Tato prezentace je součástí wiki-prezentace Metoda GUHA, LISp-Miner a typové úlohy
Je dostupná z této adresy
Verse 15. 8. 2019

Typ úlohy: Zadaný tvar histogramu za sub-podmínky

Data: Accidents

Problém: Celkové počty nehod v 2005 až 2015 klesají, ale počty nehod malých motocyklů v městských oblastech rostou. Existují nějaké dodatečné okolnosti za kterých počty nehod malých motocyklů v městských oblastech alespoň částečně klesají?

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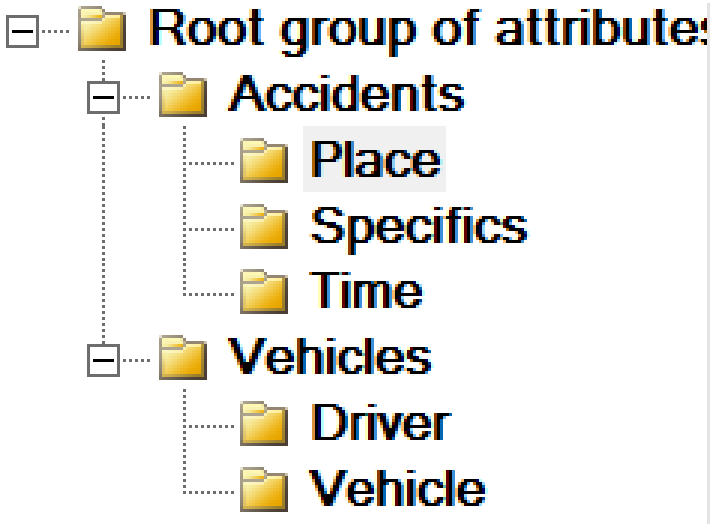
Zadaný tvar histogramu za sub-podmínky

- Data Accidents
- Zadání úlohy
- Okolnosti za kterých počty nehod rostou
- Dodatečná podmínka, pro kterou existuje období, ve kterém počty nehod klesají.

Data Accidents - přehled

- Jedna matice dat vytvořená ze tří souborů dostupných na https://www.kaggle.com/silicon99/dft-accident-data
- Zpracovány pouze nehody jednoho vozidla vzhledem k jasné odpovědnosti řidiče.
- Vzniklá matice dat má 538 989 řádků
- Vytvořené atributy rozděleny do skupin:



Data Accidents - atributy (1)

Groups of attributes tree

- Root group of attribute:
  - Accidents
    - Place

Attribute	Used	DBColumn	Categories	XCat	Sample categories
Area_type	+	Urban_or_Rural_Ar	3		Urban, Rural, Unallocated

Groups of attributes tree

- Root group of attribute:
  - Accidents
    - Place
    - Specifics
    - Time
  - Vehicles
    - Driver
    - Vehicle

Attribute	Used	DBColumn	Categories	XCat	Sample categories
1st_Road_Class	+	x_1st_Road_Class	6		Motorway, A(M), A, B, C, Unclassified
Accident_Severity	+	Accident_Severity	3		Fatal, Serious, Slight
Carriageway_Hazards	+	Carriageway_Hazar	6	x	None, Vehicle load on road, Other object on road, Previous accident, Pedestrian
Carriageway_Hazards 5 000+	+	Carriageway_Hazar	3	x	None, Other object on road, Any animal in carriageway
Did_Police_Officer_Attend_Scene_of_Acc		Did_Police_Officer_	3	x	Yes, No, Self rep only
Did_Police_Officer_Attend_Scene_of_Acc	+	Did_Police_Officer_	2	x	Yes, No
Junction_Detail	+	Junction_Detail	9	x	Not at junction or within 20 metres, Roundabout, Mini-roundabout, T or staggere
Light_Conditions	+	Light_Conditions	5		Daylight, Darkness - lights lit, Darkness - lights unlit, Darkness - no lighting, Dark
Number_of_Casualties		Number_of_Casualt	33		1, 2, 3, 4, 5, 6, 7, 8, 9, 10...
Number_of_Casualties_ef5		Number_of_Casualt	5		<1;2), <2;3), <3;4), <4;5), <5;68>
Number_of_Casualties_ef5 5000 +	+	Number_of_Casualt	3		<1;2), <2;3), <3;4)
Road_Surface_Conditions	+	Road_Surface_Con	5	x	Dry, Wet or damp, Snow, Frost or ice, Flood over 3cm. deep
Road_Surface_Conditions 5000 +	+	Road_Surface_Con	3	x	Dry, Wet or damp, Frost or ice
Speed_limit	+	Speed_limit	8		10, 15, 20, 30, 40, 50, 60, 70
Speed_limit _ed3	+	Speed_limit	3		<10;29>, <30;49>, <50;70>
Weather_Conditions	+	Weather_Conditions	9	x	Fine no high winds, Raining no high winds, Snowing no high winds, Fine + high v
Weather_Conditions 5 000 +	+	Weather_Conditions	8	x	Fine no high winds, Raining no high winds, Snowing, Fine + high winds, Raining

Groups of attributes tree

- Root group of attribute:
  - Accidents
    - Place
    - Specifics
    - Time
  - Vehicles
    - Driver
    - Vehicle

Attribute	Used	DBColumn	Categories	XCat	Sample categories
Day_of_Week	+	Day_of_Week	7		Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday
Hour	+	Time_.Hour	24	x	0, 1, 2, 3, 4, 5, 6, 7, 8, 9...
Month	+	Date_.Month	12		January, February, March, April , May, June, July, August , September, October.
Quarter	+	Date_.Quarter	4		Q1, Q2, Q3, Q4
Rush_hours	+	Time_.Hour	2	x	Other, 8-9/16-18
Weekend	+	Day_of_Week	2		Weekend, Weekdays
Year	+	Date_.Year	11		2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014...

