THE CASE TO HANDLE (1)

(Dutch Supreme-Court decision HR 23 Oct. 1992, NJ 1992, 813)

The issue

Car accident, occurred when the driver and the passenger were returning from a party

The passenger sued the driver for the damages he suffered

Claims and arguments

The passenger claimed that the driver caused the accident, by losing control without another car or obstacle in sight

The driver defended herself by claiming that the plaintiff has caused the accident, by suddenly pulling the handbrake, which caused the wheels to lock

THE CASE TO HANDLE (2)

Evidence collected - police and expert reports (undisputed)

The accident occurred beyond an S-curve

Tire marks caused by locked tires found just beyond the curve

Tire marks caused by a sliding vehicle found 25 meteres further down the road

The driver said the passenger has pulled the handbrake, which was in pulled position

No sign of any obstacles or other unusual circumstances

Pulling the handbrake in that car can cause wheels to lock (expert report)

The passenger had drunk alcohol

Decision

Evidence and circumstances make the cause claimed by the defendant not unlikely

The fact that the car crashed is insufficient to conclude the defendants responsibility
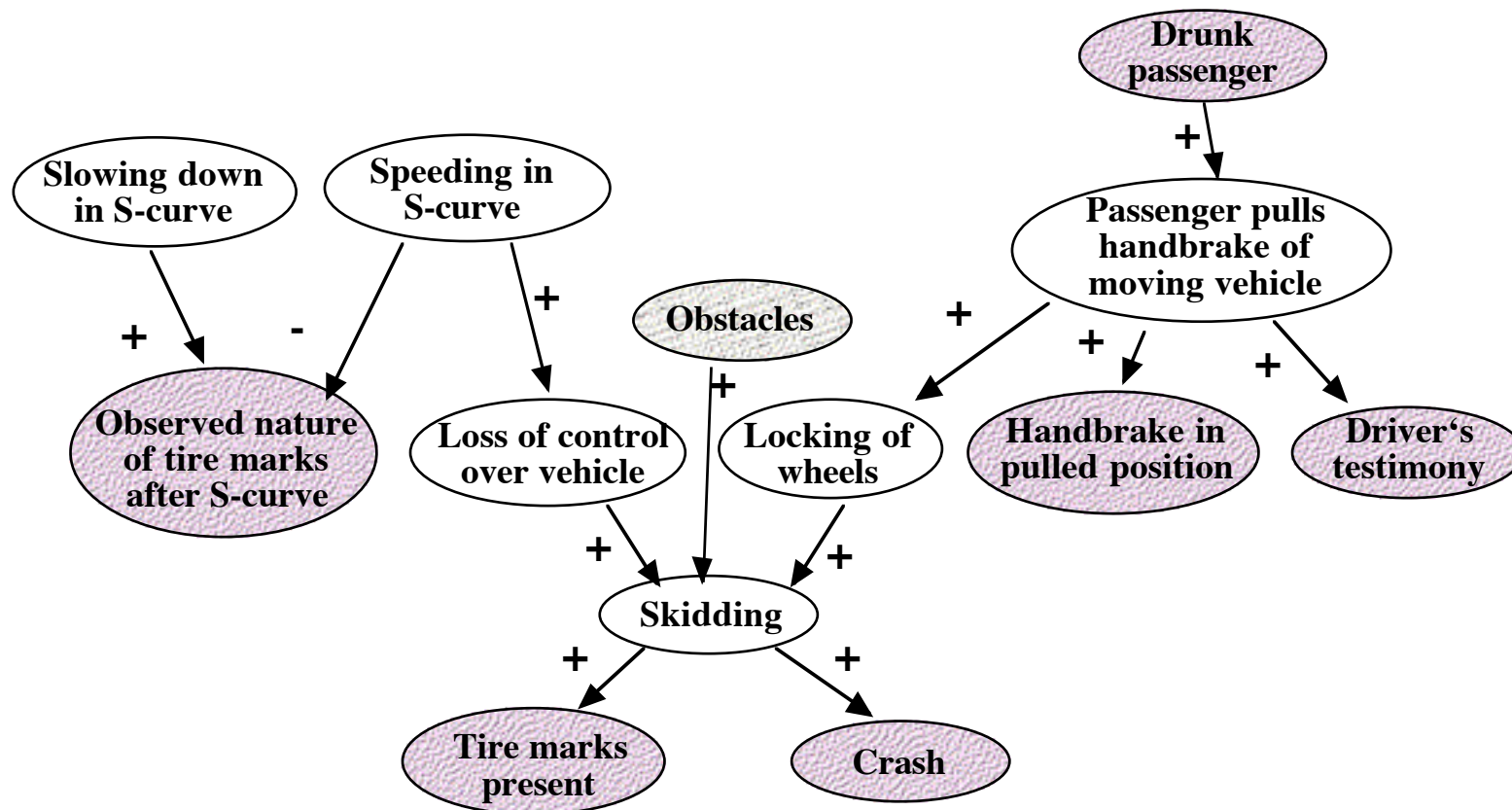
RECONSTRUCTION BY ABDUCTION (1)

