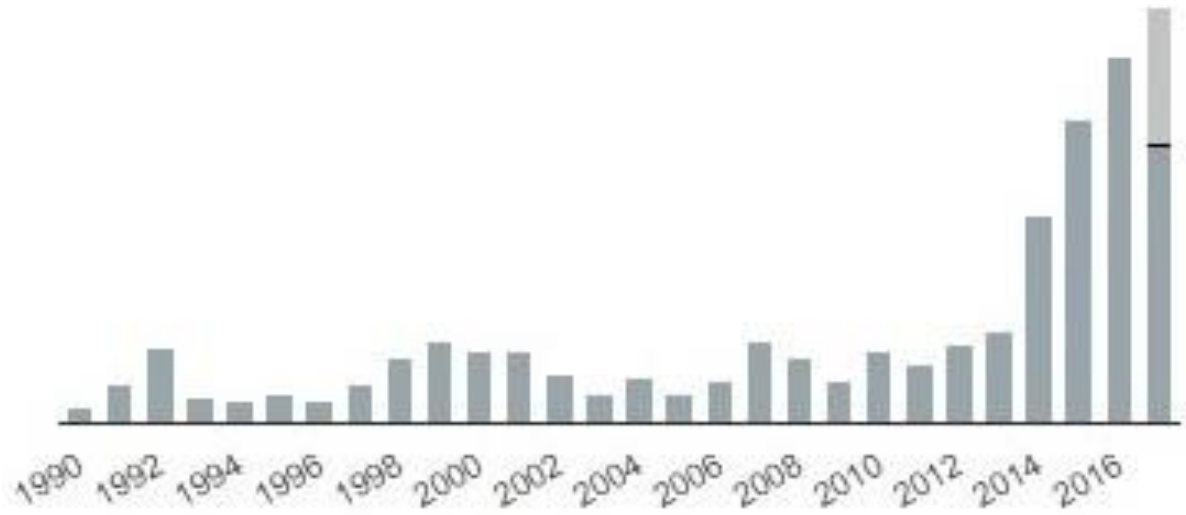
Argumenten voor goede kunstmatige intelligentie

Bart Verheij

Institute of Artificial Intelligence and Cognitive Engineering

www.ai.rug.nl/~verheij

university of groningen / faculty of science and engineering



Aantal artikelen met trefwoord ‘kunstmatige intelligentie’ in het NRC Handelsblad (1990–2017). De laatste balk is een extrapolatie op basis van de eerste 8 maanden van 2017. Bron: www.nrc.nl

nrc.nl›

Voetbalrobots hebben nu een loepzuiver en dodelijk schot

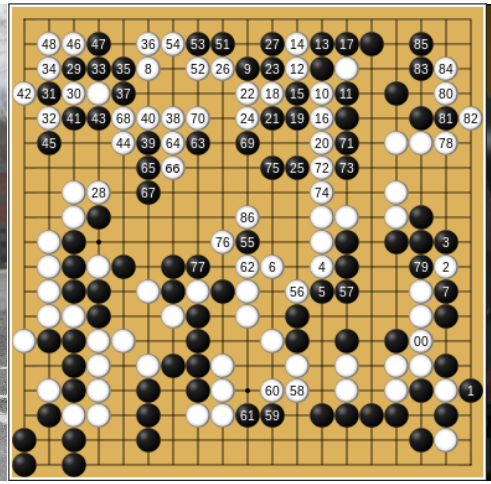
Robotvoetbal

Ruim baan voor de robottruck

Zelfrijdende vrachtwagens

Algoritme geeft werkzoekende sollicitatie-advies

Machine learning




HUMANS NEED NOT APPLY
A GUIDE TO WEALTH & WORK IN THE AGE OF ARTIFICIAL INTELLIGENCE
BY JERRY KAPLAN


BAN KILLER ROBOTS
OUR CALL TO ACTION »

European Economic and Social Committee

INT/806
Artificial intelligence

OPINION

Section for the Single Market, Production and Consumption

Artificial intelligence – The consequences of artificial intelligence on the (digital) single market, production, consumption, employment and society
(own-initiative opinion)

Rapporteur: **Catelijne MULLER**

AN OPEN LETTER TO THE UNITED NATIONS CONVENTION ON CERTAIN CONVENTIONAL WEAPONS

As companies building the technologies in Artificial Intelligence and Robotics that may be repurposed to develop autonomous weapons, we feel especially responsible in raising this alarm. We warmly welcome the decision of the UN's Conference of the Convention on Certain Conventional Weapons (CCW) to establish a Group of Governmental Experts (GGE) on Lethal Autonomous Weapon Systems. Many of our researchers and engineers are eager to offer technical advice to your deliberations.

We commend the appointment of Ambassador Amandeep Singh Gill of India as chair of the GGE. We entreat the High Contracting Parties participating

Kunstmatige intelligentie

Specialistische kunstmatige intelligentie

Bestaat en is veel in gebruik.

Belastingaangifte, fotoclassificatie

Algemene kunstmatige intelligentie

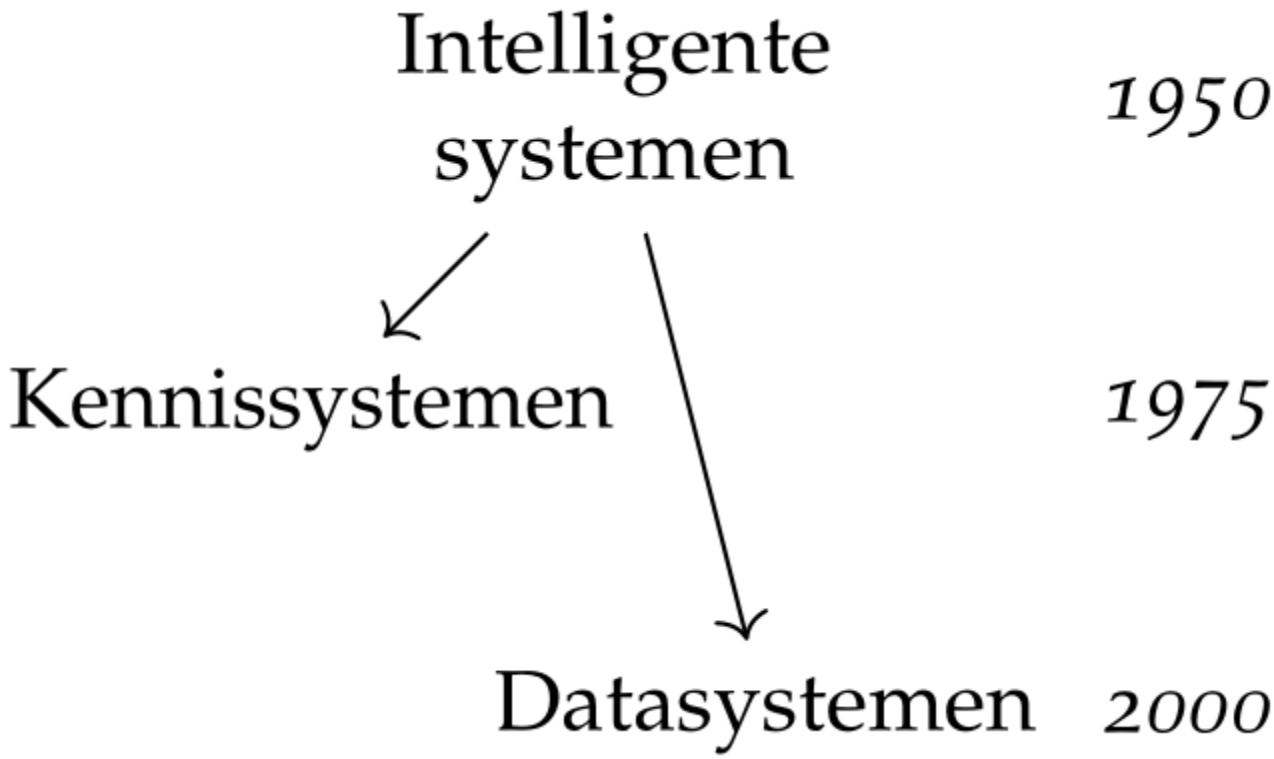
Bestaat niet. De natuurlijke variant bestaat.

Boeken begrijpen, fietsen in een drukke straat

Superieure kunstmatige intelligentie

Bestaat niet. Een natuurlijke variant bestaat per definitie niet.

Speculatief: Uitvindingen aan de lopende band, robotopstand


Intelligente
systemen
1950
Kennissystemen
1975
Datasystemen
2000

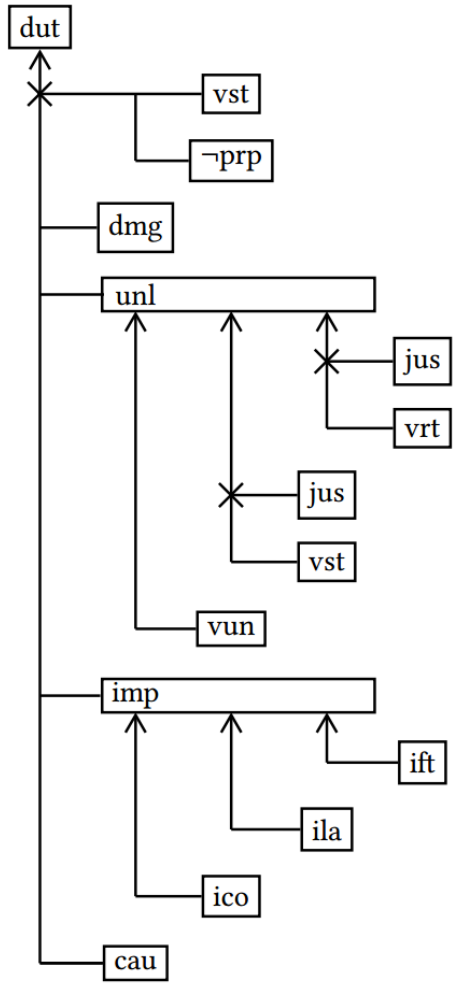
Kennissystemen

Artikel 6:162 lid 1

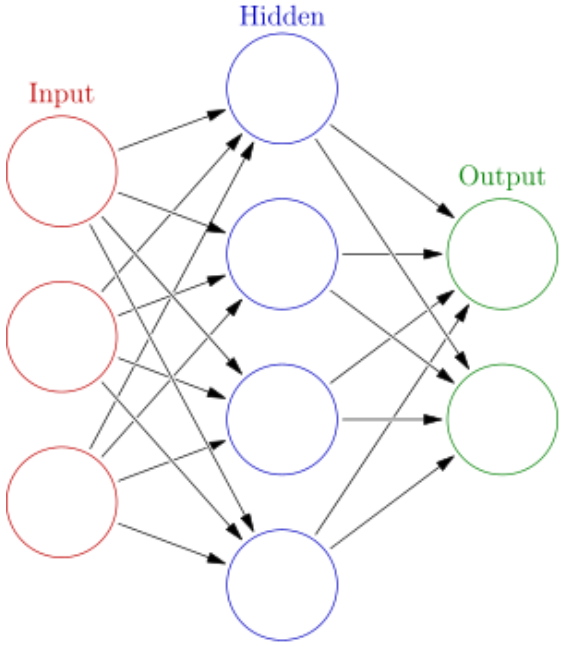
Hij die jegens een ander een onrechtmatige daad pleegt, welke hem kan worden toegerekend, is verplicht de schade die de ander dientengevolge lijdt, te vergoeden.

```
ALS schade
   EN onrechtmatig
   EN toerekenbaar
   EN causaal-verband
DAN schadevergoedingsplicht
```

