# Digital Humanities

9th Symposium and Summer School
on Service-Oriented Computing

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# Agenda:

What are the digital humanities?
Introducing the MUSE-method
Pattern as “Formulas”

# Defining digital humanities

"Digital humanities is a **diverse** and still **emerging field** that encompasses the practice of humanities research in and through **information technology**, and the **exploration of how the humanities may evolve** through their engagement with technology, media, and computational methods."

(Digital Humanities Quarterly)

# Paradigms in Science

1st Paradigm: **Experiments**

- Since about a millennium
- Description of natural phenomena

2nd Paradigm: **Theory**

- Since a few hundred years
- Generalize and create mathematical models

3rd Paradigm: **Computation**

- Since a few decades
- Simulate mathematical models too complicated to be solved analytically

4th Paradigm: **Data-Intense**

- Since nearly 20 years
- Software-based analysis of data produced by instruments and simulations

*Gray, Jim: A Transformed Scientific Method.*
*In: The fourth paradigm, 2009*

# Approaching the digital humanities

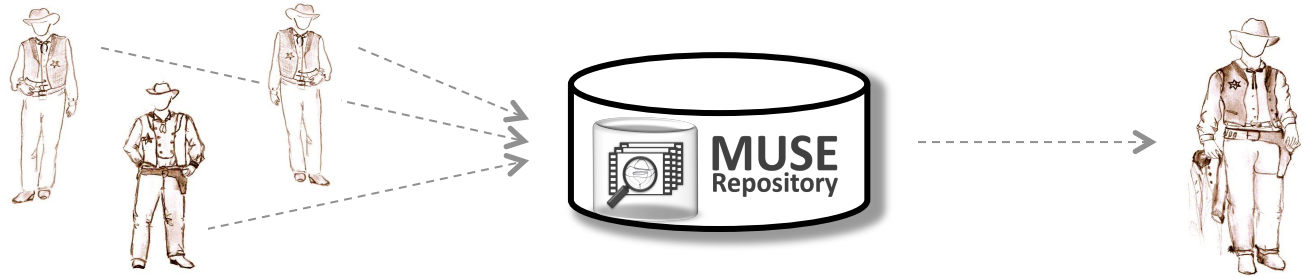
- In the natural sciences and engineering the use of concepts, methods and technologies of computer science is in an advanced stage and is is reflected by the term “eScience”
- The use of techniques and methods of computer science in the humanities is rather rudimentary. This is what the so called “eHumanities” or “digital humanities” want to change

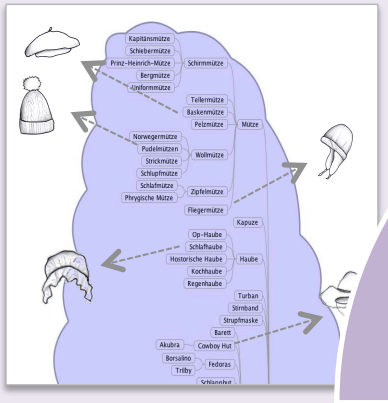
  - While databases, archives and document systems as well as technologies of computational linguistics and visualization are used in some areas of the humanities, the advanced use computer science-derived concepts, methods and technologies are still marginal.

# Our approach to digital humanities

- we use the concept of **formal languages** to concretize the term “costume language”
  - Providing a clear definition for rather vague terms used in media science
- we chose the concepts of ontologies and **pattern languages** to derive costume languages in movies
  - Development of the MUSE-method
- We **generalize** the method and formalization to make it reusable for other domains in the humanities
  - to use computer science-derived concepts, methods and technologies to gain new insight in questions existing in the humanities

