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A Case-Based System for Trade Secrets Law¹

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Abstract

In this paper, we give an overview of our casebased reasoning program, HYPO, which operates in the field of trade secret law. We discuss key ingredients of case-based reasoning, in general, and the correspondence of these to elements of HYPO. We conclude with an extended example of HYPO working through a hypothetical trade secrets case, patterned after an actual case.

1 An Overview of Case-Based Reasoning

As anyone, who has ever endured an adversarial "Socratic" dialogue with a forcefully probing judge, client, or law school professor, knows, being able to organize and marshall one's cases is key to prevailing in argument. It is certainly not enough to cite maxims, sections of statute, or even simply list the relevant cases. Rather one must view these cases with respect to the case at hand from the point of view of the party one is representing. Further, these cases and their ramifications must be thoroughly explored for weaknesses and hidden, particularly adverse, surprises, for instance by posing telling hypotheticals ("hypos"). Then one is in a position to test out various approaches and arguments, for instance, by playing through the major points of a skeletal argument, complete with discussion of supporting and contrary cases. Once the argument and the presentation of the cases are "debugged", one can then elaborate the argument and cases in a brief and ultimately prepare for trial or oral argument.

In our HYPO system, we have embodied many of the tasks key to the kind of case-based reasoning ("CBR") used in Anglo-American common law. In this paper, through general discussion and an extended example, we shall illustrate how HYPO carries them out. In particular, we discuss:

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- 1. The structure of HYPO's case knowledge base ("CKB") and case indexing scheme, called dimensions, that allows retrieval of relevant cases;
- 2. Case analysis of a current fact situation ("cfs") in terms of HYPO's legal knowledge;
- 3. A technique, the "claim lattice", for organizing the relevant retrieved cases, from the viewpoint of the cfs and finding the most-on-point cases ("mopc") and most troublesome cases;
- 4. Heuristic techniques for generating hypotheticals to test the sensitivity of the cfs to various changes in the facts, to flesh out sparse areas of the CKB, and to create cases in which two lines of analysis conflict;
- 5. Techniques for discussing and citing relevant hypothetical and retrieved cases, for example, through distinguishing;
- 6. Techniques for proposing the outline of argument points and responses in a "3-ply" structure.

2 Background

Relevant to our work on CBR and HYPO are AI research on: (1) memory and indexing; (2) example-based reasoning and hypotheticals; (3) planning and analogical reasoning; and of course, (4) legal reasoning. In this section, we briefly review a sampling of the related work.

Memory and Indexing

Recent work on memory organization, most notably by Kolodner and her colleagues, addresses the problem of using indexing schemes to retrieve relevant cases from memory. For instance, in the MEDIATOR system, Simpson and Kolodner delevoped a case-based approach for solving problems in dispute mediation [Kolodner, Simpson, & Cycara-Cyranski, 1985]. In the system's case-base were information on mediation tactics, their failures and corrections to the failures; cases were indexed by features, particularly, by those causing a failure in a mediation tactic.

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Hammond [1986a, 1987b] also uses a failure-driven and correction-driven indexing scheme for his case-based problem solver, CHEF, that plans recipes. Unlike Kolodner's system, CHEF uses a strong causal model, especially for purposes of explanation. Like Kolodner's systems, it runs into potential difficulties when the combinatorics of a large case base generate an unmanageably large number of differences or failures.

Example-Based Reasoning and Hypotheticals

The primary base of research on example-based reasoning ("EBR") and hypothetical reasoning is that from Rissland and colleagues. Some key ideas of the work on EBR that are relevant to CBR is the use of a case or examples knowledge base ("CKB" or "EKB"), indexing and assessment schemes for retrieval and evaluation of cases/examples, and very importantly, modification procedures which can be applied to the cases/examples to change them and create new ones [Rissland, 1980; 1981].

In the work on hypotheticals [Rissland, 1983; Rissland & Ashley, 1986], use of hypotheticals by human experts (e.g., law school professors and Supreme Court justices) was examined and various argument "moves" (e.g., weaken/strengthen, focus, obfuscate, moot out) and strategies (e.g., slippery slope) analyzed. Based on such observations, certain heuristics for generating hypotheticals (e.g., make a case extreme, enable a "near-miss" dimension) were formulated and implemented in HYPO using the dimensions mechanism.

Most closely related to Rissland's EBR research is Mc-Carty's "prototype-plus-deformation" model [McCarty, 1980]. McCarty's focus is also on how cases/examples can be transformed into other cases/examples. In particular, McCarty is interested in how two seemingly disparate cases can be joined together through a series of incremental changes.

Analogical Reasoning

At some point in just about any episode of case-based reasoning, one resorts to using analogy. Sometimes the analogies are quite simple (e.g., simple functional correspondence) and othertimes, complex (e.g., mapping of the purposes underlying the argument). While HYPO does not attempt to do the deepest sort of analogical reasoning involving intent and purposes, it does implicitly use other "weaker" forms of analogy. HYPO's use of analogy is more as a tool for explanation and justification than as a problem solving mechanism, as in the work on planning, for instance, by Carbonell.

A key component of Carbonell's [1982, 1983] work is examination of the underlying structure of a plan to be used in an analogy. In his "derivational" analogy, one maps over this underlying structure, and in "transformational" analogy, one examines the reasoning, particularly, the purposes, which lead to that structure.

Some of McCarty's [1985] more recent work on the deontic logic of a Hohfeldian "permissions and obligations" framework also focusses on transformational aspects of analogy. Here, the transformations might preserve the permissions/ obligations relationships between the parties in a case. The related work of Kedar-Cabelli [1984] attempts to deal directly with the underlying purposes and rationales, which as any legal scholar or practitioner will attest, is exceedingly difficult.

AI and Legal Reasoning

Previous work on legal reasoning has pointed out the desirability of designing a system to reason with cases to handle well-known problems like the "open-textured" nature of legal predicates, the existence of competing, adversarial, approaches to a legal question for which there is no one, right, answer, and the argument-driven nature of legal reasoning.

Gardner [1984] in her doctoral dissertation attacked the problem of identifying "hard" and "easy" questions in the context of analyzing fact situations from law school exams on the contracts law of offer and acceptance. In heuristics for determining whether there is a hard question, and thus a debatable point, her system examines cases. For instance, if there exist cases supporting two conflicting analyses, the question is hard. This use of cases to supplement other styles of reasoning (e.g., with rules or ATN's) is important. However, Gardner's representation of cases was at an abstract level; the cases were more like templates, and less like the cases in a legal reporter or even HYPO.

