

First approaches on knowledge representation of Elementary (patent) Pragmatics

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Background : The FSTP/-Innovation Expert System

Prior Art



Knowledge Representation of an invention

Elements: characterizing aspects of invention

Attributes:
Properties of the identified elements

Binary Inventive Concepts:
Elementary properties referred by attributes

ity „Q“

Known



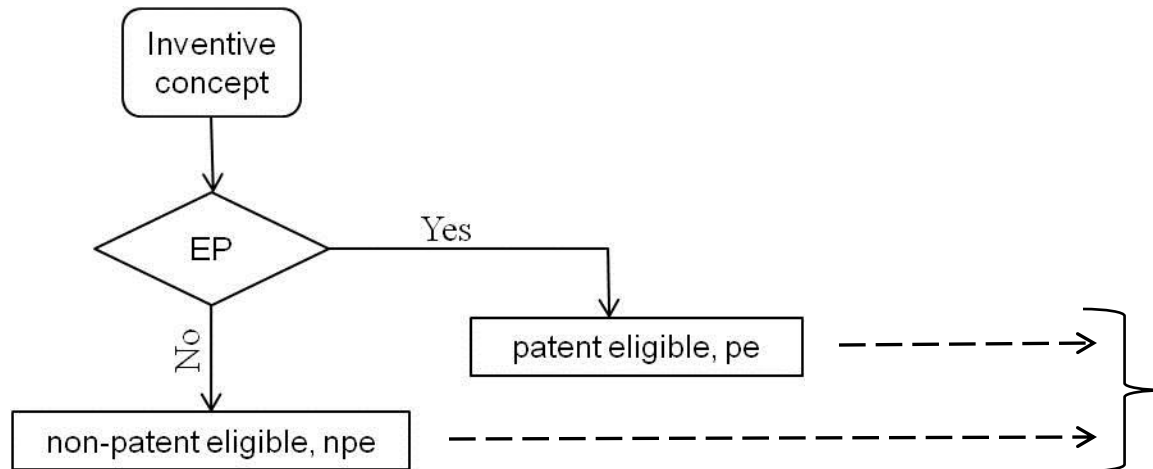
Creative height „Q_{plcs}“

Pragmatic/Innovative height „Q_{pmgp}“

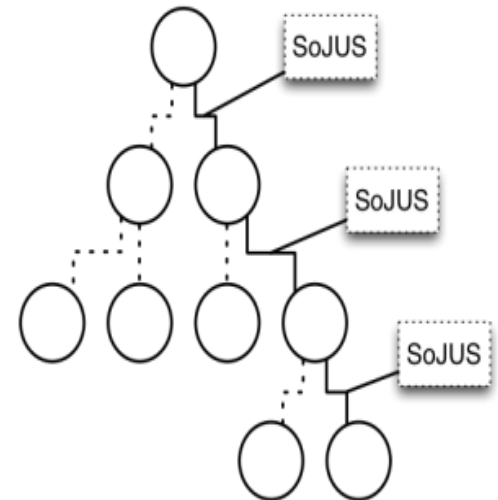
Concepts & Elementary Pragmatics (EP)

Binary Inventive Concepts: **Elementary properties** referred by attributes

Elementary Pragmatics (EP): Disclosures (explicit/implicit) of certain art which can be easily understood by a person of pertinent skill.

