

Arguments, Values and Baseballs: Representation of Popov v. Hayashi

Adam WYNER^{a,1}, Trevor BENCH-CAPON^a and Katie ATKINSON^a

^a*Department of Computer Science, University of Liverpool, Liverpool, UK.*

Abstract. In this paper, we model a recent legal case as presented in a court of first instance using argument schemes and an argumentation framework, providing a formal analysis of the case and how the outcome was determined. The paper contributes to the body of literature that formally analyses legal cases in terms of arguments and argument schemes. It is novel in that we analyse a case in a court of first instance, so we have arguments about facts, qualifications of intermediate predicates, and the application of legal rules. We show the importance of undercutters in relating principles to the specific case.

Keywords. Argumentation, Values, Case-based Reasoning, Argument Schemes

Introduction

In this paper, we model a recent legal case using argument schemes and an argumentation framework, thus providing a formal analysis of the case and how the outcome was determined. The analysis proceeds in four phases. Firstly, based on the presentation of the case, we establish what *facts* the court will accept. Secondly, from the facts, we provide *rules* which enable us to reason from the facts to *intermediate terms*, some of which are legal terms and some are not, that then form the basis of the *legal analysis*. Thirdly, we express arguments, which are applications of the rules, abstractly and organise them into an abstract argumentation framework (AF), which specifies the *attack relations* between the arguments from which we can identify sets of acceptable arguments. Finally, values are associated with the arguments, which further refines the argumentation framework. Given an audience, understood as a value-ranking on arguments, we calculate the final outcome of the case.

Building on [3] and [2], the analysis shows that useful argument schemes and associated critical questions can be extracted from a complex case, then input into an argumentation framework in order to reach the claim of the case. It provides an example of how a real case can be represented and reasoned with using argument schemes and argumentation frameworks, thus providing an empirical basis for further research and applications of argumentation. While there are representations of cases from *Eisner v. Macomber* [7] to *Pierson v. Post* [6], our presentation is novel in that we analyse a case in a court of first instance, closely following the decision of the judge in the case; so we

¹Corresponding Author: Department of Computer Science, University of Liverpool, L69 3BX, UK. Tel.: +44 (0)151 795 4294; Fax: +44 (0)151 795 4235; E-mail: azwyner@csc.liv.ac.uk

have arguments about facts and about qualifications of intermediate predicates as well as about the application of legal rules. Moreover, our analysis shows the importance of undercutters in producing a decision specific to the factors of a particular case.

1. Background

We model the case of *Popov v. Hayashi*, decided by the honourable Kevin M McCarthy,² and also discussed by Finkelman in [5] and used in [2].

The case concerned the possession of the baseball which Barry Bonds hit for his record breaking 73rd home run in the 2001 season. Such a ball is very valuable (Mark McGwire's 1998 70th home run ball sold at auction for \$3,000,000). When the ball was struck into the crowd, Popov caught it in the upper part of the webbing of his baseball glove. Such a catch, a *snowcone catch* because the ball is not fully in the mitt, does not give certainty of retaining control of the ball, particularly since Popov was stretching and may have fallen. However, Popov was not given the chance to complete his catch since, as it entered his glove, he was tackled and thrown to the ground by others trying to secure the ball, which became dislodged from his glove. Hayashi (himself innocent of the attack on Popov), then picked up the ball and put it in his pocket, so securing possession.

We now provide an analysis of the case in terms of argument schemes and argumentation frameworks. Instantiating an argument scheme gives presumptive, but defeasible, grounds for the claim. In our representation we will make use of a number of argument schemes, presented below. The first two argument schemes in this list are concerned with establishing the facts of the case. The two main sources from which McCarthy establishes the facts are the testimonies of witnesses and videotape footage, recorded by a cameraman who was positioned in close proximity to where the ball under dispute landed. The remaining two argument schemes are concerned with the reasoning involved in the the legal analysis presented in the decision.

- *Argument from Witness Testimony*: Seventeen witnesses testified in the case, including Popov and Hayashi.
- *Argument from Video Tape*: The video tape was used as evidence, and McCarthy relied on it at several points.
- *Defeasible Modus Ponens*: The standard form of if-then reasoning used to draw inferences on the basis of the evidence.
- *Argument From Purpose*: McCarthy uses teleological reasoning in reaching his decision. For these elements we will use a variant of the argument scheme for practical reasoning described in [1].