As mentioned above, McCarty's interest is primarily on the deformations one could make to a case to connect it to existing supporting, as well as contrary, cases and hypotheticals. More recently, he has investigated the deontic logic underlying the framework of permissions and obligations [Mc-Carty, 1985].

On the more traditional AI approaches to legal reasoning, there is the work of Waterman and Peterson [1981] and Meldman [1977]. Meldman, in one of the earliest projects on AI and legal reasoning, developed a system to analyze situations involving assault and battery. While he did make use of cases, there were rule abstractions, somewhat more akin to Gardner's than what we think of as a case in the context of this paper. In one of the Waterman & Peterson systems, a paradigmatic example of the rule-based approach, they model how a lawyer would assess the worth of a toxic tort cases (e.g., for asbestiosis). In their thoughtful discussion, they point out the difficulties in dealing with deliberately opentextured "weasel" words like "foreseeability" or "reasonable". They recommend handling these problems by either asking the user outright for his evaluation or backchaining through more rules.

More recently, the work of Sergot [1986], based on the use of Prolog, has attempted to model statute law, in particular the new British Emigration Act. They two have difficulties with the "gaps, conflicts, and ambiguities" inherent in the law, even statute law.

3 Components of HYPO

In this section, we briefly layout components of our casebased reasoning system HYPO. More detailed accounts may be found in [Rissland & Ashley, 1987; Ashley; 1986]. HYPO has two repositories for its legal knowledge and several component modules, roughly corresponding to key elements of case-based reasoning, that enable HYPO to start with a statement of facts, proceed to a legal analysis, and conclude with presentation of an argument outline with case citations. HYPO begins its processing with the current fact situation or "cfs" which is input directly by the user into HYPO's representation framework. $^{2}\,$

Legal knowledge in HYPO is contained in: (1) the CASE-KNOWLEDGE-BASE or "CKB"; and (2) the library of dimensions. The CKB contains HYPO's base of known cases – both real and hypothetical – in the area of trade secrets law. Each case is represented as a hierarchical set of frames whose slots are important facets of the case (e.g., plaintiff, defendant, secret knowledge, employer/employee data).

The library of dimensions encodes legal knowledge of what clusters of facts, according to a particular point of view summarizing lines of cases, have legal relevance for a particular claim, are prerequisite for dealing with a claim, and contribute to weaknesses and strengths. Metaphorically speaking, they provide axes or hyperplanes through a high dimensional space of all possible fact situations. The dimensions are expressed in terms of a set of factual predicates which represent the next level of fact derived directly from the cfs (e.g., plaintiff-is-a-corporation, employee-switched-employers). A key aspect of dimensions is that they organize the prerequisite facts in such a way so that the most important ones - the focal slots - can be analyzed and manipulated in a legally meaningful way, for instance, to strengthen or weaken a case. An example dimension which will be relevant to our example case is "Disclose-Secrets". It captures the knowledge that the more people who have been told about the secret, the worse off the teller is. Its focal slot is a number, specifying the number-of-disclosees.

Once the user inputs the case, HYPO begins its legal analysis. Specifically, the **CASE-ANALYSIS** module runs through the library of dimensions and produces a **case-analysis**record which among other things, records which dimensions apply to the cfs and which nearly apply (i.e., are "nearmisses"). The combined list of applicable and near-miss dimensions is called the **D-List**. A complete case-analysisrecord for the sample case of Section 5 is given in Figure 1.

On the basis of this analysis, the **FACT-GATHERER** may request additional information from the user, for instance, to enable HYPO to draw a legal conclusion. Once "all" the facts are in ³ the **CASE-POSITIONER** module uses the case-analysis-record to create the claim-lattice, which is a lattice showing: (1) as root node, the cfs and its D-List; and (2) as successor nodes, other cases from the CKB that have for their D-Lists subsets of the cfs's. The claim lattice, in effect, organizes cases from the CKB with respect to the cfs and makes it easy for HYPO to ascertain which cases are most-on-point cases or "mopc's" and least-on-point cases.

The claim lattice, and the set of mopc's for the user's chosen side as well as for the opponent's, are then used by the **BEST-CASE-SELECTOR** module and the **3-PLY-ARGUMENT** module to select cases on which to rely, to distinguish and to use in the construction of a skeleton of an argument [Ashley & Rissland, 1987]. The claim lattice also enables the **HYPO-GENERATOR** module to spawn legally interesting hypotheticals: for instance, a "hybrid" case which brings together two competing lines of cases, or a hypothetical that fills in a sparse area of the CKB. With its use of dimension-based heuristics, such as "Make a case extreme (with respect to a given dimension)", "Enable a near-miss dimension", "Dis-able a near-get dimension", the HYPO-GENERATOR, in effect, does a heuristic search of the space of all possible cases [Rissland & Ashley, 1986]. Lastly, the **EXPLANATION** module expands upon the argument skeleton and provides explanation and justification for the various lines of analysis and cases found by HYPO.

4 Background on Trade Secrets Law

In a trade secrets case, plaintiff and defendant are very often corporations who produce competing products. A typical claim is that the plaintiff alleges that the defendant misappropriated secret production information and a typical way to argue this claim is to show that the the purported trade secret enabled the defendant to gain an unfair competitive advantage with respect to the plaintiff. ⁴ The typical ways to argue are in fact the sort of knowledge represented in HYPO's dimensions.

Stereotypical fact situations which give rise to a trade secrets case are:

- 1. A former employee of the plaintiff with knowledge of the trade secret enters the employ of the defendant and brings with him trade secret information which he learned or developed while working for plaintiff. The *IBM v. Telex* case is an example of this situation;
- 2. The plaintiff may disclose the "secret" information to the defendant, perhaps in connection with an attempt to enter into a sales or other agreement with the defendant. The Automated Systems and Speedy Chemical cases had such elements.
- 3. The trade secret information may be obtained by theft or industrial espionage from the plaintiff and passed on to the defendant. This happened in the E.I. du Pont v. Christopher case.

Of course there, are refinements of these scenarios. For instance, in the first scenario, there could be the added facts that the defendant bribed or otherwise enticed (e.g., with salary bonuses, stock options) the plaintiff's former employee to switch company allegiance. This aspect was also present in the *IBM* case. With regard to disclosures, the disclosing party might have attempted to plug possible leaks by requiring nondisclosure agreements, as in *Data General*. These various scenarios give rise to different ways of approaching a trade

²In the COUNSELOR strategic advisory environment, HYPO functions as a legal expert subsystem and input, as well as output, can be conducted through natural language dialogue.