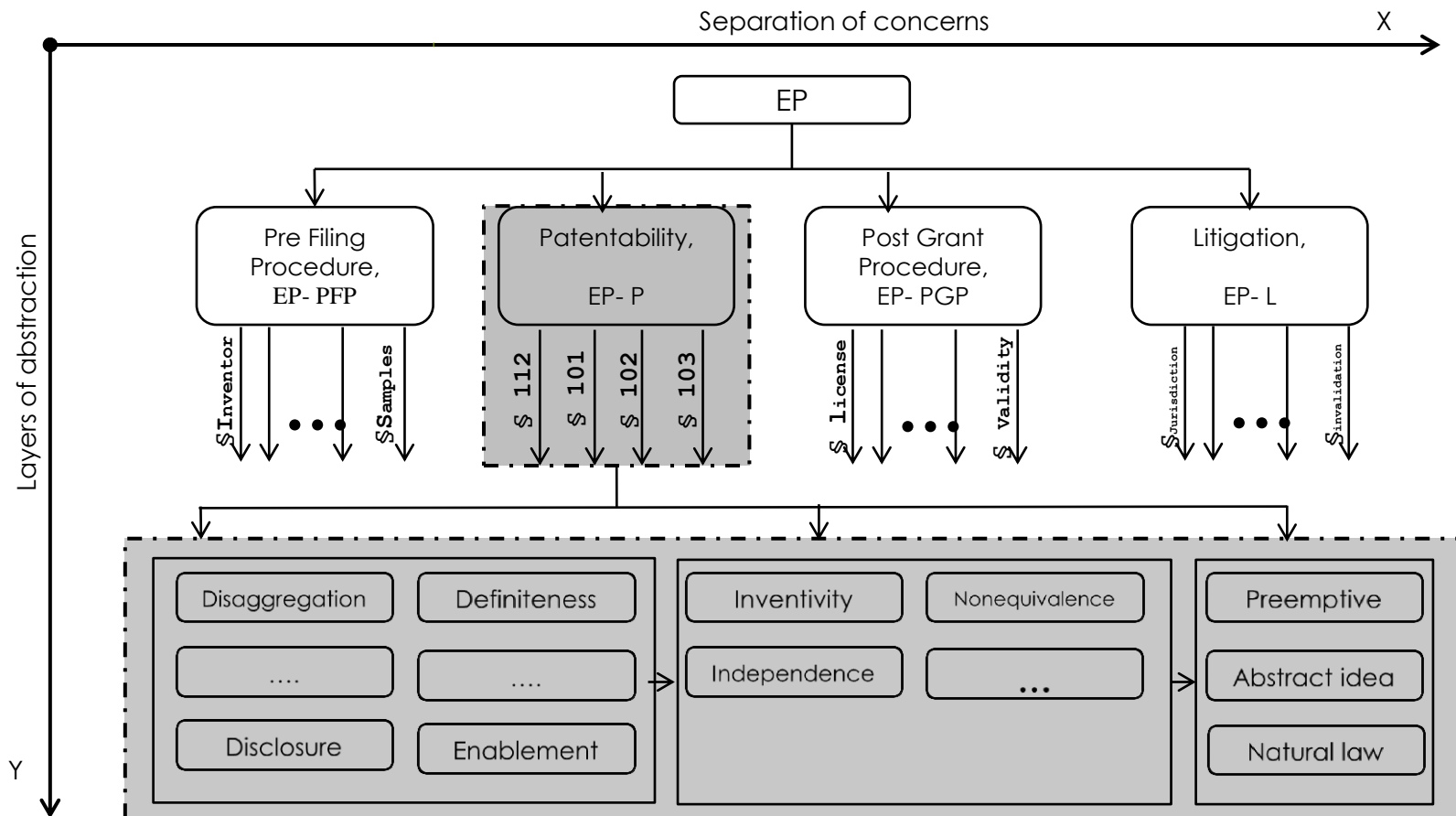


Arguments for examination/cross-examination



KR's of Elementary (patent)Pragmatics (EP)

- Patent EP's Knowledge can be represented on different layers of abstraction
- Notion : **"separation of concerns"**