2. Establishing the Facts

First we consider the argument schemes used to establish the facts using the argument from witness testimony. Arguments following this scheme take the following form:

WT: Witness W says that p , therefore p .

²*Popov v. Hayashi*, 2002 WL 31833731 (Cal.Superior Dec 18, 2002) (NO. 400545). We refer to the judge, *McCarthy*, and cite the page.

Given that the witness testimonies conflict in parts, McCarthy uses a number of different criteria to evaluate them and these form the basis of the critical questions that can be applied to this scheme. These criteria are: differences in vantage point, interest in the outcome, quality of memory and consistency. Where the facts from the witness testimonies prove to be unreliable, the videotape evidence is decisive. Arguments using this second scheme take the following form:

VT: The videotape shows that p , therefore p .

Again, there are a number of critical questions that can be applied to arguments from the videotape, e.g. can the evidence be clearly seen on the videotape, can the evidence be clearly heard on the videotape.

Our working assumption is that a given instantiation of an argument scheme which *survives* the critical questions applied to it is *accepted* by the participants in the discussion. For example, suppose an instantiation of VT as discussed in the case: *The videotape shows that Hayashi bit Shepard on the leg, therefore Hayashi bit Shepard on the leg*. The critical question *Is it clear from the videotape that Hayashi bit Shepard on the leg?* can be answered *Yes* or *No*, where a *No* answer implies that we do *not* accept the presumptive claim, which therefore does not survive. In his decision, McCarthy (p. 3) answered “No”, and thus, did not accept that Hayashi bit Shepard on the leg.

The arguments produced using these two schemes and which *survive* critical questioning give us the following facts. Firstly, concerning Popov’s initial contact with the ball:

- F1: Popov stopped the forward motion of the baseball.
- F2: The baseball was in the glove of Popov.
- F3: Popov was in motion.

The evidence supports the conclusion that when the ball entered the arcade it landed in the upper portion of the webbing of a softball glove worn by Popov (F2), thus halting its trajectory (F1). However, according to McCarthy, the evidence does not clearly conclude that the ball was secure, as Popov “*had to reach for the ball, and in doing so may have lost his balance*” (McCarthy, p. 2) (F3). The arguments used to decide whether Popov had secured the ball sufficiently to claim possession at this point are discussed in the analysis given in the subsequent section. Next come the facts concerning the behaviour of the crowd involved in the scuffle:

- F4: Unknown persons assaulted Popov.
- F4a: NOT (Hayashi assaulted Popov).
- F5: Popov lost contact with the baseball.

F4 is established from the videotape evidence which McCarthy states “*clearly establishes that this was an out of control mob engaged in violent, illegal behaviour*” (McCarthy, p. 3). However, it is important to note that Hayashi, although himself thrown to the ground, was found to have committed “*no wrongful act*” (McCarthy, p. 3) (F4a). This fact is quite an important one to establish since it vindicates Hayashi of any act of wrongdoing, rendering him blameless in the overall picture.

Concerning his acquisition of the ball, Hayashi found it whilst himself on the ground, showing that during the assault “*At some point the ball left his [Popov’s] glove and ended up on the ground*” (McCarthy, p. 3) (F5), and Hayashi retrieved it and put it in his pocket. This then gives us F6:

F6: Hayashi retrieved the baseball.

F1 - F6 form the main basis of the established facts. However, two final points must be made concerning what could *not* be shown by the evidence. Firstly, the two sources of evidence do not establish when or exactly how Popov lost the ball, and, crucially, the facts cannot tell us whether Popov would have been able to retain control of the ball had the mob not interfered with his efforts to do so. McCarthy summarises resolution of this question as “*the work of a psychic, not a judge*” (McCarthy, p. 4).

3. Legal Analysis

Now that the facts of the case have been established we can use this in the legal analysis. The established facts form the antecedents of the rules used in the arguments that follow the defeasible modus ponens scheme. We begin by considering the arguments regarding possession of the baseball. The general principle regarding possession of baseballs hit into the crowd is:

GP1: For at least the last eighty years, almost all fans attending professional baseball games in the United States have assumed they have a right to take home any balls they catch or retrieve in the stands [5, p. 1621].