 $^{^3} Note, in some sense one is never finished gathering and analyzing facts.$

⁴While dimensions are somewhat similar to the elements of a claim, they are not the same. For instance, it has been said that there are three elements as a condition of the existence of a trade secret: "novelty, secrecy, and value in the trade or business of the putative trade secret owner." [Gilburne & Johnston, 1982, p. 215]. But while elements purport to define necessary and sufficient conditions for a claim, dimensions define more fact-oriented conditions for arguing that one case is stronger or weaker than another and should be decided accordingly.

secrets case - for instance, emphasizing the employee who switches or emphasizing the disclosures - and these are reflected in HYPO's dimensional knowledge. The central facts to these different approaches - for instance, the inducement offered or the number of disclosures made - are the subject of a dimension's focal slot.

At this point, HYPO knows about 30 dimensions, which represent the basics of trade secret law [Gilburne & Johnson, 1982]. Summaries of some of the most frequently used ones are:

- Competitive-Advantage Plaintiff's argument is strengthened if the alleged trade secret information allowed defendant to gain a competitive advantage over plaintiff.
- **Generally-Known** Plaintiff's argument is weakened if the alleged trade secret information is generally known within the industry.
- Learnable-Elsewhere If the information was learned by an employee in his work for the plaintiff and he could have learned the information working for some other employer, plaintiff's argument is weakened.
- Vertical-Knowledge Plaintiff's argument is weakened if the alleged trade secret information was about a vertical market. For example, cases imply that knowledge about a vertical market, such as knowledge of the structure of the banking industry, which an employee might learn in the course of developing computer programs for that market, is not protectible as trade secret information.
- Bribe-Employee Plaintiff's argument is strengthened if the corporate defendant paid a very high bonus to get the employee to switch employers and work on a competing product.
- Noncompete-Nondisclose-Agreement Plaintiff's argument is strengthened if the employee entered into an agreement not to work for plaintiff's competitors or to disclose confidential information.
- **Disclose-Secrets** Plaintiff's argument is weakened to the extent that plaintiff did not keep secret its alleged trade secret information by allowing an increasing number of other persons to have access to the information.
- Restricted-Disclosure Plaintiff's argument is strengthened to the extent that the persons with access to the trade secret information entered into agreements not to disclose the information to others.

5 A Worked Through Example

In this section, we walk through an example in which HYPO analyzes a hypothetical case, patterned after a real case called *Amoco Production Co. v. Lindley*. By using a sample derived from real cases, we can compare HYPO's performance (e.g., the cases it cites) with that of the courts deciding the real ones.

Statement of the Current Fact Situation

The current fact situation for our sample case, *AMEXXCo* v. *EXXSSInc*, is as follows:

The plaintiff AMEXXCo has brought a claim against defendant EXXSSInc for misappropriation of trade secrets in connection with its DIP-PER system, a computer program that analyzes drilling logs of oil wells. AMEXXCo alleges that EXXSSInc gained access to confidential information about DIPPER through its former employee, G. Whiz. When he was first employed by AMEXXCo in 1979, G. Whiz entered into an agreement not to disclose any proprietary information of OILCo to others. While working for AMEXXCo, on his own initiative and over a period of four years, G. Whiz developed the DIPPER program. In 1984, G. Whiz left AMEXXCo over a dispute about the use of the DIPPER program and subsequently took a job with EXXSSInc. Within ten months, EXXSSInc was employing an oil well log anaysis program similar to DIPPER.

Case Analysis and Retrieval

On the basis of this cfs, HYPO produces the case-analysisrecord shown in Figure 1:

Applicable Factual Predicates: exists-confidential-info, employee-switched-employers,...

Applicable Dimensions: Agreed-Not-To-Disclose, Competitive-Advantage

<u>Near-Miss Dimensions</u>: Brought-Tools, Bribe-Employee, Vertical-Knowlege, Disclose-Secrets

<u>Potential Claims</u>: Trade Secrets Misappropriation (TSM), Breach of Nondisclosure Agreement (BNA)

Relevant CKB cites: Structural Dynamics, IBM v. Telex

Figure 1: The Case Analysis Record for AMEXXCo v. EXXSSInc

To produce this analysis, the CASE-ANALYSIS module used the list of applicable factual predicates to determine what dimensions apply or are near-misses. For instance, the prerequisites for the Agreed-Not-To-Disclose dimension are met: that two corporations, plaintiff and defendant, compete with respect to a product, plaintiff has confidential product information to which defendant has gained access, and former employees of plaintiff with knowledge of the information who now work for defendant, had entered into noncompetition or nondisclosure agreements with the plaintiff. The CASE-ANALYSIS module also finds similar cases on the basis of the D-Lists from the CKB and can compare the cfs to them. For instance, there are at least two cases in the CKB indexed by the Agreed-Not-To-Disclose dimension, both of which held for the plaintiff: (1) Structural Dynamics in which the plaintiff's extensive use of contractual protections was held sufficient to make its employees aware of the confidentiality of computer programs and (2) *Telex v. IBM* in which the IBM employees entered into nondisclosure agreements acknowledging a listing of IBM's proprietary information.

Positioning the Cfs with the Claim Lattice

At this point, HYPO has retrieved relevant cases but has not considered these from the point of view of the cfs. The analysis, so far, only indicates where the cfs falls along various CKB dimensions. The next step if for the CASE-POSITIONER to take these relevant cases and produce the claim lattice which will show, from the point of view of the cfs, which cases are near and which are far, and which cases are mopc or "potential mopcs". Some cases are only "potential" because they are indexed by dimensions which thus far are known only to be near-miss dimensions for the cfs. Should it come to light, through further fact gathering, that the near-miss dimensions are enabled, these cases would be mopc's. The mopc's for AMEXXCo are shown in Figure 2.

Mope's: Structural Dynamics (π; Agreed-Not-To-Disclose, Brought-Tools); Telex v. IBM (π; Agreed-Not-To-Disclose, Competitive-

Advantage, Bribe-Employee);

Potential Mopc's: Midland Ross (π ; Disclose-Secrets, Bribe-Employee); Automated Systems (π ; Vertical-Knowledge)

Figure 2: MOPC cases from the claim lattice for AMEXXCov. EXXSSInc. Title of case is followed by who won and dimensions from cfs's D-List that apply to case.

Generating Artful Hypotheticals

The FACT-GATHERER and HYPO-GENERATOR modules – as well as an attorney using HYPO – use the caseanalysis record, claim lattice, mopc's, and potential mopc's, to pose questions and hypotheticals. At this point it is easy to engage in "assume for the moment facts x and y and let's see what happens to our client's position" sort of reasoning. Obvious triggers for spawning hypos include the near-miss dimensions from the case-analysis-record and potential mopc's from the claim lattice.