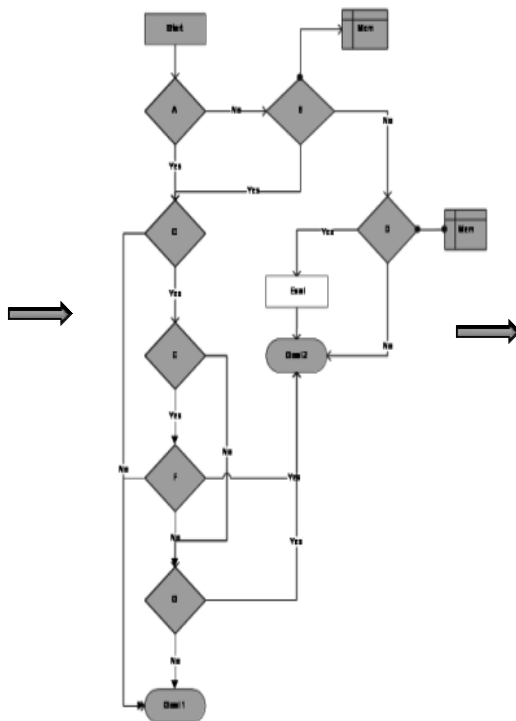
Knowledge Representation *contd...*

Each test/law (or portions) represented as workflow models, which are then modeled using **LegalRuleML**.

LegalRuleML : a rule interchange language for the legal domain.

35 USC § 112 6th Paragraph

An element in a claim for a combination may be expressed as a **means** or step for performing a specified **function** without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding **structure**, material, or acts described in the specification and equivalents thereof."



```
<lrml:LegalRuleML>

  <!-- Referencing the textual provisions-->
  <lrml:LegalSource> ... </lrml:LegalSource>

  <!-- Capturing the ex-ternal temporal dimensions of the rules are
  represented -->
  <lrml:TimeInstants> ...</lrml:TimeInstants>