Note that this is not so of all ball games: in cricket, for example, the ball must be returned to play since the age and varying condition of the ball is considered part of the game, and the same ball must be used until a new one becomes available under the laws of the game. Baseballs, in contrast, are withdrawn from play if they are damaged in any way, and so a ball hit into the stands would no longer be considered playable.

Thus it is quite clear that the fans, including both Popov and Hayashi, had the right to attempt to take possession of the ball. GP1 gives us two ways in which a fan may take possession of the ball.

R1: X caught the baseball \rightarrow X has possession of the baseball

R2: X retrieved the baseball \rightarrow X has possession of the baseball

In our representation, “caught” is a physical relationship between the catcher and baseball and “possession” is an intermediate legal concept conferring certain rights on the possessor. “Retrieve” is understood as being the act of picking up a loose ball and the right to retrieve it ceases if the ball is caught, since the catcher will have taken possession. It needs to be made clear, therefore, that if a person catches the ball, the ball has been claimed and no subsequent claim based on retrieval can be made. If Popov had caught the ball and then placed it on the bench and it had rolled off to be retrieved by Hayashi, Popov would remain the owner. Thus:

R3: X caught the baseball \rightarrow NOT (R2)

It is undisputed that Hayashi retrieved the ball. What is in dispute is whether he had the right to assume possession, or whether Popov’s snowcone catch was sufficient to establish ownership. Popov must give us a reason to think he caught the ball, such as:

R4: The baseball was in the glove of X \rightarrow X caught the baseball

However, the ball may enter a glove and then leave it before the catch is made, a fumble. As McCarthy says:

While the glove stopped the trajectory of the ball, it is not at all clear that the ball was secure. Popov had to reach for the ball and in doing so, may have lost his balance. (McCarthy, p.2).

In the decision there are two opinions as to what counts as possession by catching a baseball. Professor Brian Gray³, suggests the following definition:

A person who catches a baseball that enters the stands is its owner (R1). A ball is caught if the person has achieved complete control of the ball at the point in time that the momentum of the ball and the momentum of the fan while attempting to catch the ball ceases. A baseball, which is dislodged by incidental contact with an inanimate object or another person, before momentum has ceased, is not possessed. Incidental contact with another person is contact that is not intended by the other person. The first person to pick up a loose ball and secure it becomes its possessor (R2). (McCarthy, p. 7)

Key elements are that the catcher must be in *complete control* of the ball and that this is not established until the catcher comes to rest. Thus we have an undercutter:

R5: NOT (X in control of the baseball) \rightarrow NOT (R4)

The point about motion could be expressed either as an undercutter of R4, or as a way of showing that someone was not in control:

R6: X was still in motion \rightarrow NOT (R4)

R6a: X was still in motion \rightarrow NOT (X had control of the baseball)

We prefer R6: that someone is still in motion does not demonstrate that he is not in control of the ball, but only that he may not be. He may be in control, but this is not conclusively shown.

The next point is that of contact. One way of showing that someone has not attained sufficient control to be said to have caught the ball is that they fail to retain it through incidental contact. Again we can say either:

R7a: X lost contact with the baseball \rightarrow NOT (R4)

R7: X lost contact with the baseball \rightarrow NOT (X had control of the baseball).

This time we do not prefer the undercutter: the test is intended to demonstrate lack of control, and so we adopt R7. The contact must, however, be incidental, and if the contact is intentional, the contact is not *incidental*. Popov was, of course, assaulted, and so the contact was certainly intentional on the part of other persons (though the facts established that Hayashi was not one of the assailants).

R8: Contact on X was intentional on the part of Y \rightarrow NOT (R7).

R9: Y assaulted X \rightarrow Contact on X was intentional on the part of Y.

As McCarthy says:

Even as the ball was going into his glove, a crowd of people began to engulf Mr. Popov. He was tackled and thrown to the ground while still in the process of attempting to complete the catch. (McCarthy, p.3).

The alternative account of catching a ball was given in the position of Professors Bernhardt and Finkelman, who suggest that:

³McCarthy organised a forum of four distinguished professors to assist him in reaching his decision. These were Professors Brian Gray, Roger Bernhardt, Paul Finkelman and Jan Stiglitz.