In our example for instance, one hypo that HYPO could pose to strengthen the defendant EXXSSInc's position would be to suppose that AMEXXCo disclosed the confidential information to 100 outsiders as in the *Midland Ross* case, a potential mopc where the defendant won. Or HYPO could suppose that the confidential information was general knowledge about customer business relations as in the pro-defendant mopc *Automated Systems*. HYPO can tighten the analogy between the cfs and the mopc's *Telex* or *Structural Dynamics*, and strongly improve plaintiff's argument if the facts included that EXXSSInc bribed G. Whiz to change employers or if G. Whiz brought AMEXXCo's product-related tools with him.

The Skeletal Outline of an Argument

Based on its analysis, including which cases are actual or potential mopc's for each opponent, the ARGUMENT module can now summarize points and responses for the cfs. For instance, starting from the point of view of the plaintiff, there are really two ways to argue the case, one for each mopc:

Point :

AMEXXCo should win claim for trade secrets misappropriation. See:

 \hookrightarrow Telex v. IBM (Plaintiff IBM won trade secret misappropriation claim where defendant Telex gained competitive headstart by saving — in development time and cost by using confidential information of former IBM employees who had agreed not to disclose IBM's proprietary information.)

 \hookrightarrow Structural Dynamics v. Engineering Mechanics (Plaintiff Structural Dynamics won trade secret misappropriation claim where plaintiff's former employees agreed not to disclose confidential information.)

In the absence of any pro-defendant mope's, defendant has no cases to cite in response. As discussed above, HYPO would pose hypos based on the pro-defendant *potential* mope's to try to generate some cases to cite. All that is left is to distinguish plaintiff's cases by pointing out significant factual differences:

Response :

Those cases are *distinguishable* because they had stronger facts for plaintiff:

 \leftrightarrow In the *Telex* case, defendant Telex bribed IBM's employees to join Telex by offering a \$500,000 bonus, stock options and high salaries. In *Structural Dynamics* the employee brought product-related tools like a notebook and copies of the code.

6 Assessing HYPO's Performance

In several important respects, HYPO's analysis compares favorably with that of the Court in the the real case of Amoco Production Co. v. Lindley, 609 P2d 733 (Okla., 1980):

- First, in its opinion, the Court cites both the Telex and Structural Dynamics cases, focussing on the existence in each case of nondisclosure agreements between the plaintiff and its employees. Id. at 743-745.
- Second, the Court also distinguishes the Structural Dynamics case, not as HYPO did by pointing out the evidence of the employee's having brought product-related tools to the defendant, but by pointing out that the terms of the nondisclosure agreement in Structural Dynamics were more restrictive than those in Amoco Production. Comparing the import of contractual or statutory language is an important kind of legal reasoning that HYPO does not attempt. Id. at 745.

- Third, the Court in the Amoco Production case did not decide the merits of the trade secrets claim. Instead, it sent the case back to the trial court for further action. In effect, the Court's citing cases like Tclex and Structural Dynamics was to guide the lower court as to what factual findings to seek and how to legally evaluate the facts. HYPO uses cases in much the same way.
- Fourth, in the Telex and Structural Dynamics cases, defendants raised, and the trial courts rejected, the defenses that there were no trade secrets because plaintiffs disclosed the information to outsiders and that the information was too general. Telex Corp. v. IBM Corp., 367 F.Supp 258, 358 (N. D. Okla, 1973); Structural Dynamics Research Corp. v. Engineering Mechanics Research Corp., 401 F. Supp. 1102, 1117 (E. D. Mich., 1975). Both of these defenses are implicit in the hypotheticals posed by HYPO based on the Midland Ross and Automated Systems cases. Indeed, in the Telex case, the court cites another Midland Ross case involving the same plaintiff and the same defense that the alleged trade secrets had been disclosed.

7 Conclusions

In this paper, we have briefly surveyed how HYPO performs various elements of case-based reasoning. By working through an actual example, we have shown how HYPO starts with a representation of the current fact situation (cfs), uses factual predicates and dimensions to analyze the case by producing first, a case-analysis record, and second, a claimlattice. These are then used to organize the relevant cases from HYPO's Case-Knowledge Base (CKB) and generate the skeleton of a "3-ply" argument containing points, responses, and counter-points.

At this point, we can say that HYPO's performance within the confines of the case law it knows, performs creditably; this judgement is based on comparison for a cfs based on a real case of HYPO-derived case analysis and the analysis in the opinion of a real case. Further experiments are contemplated to provide more detailed benchmarks of performance.

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But, See, Accord: Generating "Blue Book" Citations in HYPO ¹

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Abstract

An interesting and important aspect of legal reasoning is the use of citations to precedent cases as justifications for legal conclusions. In this paper, we describe the standard use of citations as described in the attorney's "Blue Book" and how HYPO, a program that models case-based legal reasoning, generates and uses citations in a very similar way to analyze fact situations and to communicate with an attorney/user. More specifically, we describe how, given a fact situation ("cfs"), HYPO dynamically generates the citations to cases in its Case Knowledge Base ("CKB") by (1) analyzing the factual features of the cfs to see what dimensions apply, (2) retrieving and constructing a "neighborhood" of citable cases around the cfs (the "Claim Lattice") and (3) constructing the "Cites Display", a network of citations to the most on point cases ("mopc") that is a skeletal frame for a legal argument about the cfs.

1 Introduction

One of the most interesting and important aspects of legal reasoning is the use of prior cases as justifications for legal conclusions. In law, attorneys justify an analysis or argument, by citing and reasoning about cases. To justify an assertion that a client should win in a particular fact situation, attorneys draw analogies to prior cases where similarly situated parties won. They distinguish away troublesome cases that would lead to contrary conclusions by pointing out the legally important dissimilarities. Even when attorneys cite constitutional or statutory provisions in support of their conclusions, they almost always prefer also to cite cases in which courts have applied the provisions in similar circumstances. Of course, arguing from precedents is formally

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ensconced in Anglo-American law in the rule of stare decisis ² but, in practice, attorneys routinely employ prior cases as justifications for decisions in strategic planning of lawsuits, legal arguments and commercial transactions, as well as, in drafting briefs and opinions.