$$\mathrm{dmg} \wedge \mathrm{unl} \wedge \mathrm{imp} \wedge \mathrm{cau} \rightsquigarrow \mathrm{dut}$$



Datasystemen

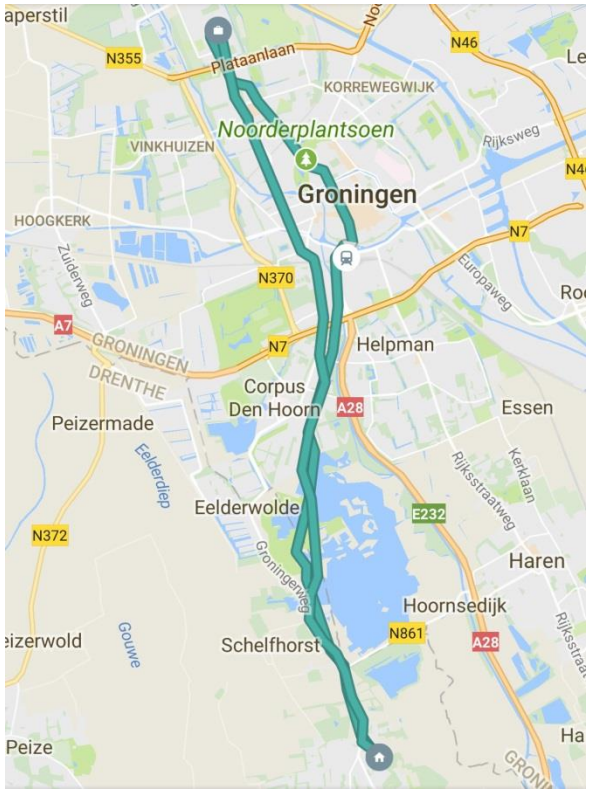


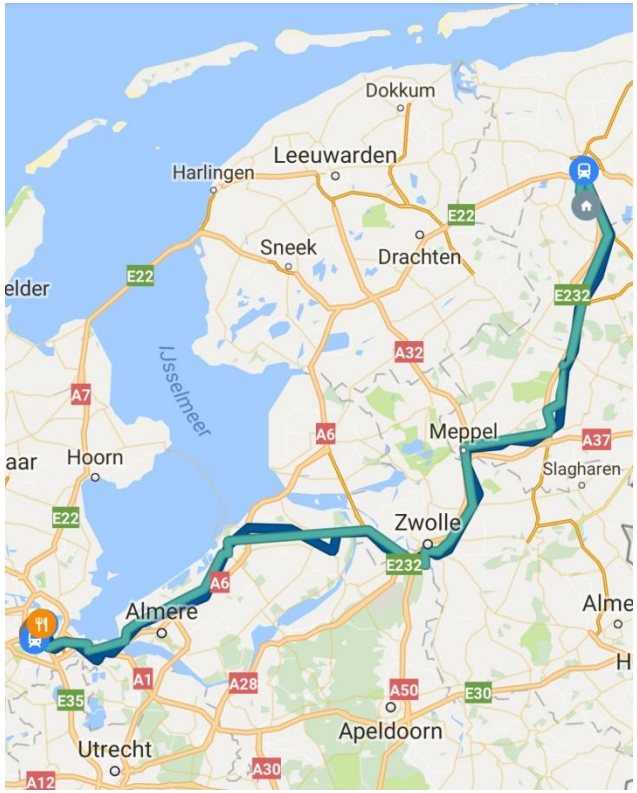
Goede kunstmatige intelligentie

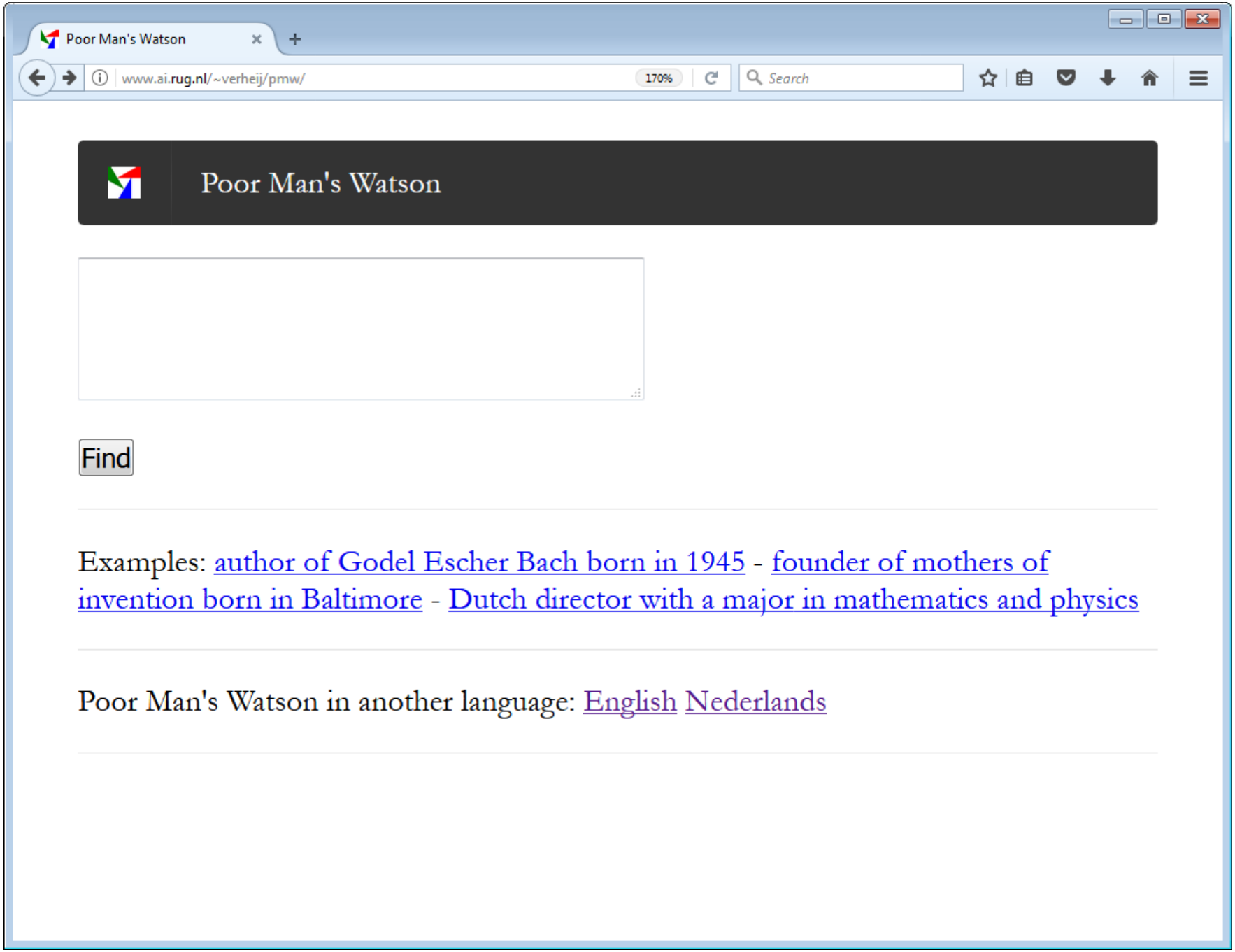
Goede antwoorden

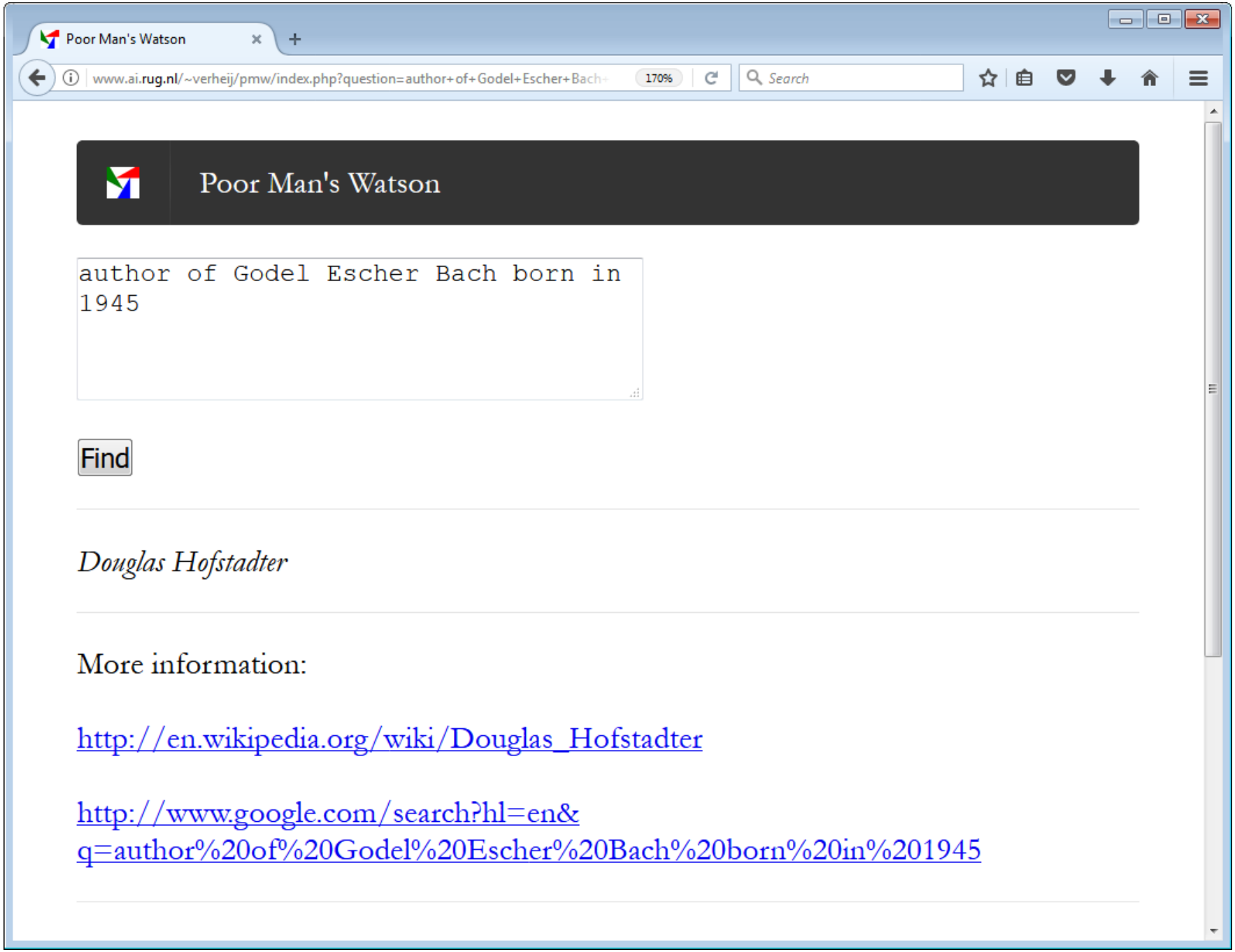
Goede redenen

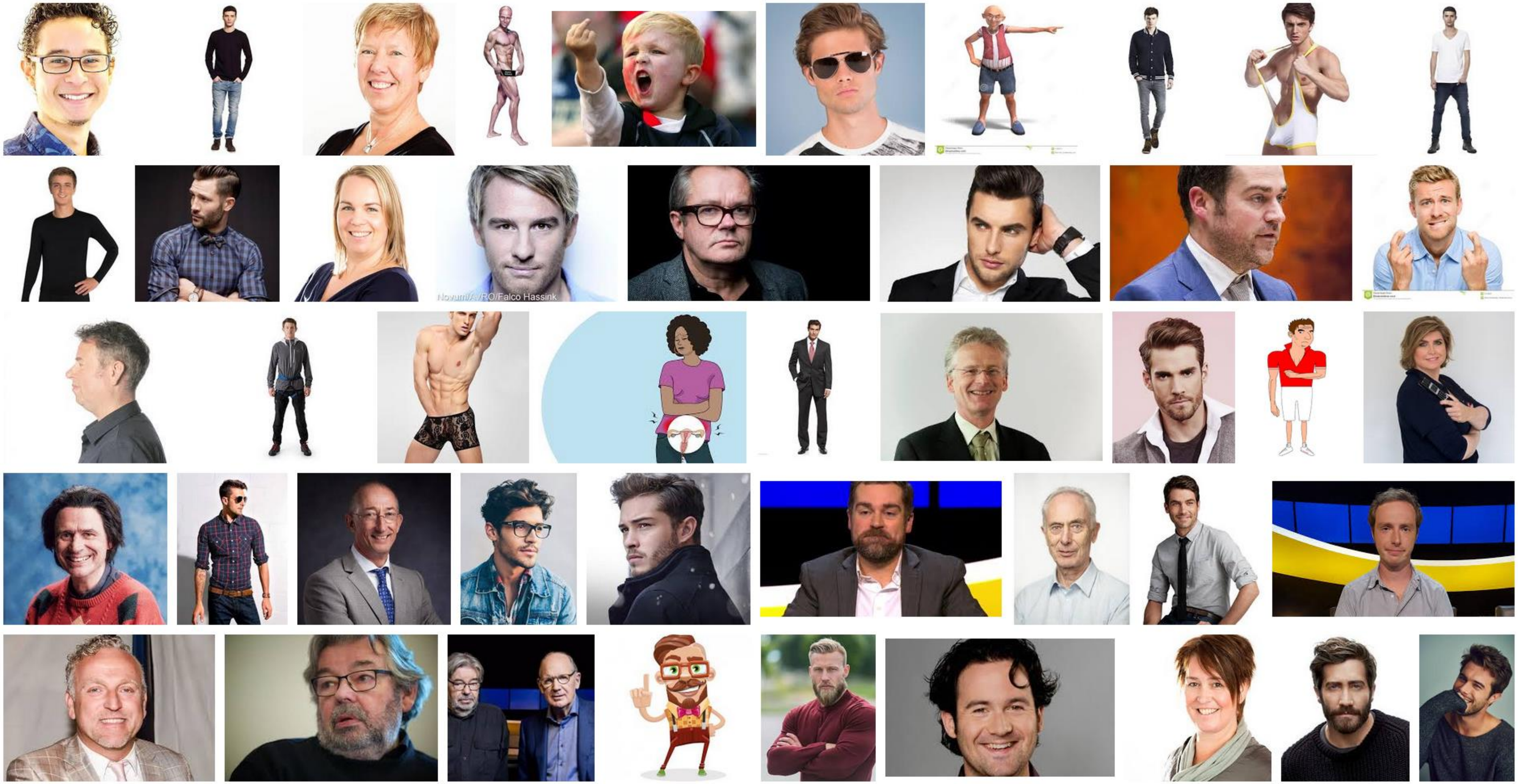
Goede keuzes


aperstil
N355
Plataanlaan
N46
KORREWEGWIJK
Noorderplantsoen
VINKHUIZEN
Rijksweg
Groningen
HOOGKERK
N7
Zuiderweg
N370
Europaweg
A7
GRONINGEN
N7
Helpman
DRENTHE
Corpus
Den Hoorn
A28
Essen
Peizermade
Eelderdiep
Eelderwolde
Rijksstraatweg
Kerklaan
E232
N372
Haren
Groningerweg
Hoornsedijk
Gouwe
Schelfhorst
N861
A28
Peize


Dokkum
Leeuwarden
Harlingen
E22
Sneek
Drachten
E22
E232
A32
IJsselmeer
A7
A6
Meppel
A37
Hoorn
Slagharen
E22
Zwolle
E232
A6
Almere
A1
A28
A50
E30
E35
Apeldoorn
Utrecht
A30
A12


Poor Man's Watson
www.ai.rug.nl/~verheij/pmw/
170%
Search
Poor Man's Watson
Find
Examples: author of Godel Escher Bach born in 1945 - founder of mothers of invention born in Baltimore - Dutch director with a major in mathematics and physics
Poor Man's Watson in another language: English Nederlands


Poor Man's Watson
www.ai.rug.nl/~verheij/pmw/index.php?question=author+of+Godel+Escher+Bach+
170%
Search
Poor Man's Watson
author of Godel Escher Bach born in 1945
Find
Douglas Hofstadter
More information:
http://en.wikipedia.org/wiki/Douglas_Hofstadter
http://www.google.com/search?hl=en&q=author%20of%20Godel%20Escher%20Bach%20born%20in%201945