Data Accidents - atributy (2)

Groups of attributes tree

- Root group of attributes
  - Accidents
    - Place
    - Specifics
    - Time
  - Vehicles
    - Driver
    - Vehicle

Attribute	Used	DBColumn	Categories	XCal	Sample categories
Age_Band_of_Driver		Age_Band_of_Drive	11	x	0 - 5, 6 - 10, 11 - 15, 16 - 20, 21 - 25, 26 - 35, 36 - 45, 46 - 55, 56 - 65, 66 - 75...
Age_Groups_of_Driver	+	Age_of_Driver	9	x	Under 18, 18 to 25, 26 to 35, 36 to 45, 46 to 55, 56 to 65, 66 to 75, 76 to 85, Ab
Age_of_Driver		Age_of_Driver	98	x	1, 2, 3, 4, 5, 6, 7, 8, 9, 10...
Age_of_Driver_ef20		Age_of_Driver	20		ef_1, ef_2, ef_3, ef_4, ef_5, ef_6, ef_7, ef_8, ef_9, ef_10...
Age_of_Driver_ef5	+	Age_of_Driver	5	x	<1;22), <22;30), <30;40), <40;52), <52;98>
Age_of_Driver_mod		Age_of_Driver	98		1, 2, 3, 4, 5, 6, 7, 8, 9, 10...
Driver_Home_Area_Type	+	Driver_Home_Area_	3	x	Urban area, Small town, Rural
Driver_IMD_Decile	+	Driver_IMD_Decile	10	x	Most deprived 10%, More deprived 10-20%, More deprived 20-30%, More depriv
Journey_Purpose_of_Driver	+	Journey_Purpose_o	5	x	Journey as part of work, Commuting to/from work, Taking pupil to/from school, P
Sex_of_Driver	+	Sex_of_Driver	2	x	Male, Female

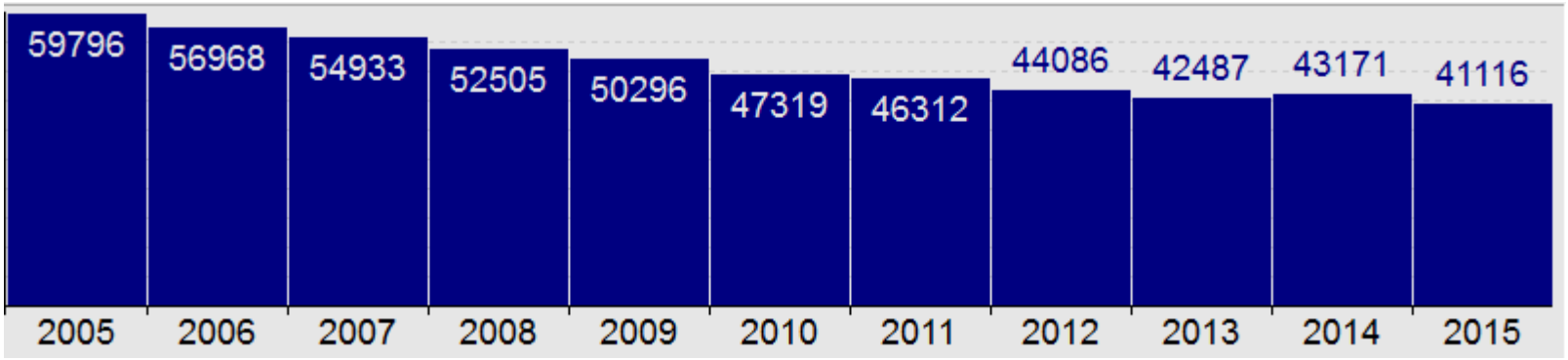
Groups of attributes tree

- Root group of attributes
  - Accidents
    - Place
    - Specifics
    - Time
  - Vehicles
    - Driver
    - Vehicle

Attribute	Used	DBColumn	Categories	XCal	Sample categories
Age_of_Vehicle	+	Age_of_Vehicle	82	x	1, 2, 3, 4, 5, 6, 7, 8, 9, 10...
Age_of_Vehicle_ed5	+	Age_of_Vehicle	21	x	<0;4>, <5;9>, <10;14>, <15;19>, <20;24>, <25;29>, <30;34>, <35;39>, <40;44>,
Age_of_Vehicle_ef	+	Age_of_Vehicle	9	x	<2;3), <3;5), <5;6), <6;7), <7;8), <8;10), <10;11), <11;13), <13;105>
Age_of_Vehicle_ef20	+	Age_of_Vehicle	20		ef_1, ef_2, ef_3, ef_4, ef_5, ef_6, ef_7, ef_8, ef_9, ef_10...
Age_of_Vehicle_mod	+	Age_of_Vehicle	82		1, 2, 3, 4, 5, 6, 7, 8, 9, 10...
Engine_Capacity__CC_	+	Engine_Capacity__(	5	x	<4;1199), <1199;1398), <1398;1794), <1794;1998), <1998;99999>
Propulsion_Code	+	Propulsion_Code	11	x	Petrol, Heavy oil, Electric, Steam, Gas, Petrol/Gas (LPG), Gas/Bi-fuel, Hybrid ele
Propulsion_Code 5000+	+	Propulsion_Code	2	x	Petrol, Heavy oil
Vehicle_Type	+	Vehicle_Type	20	x	Pedal cycle, Motorcycle 50cc and under, Motorcycle 125cc and under, Motorcyc
Vehicle_Type 5000 +	+	Vehicle_Type	10	x	Pedal cycle, Motorcycle 50cc and under, Motorcycle 125cc and under, Motorcyc
Vehicle_Type_Groups	+	Vehicle_Type	8	x	Pedal cycle, Motorcycle, Car, Bus, Other, Agricultural vehicle, Tram, Van
Vehicle_Type_Groups 5 000 +	+	Vehicle_Type	5	x	Pedal cycle, Motorcycle, Car, Bus, Van
Was_Vehicle_Left_Hand_Drive	+	Was_Vehicle_Left_I	2	x	No, Yes

Zadání úlohy

Celkové počty nehod v období 2005 až 2015 téměř soustavně klesají osm let po sobě



Zajímá nás, zda:

- za nějakých okolností počty nehod v období 2005 až 2015 rostou nejméně osm let po sobě
- pro nalezené okolnosti lze nalézt dodatečnou podmínku, pro kterou existuje období, ve kterém počty nehod klesají.

