Cases and Stories, Dimensions and Scripts

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Abstract.

Stories and legal cases have much in common, but there are also differences. Both can be seen as a sequence of events, but in a legal case the facts and events are legally qualified. Moreover, the point of a story is usually implicit, whereas the outcome of a legal case is explicitly explained. Stories have been mainly used in AI and Law to explore the evidence presented in legal cases, but here we will explore the relationship on the assumption the facts of the case have already been established, and so include legal qualification and the decision. We illustrate our approach the well known wild animals and *Popov v Hayashi* cases.

Keywords. stories, case based reasoning, dimensions, factors, facts.

1. Introduction

Stories and legal cases have much in common: both can be seen as collections or sequences of particular events, instantiations of more generic scripts [18] or case types [3]. Furthermore, both factual stories and legal cases can be used in arguments from analogy [9]. There are also clear differences: in a legal case the facts and events are legally qualified [10], and the point of a story is usually implicit, whereas the decision in a legal case is explicitly stated and justified.

Perhaps the most compelling use of our stories in legal reasoning is in explanation. Stories help to make sense of the facts in a case by structuring and providing meaning to the evidence [8], thus serving as a basis for further legal reasoning and decision-making [10]. Furthermore, it has long been recognised that a proof trace does not provide a very satisfactory explanation, and needs to be rewritten if it is to be appealing to lawyers and lay users or used for explanation and drafting. However, the consensus model of legal case-based reasoning currently (e.g. [2]) sees stories and evidence as distinct from factors and decisions and requiring a different style of reasoning, which leads to the narratives disappearing once the factors have been established, so that the explanations of the decisions are typically in terms of deduction whereas stories would be more appealing, comprehensible and convincing.

In this paper, we will explore further the relations between stories and legal cases by considering how dimensions from case-based reasoning [5] can serve as elements of scripts that can be instantiated to form legal cases. Furthermore,

Table 1. Instantiations of the basic case story script

	Protagonist	Antagonist	ProtagonistAct	InterruptAct	AntagonistAct
Pierson	Post	Pierson	Act1	-	Act6
Keeble	Keeble	Hickersgill	Act2	-	Act7
Young	Young	Hitchens	Act3	-	Act8
Ghen	Ghen	Rich	Act4	Act9	Act11
Popov	Popov	Hayashi	Act5	Act10	Act12

Table 2. Instantiations of the act script

	subject	verb	object	location	motive
Act1	Post	was hunting	fox	open land	sport
Act2	Keeble	was shooting	ducks	his pond	commerce
Act3	Young	was fishing	pilchards	sea	commerce
Act4	Ghen	harpooned	whale	sea	commerce
Act5	Popov	made snowcone catch	baseball	Pacific Bell Park	gain
Act6	Pierson	killed	fox	open land	impulse
Act7	Hickersgill	scared	ducks	adjoining land	malice
Act8	Hitchens	caught	pilchard	sea	commerce
Act9	Ellis	found	whale	beach	gain
Act10	crowd	assaulted	Popov	Pacific Bell Park	gain
Act11	Rich	bought	whale	Nantucket	commerce
Act12	Hayashi	picked up	baseball	Pacific Bell Park	gain

we discuss how stories and scripts about the facts of a case can be connected to stories and scripts about the legal aspects of the case, which can in turn be used to draw legal conclusions. Thus, we present scripts for different types of interconnected factual stories and legal cases, and generic rules that express how these are connected.

We will illustrate our exploration of the relationship between stories and legal cases using the well known wild animals cases (*Pierson v. Post*, *Keeble v. Hickergill*, *Young v. Hitchens*, *Ghen v. Rich*) and the *Popov v Hayashi* case (see, e.g. [6]). The wild animals cases concern ownership cases in which plaintiffs were chasing wild animals when their pursuit was interrupted; *Popov v Hayashi* concerned disputed ownership of a baseball, and is relevant because the wild animals cases were cited when considering whether Popov's efforts had given him possession of the ball.

