# Formalizing Practical Argumentation Lecture 4: AI & Law research on adversarial argumentation

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## 5 Classification in legal reasoning

Methods with necessary and sufficient condition are too limited:

- often no hard conditions
- often factors pro and con, which need to be 'weighed'.

**Example: Domicile according to Dutch income tax**

- *Statute:* One must pay Dutch income tax if one lives in Holland, or has income in Holland.
- *Rules Inland Revenue (on domicile):*
  1. If away less than 3 months and kept home, then domicile in Holland
  2. If away longer than 1 year and gave up home, then domicile not in Holland
- *Factors 'grey area':* duration, living situation, job prospects, nationality employer, ...
- *My case*: Worked in England for 1 year with Un. London, sublet home in Holland, at departure from Holland no job prospects afterwards



- Classification question: is my domicile in Holland or abroad?
- Problem: with which method can my case be classified?
  - Statistics of neural networks? Kan give insight in chances of success, but does not model reasoning of a judge.
  - Beter: find similar cases with desires outcome.

    $\Rightarrow$ Analogical reasoning

| (Domicile NL) | Case 1 | Case 2 | My case |
|---|---|---|---|
| Duration | 8m | 16m | 12m |
| *Factors pro* | | | |
| Dutch employer | | x | |
| Kept home | | x | x |
| Job prosp. NL | | x | |
| *Factors Con* | | | |
| Foreign employer | x | | x |
| Gave up home | x | | |
| Let home | | | x |
| No job pr. NL | x | | x |
| *Classification* | abr | NL | ? |



- In case Inland revenue - Henry Prakken:
  - I would claim similarity with Case 1
  - Inland revenue would claim similarity with Case 2

  ⇒ Conflict + debate because of:
  - room for disagreement (analogy not compulsive)
  - conflict of interests

**Conclusions**

- Legal reasoning combines rules and cases ('rule-based' vs. 'case-based' reasoning)
- Use of precedent depends on dialectical context

## HYPO (Ashley & Rissland)

Problem: classification of behaviour as 'misuse of trade secrets'.

- INPUT:
  - A set of precedents
  - A current fact situation (CFS)
- OUTPUT:

  Three ply argument between plaintiff and defendant.
- Argument moves:
  - Citing a case (directly or by analogy)
  - distinguishing a case (by pointing at differences with CFS)
  - Giving a counterexample (by citing another case with opposite outcome)



**Representing cases in HYPO**

- Can cases be represented as a rule?

  - 13 months & kept apt. $\Rightarrow$ Dom. abroad

  Problem: tendency of facts not represented.
- **HYPO:**

  $P_1, \ldots, P_n$

  $D$

  $D_1, \ldots, D_m$

**Processing a new case**

(ignoring non-boolean factors and hypotheticals)

1. Compute similarity of cases with CFS
   - Degree of similarity: union case factors with CFS
   - similarity ordering: set inclusion on degrees of similarity ('more on point')
2. Compute best cases to cite for each side:
   - most on point case; and
   - Favours side; and
   - Shares side-factors with CFS
3. Compute relevant differences of cases (with outcome side1) with CFS,

   Union of:
   - side1 factors in CFS, not in case;
   - side1 factors in case, not in CFS.



**Processing a new case (continued)**

4. Find counterexamples case2 for each case1 (with outcome side1)
   - *Trumping:* case2 is most on point case for side2, more on point than case1.
   - *Partial:* case2 is for side2, intersection of overlaps case1 and case2 with CFS is not empty (?)
5. Generate a 3-ply argument.
6. A side has the 'better argument' iff none of its cases can be trumped, but some of its opponent's cases can be trumped.