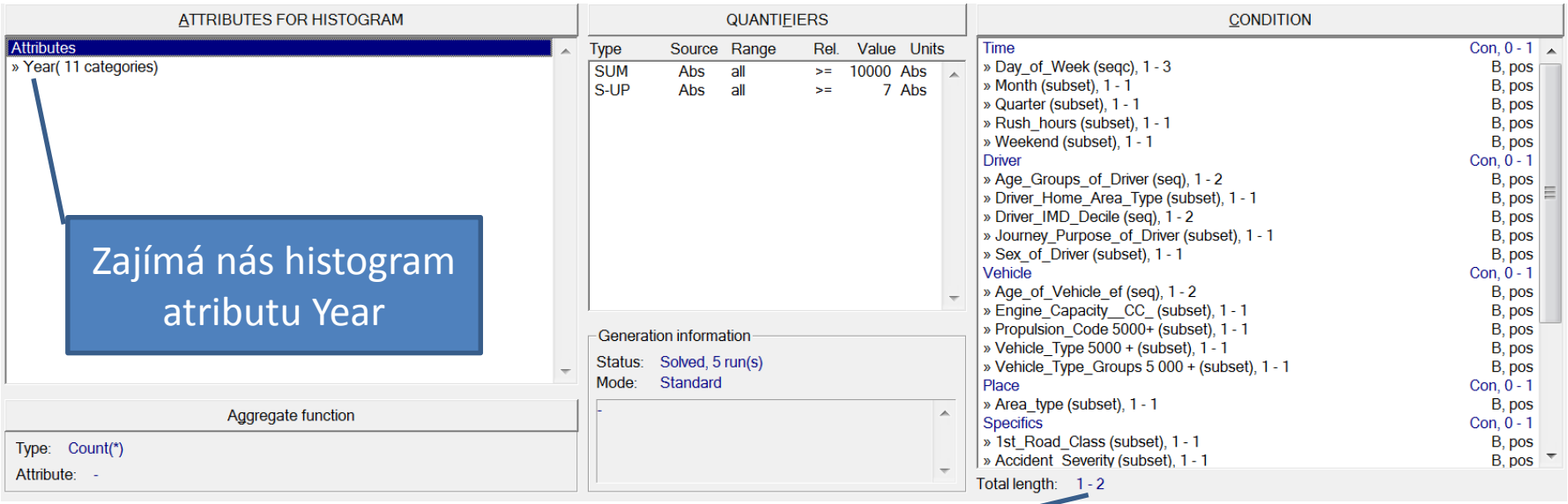
Zadaný tvar histogramu za sub-podmínky

- Data Accidents
- Zadání úlohy
- Okolnosti za kterých počty nehod rostou
- Dodatečná podmínka, pro kterou existuje období, ve kterém počty nehod klesají.

Okolnosti za kterých počty nehod rostou - zadání pro CF-Miner

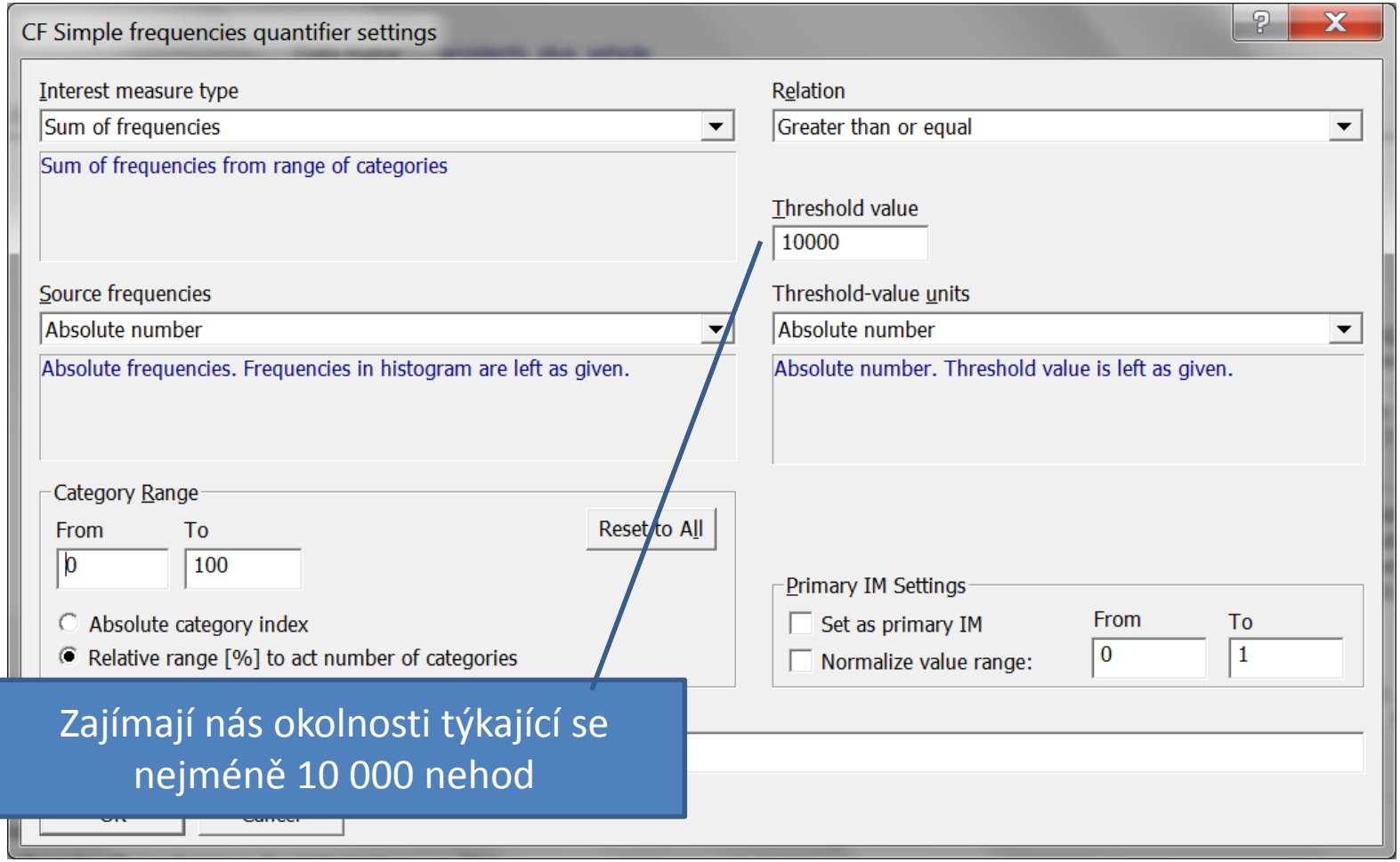
Zajímá nás, zda za nějakých okolností počty nehod v období 2005 až 2015 rostou nejméně osm let po sobě.