# Detecting costume languages



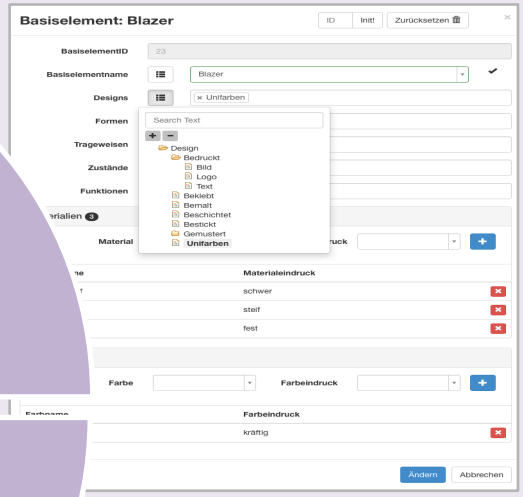



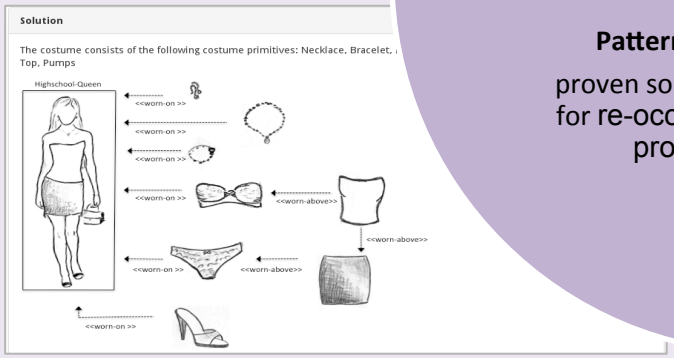
**Domain**

Taxonomies to structure the costume relevant parameters

**MUSE Repository**

detailed capturing of concrete costumes



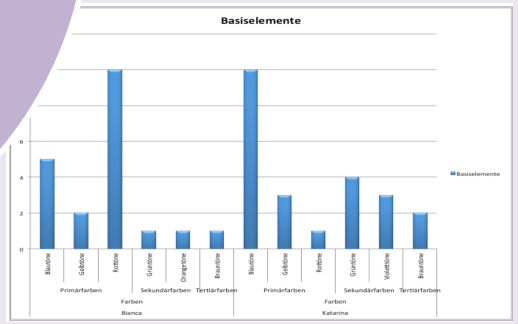




**PatternPedia**

proven solutions for re-occurring problems

**Analysis**

using OLAP Cubes and data mining to find pattern candidates

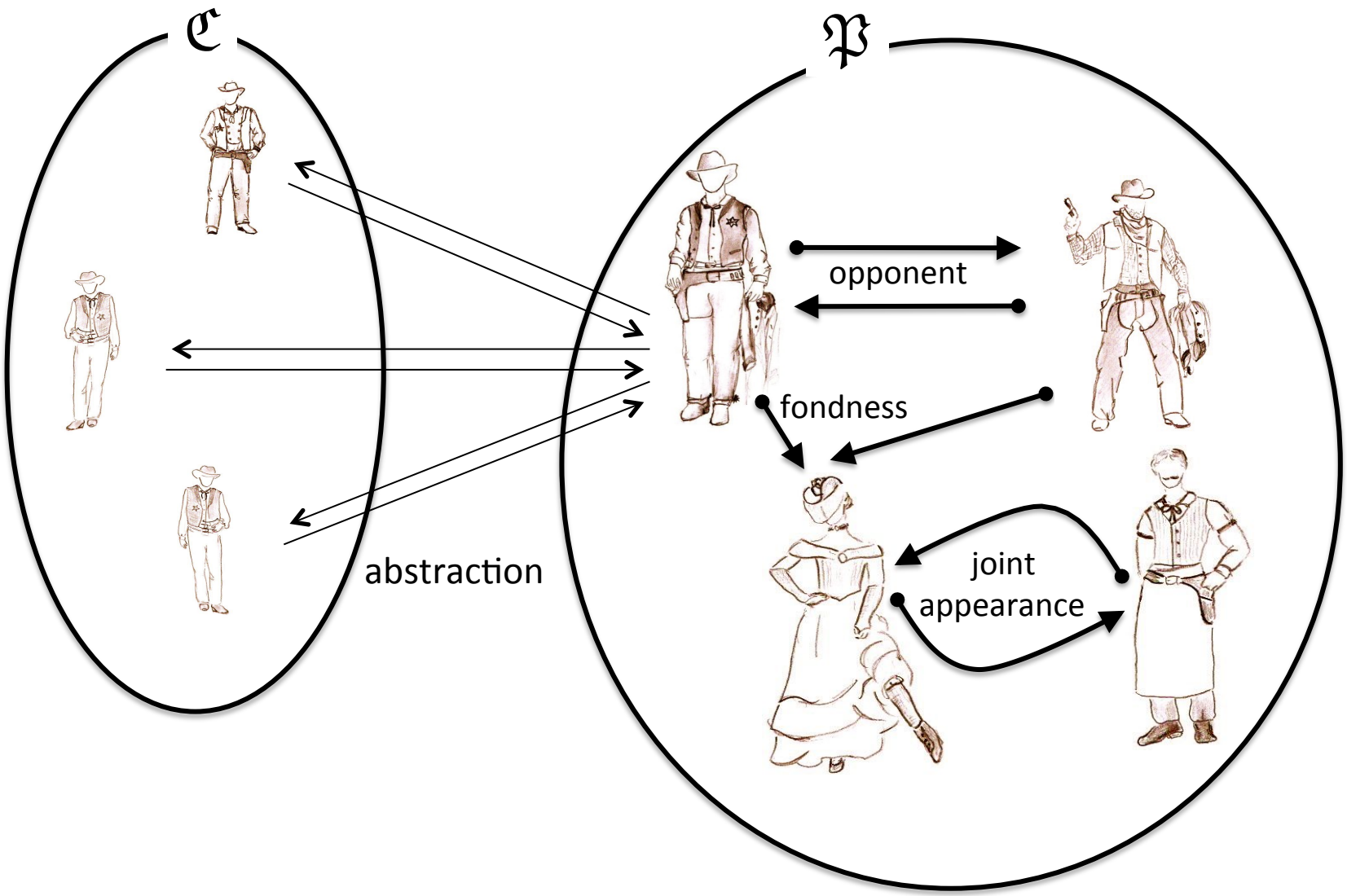


# Defining patterns

- A pattern is a proven solution to a re-occurring problem
  - Concept introduced in 1977 by Ch. Alexander, a “real” architect
- A pattern is a concept that aims to capture the best solutions in an abstract way to make this knowledge reusable
  - It is not a series of concrete instructions how to solve a problem
- A pattern language is a set of patterns conforming to a particular pattern format as well as cross-references between these patterns

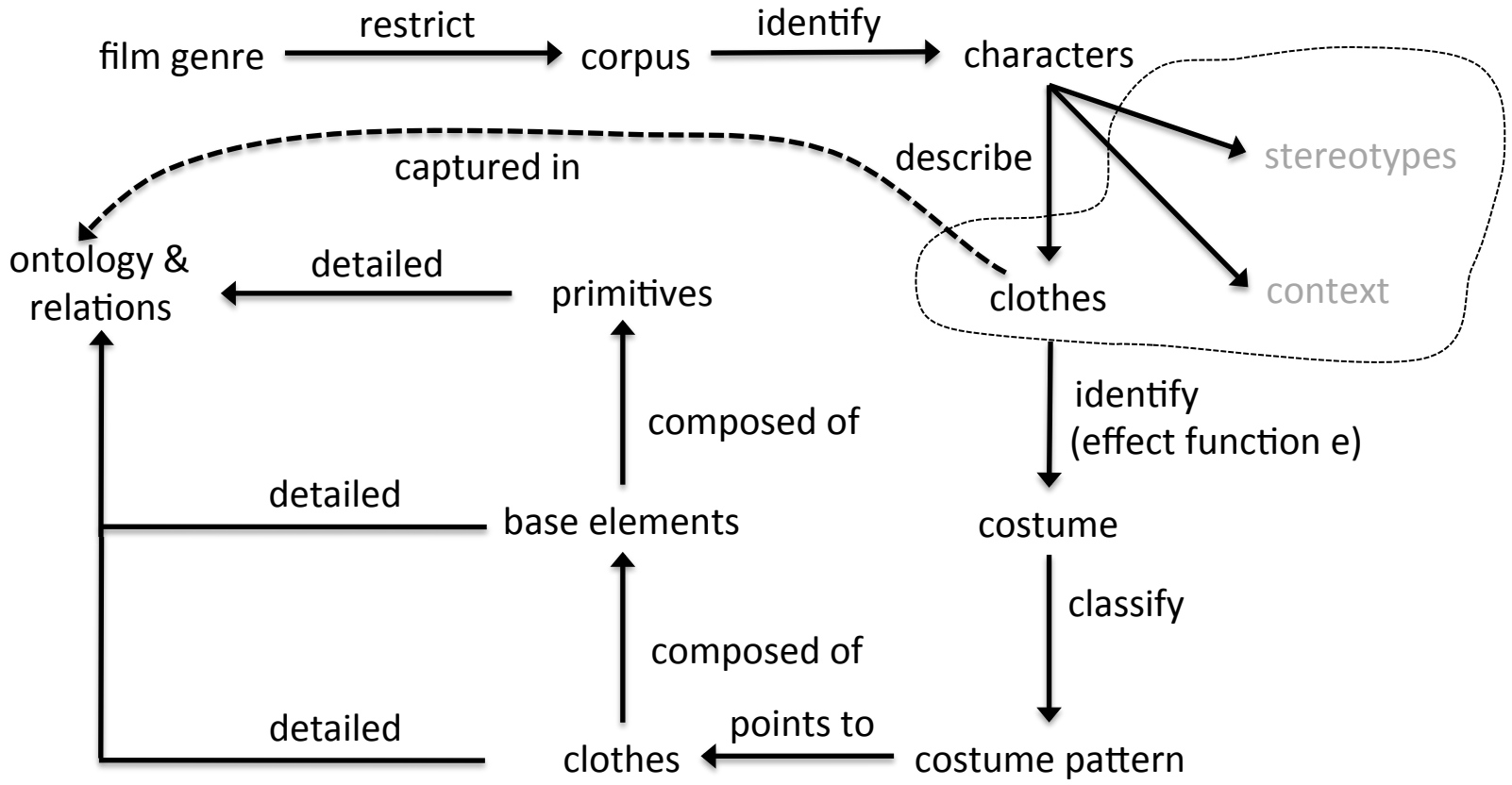
➡ A costume pattern is a proven solution to a re-occurring costume design problem.

