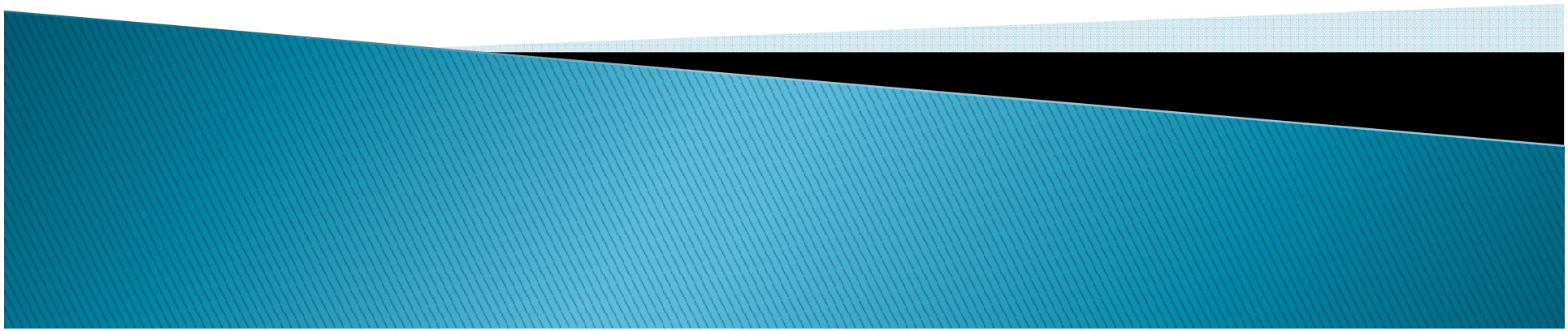
Lightweight Tools for requirements analysis

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Our research interests

1. Ambiguity identification in requirements specifications
2. Identification of rights and obligations for regulation compliance

1. Ambiguity in RSs

- Natural language requirements specifications (NL RS)
  - 79% of requirements documents are couched in unrestricted NL
  - majority of developers (64%) think that a higher level of automation is needed to improve general efficiency in modeling requirements

1. Ambiguity in RSs

- Ambiguity
  - Is an intrinsic phenomenon of natural language
  - Means the capability of being understood in two or more possible senses or ways
  - May cause:
    - Implementation of incorrect set of system requirements
    - Generation of the wrong test cases for system verification

1. Ambiguity in RSs

Two step approach to identify ambiguities in NL RSs:

1. Tool T1 would apply a set of ambiguity measures to a NL RS in order to identify potentially ambiguous sentences in the RS
2. Tool T2 would show what specifically is potentially ambiguous about each sentence in the RS

Final decision is made by a human that may want to rewrite the sentence

1. Ambiguity in RSs

- T1
  - The tool notifies of potentially ambiguous sentences by varying their background color
  - lexical ambiguity at the sentence level approximates the semantic ambiguity of a sentence
  - Uses free dictionaries to identify word lexical ambiguity

    Babylon, Wordnet, WordReference

1. Ambiguity in RSs

Suggestions for future implementation of T2

- Draw user's attention to:
  - Weak or vague words: similarly, clearly, appropriate
  - Demonstrative pronouns used as a noun: This is…
  - Undefined acronyms
  - Verbs, subjects and verb complements joined by conjunction

Etc.

2. Regulatory Compliance

- Problem
  - Law strictly regulates business activities of organizations
  - To verify if a system is compliant with a regulation, the requirements imposed by the regulatory document must be identified
  - Requirements engineers don’t have expertise in law and need tool support

2. Regulation Compliance

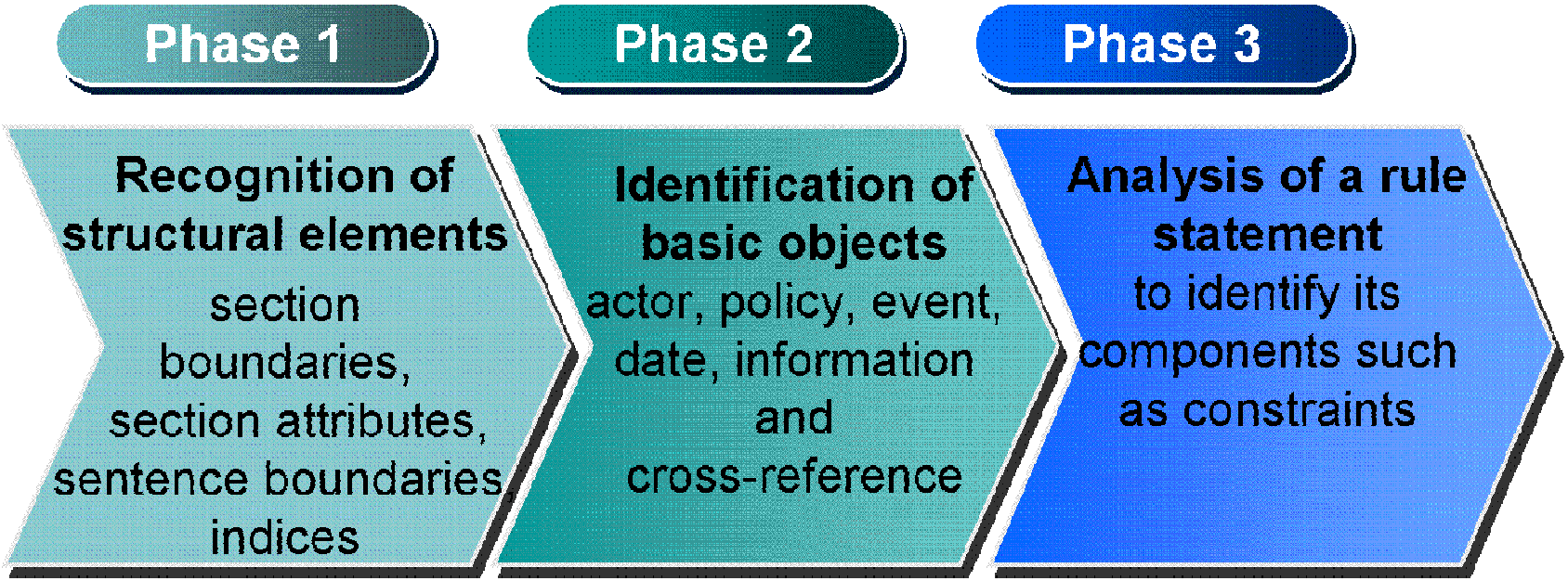
- Solution
  - Develop a systematic process for extracting requirements from regulations

    The semantic parameterization process proposed by Breaux and Antón
  - Develop tool support for the process

    Implementation of the tool, called Gaius T., based on this process

2. Regulation Compliance

Analysis of regulations with Gaius T.



2. Regulation Compliance

Evaluation notes

- English and Italian data sets
  - the HIPAA Privacy Act of U.S.
  - the Italian Accessibility Law (Stanca act)
- The tool was able to largely support humans in identification of relevant information
- Unlike manual annotations, automatic markup is more consistent

Thank you!