Novum/AVRO/Falco Hassink

Goede kunstmatige intelligentie

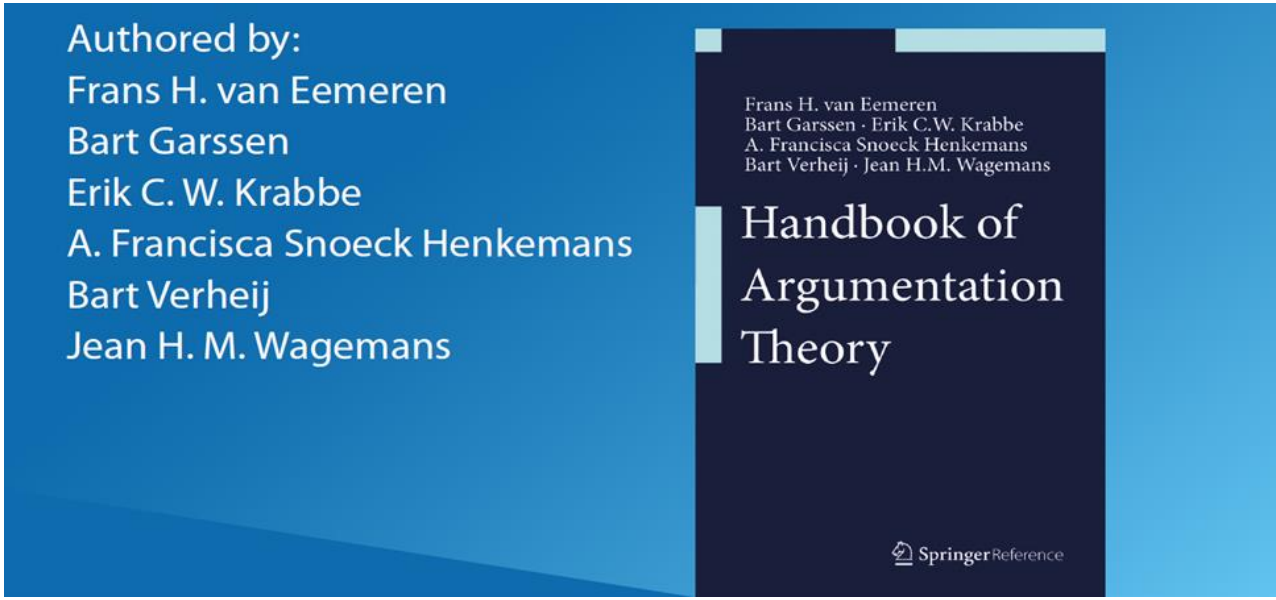
Goede antwoorden

Goede redenen

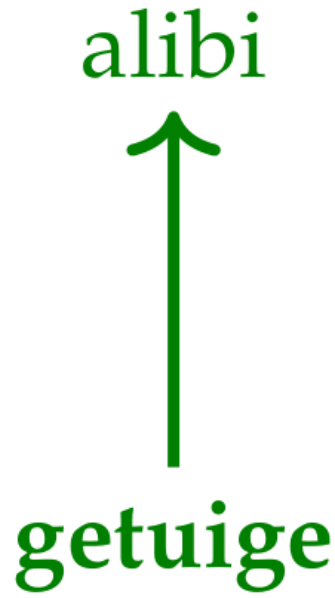
Goede keuzes

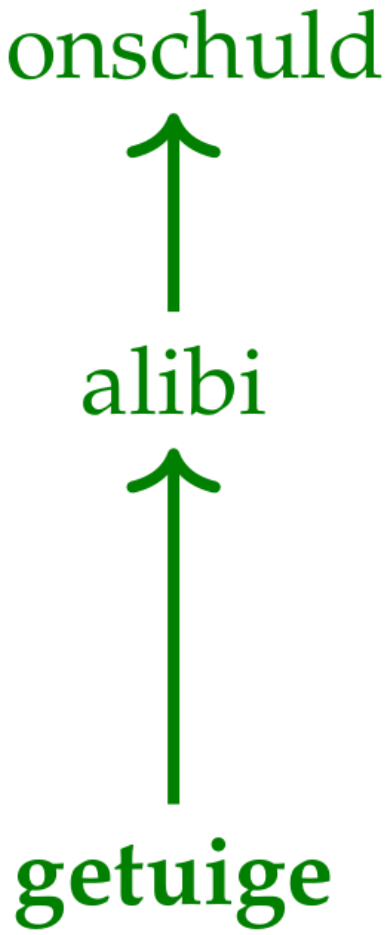
Argumentatiesystemen

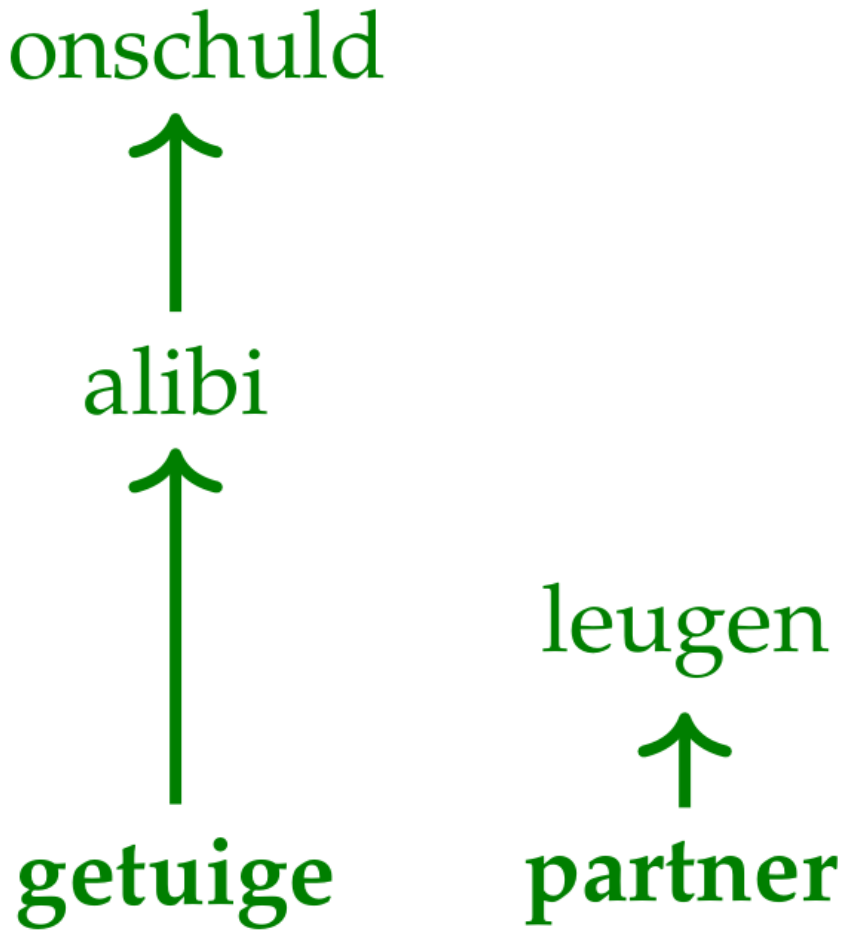
Argumentatiesystemen zijn systemen die een kritische discussie kunnen voeren waarin hypothesen worden geconstrueerd, getoetst en gewaardeerd op basis van redelijke argumenten.

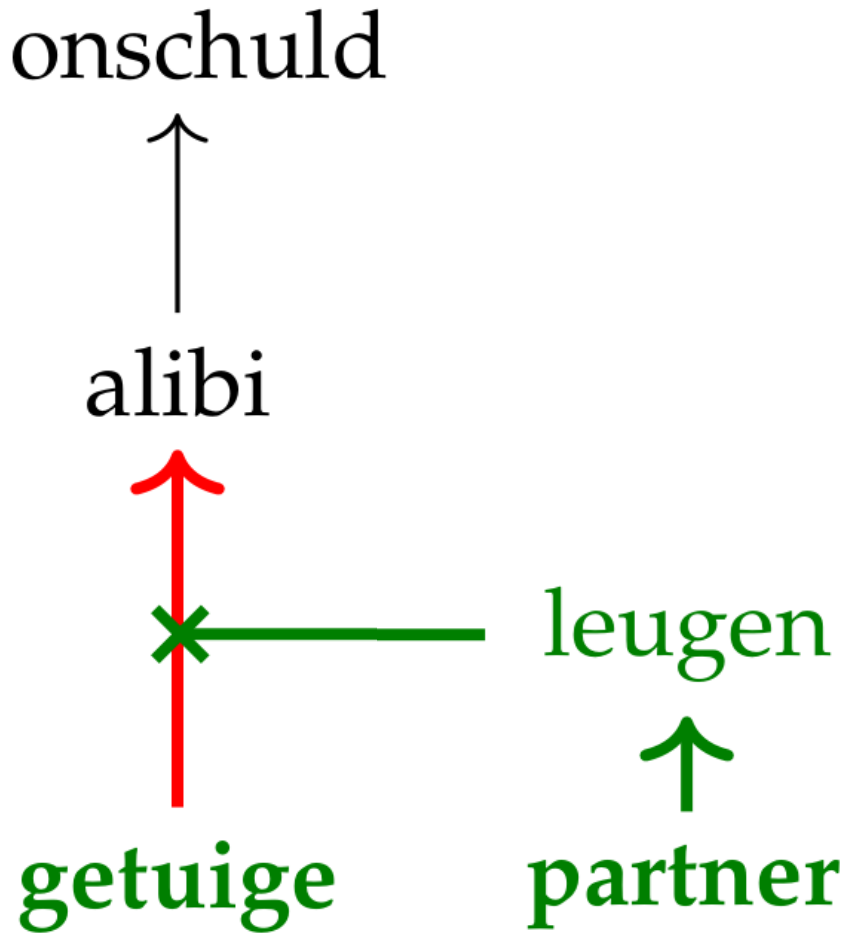


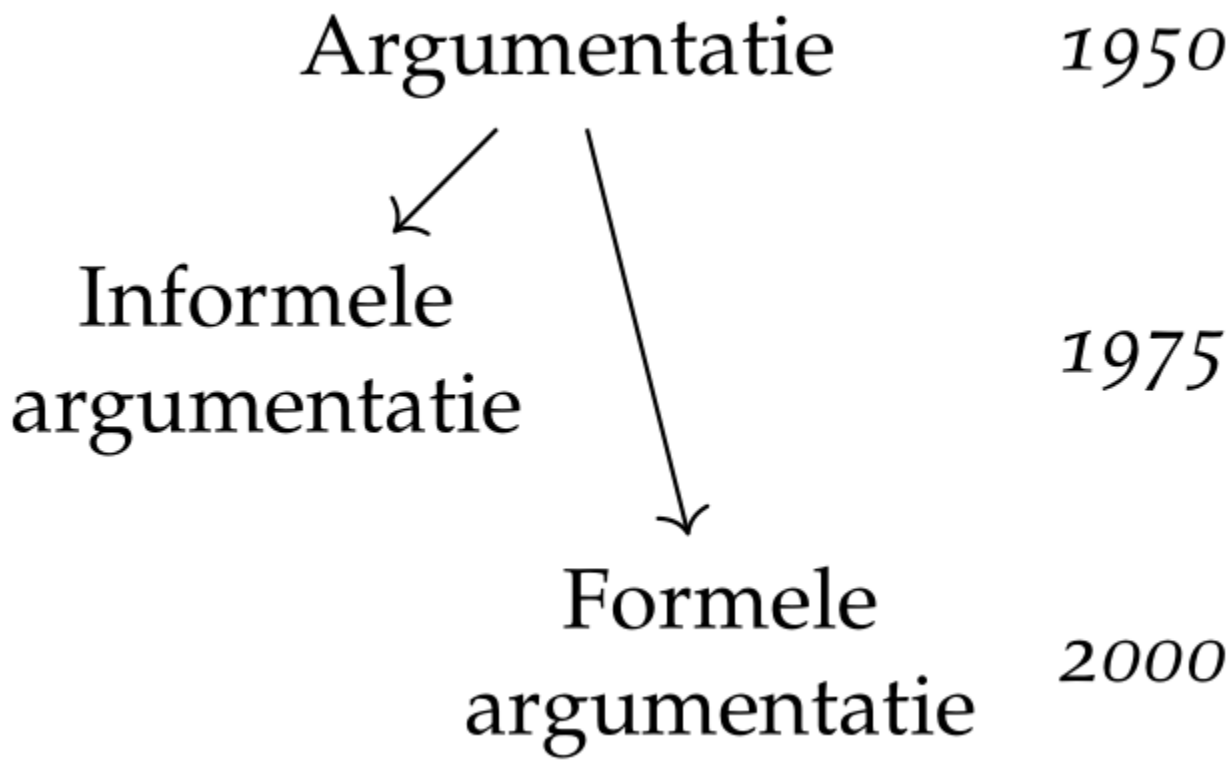
Chapter 11: Argumentation and Artificial Intelligence