  <lrml:TemporalCharacteristics> ...</lrml:TemporalCharacteristics>

  <!-- Agent and the authority of the rules for provenance-->
  <lrml:Agents> ... </lrml:Agents>
  <lrml:Authorities> ... </lrml:Authorities>

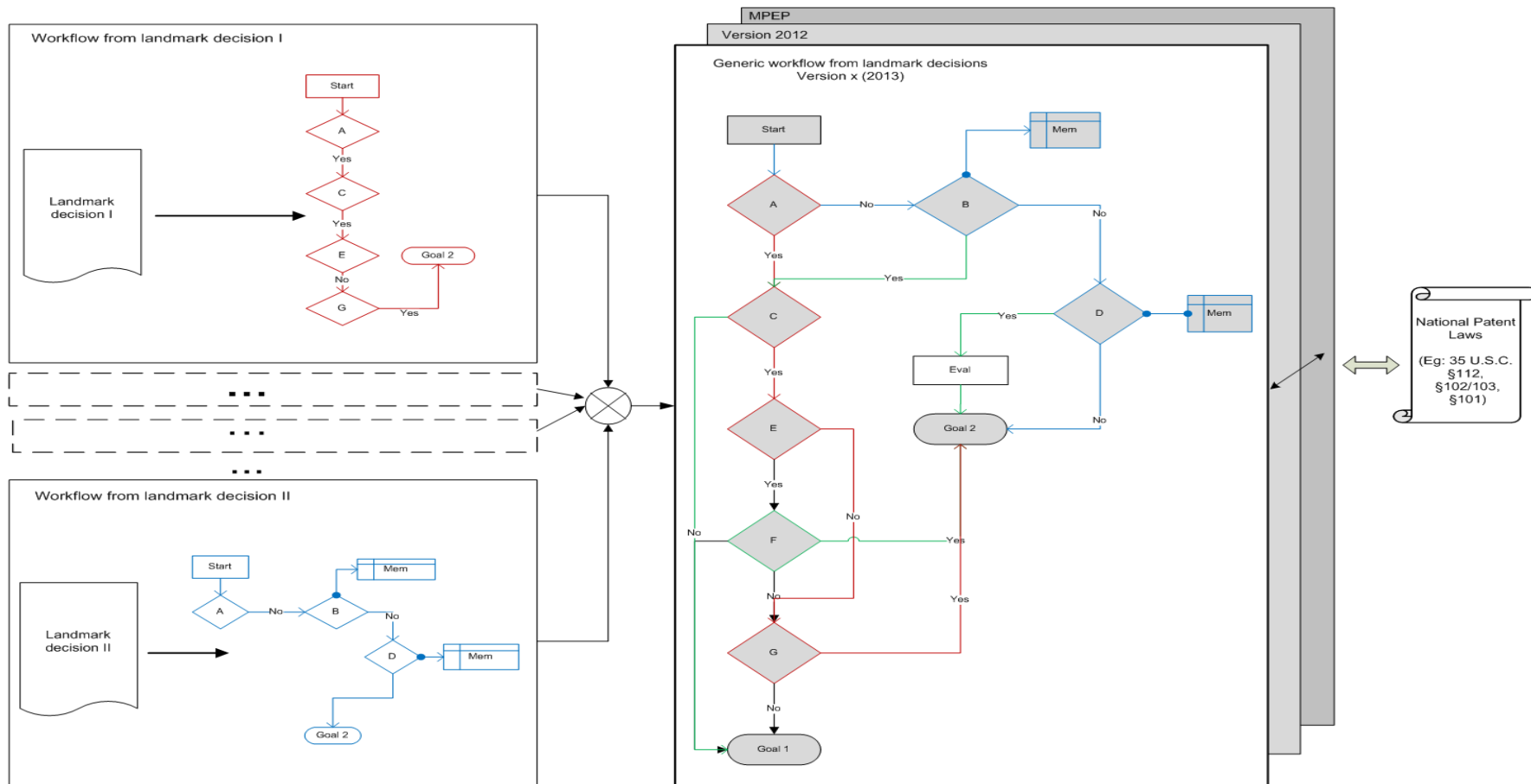
  <!-- Associates property values to rules and also adds metadata such as
  jurisdiction, role, and strength-->
  <lrml:Context>
    <lrml:appliesRole>
      <lrml:appliesStrength>
        <lrml:appliesAuthority> ...</lrml:appliesAuthority>
        <lrml:appliesJurisdiction> ... </lrml:appliesJurisdiction>
      </lrml:appliesStrength>
    </lrml:appliesRole>
  </lrml:Context>

  <!-- Rules (constitutive and prescriptive) are modelled-->
  <lrml:Statements>
    <Rule>
      ...
      <!-- ReactionRuleML-->
      ...
    </Rule>
  </lrml:Statements>

</lrml:LegalRuleML>
```