Rules

r_1:   **skidding $\Rightarrow$ accident**

r_2:   **skidding $\Rightarrow$ tire marks present**

r_3:   **obstacles $\Rightarrow$ skidding**

r_4:   **loss of control $\Rightarrow$ skidding**

r_5:   **wheels locked $\Rightarrow$ skidding**

r_6:   **speeding in curve $\Rightarrow$ loss of control**

r_7:   **speeding in curve $\Rightarrow$ $\neg$ observed nature of tire marks**

r_8:   **slowing down in curve $\Rightarrow$ observed nature of tire marks**

r_9:   **passenger drunk $\Rightarrow$ passenger pulls handbrake**

r_{10}:   **passenger pulls handbrake $\Rightarrow$ wheels locked**

r_{11}:   **passenger pulls handbrake $\Rightarrow$ handbrake in pulled position after accident**

r_{12}:   **passenger pulls handbrake $\Rightarrow$ driver said "passenger pulled handbrake"**

RECONSTRUCTION BY ABDUCTION (2)

Qualitative probabilistic network

RECONSTRUCTION BY ABDUCTION (3)

Facts / evidence

(1) ¬ obstacles

(2) tire marks present

(3) observed nature of tire marks

(4) handbrake in pulled position after accident

(5) driver said "passenger pulled handbrake"

(6) passenger was drunk

Solutions offered by plaintiff (π) and defendant (δ)

H_π = {(7) speeding in curve, (8) loss of control}

H_π additionally explains (2)

H_π contradicts (3)

H_δ: = {(9) passenger pulls handbrake}

H_δ additionally explains (2, 4, 5)

H_δ contradicts nothing

ARGUMENTATION-BASED RECONSTRUCTION (1)

Plaintiffs (passengers) argument

(0) accident   (1) ¬ obstacles

(7) speeding in curve

(8) loss of control   (7) speeding in curve

(14) driver caused accident

Defendants (drivers) counterargument

(4) handbrake in pulled position   (5) driver said "passenger pulled handbrake"

(9) passenger pulled handbrake

(10) wheels locked

(11) skidding

(0) accident   (9) passenger pulled handbrake

(15) passenger caused accident

ARGUMENTATION-BASED RECONSTRUCTION (2)

Judge's counterarguments

(3) observed nature of tire marks   **(3) observed nature of tire marks**
{0,1} do not support (7)   (12) slowing down in curve

Judge's first priority argument

(3) observed nature of tire marks
_____

second argument above not weaker than plaintiff's subargument

Judge's second priority argument

(5)   (4)   (13) expert report   (2)   (3)   (6) passenger was drunk

Defendant's counterargument not weaker than plaintiff's argument

ARGUMENTATION-BASED RECONSTRUCTION (3)

2 kinds of rules

Explanations – derive causes from effects (evidential rules)

> E.g., handbrake in pulled position is evidence that passsenger pulled it

Prediction – derive effects from causes (causal rules)

> E.g., passsenger pulled handbrake caused wheels being locked

Combination of rules and relations among them

A conclusion established by a causal rule cannot be premise for an evidential rule

The plaintiff's and the defendant's arguments rebuts each other

The counterarguments of the court undercut and rebut, resp. plaintiff's subargument (7)

CATO – AN INTELLIGENT TUTORIAL SYSTEM

Components

- *Database* **– textual summaries and factor sets (147 trade secret cases)**

- *Factor Browser* **– 26 factors for trade secret law**

- *Case Analyzer* **– Lets students compile a list of factors and generates feedback**

- *Argument Maker* **– Presents argumentations in the context of students reactions**

- *Issue-Based Argument Window* **– Presents examples of arguments**

- *Squib Reader* **– Displays squibs of retrieved cases**

Elaborated for Mason vs. Jack Daniel Distillery case

    (a trade secret problem)

PREDICTING CASE OUTCOMES (Grabmair 2017)