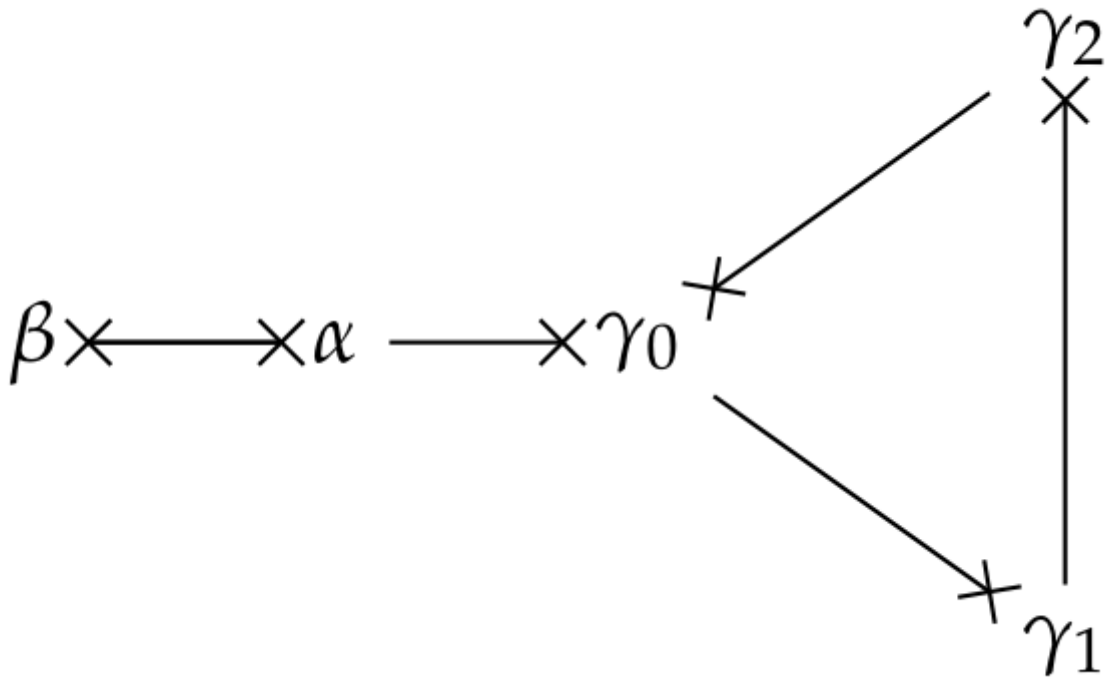

alibi
getuige

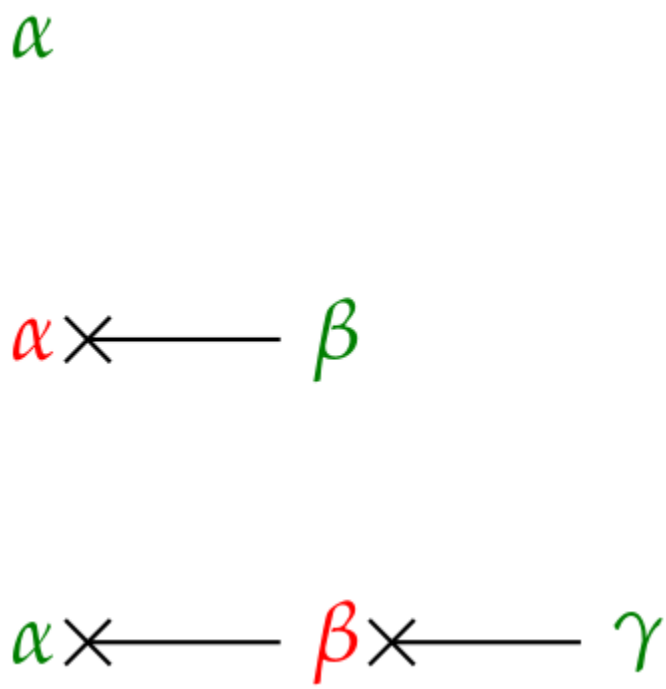

onschuld
alibi
getuige


onschuld
alibi
leugen
getuige
partner

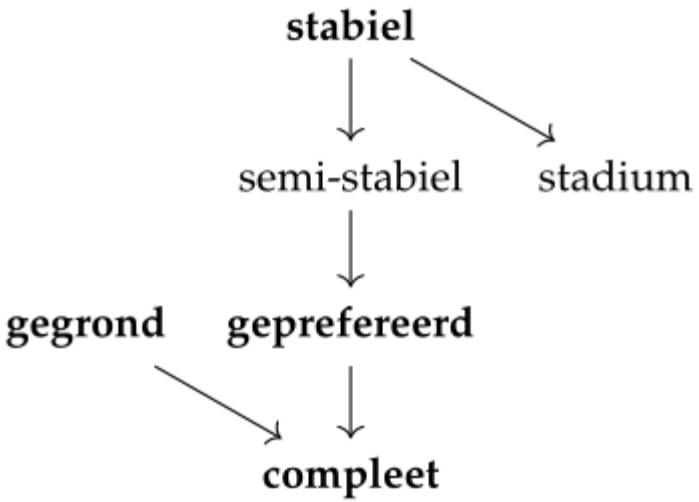

onschuld
alibi
leugen
getuige
partner

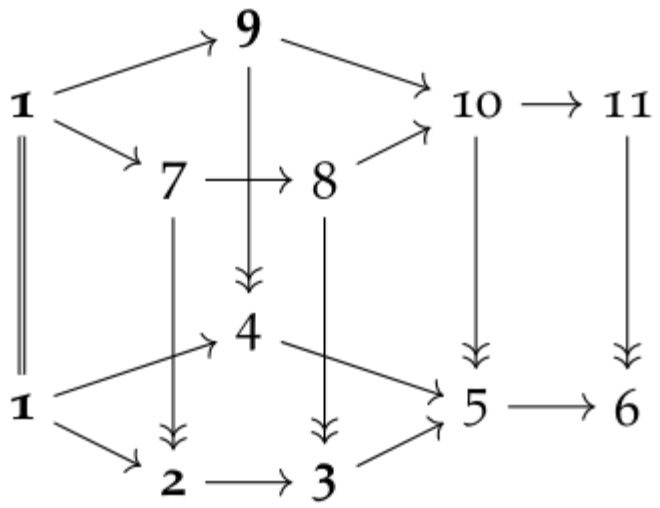

Argumentatie
1950
Informele argumentatie
1975
Formele argumentatie
2000


γ_2
β
α
γ_0
γ_1


α
α
β
α
β
γ


ArguMed - example.def
File Edit Options
File Theory Dialectical arguments
alibi
getuige
ArguMed - example.def
File Edit Options
File Theory Dialectical arguments
onschuld
alibi
getuige
ArguMed - example.def
File Edit Options
File Theory Dialectical arguments
onschuld
alibi
getuige
leugen
partner
ArguMed - example.def
File Edit Options
File Theory Dialectical arguments
onschuld
alibi
leugen
partner
getuige
Grounded semantics mode