2. Stories, cases and scripts

In the 1970s, researchers in cognitive science and artificial intelligence became interested in story structure, mainly with the aim of automating story understanding and generation. Researchers such as Rumelhart [17] developed story grammars, which express the structure of stories. Building on this early work, Schank and Abelson [18] famously argued that stories consist of goal-driven action sequences called *scripts*, which model the way things tend to happen in the world. For instance, the restaurant script lists the roles (customer, waiter) and sequence

of events (ordering, eating, paying) for a typical restaurant visit. These scripts are generic, hierarchical schemes that can be instantiated to form specific stories. In this paper, a script consists of a number of *slots* and a *scene* that puts two or more of the slots in sequence to form a simple story.

So what is the basic script for the wild animal cases? They all have a protagonist and an antagonist. The protagonist is performing some action, when interrupted by some other action, which may or may not have been performed by the antagonist, so we have to consider the possibility of a separate interrupting act. For the basic case story script, we have the five slots shown in the first row of Table 1 and a scene [`ProtagonistAct InterruptAct* AntagonistAct`], where * means 0 or more. The fillers for the slots for the wild animals cases are also shown in Table 1.

As can be seen in Table 1, a case story consists of acts, basic motivated actions [8,9]. These acts are instantiations of a sub-script of the basic case story script, which consists of a scene [`Subject Verb` a/for `Object` on/at/in `Location` on/for `Motive`]. The slots for the act script are shown in the first row of Table 2, and the fillers for each separate act below that. The stories that follow from the instantiations of the basic case story script (Table 1) and the relevant act sub-scripts (Table 2) are as follows.

- Post was hunting a fox on open land for sport. Pierson killed the fox on open land on impulse.
- Keeble was shooting ducks on a pond for commerce. Hickergill scared the ducks on a pond for malice.
- Young was fishing for pilchards at sea for commerce. Hitchens caught the pilchards at sea for commerce.
- Ghen harpooned a whale at sea for commerce. Ellis found the whale on a beach for gain. Rich bought the whale in Nantucket for commerce.
- Popov was catching a baseball at the ballpark for gain. A crowd assaulted Popov at the ballpark for gain. Hayashi picked up the baseball at the ballpark for gain.

These simple narratives, which relay only *brute facts* [4] without reference to the law, capture the essence of each case. If they seem a little sparse we might wish to include further sub-scripts so that the `Protagonist` and `Antagonist` slots have `name` and `description` subslots (so that, for example, 'Post' become 'Post, a local land owner'). Similarly it may be useful to include the `owner` under `location` (so that, for example, 'a pond' becomes 'Keeble's pond'). This adds colour and interest, but still uses only non-legal facts. Next we consider the transformation required to turn these narratives into legal cases.

3. From Narratives to Cases

To transform our simple narratives into legal cases we have to retell the stories using terms with legal significance, to move from the world to the law [10]. Where shall we get these legal terms, and what are the correspondences between the

world facts and the legal facts? The current consensus on reasoning with legal cases suggests that we move from evidence to facts, from facts to factors (i.e. legally qualified facts), and from factors to legal conclusions (e.g. [2,10]). The first step is outside the scope of this paper: we assume that the evidence has been weighed, a favoured narrative chosen and the facts established. So it might appear that factors are a prime candidate for the building blocks of our legal stories. However, there are problems with trying to form stories from factors: a lack of structure and the sparsity of factors. Representing cases as collections of factors offers a bundle of legally pertinent features of a case, but it misses the structured narrative scenes that provide context and allow the case to be readily understood. Moreover, relatively few of the available factors appear to be present in a given case: for example CATO has 26 factors [3], but only between 3 and 7 of these factors were present in any given case, which leaves too many unfilled gaps. We therefore turn back to the origins of factors, the notion of dimensions, introduced in Rissland and Ashley's HYPO system, most fully described in [5].