Jedno z více možných zadání pro proceduru CF-Miner:



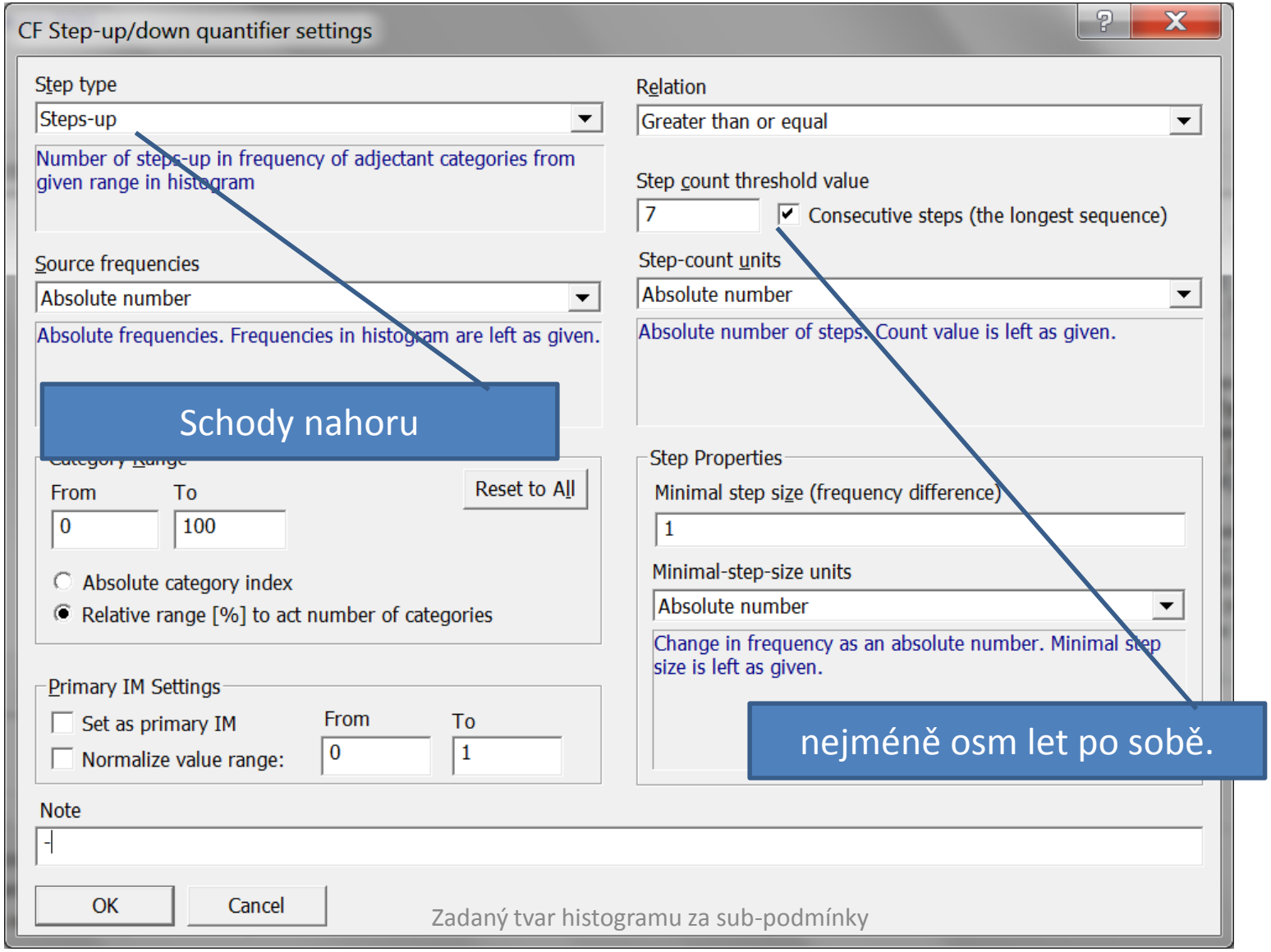
Zajímají nás okolnosti dané konjunkcí maximálně dvou atributů

Detaily zadání pro CF-Miner



Zajímají nás okolnosti týkající se nejméně 10 000 nehod

Detaily zadání pro CF-Miner



Detaily zadání pro CF-Miner

4ft Condition Partial cedent Settings

Basic parameters

Name: Time

Min. length: 0 Max. length: 1 Literals boolean operation type: Conjunction

Comment: -

Options

Allow only a consecutive sequence of literals in cedent (only neighbouring literals): No

Linked coefficients (all literals must have the same coefficient as in the first one): No

Literals Settings

Underlying attribute	Categories	X-cat	Coefficient type	Length	+/-	B/R	Class of equiv.
Day_of_Week	7	No	Cyclical sequences	1 - 3	pos	Basic	-
Month	12	No	Subsets	1 - 1	pos	Basic	-
Quarter	4	No	Subsets	1 - 1	pos	Basic	-
Rush_hours	2	Yes	Subsets	1 - 1	pos	Basic	-
Weekend	2	No	Subsets	1 - 1	pos	Basic	-

4ft Condition Partial cedent Settings

Basic parameters

Name: Driver

Min. length: 0 Max. length: 1 Literals boolean operation type: Conjunction

Comment: -

Options

Allow only a consecutive sequence of literals in cedent (only neighbouring literals): No

Linked coefficients (all literals must have the same coefficient as in the first one): No

Literals Settings

Underlying attribute	Categories	X-cat	Coefficient type	Length	+/-	B/R	Class of equiv.
Age_Groups_of_Driver	9	Yes	Sequences	1 - 2	pos	Basic	-
Driver_Home_Area_Type	3	Yes	Subsets	1 - 1	pos	Basic	-
Driver_IMD_Decile	10	Yes	Sequences	1 - 2	pos	Basic	-
Journey_Purpose_of_Driver	5	Yes	Subsets	1 - 1	pos	Basic	-
Sex_of_Driver	2	Yes	Subsets	1 - 1	pos	Basic	-