Knowledge Representation *contd...*

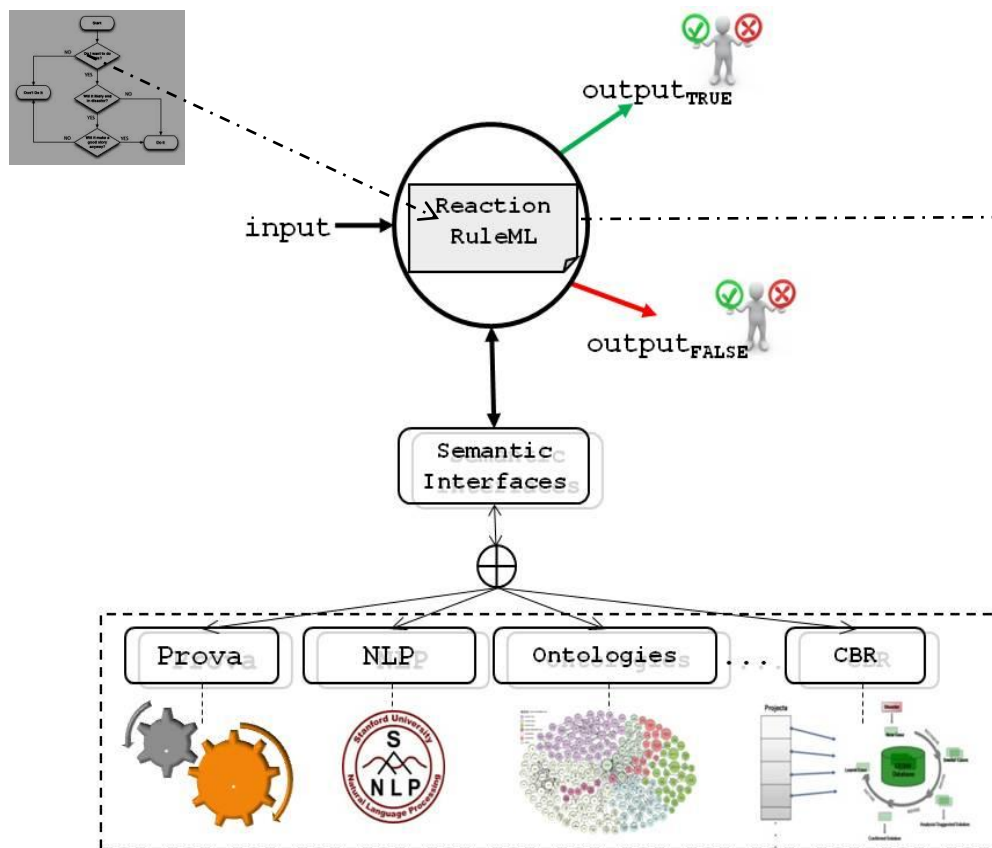
Similarly, patent precedents (or portions) are also represented as workflow models, which are then modeled using **LegalRuleML**.



Knowledge Representation contd...

Each decision point in the workflow are *currently* modeled using **ReactionRuleML**.

ReactionRuleML: XML-serialized language and rule interchange format for the family of reaction rules.



```
<Rule>

<!-- rule info and life cycle management, modularization -->
<!-- (semantic) metadata of the rule -->
<meta> ... </meta>
<!-- scope of the rule e.g. a rule module -->
<scope> ...</scope>

<!-- rule interface description -->
<!-- intended semantic profiles -->
<evaluation> ... </evaluation>
<!-- rule interface signature and modes -->
<signature> ... </signature>

<!-- rule implementation -->
<!-- e.g. qualifying rule declarations, e.g.priorities, validity, -->
<qualification> ... </qualification>
<!-- quantifying rule declarations, e.g. variable bindings -->
<quantification> ... </quantification>
<!-- event part -->
<on> ... </on>
<!-- condition part -->
<if> ... </if>
<!-- (logical) conclusion part -->
<then> ... </then>
<!-- action part -->
<do> ... </do>
<!-- postcondition after action, e.g. to check effects of execution -->
<after> ... </after>
<!-- (logical) else conclusion -->
<else> ... </else>
<!-- alternative/else action, e.g. for default, exception handling -->
<elsedo> ... </elsedo>

</Rule>
```