Factors represent stereotypical fact patterns which are legally significant, in that they favour either the plaintiff or the defendant, and which are either present in, or absent from, a case. They emerged from dimensions in the later stages of the HYPO project, and formed the basis of the representation in CATO [3]. Dimensions in contrast represent a *range*, running from an extreme pro-plaintiff point to an extreme pro-defendant point. Since the cross-over from pro-plaintiff to pro-defendant is not fixed, dimensions cannot be said to favour either party: which party is favoured by a dimension in a particular case depends on where on that dimension the case lies (and where the line is drawn). For a full discussion of the relationship between dimensions and factors see [16]. There are of course considerable advantages, both computational and formal, in using factors. Because they are Boolean and give definite support for one side or the other, they facilitate formal accounts of reasoning with legal cases [14], [13], [15]. But the grouping of legal facts and their ordering on a dimension, required to provide the structure needed to construct a story, are lost. So in this paper we see facts as determining a point on a dimension, referred to by the sub-range within which that point falls (very often these sub-ranges will correspond to factors). In script terms, dimensions will be slots and the sub-ranges (factors) will be fillers. This also explains the sparseness of factors: the number of dimensions sets an upper bound on the number of factors that can be present in a case.

We can take our dimensions from the extensive literature on these cases. Dimensions for the wild animals cases have been discussed in [7], [6] and [1]. As the nine dimensions in [1] are most expansive, we will use them in this paper. The first column of Table 3 indicates the different dimensions, which are fairly self-explanatory. The points on the range for each dimension are mentioned for each case - QuarryValue, for example, ranges from Market to None, and in all but the Pierson case the value of the quarry was market value.

The dimensions can be used to represent the elements in the cases. Note how the dimensions are similar to the slots in a script. What is missing here, however, is a scene that allows us to provide some structure and thus helps us to make sense of a case. Various scenes are possible, depending on the level of detail in which we want to present the case. Take, for example, the following script.

1. `Protagonist` was/had `ClosenessOfPursuit` of [`ProtagonistAct.Object`], motivated by `PMotive`.
2. The land/sea was `LandOwnership`, and `ProtagonistAct.Object` was a `QuarryConnection` visitor.
3. `ProtagonistAct.Object` had `QuarryValue`.
4. Convention gave `Convention` to `Protagonist`.
5. [`InterruptAct.Subject | Antagonist`] behaviour was `NatureOfAct`.
6. `Antagonist` was `DefendantRole` and he acted out of `DMotive`.

Here, [`A.B`] denotes the `B` slot that is in the sub-script under slot `A` (e.g. the `Object` of the `ProtagonistAct` in line 1) and [`A | B`] stands for 'A or B', so line 5 concerns the behaviour of either the `Subject` of the `InterruptAct` or the `Antagonist` in case there is no interrupting act because the antagonist act is the one that interrupts the protagonist. [`A.B`] denotes the `B` slot that is in the sub-script under slot `A`.

The above script is similar to the *case vectors* of [1], which express a case as the sequence of points for all nine dimensions. The script adds some explanatory language to this, but still mainly focuses on these individual factor points, viz.

Ghen had captured a whale, motivated by gain. The sea was unowned and the whale was a resident visitor. The whale had commercial value. Convention gave full possession to Ghen. Ellis' behaviour was OK. Rich was innocent and he acted out of commerce

Note that mentioning just the factor points in a dimension makes for a very sparse story without much meaningful structure. What is missing here is the antagonist's act as well as any information about possible interrupting acts. To have the corresponding story make more sense, we can update the above scene with further information from the basic case story and act slots (Tables 1 and 2). One option is to replace line 5 above by the following:

Table 3. Dimensions from [1]