Detaily zadání pro CF-Miner

4ft Condition Partial cedent Settings

Basic parameters

Name: Vehicle

Min. length: 0 Max. length: 1 Literals boolean operation type: Conjunction

Comment: -

Options

Allow only a consecutive sequence of literals in cedent (only neighbouring literals): No

Linked coefficients (all literals must have the same coefficient as in the first one): No

Literals Settings

Underlying attribute	Categories	X-cat	Coefficient type	Length	+/-	B/R	Class of equiv.
Age_of_Vehicle_ef	9	Yes	Sequences	1 - 2	pos	Basic	-
Engine_Capacity__CC_	5	Yes	Subsets	1 - 1	pos	Basic	-
Propulsion_Code 5000+	2	Yes	Subsets	1 - 1	pos	Basic	-
Vehicle_Type 5000 +	10	Yes	Subsets	1 - 1	pos	Basic	-
Vehicle_Type_Groups 5 000 +	5	Yes	Subsets	1 - 1	pos	Basic	-

4ft Condition Partial cedent Settings

Basic parameters

Name: Place

Min. length: 0 Max. length: 1 Literals boolean operation type: Conjunction

Comment: -

Options

Allow only a consecutive sequence of literals in cedent (only neighbouring literals): No

Linked coefficients (all literals must have the same coefficient as in the first one): No

Literals Settings

Underlying attribute	Categories	X-cat	Coefficient type	Length	+/-	B/R	Class of equiv.
Area_type	3	No	Subsets	1 - 1	pos	Basic	-

Detaily zadání pro CF-Miner

4ft Condition Partial cedent Settings

Basic parameters

Name: Specifics

Min. length: 0 Max. length: 1 Literals boolean operation type: Conjunction

Comment: -

Options

Allow only a consecutive sequence of literals in cedent (only neighbouring literals): No

Linked coefficients (all literals must have the same coefficient as in the first one): No

Literals Settings

Underlying attribute	Categories	X-cat	Coefficient type	Length	+/-	B/R	Class of equiv.
1st_Road_Class	6	No	Subsets	1 - 1	pos	Basic	-
Accident_Severity	3	No	Subsets	1 - 1	pos	Basic	-
Carriageway_Hazards	6	Yes	Subsets	1 - 1	pos	Basic	-
Carriageway_Hazards 5 000+	3	Yes	Subsets	1 - 1	pos	Basic	-
Did_Police_Officer_Attend_Scene_of_Ac	2	Yes	Subsets	1 - 1	pos	Basic	-
Junction_Detail	9	Yes	Subsets	1 - 1	pos	Basic	-
Light_Conditions	5	No	Subsets	1 - 1	pos	Basic	-
Number_of_Casualties_ef5 5000 +	3	No	Subsets	1 - 1	pos	Basic	-
Road_Surface_Conditions 5000 +	3	Yes	Subsets	1 - 1	pos	Basic	-
Speed_limit _ed3	3	No	Subsets	1 - 1	pos	Basic	-
Weather_Conditions 5 000 +	8	Yes	Subsets	1 - 1	pos	Basic	-

CF-Miner - výstup

Task run

Start: 16.8.2019 14:54:40 Total time: 0h 0m 38s

Number of verifications: 4738

Number of hypotheses: 5 Mode: Standard

Add group | Del group | Edit group

Actual group of hypotheses: All hypotheses

Hypotheses in group: 5 Shown hypotheses: 5 Highlighted: 0

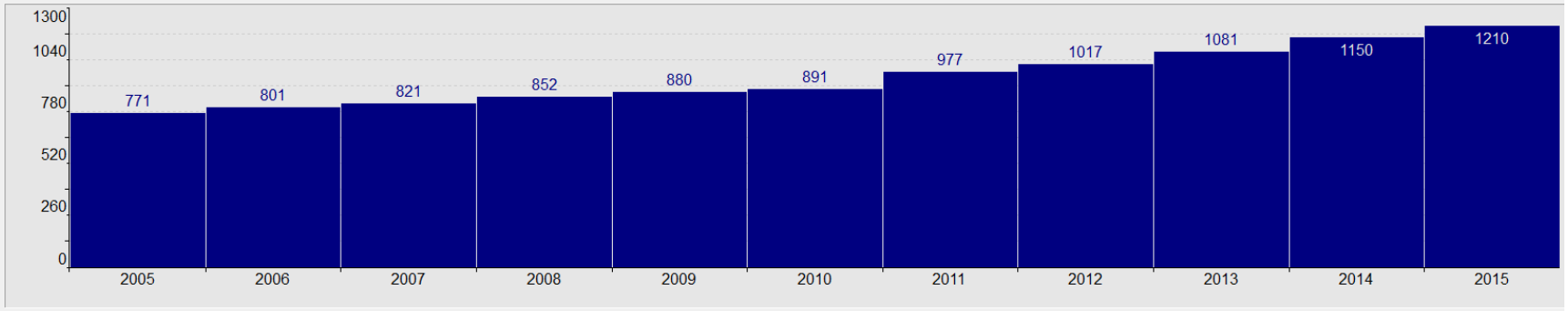
Nr.	Id	S-UP	Hypothesis
1	4	10.000	**Year** / **Driver_Home_Area_Type**(*Urban area*) & **Vehicle_Type**(*Motorcycle 125cc and under*)
2	1	9.000	**Year** / **Age_Driver**(*46 to 55*) & **Age_Vehicle**(>= *11*)
3	2	9.000	**Year** / **Age_Driver**(*46 to 55*,*56 to 65*) & **Age_Vehicle**(*<10*; *13)*)
4	3	9.000	**Year** / **Age_Driver**(*46 to 55*,*56 to 65*) & **Age_Vehicle**(>= *11*)
5	5	8.000	**Year** / **Sex**(*Female*) & **Age_Vehicle**(*<11;13)*)

CF-Miner - výstup, detail

Driver_Home_Area_Type(*Urban area*) & Vehicle_Type(*Motorcycle 125cc and under*)

Attribute: Year: frequencies
Condition: Driver_Home_Area_Type(Urban area) & Vehicle_Type(Motorcycle 125cc and under)