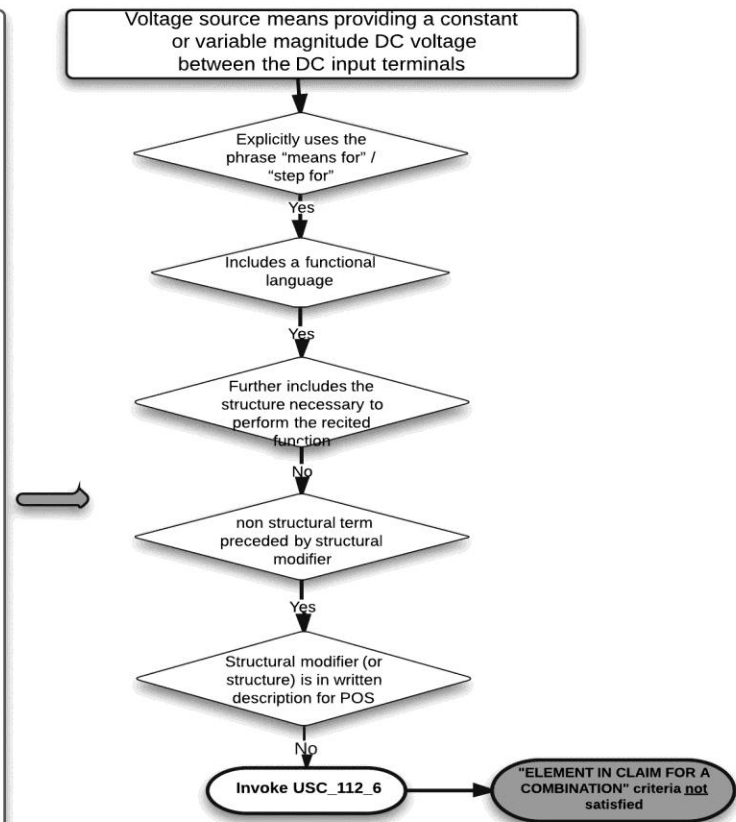

Example

Lighting Ballast Control LLC v. Philips Electronics (CAFC : January 02, 2013).

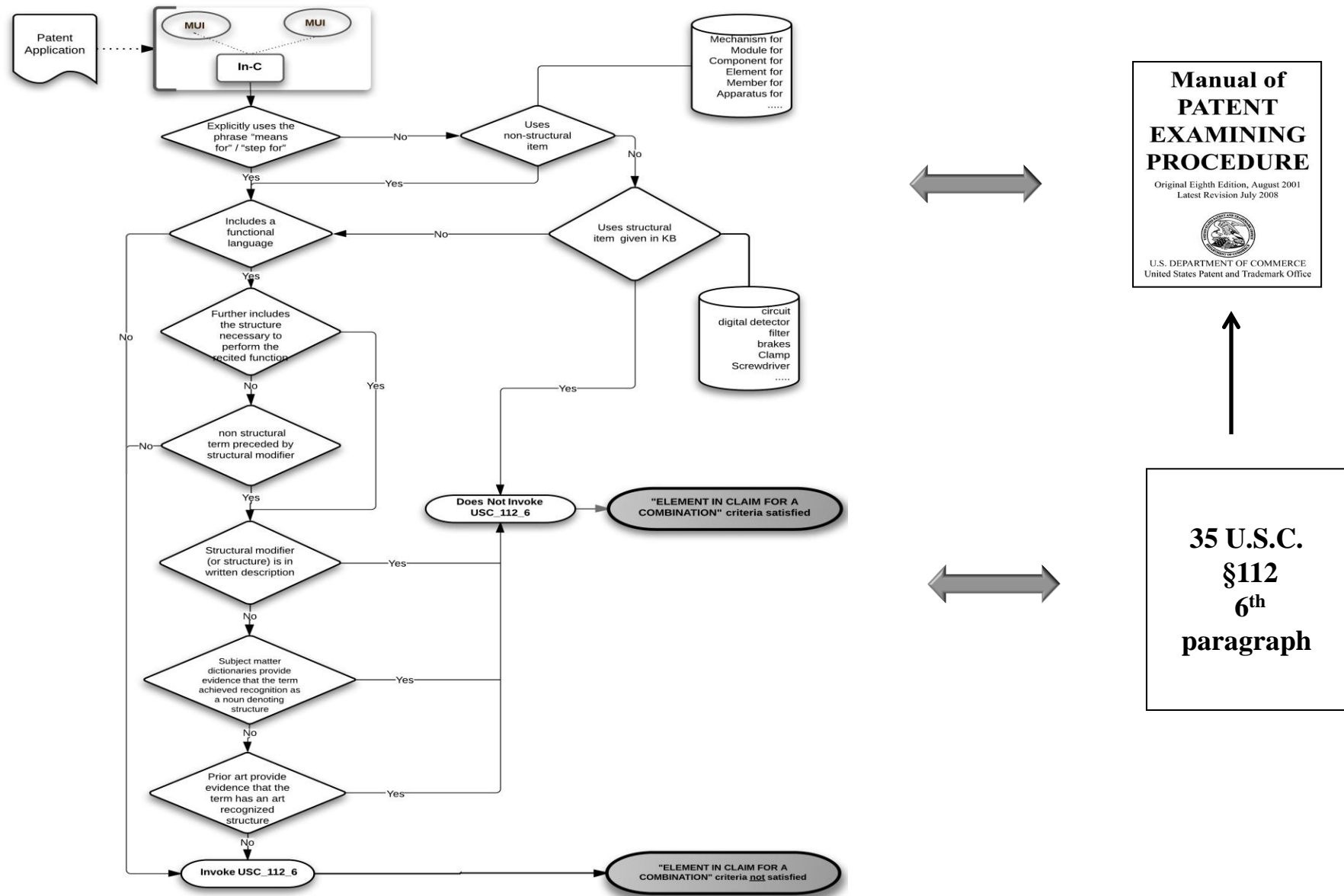
Decision re-explained the norms within the 6th Para of § 112 (35 U.S.C Patent Law).