# Costume Pattern



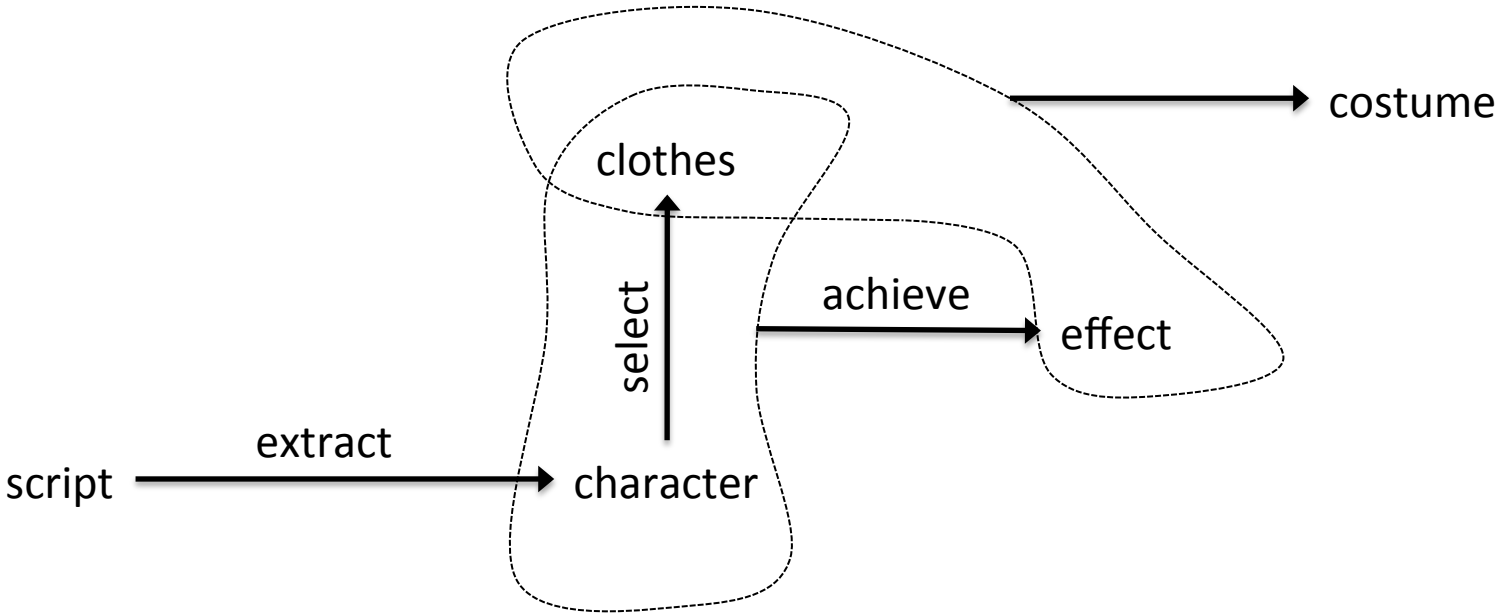
# Formalizing the Method

# Identification of Patterns: Overview



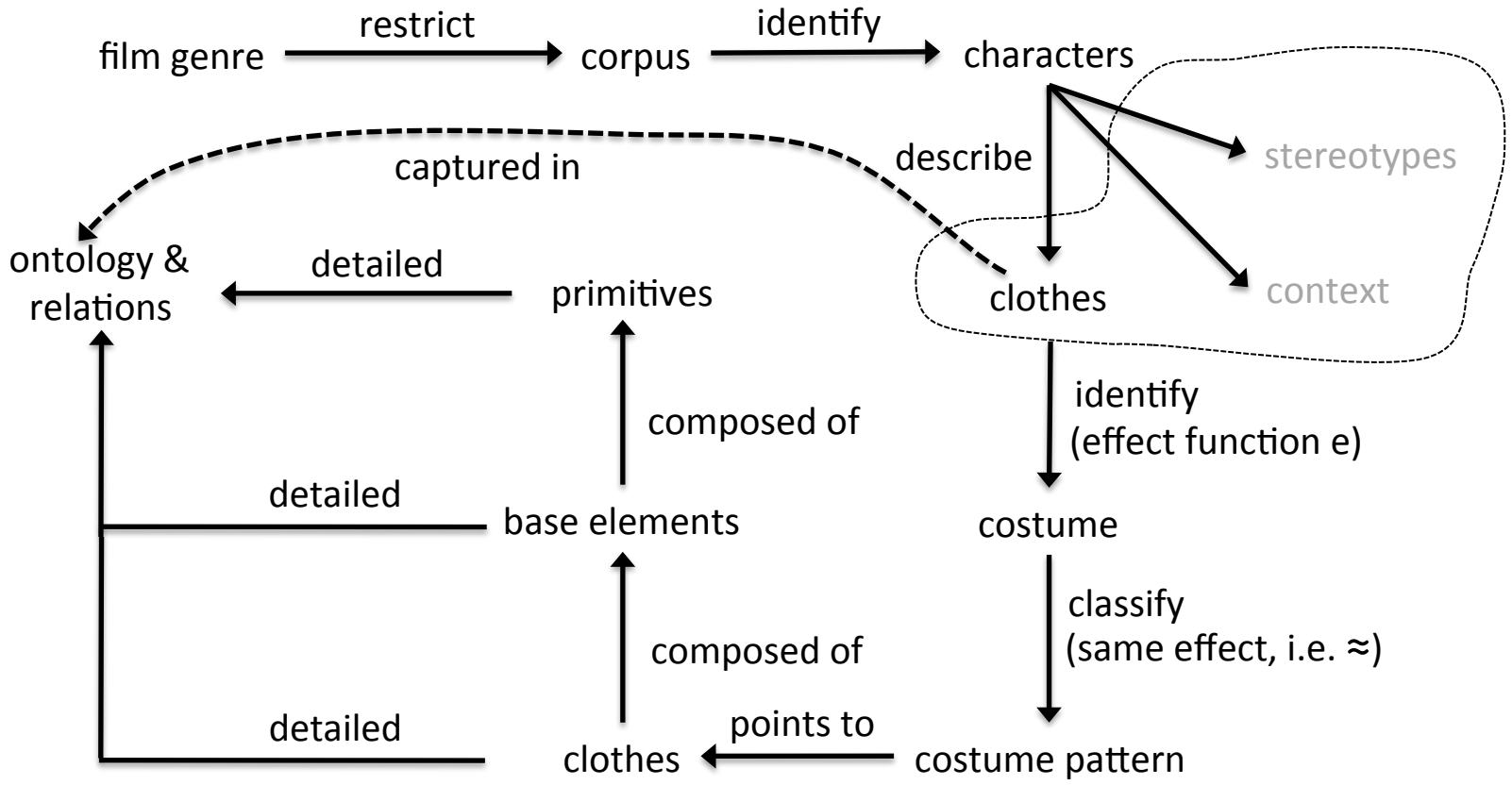

(*) captured clothes
(**) all „valid“ clothes

# From Clothes to Costumes (Task of Costume Designer)



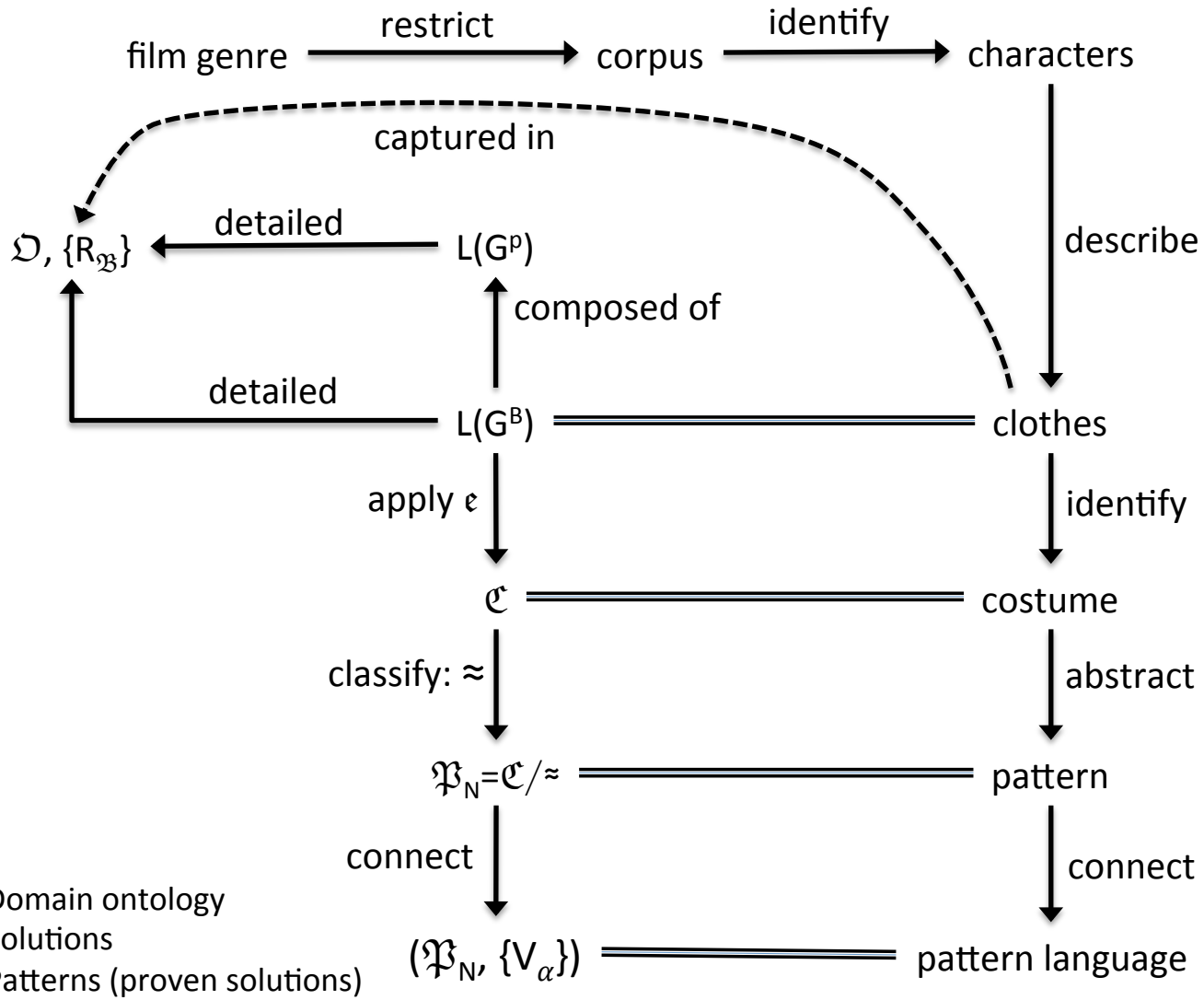