TEXT | DATA | FREQUENCIES | PATTDIFF



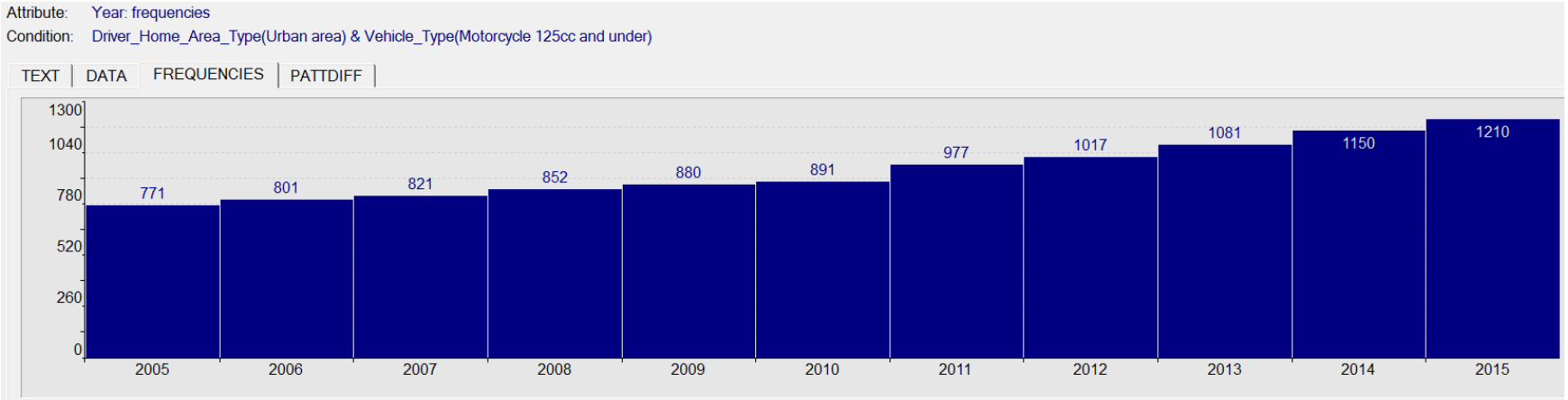
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Year	771	801	821	852	880	891	977	1017	1081	1150	1210

Zadaný tvar histogramu za sub-podmínky

- Data Accidents
- Zadání úlohy
- Okolnosti za kterých počty nehod rostou
- Dodatečná podmínka, pro kterou existuje období, ve kterém počty nehod klesají.

Připomenutí zadání

Driver_Home_Area_Type(*Urban area*) & Vehicle_Type(*Motorcycle 125cc and under*)



Zajímá nás, zda:

- ✓ za nějakých okolností počty nehod v období 2005 až 2015 rostou nejméně osm let po sobě
- ➢ pro nalezené okolnosti lze nalézt dodatečnou podmínku, pro kterou existuje období, ve kterém počty nehod klesají.

Dodatečná podmínka, pro kterou existuje období, ve kterém počty nehod klesají - formulace úlohy

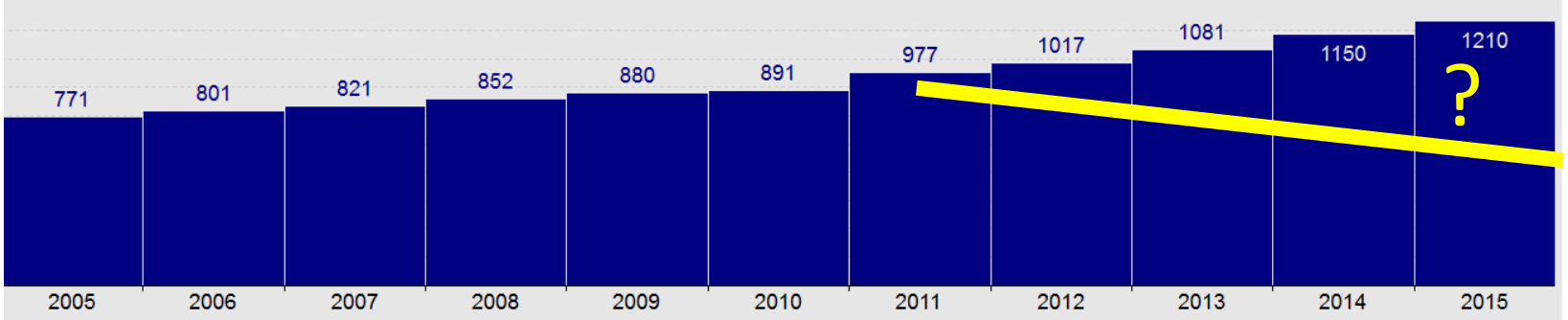
Existuje dodatečná podmínka κ

k ω = Driver_Home_Area_Type(*Urban area*) & Vehicle_Type(*Motorcycle 125cc and under*)

tak, že pokud platí $\omega \wedge \kappa$, tedy

Driver_Home_Area_Type(*Urban area*) & Vehicle_Type(*Motorcycle 125cc and under*) $\wedge \kappa$

pak histogram alespoň částečně klesá? Nejlépe v posledních letech?