Method

- *Database* **of previous cases**

- **Factors favoring plaintiff or defendant**

- **Court decisions for each case**

- **Elaborated for trade secret problems**

- **Based on previous systems (CATO)**

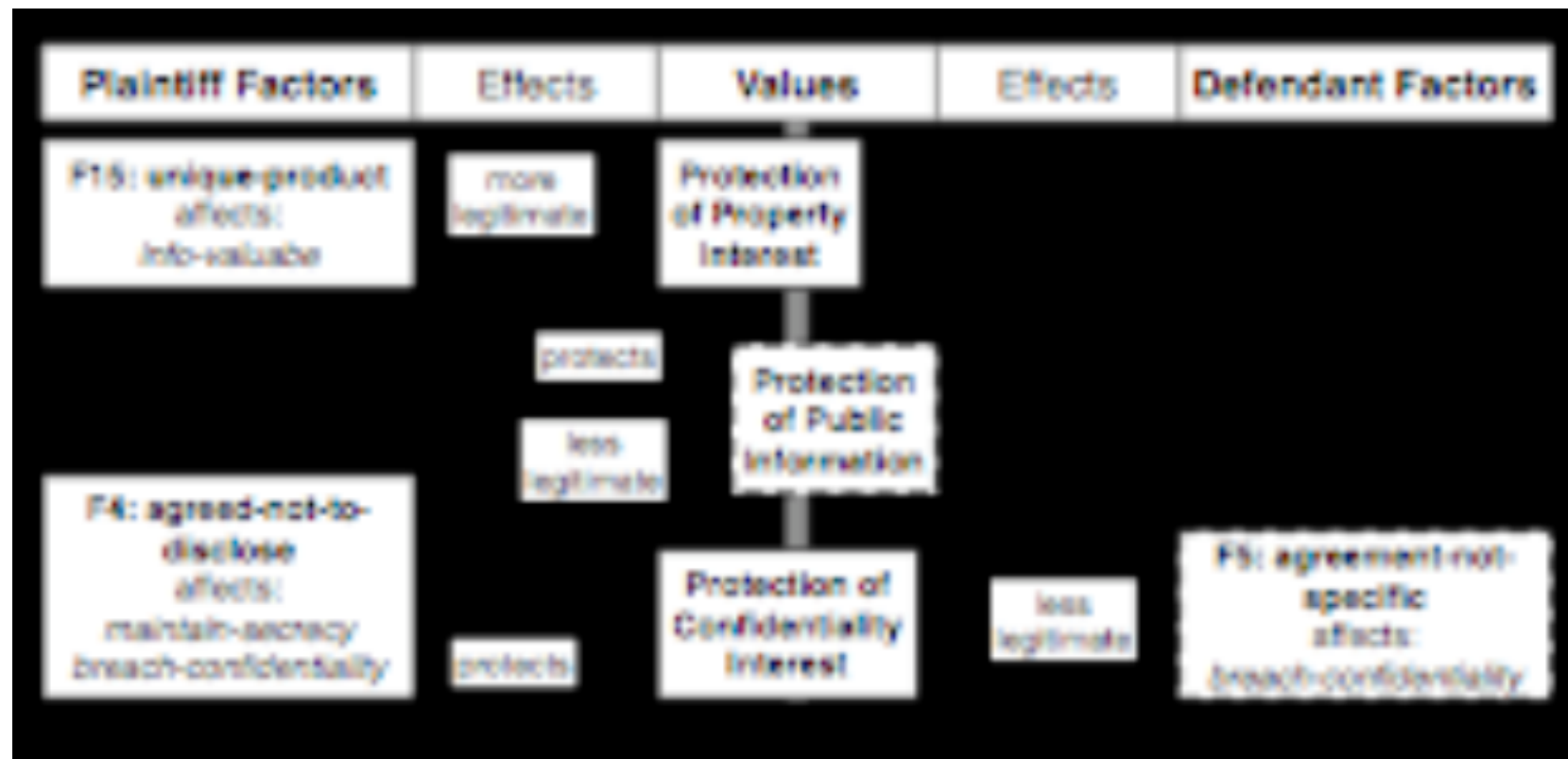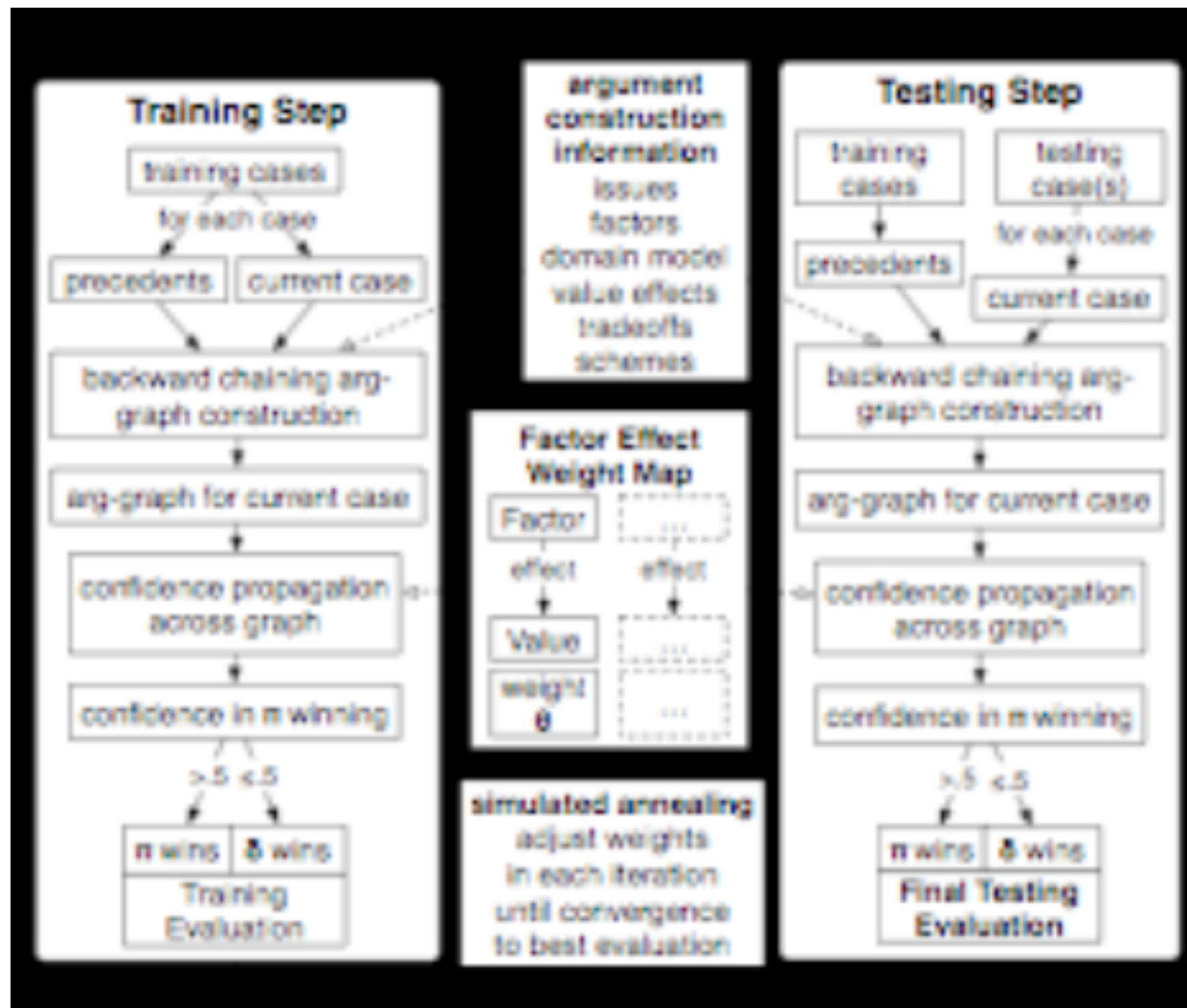 **in particular, the database**

DOMAIN MODEL OF ISSUES AND FACTORS

THE CASE TO HANDLE IN THE DOMAIN MODEL

INTER-ISSUE TRADE-OFF
(FOR BREACH OF CONFIDENTIALITY)

SYSTEM ARCHITECTURE

RESULTS

model	LOO	train	5-fold	train	fold-5D
GTW	.802 .	.84	.805	.845	.059
VJAP-full	.793	.828	.779	.837	.046
VJAP-local	.694	.717	.691	.725	.095
VJAP-no-precedent	.711	.727	.715	.73	.097
VJAP-timeline	.843	.854	.821	.862	.079
major-label	.612	n/a	.612	n/a	n/a
naive-bayes	.843	n/a	.851	n/a	n/a
decision tree	.777	n/a	.835	n/a	n/a
IBP	.81	n/a	.725	n/a	.112
IBP-noEE	.587	n/a	.562	n/a	.14