Costume is „effective clothes“

# Identification of Patterns: Overview




(*) captured clothes
(**) all „valid“ clothes

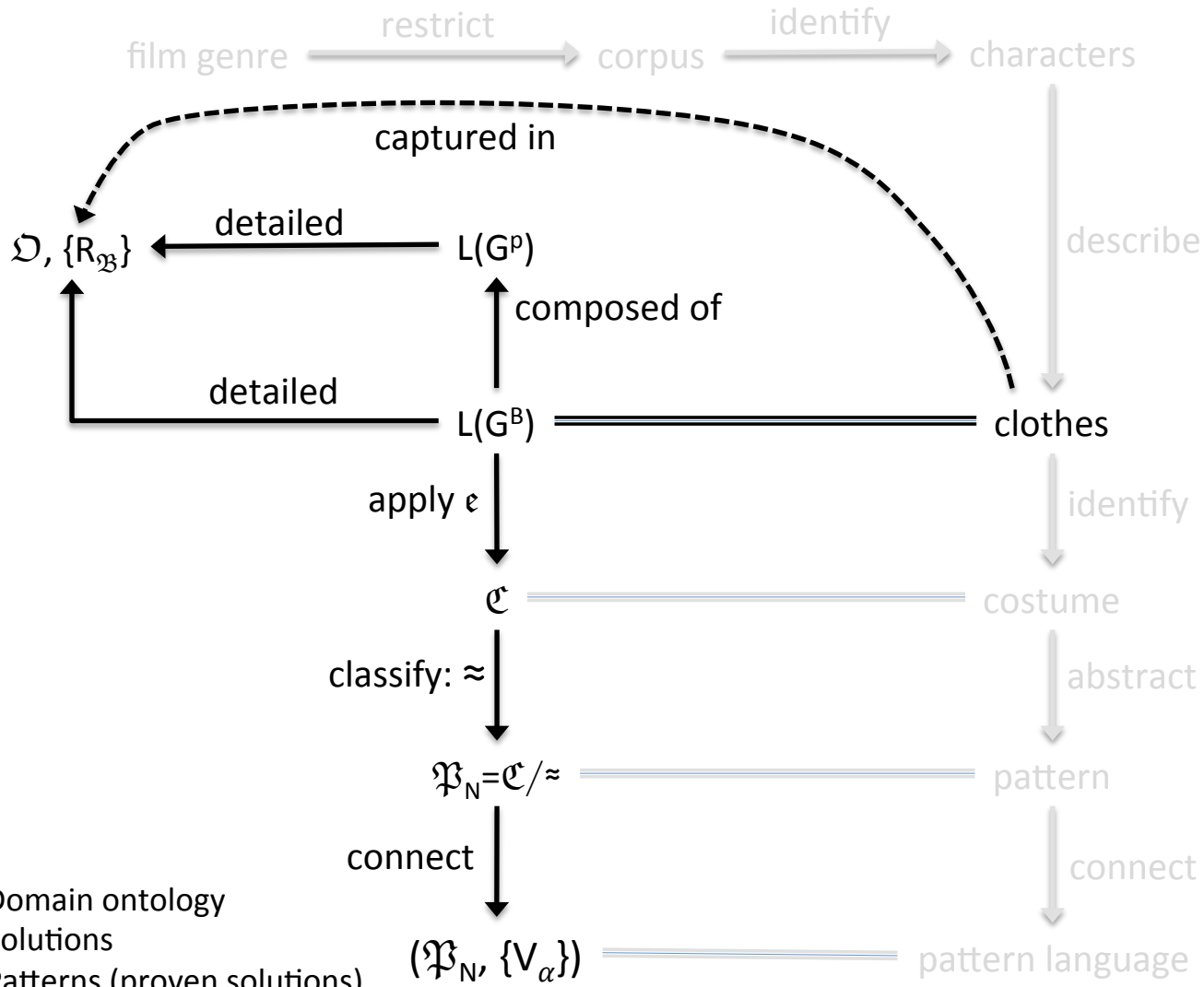
# Summary: Formal Aspects and Method




$\mathfrak{D}$: Domain ontology
$\mathfrak{S}$: Solutions
$\mathfrak{P}$: Patterns (proven solutions)