Lighting Ballast Control LLC v. Philips Electronics North America Corp & Universal Lighting Technologies
(Fed. Cir. January 02, 2013)

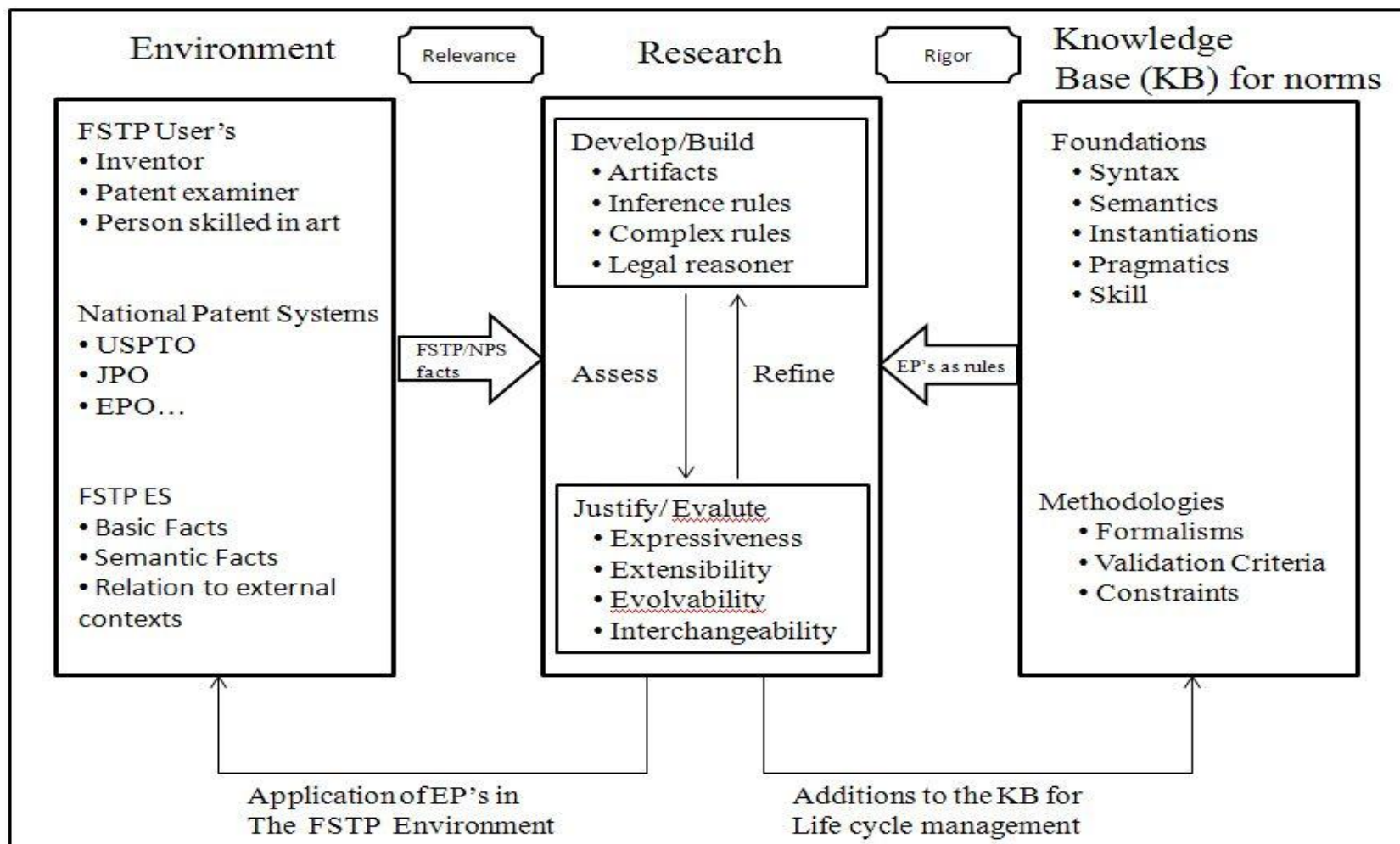
The patented technology relates to control and protection circuits for electronic lighting ballasts commonly used in fluorescent lighting. The district court construed the term “voltage source means” as a means-plus-function limitation under 35 U.S.C. § 112, ¶ 6.Means-plus-function limitations are governed by 35 U.S.C. § 112, ¶ 6. The presumption triggered by use of the word “means” may be rebutted if the claim itself recites sufficient structure for performing the function.By contrast, when a term only indicates what the recited means “does, not what it is structurally,” the claim is properly construed under § 112, ¶ 6. For example, Biomedino, LLC v. Waters Techs. Corp., 490 F.3d 946, 949 (Fed. Cir. 2007), we construed the phrase “control means for automatically operating said valving.” 490 F.3d at 949. We held that the term “control” Lighting Ballast points to case law in which this Court declined to apply means-plus-function claiming in view of expert testimony and other extrinsic evidence showing that certain claimed elements implied sufficient structure. In those cases, however, ..at means-plus-function claiming did not apply because the claim limitations at issue did not include the word “means.” See MIT v. Abacus Software, 462 F.3d 1344, 1353 (Fed. Cir. 2006)Greenberg v. Ethicon