... possession occurs when an individual intends to take control of a ball and manifests that intent by stopping the forward momentum of the ball whether or not complete control is achieved. (McCarthy, p.7)

The professors argue from cases concerning wild animals, (often discussed in AI and law (e.g. [2])), and salvage at sea that the law can recognise possession even before absolute dominion and control is achieved, provided the actor is “actively and ably engaged in efforts to establish complete control”. The cases show that complete control is not required to establish that the ball was caught. Here “caught” seems to be more like catching a bird than catching a ball as understood in the technical terms of baseball.

R10a: X ably and actively engaged in establishing control → NOT (R5).

Moreover, they argue that able and active engagement means that the motion can also be disregarded.

R10: X ably and actively engaged in establishing control → NOT (R5) AND NOT (R6)

In doing so Bernhardt and Finkelman give (McCarthy, p. 7) a test for being ably and actively engaged in establishing control by stating:

R11a: X stopped forward motion of baseball → X had possession of the baseball

This seems plainly wrong: had Popov mistimed his leap for the ball and been struck on the forehead, he may well have stopped the forward momentum of the ball, but the right of Hayashi to retrieve the ball would not have been disputed. We therefore think a better expression of the sense of the learned professors is:

R11b: X stopped forward motion of baseball → X ably and actively engaged in establishing control

Or perhaps, since the striking on the forehead situation would illustrate active but not able engagement, it would be better as:

R11: The baseball was in the glove of X → X ably and actively engaged in establishing control.

McCarthy rejects this line of reasoning, arguing that the rules:

...are contextual in nature. They are crafted in response to the unique nature of the conduct they seek to regulate. Moreover, they are influenced by the custom and practice of each industry. The custom and practice of the stands creates a reasonable expectation that a person will achieve full control of a ball before claiming possession. (McCarthy, p.8)

The reasoning is supported by cases which state that the court should uphold the accepted conventions on the industry concerned⁴, and the conventions of baseball fans are that making a catch means the same in the stands as on the field of play. Arresting the forward motion is not enough call out, and so it is not enough to be granted possession⁵. McCarthy holds:

R12: The custom and practice of the stands in baseball → NOT (R10)

⁴Rich v. Ghen 8 F. 159 (D. Mass. 1881)

⁵In cricket, where a batsman collides with a player attempting to catch a ball, the out is recorded as “obstructing the field”, not “caught” since it cannot be known whether the catch would have been made.

4. Argumentation Framework

We can now take all the arguments generated in the previous section and organise them into a Dungian argumentation framework [4] to show the attacks between the arguments. An argument A_n , for some n , is an application of rule R_n , for that n . In addition to arguments based on the rules given above we have included four additional arguments, labelled with questions. While some arguments use premises that are established from the video and witness testimony, some arguments use premises which, while concerning matters of fact, are not observable, and so have to be inferred on the basis of what was observed. Thus whether the ball was caught, whether Popov was not in control, whether he was actively attempting to establish control and whether the contact was intentional, are all open to question. These four arguments are intended to represent positive answers to the questions: if the argument is not defeated, the contrary has not been shown. See Figure (1). A13, which we have not yet discussed, will be explained later.

