Team Practical Course on AR and VR Research

05 – Structure of a Research Report

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Structure of a Research Report

- Abstract

1. Introduction

2. Foundations

3. Related Work

4. Approach

5. Case Study

6. Summary and Outlook

Structure of a Research Report

- Abstract
  - Motivation and research goal
  - Brief description of approach
  - Overview of case study
  - Major results and conclusions

  - For example:
    - For building parking lots, we need to know the average size of cars.
    - To determine this, we developed an approach based on …
    - We applied this approach in a case study on data of …
    - Our results show that our approach can correctly … but that …

Structure of a Research Report

1. Introduction
   - Motivation
   - Research goals and questions
   - Structure of report

   - For example:
     - The IFI has no parking lots.
     - We want to build some. For this, we need to know first: What is the average size of cars?
     - To answer this question, we designed and evaluated and approach …
     - The report is structured as follows. First …

Structure of a Research Report

2. Foundations
   - Terminology
   - Brief description of other work that is used as baseline
   - Other things to understand the described work

   - For example:
     - In our work, we measure the size of cars by considering the car length and width. … The width is the distance between the outer most points of the outside mirrors of a car. If a car has less then two mirrors, then …
     - The German Kraftfahrtbundesamt [3] manages a list of car types registered in Germany. This list contains, in addition to others, the length and width …

Structure of a Research Report

3. Related Work
  - Work of other researchers that aimed at the same or similar goals or answered the same or similar research questions
  - Difference of your work in comparison to the other work

  - For example:
    - Harms et al. [5] performed an identification or average car sizes in 1980. In their work, they analyzed …
    - In comparison to our work, Harms et al. considered rather old car types only known until 1980. We consider also car types build until 2018.

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4. Approach

- The approach you developed or propose for answering the research questions (no implementation or even source code)

- For example:

  - For calculating the average length of cars, we first determine the lengths of all types of cars currently used in Germany. Then we sum up these lengths and divide the sum with the number of lengths as in the following formula …

Structure of a Research Report

5. Case Study
   - The usage/application of your approach for answering the research question
   - A discussion of your results (What do they say? Are they valid?)

   - For example:
     - We applied our calculation for average car lengths and widths on the data provided by the Kraftfahrtbundesamt. The resulting values can be found in the following table…
     - Our results show, that on average cars are unexpectedly short. The reason is, that we also considered small car types like the Smart. Through this, our parking lots may be planned to small. Hence, we need to …

Structure of a Research Report

6. Summary and Outlook
   - What did you do in the work?
   - What are the major outcomes?
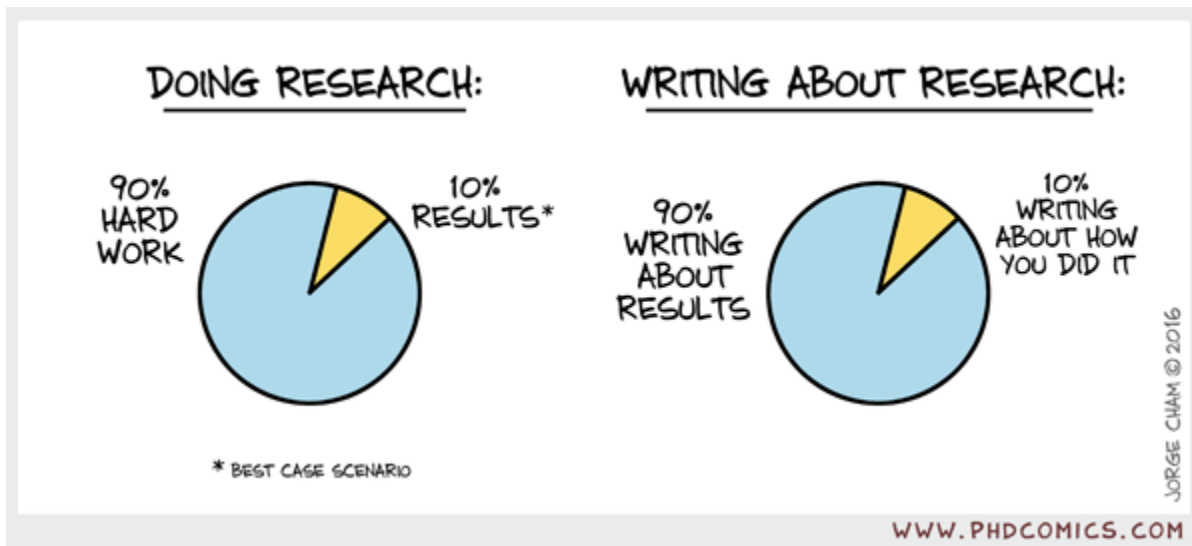   - What are the next steps?

   - For example:
     - We developed an approach for determining the average size of cars. We applied the approach on data of the Kraftfahrtbundesamt.
     - Our results show that the approach is basically valid, but that for our major goal of planning the construction of parking lots, we need to …
     - In the future, we will adapt our approach to correct it and then use the results for the next steps of planning the construction of parking lots.

Typical Mistakes

- Wrong motivation
  - Don't do the research for the purpose of doing it but to answer a research question
  - Wrong: „We applied machine learning because we wanted to apply it!"

- Unimportant foundations
  - Not everything you ever read is important for your report
  - Not every framework you used in your implementation is relevant

- No or too much related work
  - Only the important and relevant work

Typical Mistakes

- Inclusion of source code
  - Reports describe concepts, not implementations
  - Only refer to implementations briefly, e.g., if something important was done → usually part of the case study description

Typical Mistakes

- No separation between approach and case study
  - The approach is how you intend to answer the research question
  - The case study is the actual attempt to answer the research question

- No separation between results and discussion
  - Results are pure numbers, the discussion is their interpretation

- Wrong or too far reaching conclusions
  - „The average width of cars is 2,13 meters. We conclude that adding 50 centimeters for opening the doors would be enough for the width of parking lots."

Task for upcoming weeks

- Self dependent learning
  - Structure of research report
  - Typical mistakes

- Practical Part
  - Create/adapt report outline
  - Fill in bullet points of what to include in which part
  - Send this to me

- Presentation
  - Report outline and planned contents

Questions???