Given the importance in law of case-based justifications, it is not surprising that *citations* to cases are important, also. Citations are references to legal authorities like precedent cases, constitutions, statutes and other persuasive materials used in legal argument to support a proposition of law. Citations are ubiquitous; they appear in court opinions and legal treatises (see e.g., Figures 1 and 2) as well as briefs, law review articles, texts, and indeed anywhere that an attorney needs to back up a statement with a precedent. It is also no wonder that standards have been adopted for the use and interpretation of citations. The most influential standard setter is the "Blue Book", A Uniform System of Citation, published by The Harvard Law Review Association.

A program that models legal reasoning should understand and use citations. In the following sections, we describe the Blue Book's standardization of the semantics of citations and how HYPO models that standard, using citations to analyze fact situations and to communicate with an attorney/user. HYPO is a computer program that models reasoning with cases and hypotheticals in the legal domain. It is designed to help attorneys analyze and make arguments about a new fact situation (the current fact situation or "cfs") by comparing the cfs critically to the most relevantly similar prior cases (i.e., "most on point cases" or "mopc's"). The goal is to build an argument how to decide the cfs based on its significant similarities to and differences from the most on point cases.

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²The rule followed in Common Law jurisdictions that "a holding by a court in a previous case is binding on the same court (or on an inferior court) in a similar case." [Berman & Greiner, 1980].

1. From Crown Industries, Inc. v. Kawneer Co., 335 F. Supp. 749, 761 (N.D.III. 1971):

To be entitled to equitable relief, Plaintiff has the burden of showing, among other things, that the information disclosed to Defendant Kawneer was, in fact, a trade secret. *Midland-Ross Corp. v. Sunbeam Equipment Corp.*, 316 F. Supp. 171, 177 (W.D.Pa. 1970), affirmed, 435 F.2d 159 (3rd Cir. 1970).

Even though the Plaintiff's power packs, exempified by PX-121, might have had to be rendered inoperative and examined by an engineer in order to discover the alleged trade secrets contained therein, the sale of the power packs nevertheless constituted a public disclosure which defeats a claim founded upon alleged misappropriation of the trade secrets allegedly contained in the power packs. *Midland-Ross Corp. v. Sunbeam Equipment Co.*, 316 F.Supp. 171, 177 (W.D.Pa. 1970), affirmed, 435 F.2d 159 (3rd Cir. 1970).

 From Black, Sivalls & Bryson, Inc. v. Keystone Steel Fabrication, Inc., 584 F.2d 946,952 (10th Cir., 1978):

Although the evidence of trade secret misappropriation is not strong, "in our view, the facts and circumstances, when viewed in their totality, do permit the inference that there was such misappropriation." *Telex Corp. v. International Business Machs. Corp.*, 510 F.2d at 928. Assuming [a feature of the plaintiff's product] and the pricing information to constitute trade secrets, the fact that such information or part of it could have been subsequently procured by Smalling [the defendant] through independent research or experience did not justify Smalling's conduct. See id. at 929.

3. From Amoco Production Co. v. Lindley, 609 P.2d 733,743, (Supreme Court, Oklahoma, 1980):

[That manuals were stamped confidential, numbered, and controlled centrally by management] was not true of [plaintiff's] Lindley System. Trade secret status is difficult to establish and often entails establishing that affirmative and elaborate steps be taken to insure that the secret claimed would remain so. *Telex Corp. v. International Business Machines Corp.*, 367 F.Supp. 258 (N.D. Okl. 1973), reversed on other grounds, 510 F.2d 894 (10th Cir. 1975);....

Figure 1: Sample Text with Citations from Court Opinions

2 Blue Book Citations

As formulated in the *Blue Book* and illustrated by the examples in Figures 1 and 2, citations consist of the following parts (in order of their appearance in the citation): ³

- 1. Legal Proposition (sentence or clause).
- 2. Introductory signal.
- 3. Authority.
- 4. Parenthetical Explanation.
- 5. Related Authority.

The legal proposition is a more or less specific generalization that expresses a legal conclusion. In Figures 1 and 2, for example, the propositions describe some factual circumstances when a claim for misappropriation of trade secrets would fail or succeed. Introductory signals are the words that preface the authorities (i.e., legal cases) such as Accord, Cf., But cf.. They show whether a case supports the proposition or its contrary or something in between. A sampling of citation signals and their interpretations are set forth in Figure $3.^4$

The authorities may be legal cases, statutory provisions or some secondary source like Milgrim on Trade Secrets. In this paper we focus on cases as authorities. It is reasonable, because even when an attorney cites a statute, he almost always prefers to cite, as an *additional authority*, a case in which the court has applied the statutory provision in a favorable way in similar circumstances.

The persuasiveness of the citation depends, among other things, on how well the authority supports the proposition. When the authorities are cases, and the propositions are about the merits of a claim (like whether or not there is a trade secret given certain circumstances) then ideally the citcd case involves: (1) the relevant claim; (2) facts as described by the proposition and (3)

Citations are made in citation sentences and clauses \ldots , and are introduced by signals, which indicate the purposes for which the citations are made and the degree of support the citations give. [p.5].

Information may be added to the basic citation in a parenthetical immediately following the citation Parentheticals giving the weight of the authority should precede those giving other information, and explanatory parentheticals or parentheticals containing a quotation should follow all others. [p.10]. Related authorities may be appended [p.11].

⁴See [Blue Book, pp. 6 - 7].

³Specifically, the *Blue Book* says:

Legal Proposition: When a product is marketed, put on display or advertised in such a manner as to allow its secret to be known, the "secret" is lost.

Authorities:

- Crown Industries, Inc. v. Kawneer Co., 335 F. Supp. 749, 761 (N.D.III. 1971) (sale terminates trade secret status even if product would have to be rendered inoperative and disassembled by an engineer, i.e., if product which can be readily reverse-engineered is sold, secrecy is lost);
- Midland-Ross Corp. v. Sunbeam Equipment Corp., 316 F. Supp. 171 (W.D. Pa.) aff'd, 435 F.2d 159 (3d Cir. 1970) (disclosure of trade secret by reason of operating instructions provided to customers);

Speedry Chems. & Prods., Inc. v. Carter's Ink Co., 306 F.2d 328, 334 (2d Cir. 1962);

- Cf. Telex Corp. v. IBM, 367 F. Supp. 258, 358 (N.D. Okla. 1973), antitrust aspects rev'd, trade secret aspects aff'd although computation of damages modified, 510 F. 2d 894, (10th Cir. 1975) (although some of IBM's trade secrets lost through IBM's marketing products, Telex's pervasive, willful trade secret misappropriation grounds for injunctive relief designed to limit further misappropriation);
- But cf. Data Gen. Corp. v. Digital Computer Controls, Inc., 357 A. 2d 105 (Del. Ch. 1975) (despite arguably broad distibution of maintenance manual - restrictively legended - from which defendant copied plaintiff's minicomputer circuitry, court found (a) trade secret continued and (b) an absence of independent development by defendant.);

Figure 2: Sample Compilation of Citations: Excerpts from three footnotes, citing more than 100 cases, in the legal treatise, *Milgrim on Trade Secrets*, Volume 12, Section 2.05[2], nn. 8-10.

a holding on the claim consistent with the sense of the proposition. ⁵ If all three are satisfied, then *accord* or [no signal] would be an appropriate signal. If the cited case involved a different but related kind of claim or if the facts were not quite as described then a *See* or *Cf*. cite would be in order. If the holding in the cited case were opposite the sense of the proposition, then a *Contra*, *But See* or *But Cf*. cite would be in order. In any event, *parenthetical explanations* are used, among other things, to summarize the particular facts of the case that correspond to the circumstances described in the proposition.