Barzen, Johanna; Leymann, Frank. Costume Languages As Pattern Languages. In: Proceedings of PURPLSOC - Preparatory Workshop 2014.

# Summary: Formal Aspects and Method

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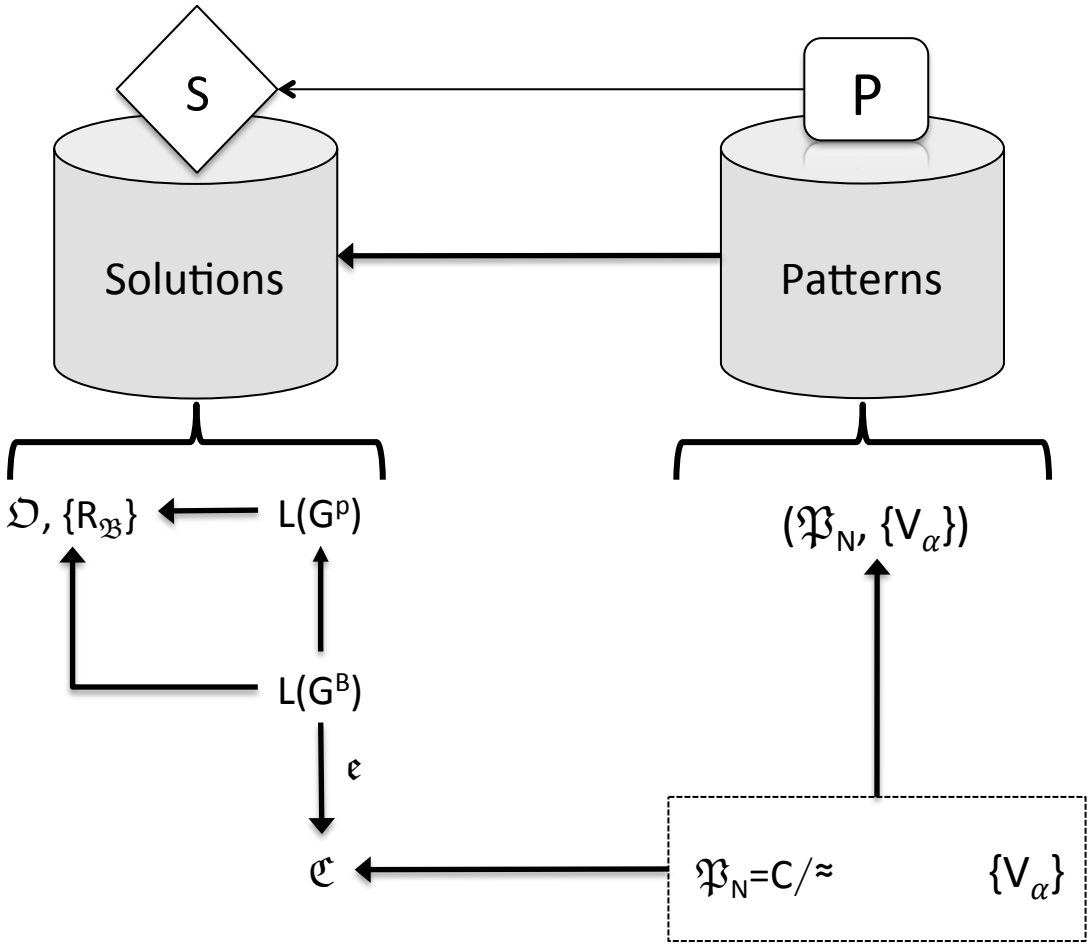
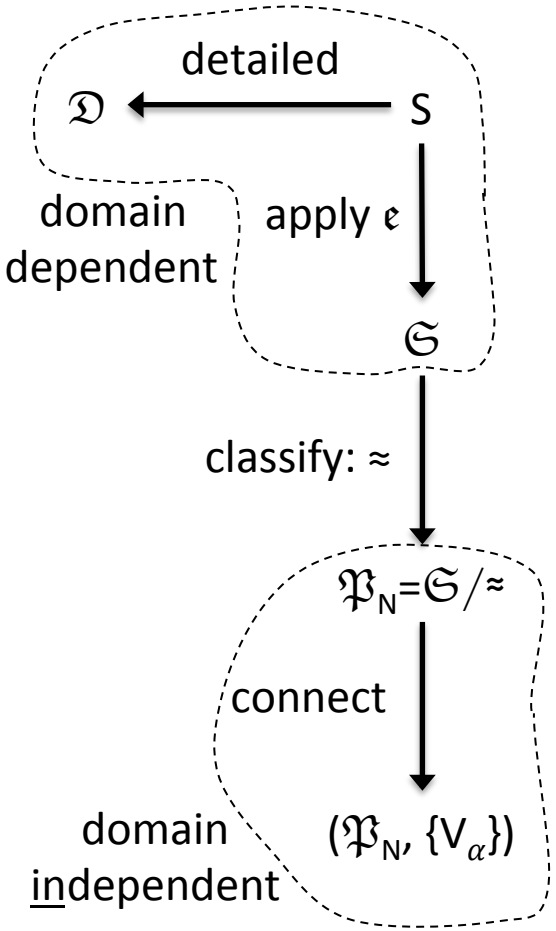
# Repositories