Endo-Surgery, Inc., 91 F.3d 1580, 1583 (Fed. Cir. 1996) (construing the term “detent mechanism”; “means” did not appear in the claim.). In this case, we start with the presumption that means-plus function claiming doeshe claim limitation includes the word “means.” ULT failed to evidence to overcome that presumption.



Example : Lighting Ballast Control v. Philips Electronics (CAFC : January 02, 2013).



Proposed Framework *(Future directions...)*



Research plan *(Future directions...)*

Evaluation for adequacy of knowledge representation
e.g. expressiveness vs. complexity,
soundness and completeness,
decidability, consistency...)

Connecting current formal representation with real-world resources.

Non-functional requirements like:
Interoperability ?
Evolvability ?
Reusability & Interchangeability ?

Summary

- **Legal representation format** for legal reasoning.
 - To support a semi-automated legal **decision support system**
 - A platform-independent rule standardization in **LegalRuleML XML**
 - Support for **reusability, life cycle management** of the knowledge
 - Transformations into executable representation language and **automated execution** (Prova rule engine + ontology reasoner)
- Basis for legal argumentations / justifications



Thank you

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Corporate Semantic Web (CSW)

Freie Universität Berlin

<http://www.inf.fu-berlin.de/groups/ag-csw>

Teles PRI GmbH

Berlin

<http://www.fstp-expert-system.com>