3 Using Citations

As previously stated, an attorney cites a precedent case to show that a legal proposition is justified. Citation statements similar to those of Figure 1, in which *judges* justified the legal conclusions of their opinions, no doubt appeared in the briefs and legal memoranda of counsel urging their conflicting interpretations of the facts and law upon the judges. Naturally, attorneys want to cite cases that directly support their propositions. This puts a premium on finding the best cases to cite as well as judiciously crafting the proposition so as not to overstate the degree of support. ⁶

In order to find the best cases and to plan legal arguments,

⁶One of the surest ways to lose credibility with a judge is to exaggerate the degree to which cases support a proposition. attorneys use compilations of case citations like the one in Figure 2. Consider the plight of the plaintiff in the fact situation described in Figure 5. Plaintiff's product has already been distributed to some customers and disclosures about the product have been made to outsiders. The [no signal] citations to cases like Midland Ross and Speedry convey the bad news that the disclosures probably spell plaintiff's doom, or so his opponent will argue by citing those cases. But the same compilation also suggests plaintiff's salvation. The Cf. and But cf. cites refer to cases where disclosures were made but plaintiffs still won. If plaintiff could show a pervasive, willful misappropriation as in Telex or restrictive legends as in Data General, then plaintiff's weakness might become a strength. Plaintiff could both distinguish cases like Midland Ross based on the differentiating facts and make new citations in its support. Conversely, from defendant's viewpoint, the Accord and [no signal] cases are his main support, the Cf. and But Cf. cites his potential problem. In any event, the important linkages are in the introductory signals, the important facts in the parenthetical explanations.

If the utility of compilations of citations like that of Figure 2 is apparent, how to find them may not be. There are three indexes to *Milgrim on Trade Secrets*. All require the knowledge that trade secrets misappropriation is a plausible claim (One needs to know that in order to pull *Milgrim* off the shelf). The subject index and the table of contents also require the knowledge that a particular fact is potentially significant to the merits of the claim, how that "significance" is characterized and where it is filed in the index. As it happens, Milgrim's index has an (enormous) entry for "secrecy", (and a cross-reference to it from "disclosures"). So *if* one knows about the disclosures and that they make a difference legally, one is all set. Alternatively, if one already knows of an important case (e.g., *Midland Ross*), the table of cases would

⁵A legal claim is a recognized kind of complaint for which the courts will grant relief (e.g., breach of contract, negligence, trade secrets misappropriation, copyright infringement). The holding is the decision of the court as to the legal effect on each claim of the facts of the case, either in favor of the plaintiff or defendant (π or δ).

Signal: How Cited Case Supports Proposition

Accord or [no signal]: directly supports

See: supports

Cf: analogously supports

Contra: directly supports contrary

But See: supports contrary

But Cf: supports analogous contrary

Figure 3: Citing Cases in an Argument: Citation Signals

Plaintiff's $(\pi's)$ position is strengthened to extent:

Brought-Tools: π 's former employees brought π 's notes, diagrams, tools to defendant (δ). Competitive-Advantage: δ 's access to π 's secret information gave δ a competive advantage. Disclose-Secrets: π did not voluntarily disclose his secrets to outsiders. Restricted-Disclose: disclosees agreed to keep π 's secrets confidential. Noncompete-Agreement: π 's employees had entered into nondisclosure agreements. Bribe-Employee: δ bribed π 's employees to switch employ. Vertical-Knowledge: π 's secrets were not simply about customer's business methods.

Figure 4: Sample Dimensions and Related Factual Strengths.

From 1962 to 1964, Crown Industries, Inc., the plaintiff (π) , developed a hydraulic power pack, PX-121, for automatic door openers. Crown complained that defendant (δ) Kawneer Co. developed a competing product, PX-125, by misappropriating π 's trade secrets. Crown's power packs had been sold to and installed in five public retail establishments. Crown made disclosures about the power pack to a third party, and in 1963 and 1965 a Crown employee made disclosures concerning the pack to Kawneer. PX-121 did not have any unique features not generally known to the prior art. It took Kawneer six years to develop PX-125, from 1962 to 1968.

Figure 5: Current Fact Situation (cfs) based on Crown Industries, Inc. v. Kawneer Co.

lead to all the places in *Milgrim* where the case is cited, including the footnotes summarized in Figure 2. Of course, knowledge of a particular relevant case can also lead to compilations of cites outside of the treatise in the opinions in that case and cases that cite or are cited by that case. ⁷

HYPO follows a different route into compilations of cases and citations. For a given fact situation ("cfs"), HYPO dynamically generates the citations to cases in its Case Knowledge Base ("CKB"). It analyzes the factual features of the cfs to see what dimensions apply, retrieves and constructs a "neighborhood" of citable cases around the cfs and constructs a network of citations to the most on point cases ("mopc") that is a skeletal frame for a legal argument about the cfs.

4 Legal Knowledge Sources in HYPO

HYPO uses two kinds of domain knowledge to construct claim lattices: (1) the Case Knowledge Base (CKB) containing actual legal cases and (2) the library of dimensions. (Other A.I. approaches to modelling legal reasoning, for example, those of Gardner, McCarty and Waterman, place less or no emphasis on representing and indexing cases and hypotheticals. For an extensive bibliography see [Rissland, 1985].)

The CKB contains hierarchical clusters of frames (implemented as flavors) which describe the main components of a case including: plaintiff (π), defendant (δ), legal claim, prevailing party (π or δ), holding and facts like products, secret or agreements. Some features are in turn expanded and represented as frames (e.g., plaintiff, secret, agreement). See [Rissland, Valcarce, & Ashley, 1984] for an example.