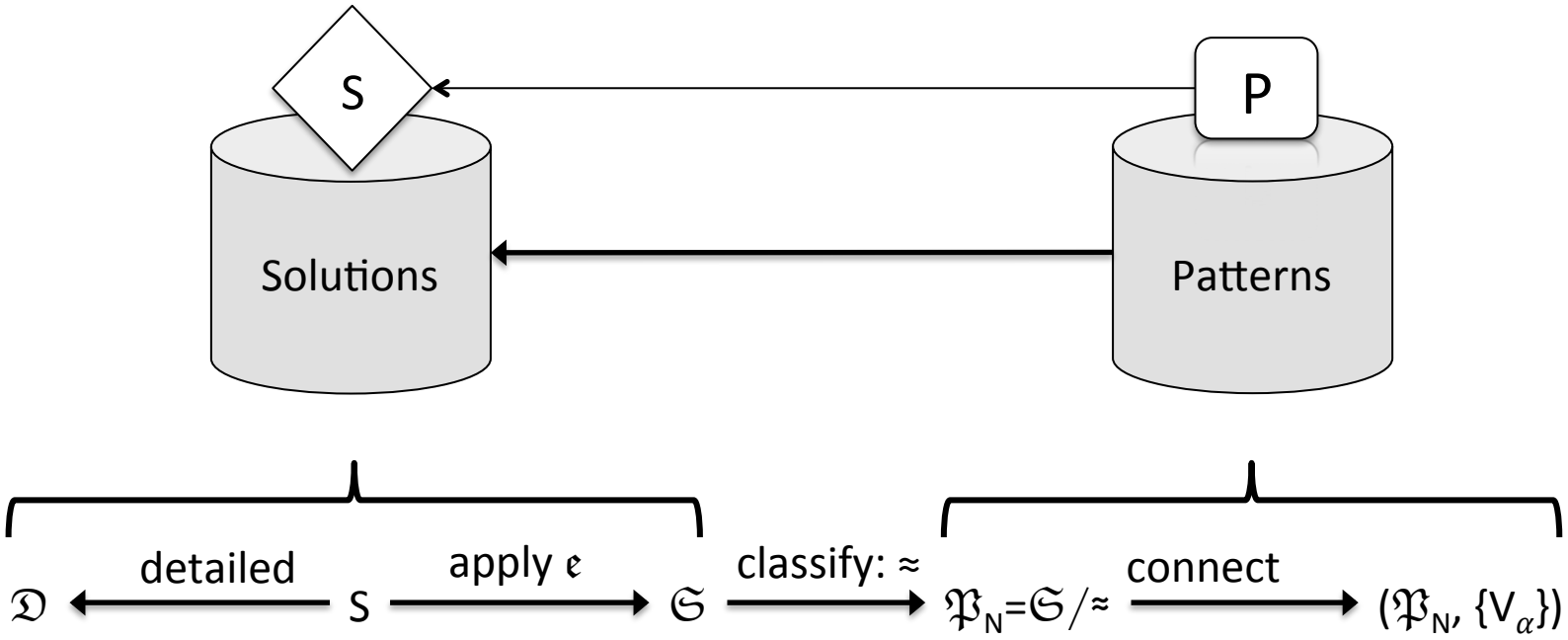

Fehling, Christoph; Barzen, Johanna; Falkenthal, Michael; Leymann, Frank: PatternPedia - Collaborative Pattern Identification and Authoring. In: Proceedings of PURPLSOC - Preparatory Workshop 2014.