	Pierson	Keeble	Young	Ghen	Popov
LandOwnership	Unowned	P-Freehold	Unowned	Unowned	Other Owned
Convention	Social Preference	Nothing	Nothing	Full Possession	Informal Right
ClosenessOfPursuit	In Hot Pursuit	Certain To Capture	Certain To Capture	Captured	In Hot Pursuit
QuarryValue	Social	Market	Market	Market	Market
QuarryConnection	Regular	Frequent	Resident	Resident	Frequent
NatureOfAct	Impolite	Nuisance	Impolite	ActOk	Violently Illegal
PMotive	Sport	Commerce	Commerce	Commerce	Gain
DMotive	Impulse	Malice	Commerce	Commerce	Gain
DefendantRole	Solely Responsible	Solely Responsible	Solely Responsible	Innocent	Innocent

$\big[$[`InterruptAct`, and `InterruptAct.Subject` behaviour was `NatureOfAct`. An-tagonistAct] | [`AntagonistAct`, and `Antagonist` behaviour was `NatureOfAct`]$\big]$

This part of a scene says that the story either contains information about the interrupting act and its nature followed by the antagonist's act or that, if there is no separate interrupting act, the story mentions the antagonist's act and its nature. This gives us the following type of story, which provides for a more understandable and coherent account of the case.

> Ghen had captured a whale, motivated by gain. The sea was unowned and the whale was a resident visitor. The whale had commercial value. Convention gave full possession to Ghen. Ellis found the whale on a beach for gain, and Ellis' behaviour was OK. Rich bought the whale in Nantucket for commerce. Rich was innocent and he acted out of commerce.

The last story above shows how dimension points can be combined with basic, non-legal facts in a case to provide a more natural account of a case. These facts from the basic case story and act scripts (Tables 1 and 2) also play another important role, as they provide the basis for inferring the dimension points, that is, the legal facts (Table 3).

Several of the dimension points, such as `PMotive`, correspond more or less directly to facts (i.e. `ProtagonistAct.Motive`). Where this is so, we can require that the vocabulary is restricted to words which can be related either directly or through a thesaurus (e.g. `Livelihood = Commerce`) to the dimension points. Other dimension points need additional, non-case specific facts. `QuarryValue`, for example, can be derived from the nature of the quarry and knowledge of, for example, the price of fish, and `LandOwnership` requires that the owner and the nature of the tenure of `ProtagonistAct.location` are known. These new facts can be added as slots in the basic case story script (Table 1). Some dimension points furthermore require additional knowledge of what is legal or conventional. For example, whaling conventions are held to have the force of law, whereas those of baseball and hunting are somewhat weaker. Similarly `NatureOfAct` requires knowledge of what is and what is not illegal: while the law does uphold whaling conventions, breaking them is not considered illegal.

The steps from brute facts to dimension points detailed above can be captured as separate `IF Slot1=X THEN Slot2=Y` rules, where `Slot1` is a slot in a script that is related to brute facts (Tables 1 and 2) and `Slot2` is a slot that represents a dimension (Table 3). Such rules are called *qualification rules* by [10], because they provide a legal qualification of brute facts. In [1], some of these rules are given for the example cases.

```
IF Verb = "was shooting" THEN ClosenessOfPursuit = In Hot Pursuit
IF Verb = "harpooned" THEN Convention = FullPossession
IF Verb = "made snowcone catch" THEN Convention = InformalRight
IF Verb = "assaulted" THEN NatureOfAct = ViolentlyIllegal.
```

We could expand the scene and any stories based on it with the explanation of the ascription: change line 4 in the scene on the previous page to 'Convention gave `Convention` to `Protagonist`, because he `ProtagonistAct.Verb` the `ProtagonistAct.Object`', which instantiates in a story as, for example, *Convention gave full possession to Ghen because he harpooned the whale.*