From this basic level of representation, HYPO computes factual predicates that state whether or not a particular legal fact is true (e.g., there-exist-disclosees, there-exist-nondisclosure-

⁷Backpointers to cases that cite a case are locatable, for example, through *Shepardizing*.

Applicable Factual Predicates: exists-corporate-claimant, exists-confidential-info, exists-disclosures ...

Applicable Dimensions: Disclose-Secrets

Near-Miss Dimensions: Restricted-Disclose, Competitive-Advantage, Vertical-Knowledge

Potential Claims: Trade Secrets Misappropriation

Relevant CKB cites: See Claim Lattice

Figure 6: Case-Analysis-Record for CFS

agreements). Factual predicates form the building blocks of a second source of legal knowledge in HYPO, the dimensions.

Dimensions capture the legal *relevance* of a cluster of facts to the merits of a claim. For a particular kind of case, dimensions generalize collections of facts that constitute *strengths* and *weaknesses* in a party's position. Each of the generalizations can be backed up by one or more cases where a court held in favor of a party, in part because of the cluster of facts associated with the dimension. Figure 4 shows some examples of some potential strengths and weaknesses in a trade secrets situation and the dimensions that capture them.

Dimensions allow HYPO to *abstract* the cases. They can be thought of as a "cross section" or "projection" of the facts of a case through a space spanned by HYPO's set of factual predicates. We have identified about 30 dimensions in all. Other examples of dimensions can be found in [Rissland, Valcarce and Ashley, 1984; Rissland and Ashley, 1986, 1987; Ashley and Rissland, 1986, 1987]. We do not compile these ourselves but rather take them from scholarly analyses and treatises like [Gilburne and Johnson, 1982; Milgrim, 1985].

A dimension, itself, is a frame-like knowledge source. It has the following facets: (1) prerequisite[s], which are necessary factual predicates for the dimension to apply; (2) focalslot[s] which of all the prerequisites are the ones that really matter; (3) range[s] of values for the focal slots; (4) directionto-strengthen-plaintiff which specifies how to change the focal slots; (5) significance which lists the claims for which the dimension has relevance; and (6) cases-indexed from the CKB. Note that a focal slot can be a symbolic value and that the direction-tostrengthen might specify climbing or descending a value hierarchy tree.

5 Positioning the Case

In analyzing a new cfs, HYPO runs through the library of dimensions and produces a case-analysis-record that contains: (1) applicable factual predicates; (2) applicable dimensions; (3) near-miss dimensions; (4) potential claims and (5) relevant cases from the CKB. Near-miss dimensions are those for which some, but not all, of the prerequisites are satisfied. The combined list of applicable and near-miss dimensions is called the D-list. Figure 5 describes a cfs based, for purposes of illustration, on *Crown Industries, Inc. v. Kawneer Co.* Figure 6 shows the case-analysis-record for the cfs.

HYPO uses the case-analysis-record to construct the claim lattice, which is a lattice such that: (1) the root is the cfs together with its D-list; and (2) successor nodes contain pointers

to cases that share a subset, usually proper, of the dimensions in the cfs's D-list. [Ashley & Rissland, 1987]. Figure 7 shows the claim lattice actually generated by the HYPO program for analyzing the cfs of Figure 5 from the viewpoint of a trade secrets misappropriation claim. (There is a separate claim lattice for each possible claim.)

The ordering scheme enables claim lattices to capture a sense of closeness to the cfs of cases in the CKB. Those sharing more dimensions are nearer to the cfs. Those nodes closest to the root whose subsets of the cfs's D-list do not contain near-miss dimensions can be considered most-on-point-cases "mopc's" to the cfs; leaf nodes are the least-on-point. All of the cases displayed are relevant to the cfs because they all share some legally important strengths or weaknesses with the fact situation as represented by the dimensions shared with the cfs.

Different major branches of the lattice indicate different ways to argue the case, effectively one way for each group of mopc's. HYPO can argue the case for side 1, let us say the defendant in the cfs, by citing a pro-defendant mopc. In Figure 7 there is only one such mopc, Midland Ross. Since mopc's share the most legally important strengths and weaknesses with the cfs (i.e., mopc's are the closest analogies to the cfs), Midland Ross is the most persuasive case HYPO could cite for the defendant as side 1. There are no pro-plaintiff mopc's in Figure 7. Data General, for example, is not a mopc because, although it is very close to the root, the Restricted-Disclose dimension, which applies to Data General, and which would help π if it applied to the cfs, is only a near-miss for the cfs.⁸ (Note that Restricted-Disclose is *'d in Figure 7.)

The Claim Lattice also shows cases that potentially would be useful in an argument about the case. Although not a mopc, the *Data General* case is <u>potentially</u> a mopc for π . A *potential* mopc is very similar to the fact situation, except that some dimensions (i.e., a strength or weakness) that apply to it are near-misses with respect to the cfs; they are located in the nodes closest to the root whose subsets of dimensions contain near-misses. If it were true that the disclosees had agreed to keep π 's confidential information secret, *Data General* would become a very important case to the plaintiff.

The relative locations of cases in the lattice also show how to respond to an argument. Assume that the disclosures were made on a restricted basis. Data General would become a pro- π mopc. HYPO would use the new mopc on behalf of plaintiff, as side 2,

⁸Restricted-Disclose is a near-miss because the cfs does not have the prerequisite factual predicate that some disclosees agreed to keep π 's secrets confidential.



The root node represents the cfs and its D-list. (Dimensions that are near-misses for cfs have *'s.) Successor nodes contain pro-plaintiff (π) or pro-defendant (δ) cases, involving trade secrets misappropiation claims, that are on point to cfs. Nodes closest to root that do not have near-miss dimensions contain mopc's; otherwise they may contain potential mopc's. Leaf nodes are leaston-point. Each major branch of lattice that contains mopc's represents one way of arguing the cfs. Mopc's distinguish cases in successor nodes. Potential mopc's suggest fruitful hypothetical variants of cfs.

Figure 7: A Claim Lattice.

to distinguish side 1's Midland Ross case because it is more on point (i.e., between the root and Midland Ross in Figure 7) and held for π . As it is, without the fact that disclosees agreed to maintain the secret, if Data General were cited in favor of side 2, HYPO would distinguish it on behalf of side 1 by pointing out the "dis-analogy" between the cfs and Data General, that the facts associated with the Restricted-Disclose dimension, which help π , obtained only in Data General, not in the cfs. In other words, using the claim lattice and reciting unshared dimensions that helped π in the cited case or hurt π in the cfs, HYPO knows that and why the cfs presents a weaker case for plaintiff than Data General.