# Generalization of Formalization



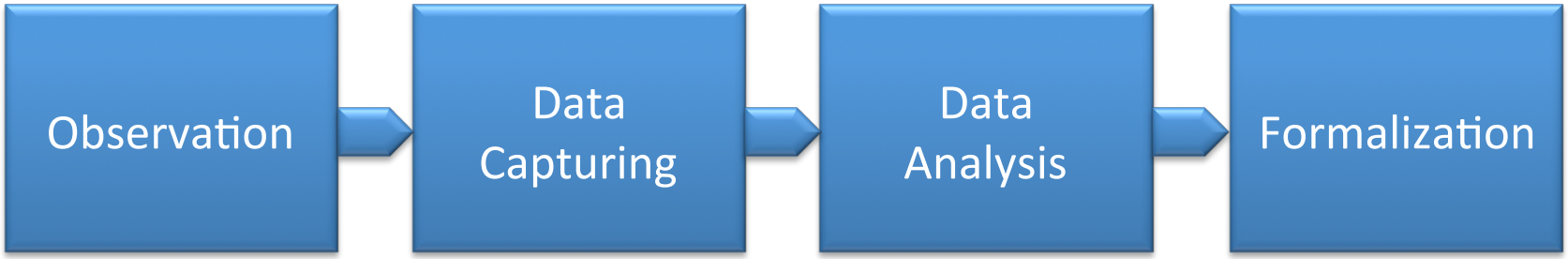

$\mathfrak{D}$: Domain ontology
S: Solution language
$\mathfrak{S}$: Solutions
$\mathfrak{P}$: Patterns (proven solutions)