4. Making a Decision

We now have the story in terms of dimension points, derivable from the factual story with some simple rules and appropriate background knowledge, which give the legally qualified facts. The case can be represented as a vector of dimension points: $\langle$LO, AC, COP, QV, QLC, NOA, PM, DM, DR$\rangle$. What is still missing is the denouement - the decision based on these facts. Analysis of the cases suggests that the plaintiff will win if he has established possession of the quarry, which can be done in three ways: by capturing the animal, by owning the land or by convention[1]. There will be a point on each of these three dimensions at which the dimension becomes, in the words of [12], a *knock-out factor*. But where on the dimension this point lies is debatable. Authorities are not in agreement as to whether bodily capture, mortal wounding, or certain capture is required to establish possession. *Pierson v Post* is a precedent for a narrow interpretation (attributed to Justinian) requiring actual physical possession (the extreme pro-plaintiff position on the *ClosenessOfPursuit* dimension). With respect to ownership through land, the degree of ownership must be sufficient (is a tenancy enough, or do the animals belong to the landlord?), and the quarry must have a sufficient connection with the land (must the quarry be resident or is being an occasional visitor, or even being merely present, enough?). With respect to convention, *Ghen* establishes that conventions will be upheld for whaling, but Livingston (unsuccessfully) argued that the law should uphold sporting conventions also.

If none of these apply, the plaintiff needs to show that act was sufficiently wrong and that defendant was responsible. Thus the violent illegality perpetrated on Popov did not aid his case since Hayashi was innocent of it. Had Hayashi been the assailant, the decision may well have differed. But whether Hickergill's malicious nuisance would have been enough for Keeble to win was not tested, since ownership of the land was decisive: mere impoliteness is not enough. So this requires consideration of the *NatureOfAct* and *DefendantRole* dimensions.

Finally a judgement requires a view on how interventionist the law should be. *Young* established that the law would not take a position on what constituted unfair competition where both plaintiff and defendant were acting from commercial motives. But what of *Popov v Hayashi*, where the parties were motiated by gain, or a hypothetical dispute between two fox hunters? And would the quarry require a certain value (*de minimis non curat lex*)? This issue requires consideration of the two motive and the *QuarryValue* dimensions.

This discussion suggests that each dimension can have, by precedent or authority, two thresholds (which may co-incide), one to make it "knock-out" for

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[1]These are *issues*. They may be established by a precedent [15], or a commentary or some other document such as the *Restatement of Torts* [12].

the plaintiff and one for the defendant. We may also need to establish priorities (based on precedents, legal principles, or some kind of value-based argument) between these issues to resolve potential conflicts. This approach reflects the top layer of rules found in CABARET [19], or the logical model of IBP [12] or the framework precedents of [15]. In our cases the issues are disjunctive, which is the simplest structure, but other logical relations are possible (as in [12]). Genuine case-based weighing of reasons should, on this view, be reserved for cases where some dimensions (which are needed to resolve the issues layer) fall between the decisive thresholds (which could be few cases or many depending on how tightly the thresholds are drawn). In [1] the theory from which these rules can be derived is encapsulated in an Abstract Dialectical Framework [11], but we use a set of rules, annotated with precedent, authorities and values promoted, and a descriptive text.

```
IF LandOwnership >= P-leasehold AND QLC >= RegularVisitor
                  THEN Find for Plaintiff
 (Keeble v Hickergill) (Commentator1) (PropertyRights)
 (possession through land ownership).
IF Convention = FullPossession THEN Find for Plaintiff
 (Ghen v Rich) (Commentator2) (LessLitigation)
 (possession through convention).
IF ClosenessOfPursuit = Capture THEN Find for Plaintiff
 (Pierson v Post) (Justinian) (LegalClarity)
 (possession through capture).
If Closeness of Pursuit > Chasing AND NatureOfAct >= Illegal
                  THEN Find for Plaintiff
 (Precedent6) (Commentator4) (NaturalJustice)
 (illegal interference)
IF ClosenessOfPursuit < Capture AND  NatureOfAct < Illegal
                  THEN Find for Defendant
 (Pierson v Post) (Justinian) (LegalClarity)
 (no possession through capture).
IF NatureOfAct < Illegal OR DefendantRole < IgnorantOfTheLaw
                  THEN Find for Defendant
 (PrecedentX) (Commentator3) (NaturalJustice)
 (defendant not to blame).
IF QuarryValue >= DomesticPet AND NOT (PMotive > DMotive)
   AND PMOtive >= Gain  THEN Find for Defendant
 (Young v Hitchens) (Commentator4) (Enterprise)
 (fair competition).
OTHERWISE The Decision is Unclear.
```