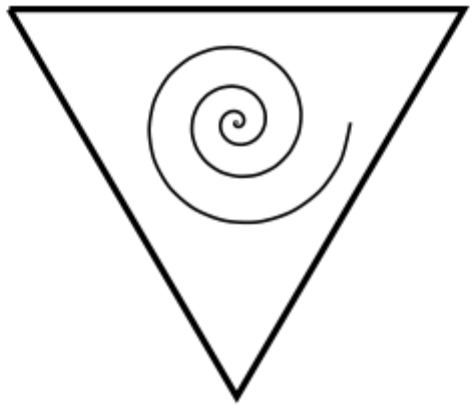




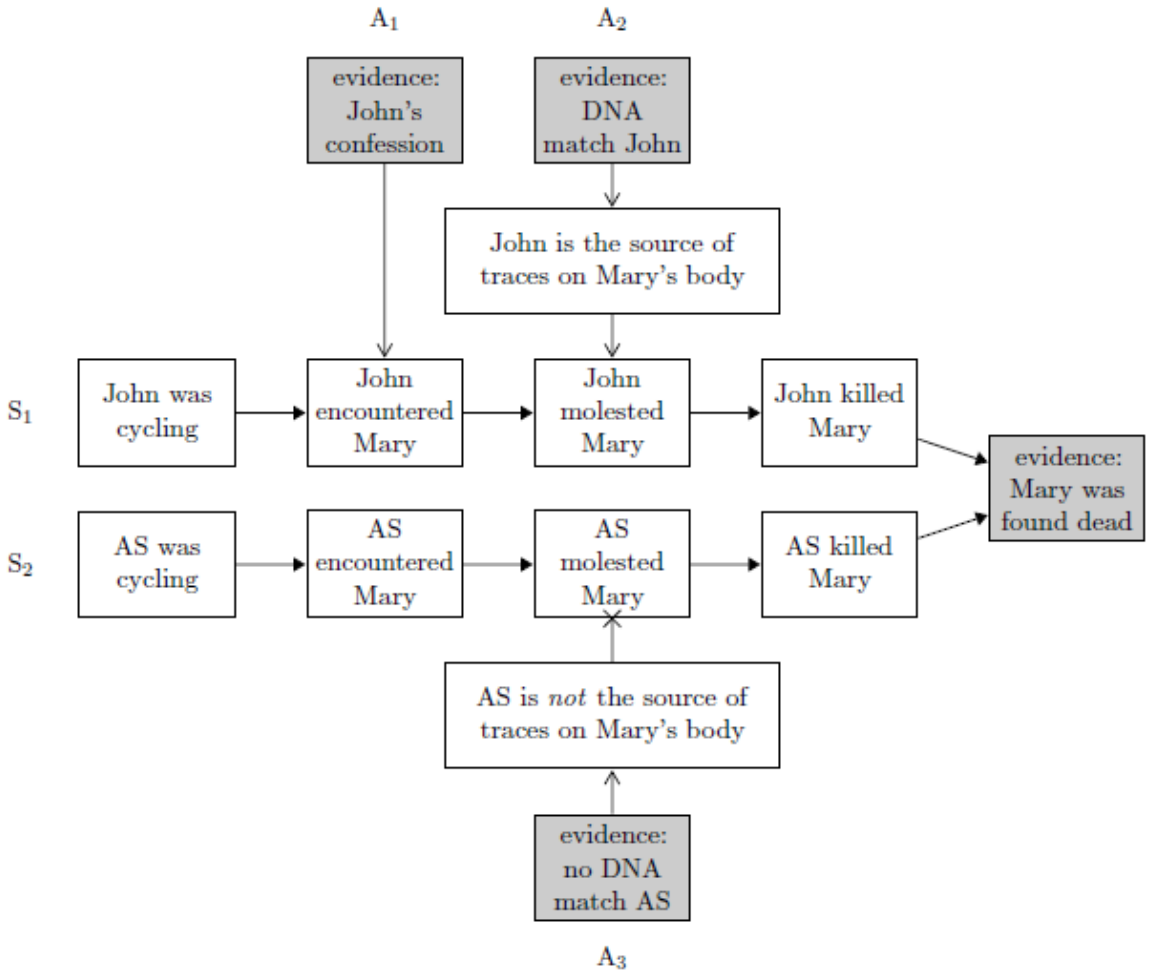
1995, 1996

2003

Kansen Scenarios



Argumenten



Bex 2009 proefschrift

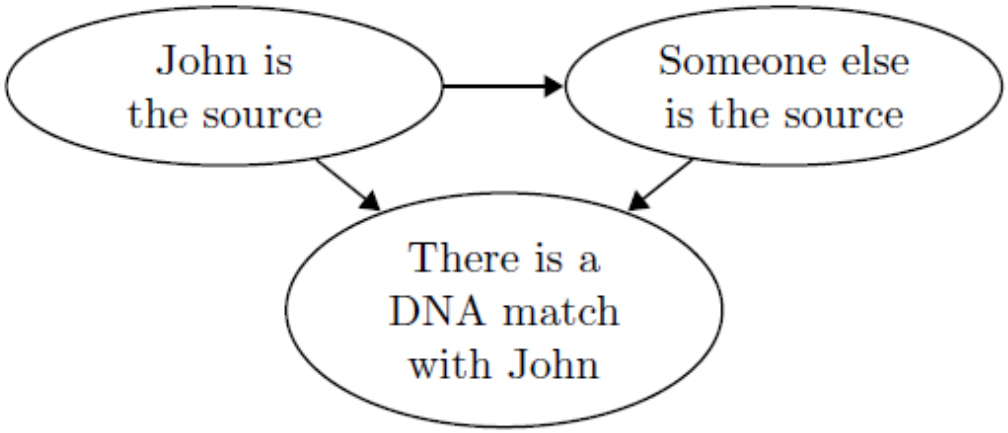


Figure 5: A Bayesian network structure with dependency relations

John is the source

John is the source = false	8000/8001
John is the source = true	1/8001

Someone else is the source

John is the source	false	true
Someone else is the source = false	0	1
Someone else is the source = true	1	0

DNA match

John is the source	false		true	
Someone else	false	true	false	true
DNA match = false	0.5*	$1 - 0.66 \cdot 10^{-21}$	0	0.5*
DNA match = true	0.5*	$0.66 \cdot 10^{-21}$	1	0.5*

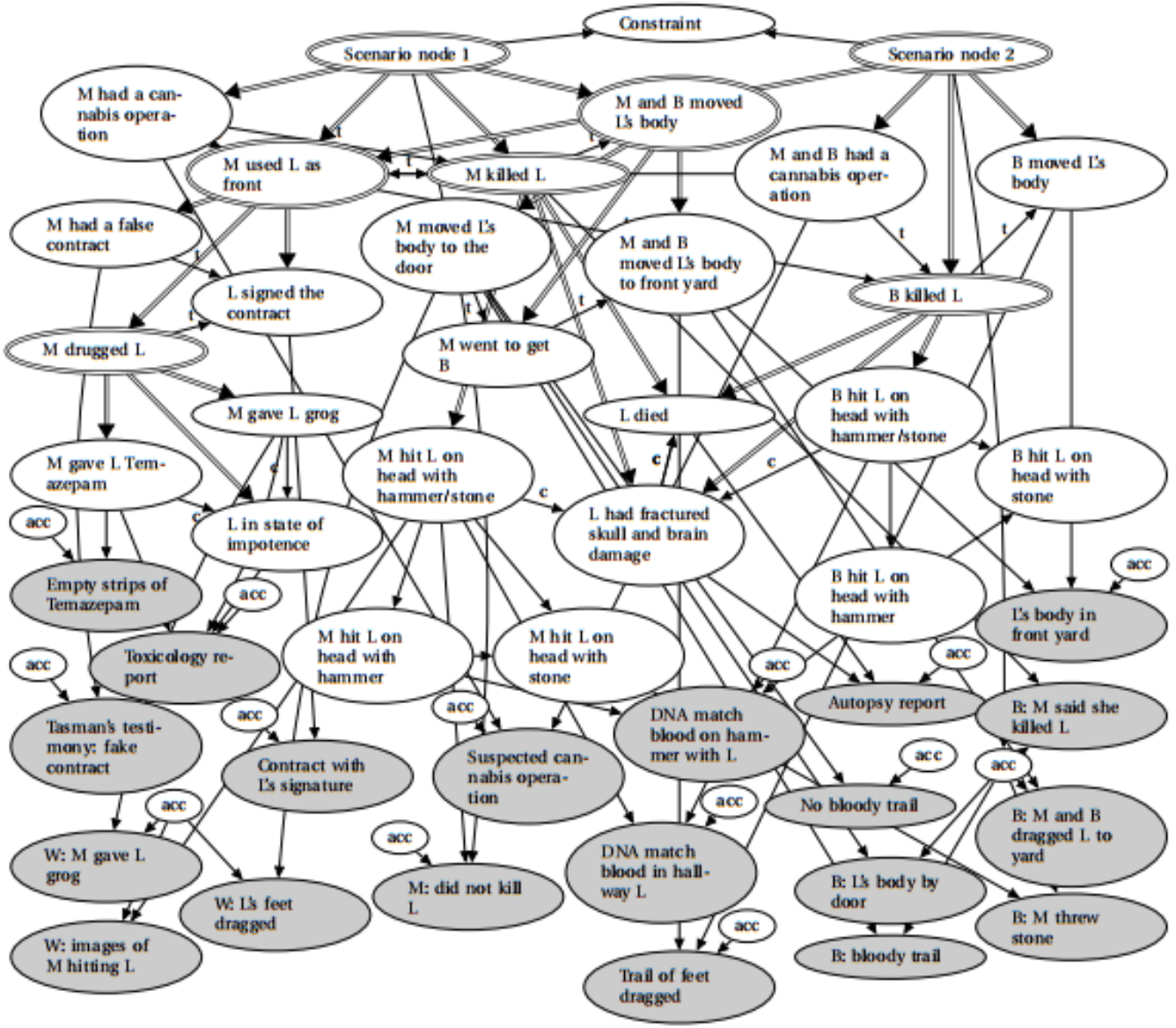


Figure 4.11: Scenario 1 and scenario 2 with evidence. Evidential nodes are indicated as grey nodes.

Vlek 2016 proefschrift

Motive	
true	0.05
false	0.95

Psych_report		
Motive	true	false
true	0.6	0.1
false	0.4	0.9

Crime		
Motive	true	false
true	0.5	0.01

Twin	
true	0.01

Figure 2: A small BN concerni
are shown as tables inside the r

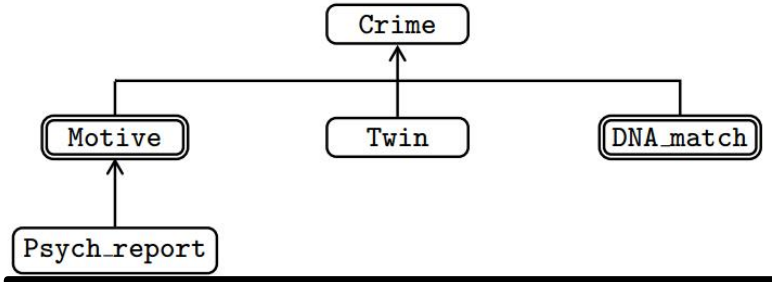


Figure 7: Supp
variables are de

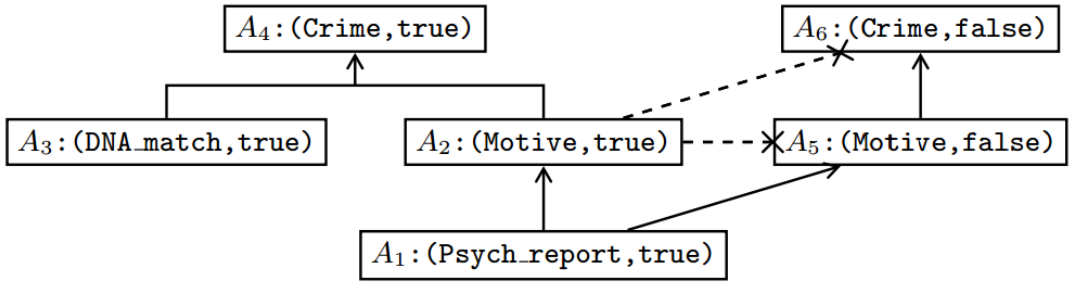
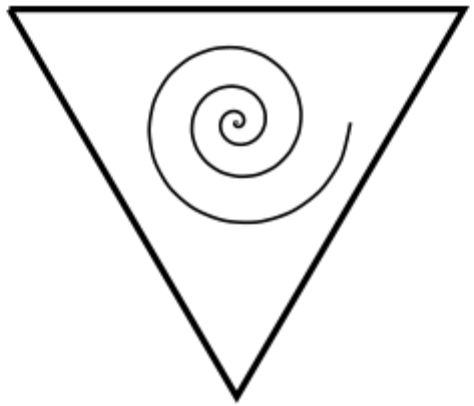