# Generalization: Repositories



# Pattern and the digital humanities

# The Scientific Method

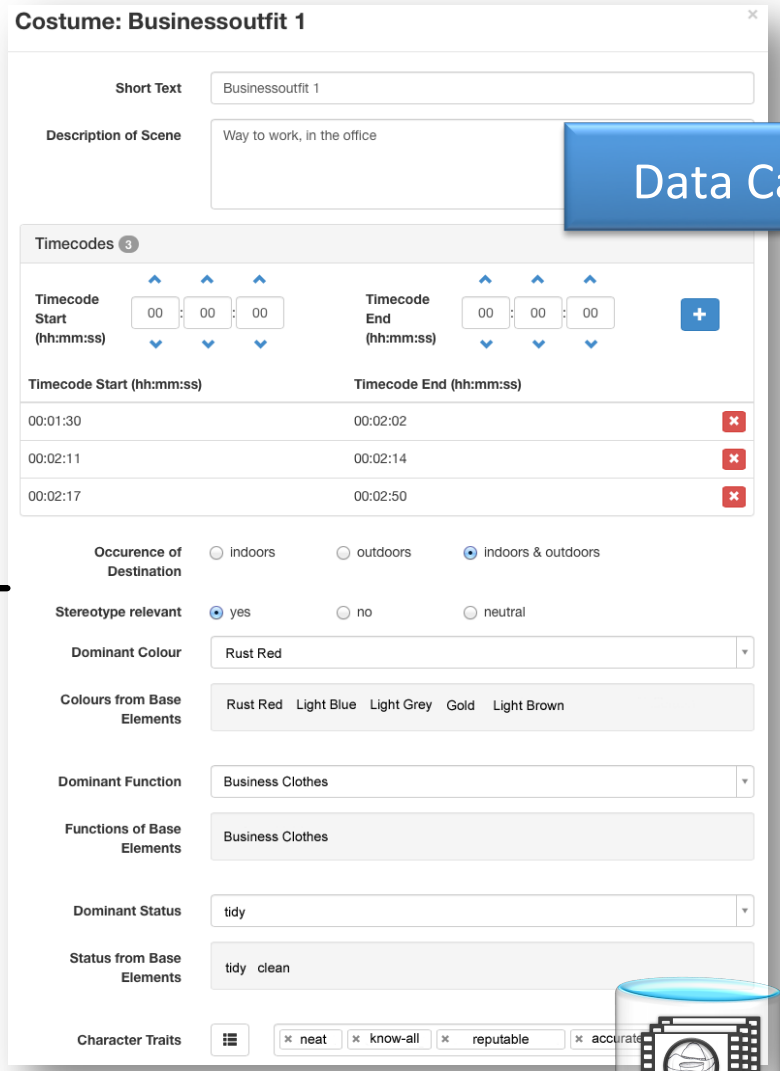


# Capturing Movies

MUSE
Muster Suchen und Erkennen

Observation

Data Capturing




MUSE
Repository

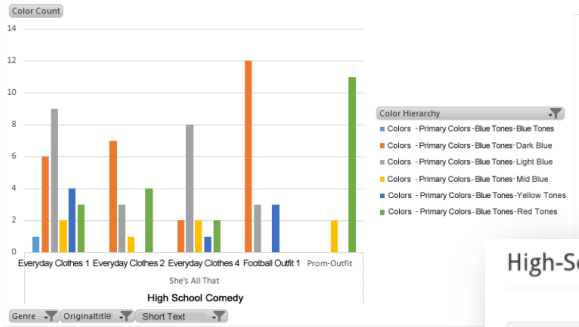
# Analyzing Movies

MUSE
Muster Suchen und Erkennen


**MUSE**
**Repository**

## Data Analysis

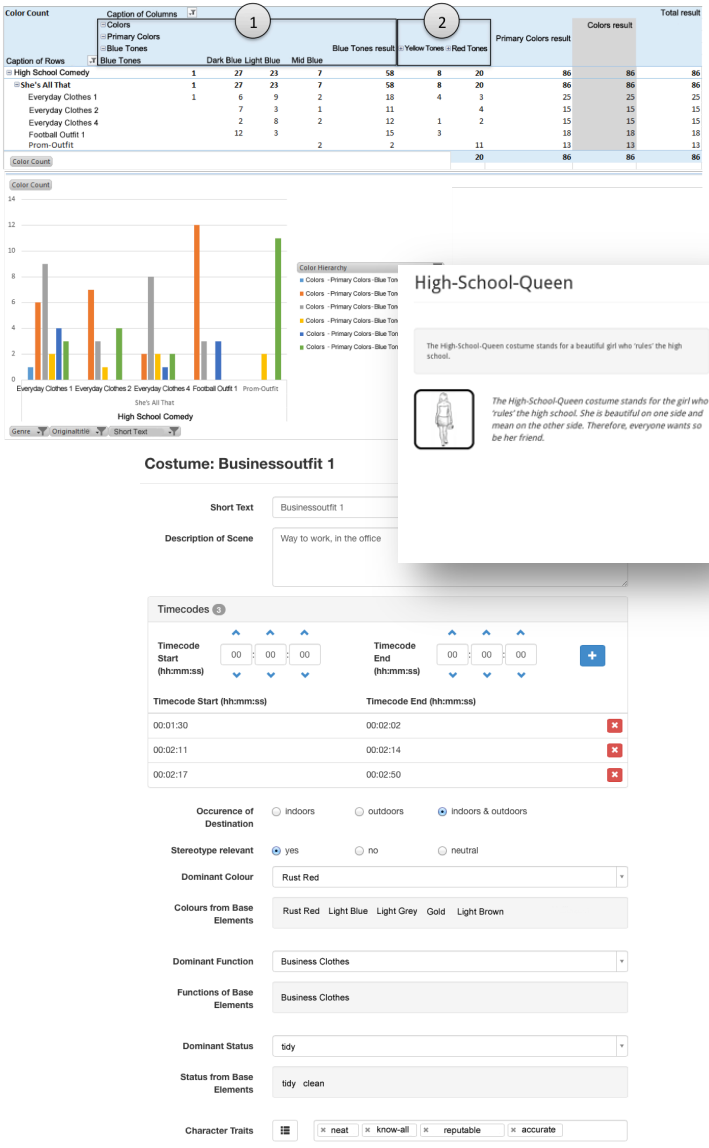
| Color Count | Caption of Columns | 1 | | | | 2 | | | | Total result |
|---|---|---|---|---|---|---|---|---|---|---|
| | Colors | | | | | | | | | |
| | Primary Colors | | | | | | | Primary Colors result | Colors result | |
| | Blue Tones | | | | Blue Tones result | Yellow Tones | Red Tones | | | |
| Caption of Rows | Blue Tones | Dark Blue | Light Blue | Mid Blue | | | | | | |
| High School Comedy | 1 | 27 | 23 | 7 | 58 | 8 | 20 | 86 | 86 | 86 |
| She's All That | 1 | 27 | 23 | 7 | 58 | 8 | 20 | 86 | 86 | 86 |
| Everyday Clothes 1 | 1 | 6 | 9 | 2 | 18 | 4 | 3 | 25 | 25 | 25 |
| Everyday Clothes 2 | | 7 | 3 | 1 | 11 | | 4 | 15 | 15 | 15 |
| Everyday Clothes 4 | | 2 | 8 | 2 | 12 | 1 | 2 | 15 | 15 | 15 |
| Football Outfit 1 | | 12 | 3 | | 15 | 3 | | 18 | 18 | 18 |
| Prom-Outfit | | | | 2 | 2 | | 11 | 13 | 13 | 13 |
| Color Count | | | | | | | 20 | 86 | 86 | 86 |

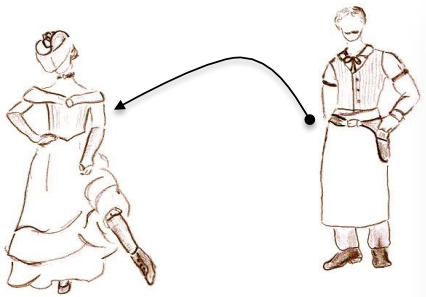


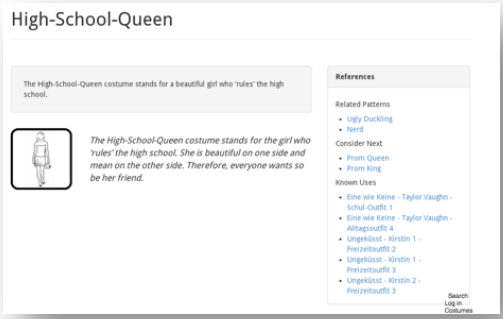


Falkenthal, Michael; Barzen, Johanna; Dörner, Simon; Elkind, Vadym; Fauser, Jan; Leymann, Frank; Strehl, Tino: Datenanalyse in den Digital Humanities – Eine Annäherung an Kostümmuster mittels OLAP Cubes. In: BTW 2015.

# Abstraction and Formalization






$\mathfrak{O}, \{R_{\mathfrak{B}}\} \leftarrow L(G^p) \leftarrow (\mathfrak{P}_N, \{V_\alpha\})$

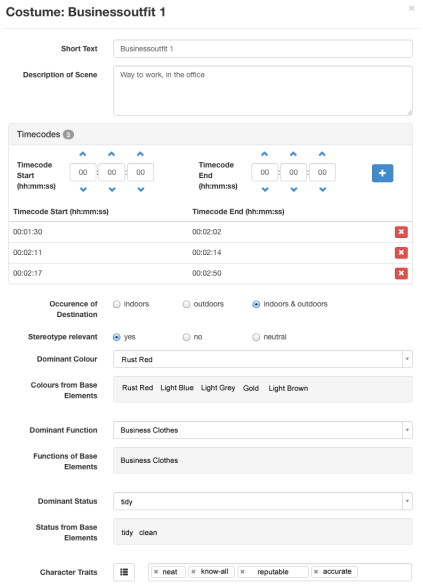
$L(G^B)$

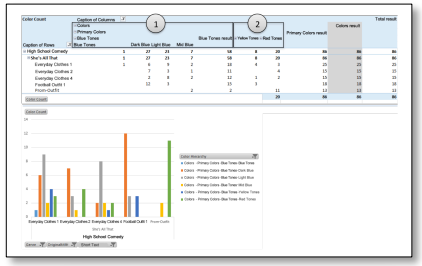
$\mathfrak{e}$

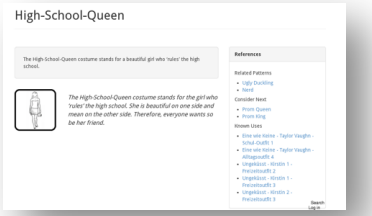
$\mathfrak{C} \leftarrow \mathfrak{P}_N = C/\approx \{V_\alpha\}$

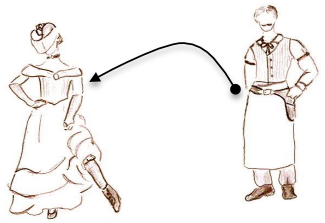
**Formalization**

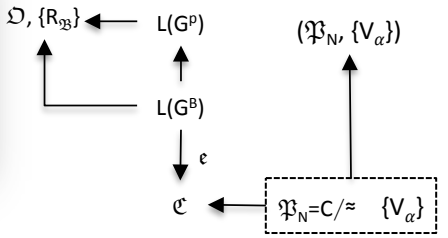
# The MUSE Method








Observation → Data Capturing → Data Analysis → Formalization

# Conclusion

# Conclusion: A Paradigm Change Is Possible

- We presented a method (and the implementation) to derive a costume language for movies
- In doing so, we have shown that digital humanities are not restricted to archiving or text/image/&… processing. Other concepts of computer science can result in new insights in the Humanities
  - Modeling, Patterns, Formal Languages, Semantics,…
- Even more, the empirical method of science can become beneficial for the Humanities
  - We plan to use of method in another domain of the humanities

# The End