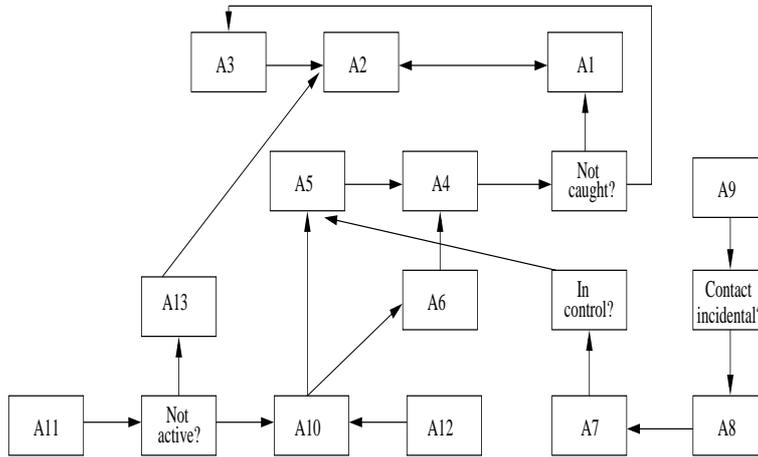


Figure 1. Argument Graph for Popov v. Hayashi

Analysis of this argumentation framework shows that A9, A11 and A12 are all unattacked and so must be accepted. A9 removes the possibility that the contact was incidental and means that A8 can defeat A7, hence it has not been shown that Popov was not in control. A11 means that neither has it been shown that Popov was not actively and ably engaged in establishing control. Now, since McCarthy applies the definition of caught as used in baseball, Popov’s motion is sufficient to mean that the ball being in his glove does not establish that a catch was made. At this point A1 and A3 fall, and so it would appear that A2 survives, giving possession to Hayashi. However, it is accepted that Popov was ably and actively engaged in establishing control when he was assaulted. As a result he should have been allowed to complete his attempt. In McCarthy’s view, the activity, while insufficient to allow us to deem Popov to have caught the ball, is enough to establish a “*legally cognizable pre-possessory interest*” in the ball which precludes Hayashi from establishing control by retrieving the ball:

R13: X ably and actively engaged in establishing control \rightarrow NOT (R2)

The upshot of this is that neither Popov nor Hayashi had established possession of the ball: however, someone possesses the ball, and that someone is either Popov or Hayashi. How is this to be resolved? McCarthy takes it upon himself to craft a decision which is fair to both parties.

A court sitting in equity has the authority to fashion rules and remedies designed to achieve fundamental fairness. (McCarthy, p.9) ...

The court is required to balance the interests of all parties. (McCarthy, p.10).

We now consider the arguments from purpose, using practical reasoning argument schemes with values [1]⁶. One argument McCarthy considers is:

PR1: Where interruption of completing the catch so establishing possession was illegal; decide for Popov; to prevent assault being rewarded; promoting the value of public order. (McCarthy, p. 9)

The basis of this argument is that by deeming Popov to have established possession, future crowds will be aware that assaulting a person attempting to catch a valuable baseball will avail them nothing, and so such assaults are less likely to occur. Unfortunately, such a decision would punish Hayashi, who was not one of the assailants:

PR2: Where it has not been shown that Hayashi did not have possession and did nothing wrong; do not decide for Popov; which would punish Hayashi; demoting the value of fairness. (McCarthy, p. 10)

PR2 is attacking PR1 by offering an alternative action – decide for the other party – that concerns some other value that needs to be considered: fairness to each party. The basis of this argument is that deciding for Popov would show bias since Hayashi thus receives punishment, even though the facts recognise that he did no wrong. As each of PR1 and PR2 endorses an opposing conclusion about which party to find for, there is a symmetric attack relation between them.

Similarly to PR2, one could – as in the spirit of the wild animals cases – argue that a decision for Hayashi would give a clear criterion: whoever ended up with the ball owned it.

PR3: Where Hayashi had unequivocal control of the baseball; decide for Hayashi; to provide a bright line; promoting clarity of law. (McCarthy, p. 10)

PR3's conclusion is in conflict with PR1 providing a symmetric attack between the two arguments and additionally this alternative action – deciding for the other party – is based upon the promotion of a different value that needs to be considered: that we should be clear about the law. PR3 itself would of course have the unfortunate effect of actually encouraging violence to prevent the catcher establishing unequivocal control:

PR4: Where interruption of completing the catch so establishing possession was illegal; do not insist on unequivocal control; which would reward assault; demoting the value of public order. (McCarthy, p. 9)

⁶These schemes are associated with a range of critical questions, some of which are appropriate to the case under consideration. Some of these questions yield attacking arguments based on value, whilst others yield arguments based on fact. We will not provide details here of the specific critical questions used as the basis for the arguments and attacks, though we do provide a general description about the nature of the disagreement.

Thus PR3 and PR4 attack each other by each providing alternative actions concerning determination of control of the ball, though each argument is based on consideration of a different value. We can, however, include a further attack on PR4 to deny that the consequence of rewarding assault would follow, given that the facts established that Hayashi himself did no wrong:

PR5: Since Hayashi was not an assailant, finding for Hayashi would not reward assault.