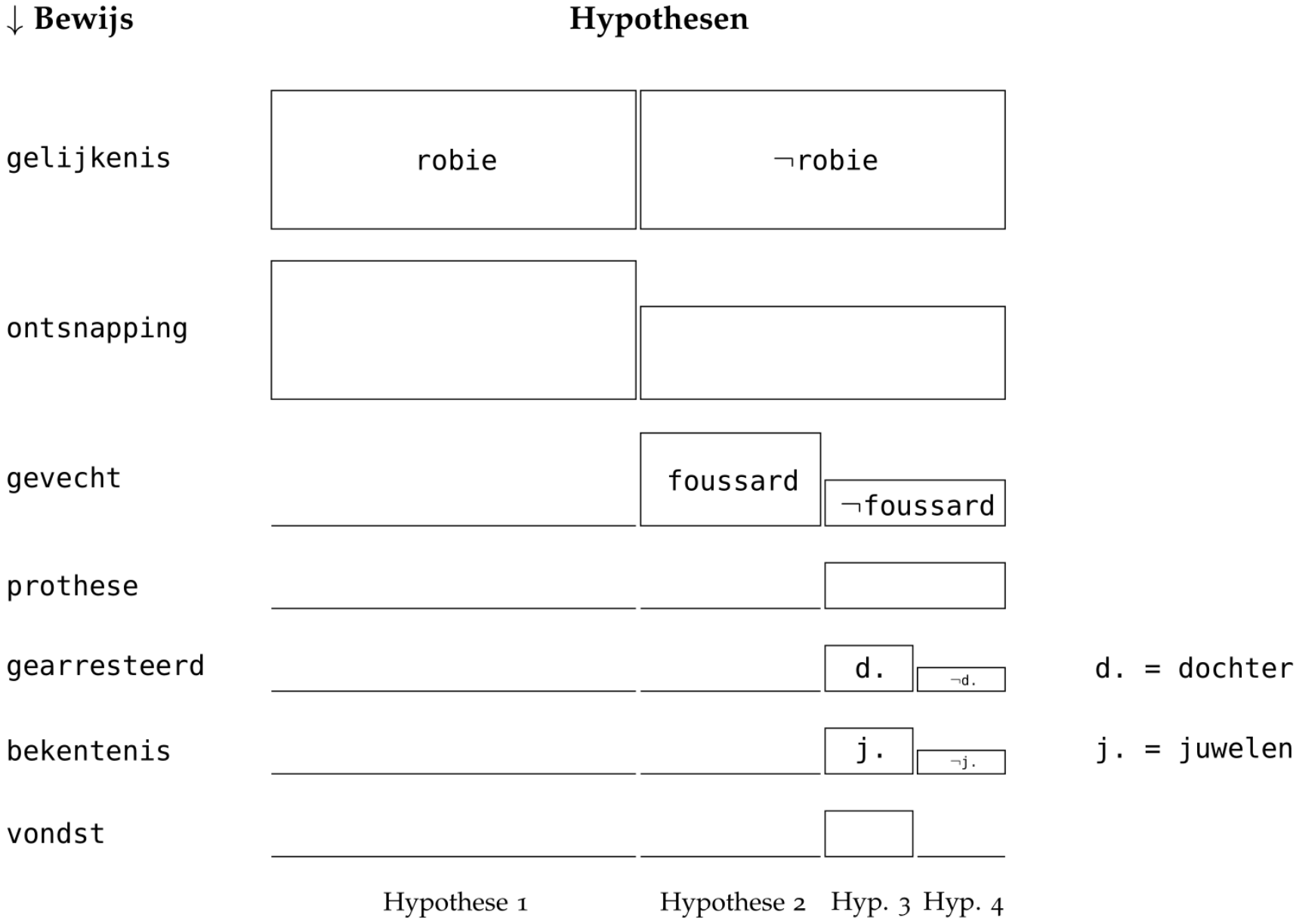
Figure 8: An argument graph resulting from our running example. Arrows show the immediate sub-argument relation. Besides the intuitively correct arguments $A_1, \ldots, A_4$ there are two additional arguments depicted that can also be made but that are successfully rebutted by A_2. The dashed arrows with crosshair tips show the defeat relation between arguments. Argument A_5 is defeated by A_2 because (`Motive`, `true`) is probabilistically stronger (using the likelihood ratio measure of strength in this case) than (`Motive`, `false`) based on this evidence. Any conclusion that builds on this second argument (such as A_6) is also defeated.

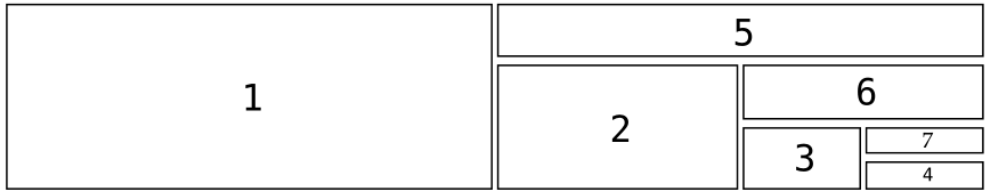
Timmer 2017 proefschrift

Kansen Scenarios



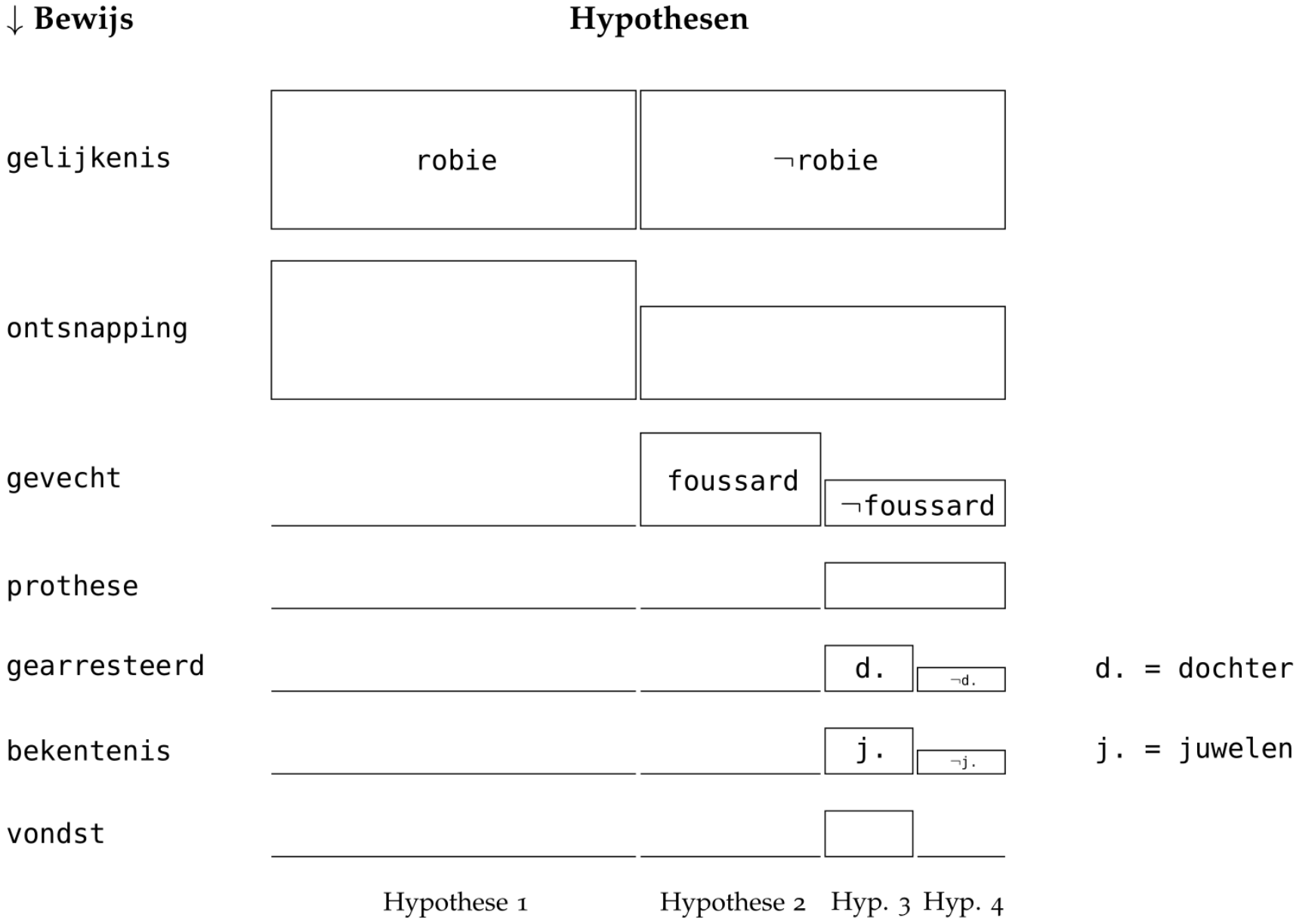
Argumenten


↓ Bewijs
Hypothesen
gelijkenis
robie
¬robie
ontsnapping
gevecht
foussard
¬foussard
prothese
gearresteerd
d.
¬d.
bekentenis
j.
¬j.
vondst
Hypothese 1
Hypothese 2
Hyp. 3
Hyp. 4
d. = dochter
j. = juwelen



Blok 1: Robie was inderdaad de dief

Blok 3: De dochter van verzetsvriend Foussard was de dief


↓ Bewijs
Hypothesen
gelijkenis
robie
¬robie
ontsnapping
gevecht
foussard
¬foussard
prothese
gearresteerd
d.
¬d.
bekentenis
j.
¬j.
vondst
Hypothese 1
Hypothese 2
Hyp. 3
Hyp. 4
d. = dochter
j. = juwelen

Definition 1. A *case model* is a pair $(C, \geq)$ with finite $C \subseteq L$, such that the following hold, for all φ, ψ and $\chi \in C$:

1. $\not\models \neg\varphi$;
2. If $\not\models \varphi \leftrightarrow \psi$, then $\models \neg(\varphi \wedge \psi)$;
3. If $\models \varphi \leftrightarrow \psi$, then $\varphi = \psi$;
4. $\varphi \geq \psi$ or $\psi \geq \varphi$;
5. If $\varphi \geq \psi$ and $\psi \geq \chi$, then $\varphi \geq \chi$.