6 Cites Displays in HYPO

HYPO makes the citations and distinctions explicit in a *Cites Display.* Given a Claim Lattice, HYPO generates a network of citations, the Cites Display, to represent the cases that most strongly support a legal proposition, most strongly contradict it, and the cases that are in between. The legal propositions that HYPO deals with are conclusions of the form " π [δ] in [fact sitnation] should win a claim of [type of claim]." The Cites Display graphs the cases pro and con the proposition with an indicator just like a citation signal that shows how strong the support is. In effect, the Cites Display is a compilation of citations like that in Figure 2 but generated dynamically and tailored specifically for the cfs from the information contained in the Claim Lattice.

Figure 8 shows the Cites Display for the proposition that the plaintiff should win on its claim for trade secrets misappropriation in the fact situation of Figure 5. The Cites Display consists of a root node, representing the current fact situation and various case-support-nodes, each representing a group of cases that hold the same way on the same kind of claim and share the same subset of strengths and weaknesses with the fact situation (i.e., subset of the cfs's D-list). The links between the root node and the case-support-nodes are pro and con links, indicating that the cases of the support-node either provide support for an argument in favor of the proposition or for an argument against it (i.e., the cases can be *cited* for or against the proposition.) The case-support-nodes are connected among themselves by another kind of link, the distinguished-by links. A distinguished-by link from one case-support-node to another indicates that the cases of the node at the origin of the link, when cited pro or con the proposition, can be distinguished by the cases of the node pointed to.

The pro and con links confer different levels of support on the proposition based on (1) how on point the cited cases are (i.e., if they are mope's) and (2) whether the cited cases are distinguished or distinguishable. These distinctions are expressed using citation signals like those in Figure 3 only with computational definitions based on the Claim Lattice. Figure 9 shows how HYPO defines the citation links among cases.



PROPOSITION: π in cfs should win claim of trade secrets misappropriation.

Root nodes represent cfs's: (a) is cfs with fact that disclosures were made. (b) is like (a) plus fact that disclosees agreed to treat π 's secrets as confidential. Successor nodes contain citable cases. Pro or con links from root to successor nodes are *citation signals*; they show how well citable cases support proposition. Compare differences in signals in (a) and (b) given added fact: Distinguished-by link in (b) shows that new pro- π mope Data General distinguishes old pro- δ mope Midland Ross. Data General is promoted from Cf. to Accord; Midland Ross is demoted from Contra to But cf.

Figure 8: Two Cites Displays.

The Cites Display can be seen as a skeletal framework for a legal argument about the cfs. The network demonstrates the cases' significance as parts of the argument. The links among the case-support-nodes indicate the roles that a case plays in supporting or detracting from the legal conclusion and in distinguishing other cases. The pro [con] link joining the root and a case-support-node is a schematic shorthand for citing a case to make an argument point. A distinguished-by link is a schematic shorthand for responding to the point by distinguishing the cited case. For purposes of explaining the argument, the program can follow the links in reverse to show how a particular case relates to other cases.

7 Example of HYPO's Citations

As Cites Display (a) of Figure 8 shows, the case support for the legal proposition is significantly on defendant's side. As indicated by the *Contra* signal, the strongest case to cite, *Midland Ross*, is against the proposition. HYPO's citing *Midland Ross* for δ 's side agrees with what the court actually fid in its opinion in the case. (The cfs in Figure 5 is based on C. swn Industries, Inc. v. Kawneer Co., excerpts from which are shown in Figure 1.) As described above, Midland Ross is a pro- δ mope that is not distinguishable: There is no distinguished-by link from Midland Ross to any more on point pro- π case and, as shown in the Claim Lattice, Figure 7, Midland Ross has no dimensions that favor δ that are not shared by the cfs.

Although the cases in favor of the proposition are all distinguishable, as indicated by the *Cf.* signals, they and the *But cf.* cites are clues about how to strengthen or weaken the argument about the cfs. *Telex, Widget King* and *Data General* are only *potential* mope's, they all have $\text{pro-}\pi$ strengths not shared by the cfs. They are in separate nodes to reflect the fact that they represent different potential ways to argue the proposition (i.e., they come from different major branches of the Claim Lattice; the extra strengths (dimensions) they have over the cfs are different.) To strengthen the argument, add restrictions on disclosures (*Cf. Data General*), increase δ 's competitive advantage gained from

Signal: How Cited Case Supports Proposition

Accord: Link pro mope's if not distinguishable.

See: Link pro cases if not distinguishable.

Cf: Link distinguishable pro cases. (e.g., potential mope's.)

Contra: Link con mopc's if not distinguishable.

But See: Link con cases if not distinguishable.

But Cf: Link distinguishable con cases (e.g., potential mopc's.)

Figure 9: Citation Signals in HYPO

its access to the secrets (Cf. Telex). To further weaken it, make the secret information be vertical knowledge about customers' business methods ($But \ cf. \ Automated \ Systems.$)

In other words, the Cites Display has much of the utility for helping an attorney to plan an argument that the compilation of citations in Figure 2 has, but it is easier to find. HYPO has generated the compilation dynamically for the user from its analysis of the cfs.

The Cites Display (b) of Figure 8 shows the changes that occur when a new fact is added to the cfs, namely that the disclosures are subject to restriction. The biggest change is that Data General becomes a pro- π mope and worthy of an Accord signal. Midland Ross, now distinguished by Data General, is demoted to But cf. In moving from (a) to (b) there has been a big shift in the balance of the argument in favor of the plaintiff, a legal conclusion that HYPO demonstrates explicitly in the changes in the Cites Displays. This also suggests how the Cites Displays can be used to evaluate the arguments in favor of a proposition, essentially by comparing the strong cites pro and con (i.e., Accord or Contra). All of one and none of the other mean a strong argument. Some of each mean a debatable point.

8 Conclusion

In this paper, we have described the importance in legal reasoning of the use of citations to precedent cases as justifications for legal conclusions. We have described how, given a fact situation (cfs), HYPO dynamically generates the citations to cases in its Case Knowledge Base (CKB) by (1) analyzing the factual features of the cfs to see what *dimensions* apply, (2) retrieving and constructing a Claim Lattice, a neighborhood of citable cases around the cfs and (3) constructing the Cites Display, a network of citations to the most on point cases (mopc) that is a skeletal frame for a legal argument about the cfs.

We have examined a Cites Display generated by HYPO from a cfs based on a real case and shown how it (a) comports with the court's own use of citations and (b) captures the functionality for planning an argument that an actual compilation of citations from a legal treatise has but with the advantage that it is tailored to, and generated automatically from, a description of the cfs.

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