., 2023).

There are three common types of segmentation:

1. Semantic segmentation assigns every pixel in an image a semantic label, such as “car” or “sky”.
2. Instance segmentation separates individual objects within the same class, for example distinguishing several people in one image.
3. Panoptic segmentation combines both approaches by providing pixel-wise class labels and also identifying individual object instances.

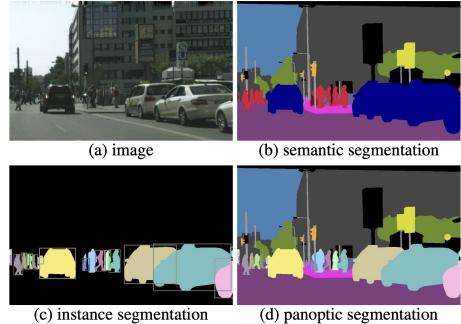


Figure 1 Types of image segmentation by Kirillov et al., 2019

Earlier approaches to image segmentation include algorithms such as k-means-clustering (Dhanachandra et al., 2015). Yet in recent years, deep learning models have significantly improved the segmentation effect and performance, therefore becoming the dominant method for solving segmentation tasks in complex environments (Minaee et al., 2022).

2.2 Models

3 Methodology

3.1 Design Science Research Approach

This research is based on the Design Science Research Methodology (DSRM) by Peffers et al., 2008. It follows the framework in the five first activities to support the development of a pipeline which goal it is to improve the performance of image-to-text models on complex images used in social media context.

Identify & Motivate = Introduction and Theoretical Background (Chapters 1 and 2)

Define Objectives of a Solution = BELOW: describe what the pipeline should fulfill

Design & Development = BELOW: Planned Practical Steps, implementation in project phase

Demonstration & Evaluation: To come in project phase

3.2 Objectives

3.3 Planned Practical Steps

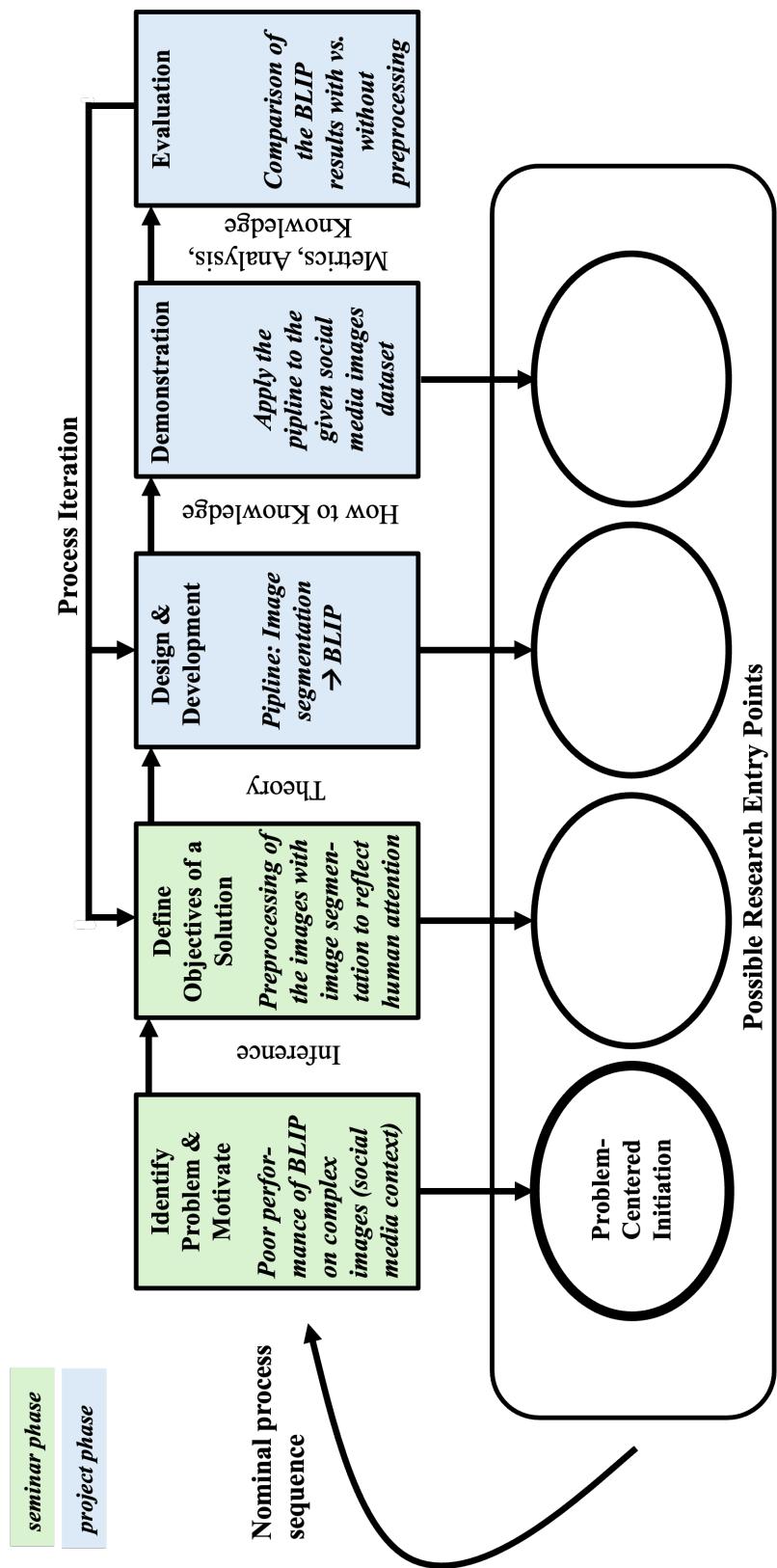


Figure 2 DSRM process of this project (adapted by Peffers et al., 2008)

4 Results

4.1 Model Selection

4.2 Expected Results

A Appendix: Very important stuff

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