The rules are in priority order. We can now provide a text template for the decision. The applicable rule will instantiate five variables: recommendation, precedent, authority, value and text (although in our example cases the precedents will not be instantiated, since they are themselves the cases which led to the rule applying to them). This gives: [recommendation], because [text] following [precedent,] [authority] to promote [value]. The disjunctive relation between issues

means that while a finding for the plaintiff can be based on a single rule, where more that one rule for the defendant applies, both should be reported.

Pierson: Find for Pierson because no possession through capture following Justinian to promote legal clarity. Find for Pierson because Pierson not to blame following Commentator3 to promote natural justice.
Keeble: Find for Keeble because possession through land ownership following Commentator1 to promote property rights.
Young: Find for Hitchens because no possession through capture following Justinian to promote legal clarity. Find for Hitchens because fair competition following Commentator2 to promote enterprise
Ghen: Find for Ghen because possession through convention following Commentator4 to promote less litigation.
Popov: The decision is unclear

We can also use these rules to consider hypothetical versions of the story. For example: *If Hayashi had assaulted Popov, then Find for Plaintiff because of illegal interference, following precedentX and Commentator4 to promote NaturalJustice.* In *Pierson* the minority opinion of Livingston rejects Justinian and adopts Barbeyrac as his authority. His rule requires only that Closeness of Pursuit > Chasing when QuarryValue > DomesticPet. Thus the minority opinion in Pierson: *Find for the Plaintiff because possession through pursuit following Barbeyrac to promote socially worthwhile activity.* If desired, all possible case narratives could be envisioned in this way.

5. Discussion and Concluding Remarks

Since CATO, factors have dominated discussions of case based reasoning: their Boolean nature has made it possible to produce a logic of precedential reasoning [14,13,15]. This level of consideration, however, presents problems of expressiveness: degrees of presence of factors seem essential to capture certain nuances [2], and seeing cases as bundles of factors loses the structural elements required to view cases as narratives. Both these aspects can be provided using dimensions, and it is the latter we have focused on in this paper. The dimensions group factors and supply a structure, which can be used to provide a script, an outline of a narrative, which can instantiated to particular facts to present the case narrative.

By understanding legal cases in terms of scripts, we can use simple rules to reason from a narrative in terms of brute facts to a legally qualified case description, essentially a vector of points on a set of dimensions [1]. This case description can be used together with a second set of rules based on precedents and authorities to provide a recommendation, providing, of course, that the case is covered by existing precedents and authorities. Variants can be explored: we can vary the original facts to see how this affects the legal story and the recommendation.

The path from evidence to facts to legal cases to conclusions (and back) was earlier explored in [10]. A novelty of this paper is the use of well-known legal cases from AI and Law - [10] focused mostly on continental law, which is based on rules rather than precedent cases. Furthermore, in [10] the levels of brute facts

and legal facts were clearly separated, whereas in this paper we show how certain stories and their corresponding scripts can combine brute and legal facts.

Considering factual stories and legal cases as intertwined case narratives greatly facilitates the human understanding of the formalised case descriptions. Thus, this work attempts to provide a basis to technologies for explanatory CBR applications, which can be used by lawyers as well as logicians. Using a basic set of scripts and a formal representation of case facts, different case narratives can be constructed automatically and tailored towards the specific audience of our CBR applications. Because the domain of particular legal cases is fairly limited (at least when compared to generic CBR), such automatic story construction lies within what is reasonably achievable.

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