Dodatečná podmínka - období, ve kterém počty nehod klesají - zadání pro CF-Miner

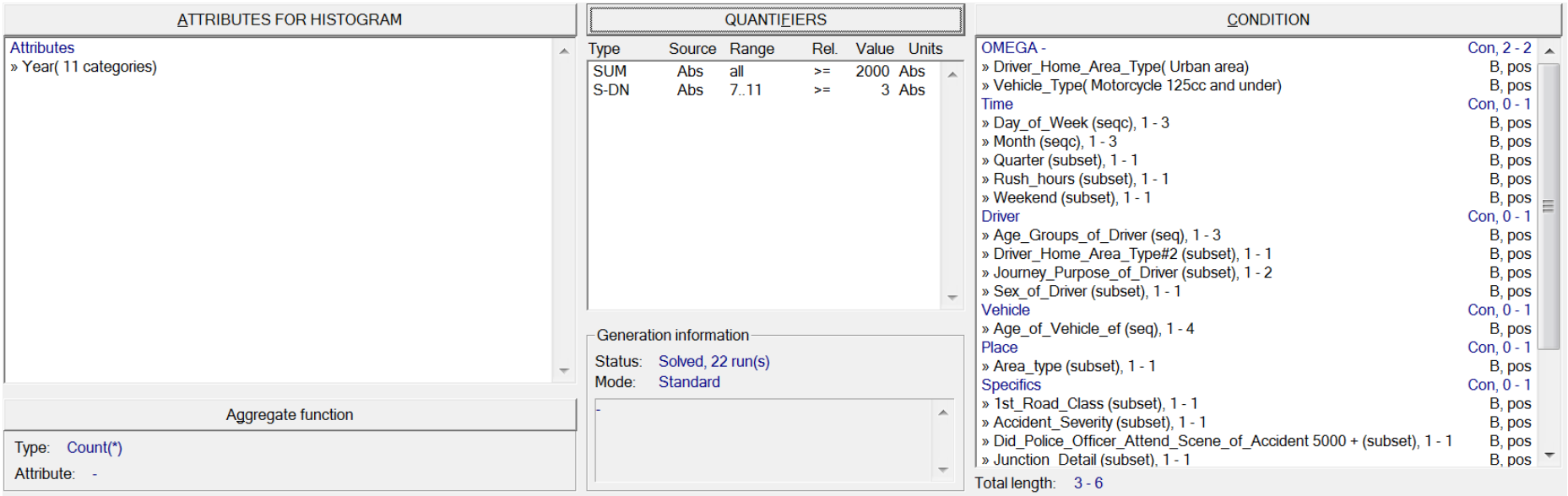
Existuje dodatečná podmínka κ

k ω = **Driver_Home_Area_Type(*Urban area*) & Vehicle_Type(*Motorcycle 125cc and under*)**

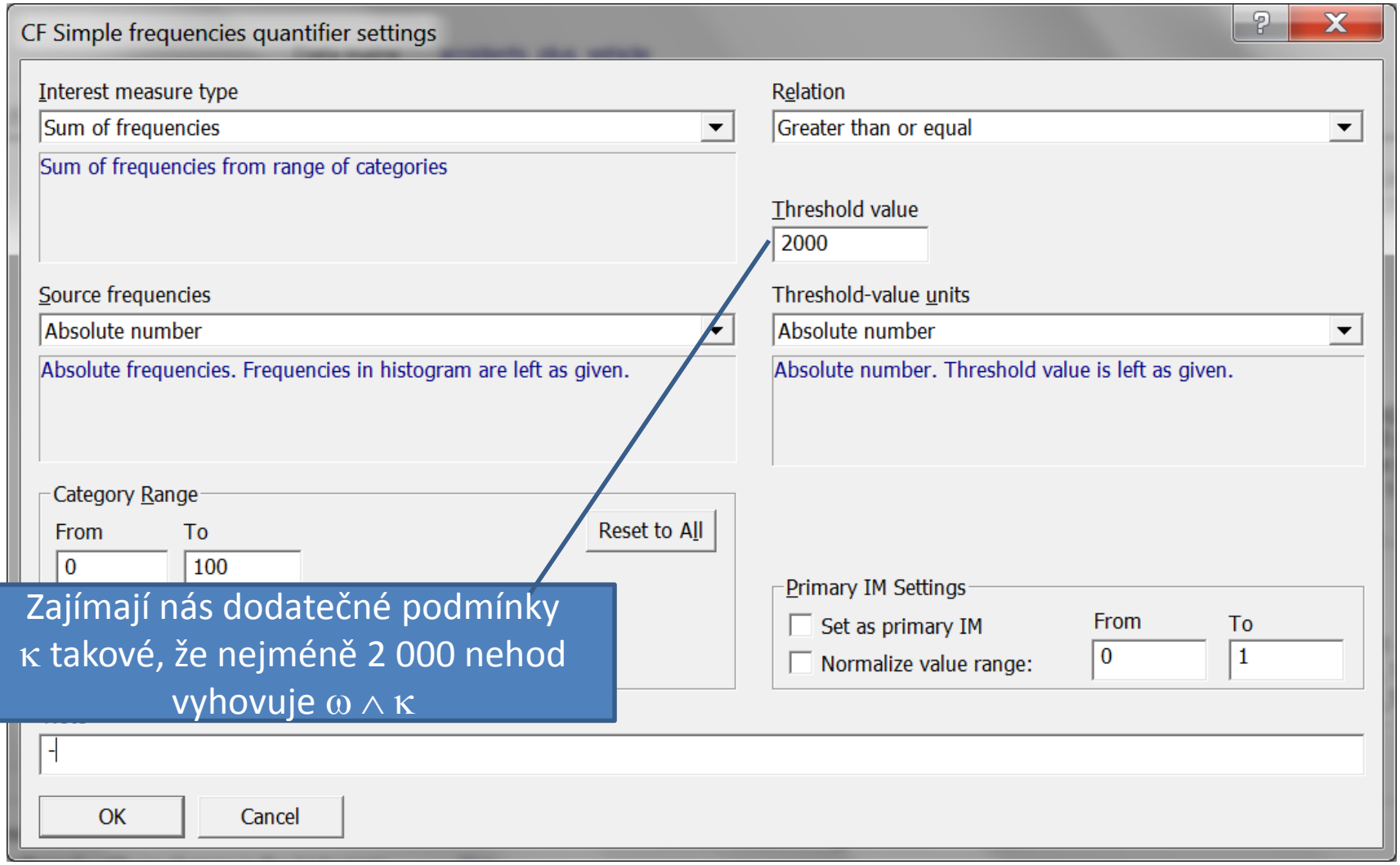
tak, že pokud platí $\omega \wedge \kappa$,

pak histogram alespoň částečně klesá? Nejlépe v posledních letech?

Jedno z více možných zadání pro proceduru CF-Miner:



Detaily zadání pro CF-Miner



Zajímají nás dodatečné podmínky κ takové, že nejméně 2 000 nehod vyhovuje $\omega \wedge \kappa$

Detaily zadání pro CF-Miner

Existuje dodatečná podmínka κ k

ω = **Driver_Home_Area_Type**(*Urban area*) & **Vehicle_Type**(*Motorcycle 125cc and under*)

tak, že pokud platí $\omega \wedge \kappa$, pak histogram alespoň částečně klesá?