But Popov retains an argument parallel to PR2, this time to show no bias against him, since he too has done no wrong. This argument, PR6, symmetrically attacks PR3:

PR6: Where it has not been shown that Popov did not have possession and did nothing wrong; do not decide for Hayashi; which would punish Popov; demoting the value of fairness. (McCarthy, p. 10)

Against this point it could be argued that there is an alternative action for Popov to pursue whereby the perpetrators of the assault are held to account for their actions, which promotes the same value as PR6, fairness to both parties:

PR7: Where interruption of completing the catch so establishing possession was illegal; Popov should sue the assailants of the assault; which would not punish Popov; promoting the value of fairness. (McCarthy, p. 3)

However, as the facts established, this is not a viable action since the evidence presented was not able to identify the particular individuals involved in the assault:

PR8: Since assailants cannot be identified, suing those responsible for the assault is not a viable action. (McCarthy, p. 3)

We can now form all these arguments and the attack relations between them into a value-based argumentation framework [3] as in Figure (2):

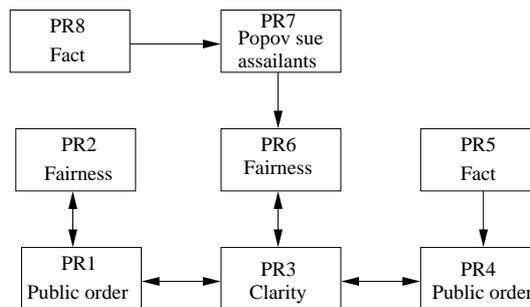


Figure 2. Value-based Argument Graph for Popov v. Hayashi

In order to evaluate the status of the arguments and determine the justifiable ones, we must identify the value ranking used. McCarthy has explicitly said that fairness will be his primary value. Thus, both PR1 and PR3 are defeated. PR5 will defeat PR4, and PR8 will defeat PR7, since both must be objectively accepted given the facts. This leaves us with PR2 and PR6. Note that these are not in conflict: the result is that McCarthy can decide neither for Popov nor for Hayashi. In fact, he decided that the ball should be sold and the proceeds divided between the two.

5. Concluding Remarks

We have provided a formal analysis of a recent legal case using argument schemes and an argumentation framework. The analysis has proceeded in four phases: establishing the facts, giving rules that allow us to reason from facts to intermediate terms, organising the arguments provided by the rules into an argumentation framework, then associating values with arguments. We have shown how this analysis can provide the outcome as given in the case.

This work builds on a previous argumentation-based approach to the analysis and representation of legal cases, as set out in [2]. There a distinction was made between the justification of facts based on the reliability of their sources, and the justification of choices relating to the law and its interpretation based on value preferences. Here this separation is reflected in the use of two argumentation frameworks. The case we have considered in this paper serves to provide a detailed example of how legal cases can be represented in this manner to accurately model the reasoning involved, through the use of argument schemes, argumentation frameworks and their evaluation.

Among the interesting points to emerge from our analysis of the case: McCarthy's explicit statement of the critical questions which he will use to test arguments from witness testimony; that the intermediate terms include matters of law ("possession"), convention ("caught"), and fact ("control"); and that undercutters are used extensively in the legal analysis to fit general principles to the specific circumstances of the case. The novel contribution of the paper is that we have shown how we can provide an argumentation analysis of a case of first instance, allowing scope to consider argumentation about facts and intermediate concepts, as well as how these findings should be applied to reach a decision.

References

- [1] K. Atkinson. *What Should We Do?: Computational Representation of Persuasive Argument in Practical Reasoning*. PhD thesis, Department of Computer Science, University of Liverpool, UK, 2005.
- [2] K. Atkinson and T. Bench-Capon. Argumentation and standards of proof. In *Proceedings of the Eleventh International Conference on Artificial Intelligence and Law (ICAIL 2007)*, pages 107–116. ACM Press, 2007.
- [3] T. Bench-Capon. Persuasion in practical argument using value based argumentation frameworks. *Journal of Logic and Computation*, 13(3):429–48, 2003.
- [4] P. M. Dung. On the acceptability of arguments and its fundamental role in nonmonotonic reasoning, logic programming and n-person games. *Artificial Intelligence*, 77:321–357, 1995.
- [5] P. Finkelman. Fugitive baseballs and abandoned property: Who owns the home run ball? *Cardozo Law Review*, 23(5):1609–1633, 2002.
- [6] T. Gordon and D. Walton. Pierson v. Post revisited. In P. E. Dunne and T. Bench-Capon, editors, *Computational Models of Argument: Proceedings of COMMA 2006*, pages 208–219. IOS Press, 2006.
- [7] T. L. McCarty and N. S. Sridharan. The representation of an evolving system of legal concepts: II. prototypes and deformations. In *Proceedings of the Seventh International Joint Conference on Artificial Intelligence (IJCAI 1981)*, pages 246–253, 1981.