Drie soorten geldigheid

Coherente argumenten

$(C, \geq) \models (\varphi, \psi)$ if and only if $\exists \omega \in C$: $\omega \models \varphi \wedge \psi$.

Presumptieve, `veronderstellende' argumenten

$(C, \geq) \models \varphi \rightsquigarrow \psi$ if and only if $\exists \omega \in C$:

1. $\omega \models \varphi \wedge \psi$; and
2. $\forall \omega' \in C$: if $\omega' \models \varphi$, then $\omega \geq \omega'$.

Conclusieve, `beslissende' argumenten

$(C, \geq) \models \varphi \Rightarrow \psi$ if and only if $\exists \omega \in C$: $\omega \models \varphi \wedge \psi$ and $\forall \omega \in C$: if $\omega \models \varphi$, then $\omega \models \varphi \wedge \psi$.

Definition 1. A *case model* is a pair $(C, \geq)$ with finite $C \subseteq L$, such that the following hold, for all φ, ψ and $\chi \in C$:

1. $\not\models \neg\varphi$;
2. If $\not\models \varphi \leftrightarrow \psi$, then $\models \neg(\varphi \wedge \psi)$;
3. If $\models \varphi \leftrightarrow \psi$, then $\varphi = \psi$;
4. $\varphi \geq \psi$ or $\psi \geq \varphi$;
5. If $\varphi \geq \psi$ and $\psi \geq \chi$, then $\varphi \geq \chi$.

≥ is een totale preordening

d.w.z. representeerbaar door een numerieke functie

Tegelijk met en zonder getallen

Drie soorten geldigheid

Coherente argumenten $p(\psi \mid \varphi) > 0$

$(C, \geq) \models (\varphi, \psi)$ if and only if $\exists \omega \in C$: $\omega \models \varphi \wedge \psi$.

Presumptieve, `veronderstellende' argumenten $p(\psi \mid \varphi) > t$

$(C, \geq) \models \varphi \rightsquigarrow \psi$ if and only if $\exists \omega \in C$:

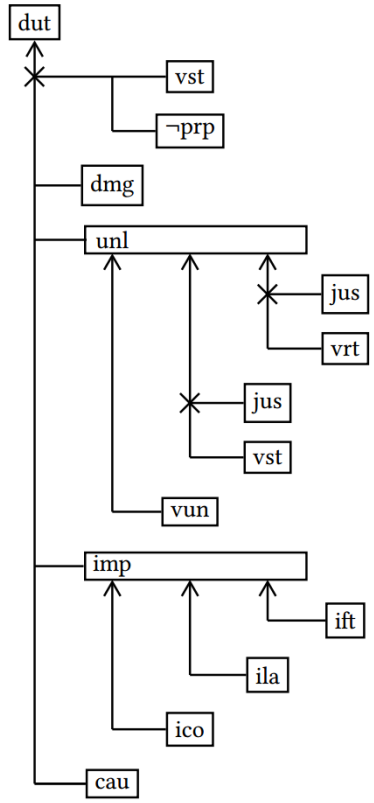
1. $\omega \models \varphi \wedge \psi$; and
2. $\forall \omega' \in C$: if $\omega' \models \varphi$, then $\omega \geq \omega'$.

Conclusieve, `beslissende' argumenten $p(\psi \mid \varphi) = 1$

$(C, \geq) \models \varphi \Rightarrow \psi$ if and only if $\exists \omega \in C$: $\omega \models \varphi \wedge \psi$ and $\forall \omega \in C$: if $\omega \models \varphi$, then $\omega \models \varphi \wedge \psi$.

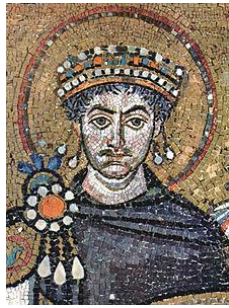
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	¬dut	¬dut	¬dut	dut	dut	dut	dut	dut	dut	dut	dut	dut	¬dut	¬dut	¬dut
¬dmg	dmg	dmg	dmg	dmg	dmg	dmg	dmg	dmg	dmg	dmg	dmg	dmg	dmg	dmg	dmg
	¬unl	unl	unl	unl	unl	unl	unl	unl	unl	unl	unl	unl	¬unl	¬unl	unl
		¬imp	imp	imp	imp	imp	imp	imp	imp	imp	imp	imp			imp
			¬cau	cau	cau	cau	cau	cau	cau	cau	cau	cau			cau
	¬vrt			vrt	vrt	vrt	¬vrt	¬vrt	¬vrt	¬vrt	¬vrt	¬vrt	vrt	¬vrt	
	¬vst			¬vst	¬vst	¬vst	vst	vst	vst	¬vst	¬vst	¬vst	¬vst	vst	vst
	¬vun			¬vun	¬vun	¬vun	¬vun	¬vun	¬vun	vun	vun	vun			
		¬ift		ift	¬ift	¬ift	ift	¬ift	¬ift	ift	¬ift	¬ift			
		¬ila		¬ila	ila	¬ila	¬ila	ila	¬ila	¬ila	ila	¬ila			
		¬ico		¬ico	¬ico	ico	¬ico	¬ico	ico	¬ico	¬ico	ico			
				¬jus	¬jus	¬jus	¬jus	¬jus	¬jus	¬jus	¬jus	¬jus	jus	jus	
				prp	prp	prp									¬prp

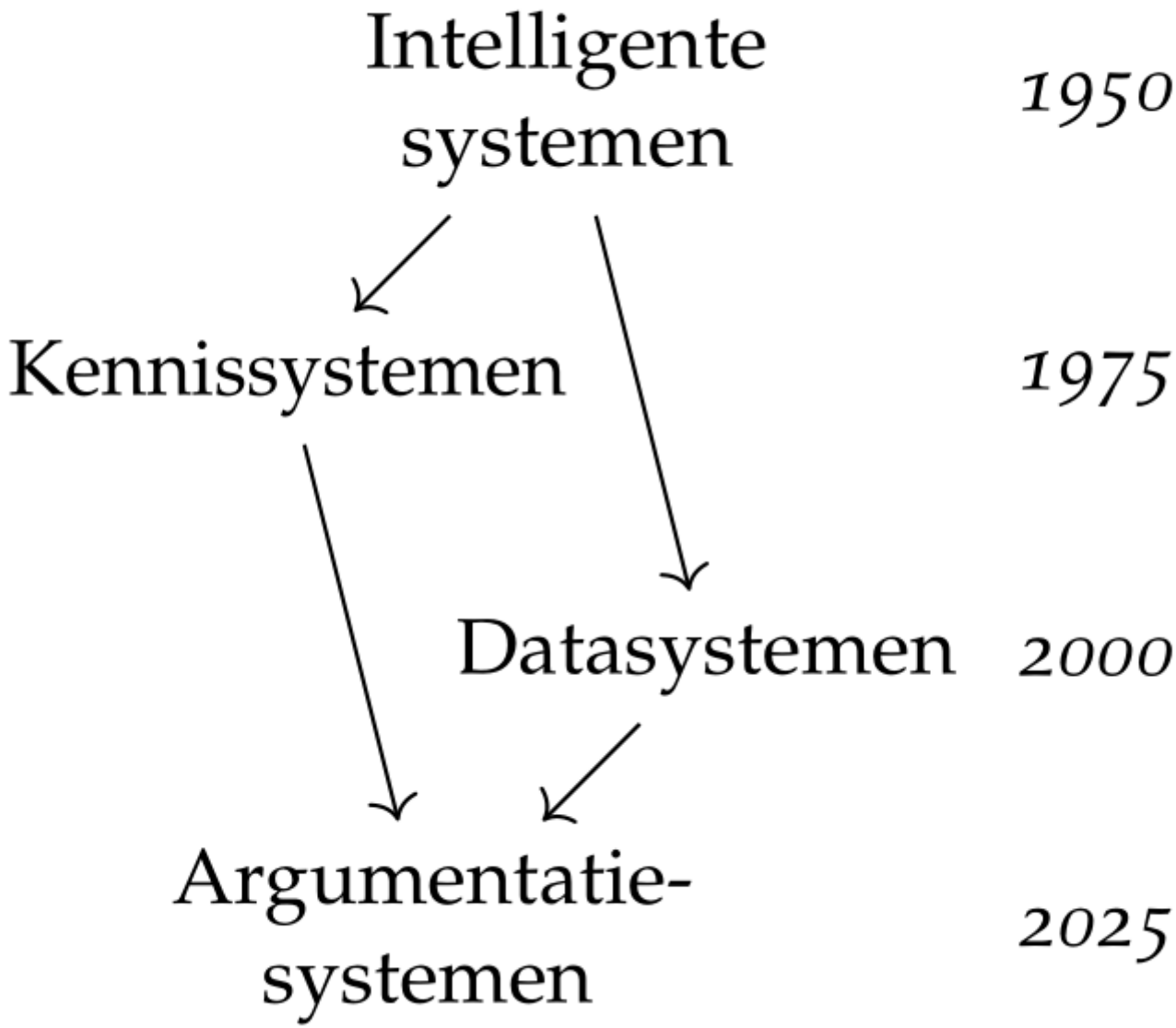
1 > 2 > 3 > 4 > 5 ~ 6 ~ 7 ~ 8 ~ 9 ~ 10 ~ 11 ~ 12 ~ 13 > 14 ~ 15 ~ 16



Data

Kennis




Intelligente systemen
1950
Kennissystemen
1975
Datasystemen
2000
Argumentatie-systemen
2025

Goede kunstmatige intelligentie

Goede antwoorden

Goede redenen

Goede keuzes

Argumenten voor goede kunstmatige intelligentie

Bart Verheij

Institute of Artificial Intelligence and Cognitive Engineering

www.ai.rug.nl/~verheij

university of groningen / faculty of science and engineering