CONDITION	
OMEGA -	Con, 2 - 2
» Driver_Home_Area_Type(Urban area)	B, pos
» Vehicle_Type(Motorcycle 125cc and under)	B, pos
Time	Con, 0 - 1
» Day_of_Week (seqc), 1 - 3	B, pos
» Month (seqc), 1 - 3	B, pos
» Quarter (subset), 1 - 1	B, pos
» Rush_hours (subset), 1 - 1	B, pos
» Weekend (subset), 1 - 1	B, pos
Driver	Con, 0 - 1
» Age_Groups_of_Driver (seq), 1 - 3	B, pos
» Driver_Home_Area_Type#2 (subset), 1 - 1	B, pos
» Journey_Purpose_of_Driver (subset), 1 - 2	B, pos
» Sex_of_Driver (subset), 1 - 1	B, pos
Vehicle	Con, 0 - 1
» Age_of_Vehicle_ef (seq), 1 - 4	B, pos
Place	Con, 0 - 1
» Area_type (subset), 1 - 1	B, pos
Specifics	Con, 0 - 1
» 1st_Road_Class (subset), 1 - 1	B, pos
» Accident_Severity (subset), 1 - 1	B, pos
» Did_Police_Officer_Attend_Scene_of_Accident 5000 + (subset), 1 - 1	B, pos
» Junction_Detail (subset), 1 - 1	B, pos
Total length: 3 - 6	

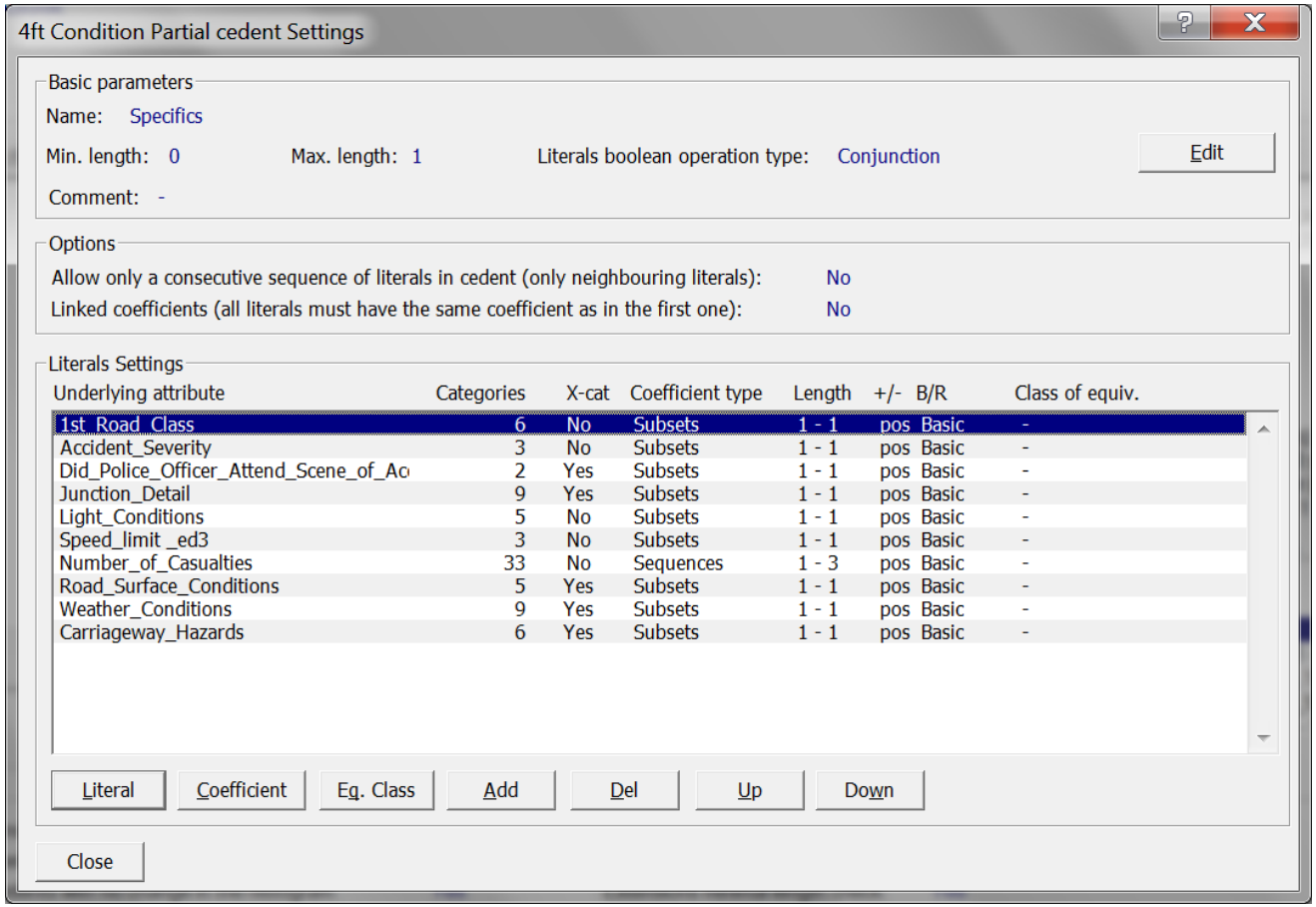
ω

κ

Dodatečná podmínky
κ délky 1 - 4, délka $\omega \wedge \kappa$ 3 - 6

Detaily zadání pro CF-Miner

Dílčí cedent Specifics, který se nevešel na předchozí slide.



4ft Condition Partial cedent Settings

Basic parameters

Name: Specifics

Min. length: 0 Max. length: 1 Literals boolean operation type: Conjunction Edit

Comment: -

Options

Allow only a consecutive sequence of literals in cedent (only neighbouring literals): No

Linked coefficients (all literals must have the same coefficient as in the first one): No

Literals Settings

Underlying attribute	Categories	X-cat	Coefficient type	Length	+/-	B/R	Class of equiv.
1st_Road_Class	6	No	Subsets	1 - 1	pos	Basic	-
Accident_Severity	3	No	Subsets	1 - 1	pos	Basic	-
Did_Police_Officer_Attend_Scene_of_Ac	2	Yes	Subsets	1 - 1	pos	Basic	-
Junction_Detail	9	Yes	Subsets	1 - 1	pos	Basic	-
Light_Conditions	5	No	Subsets	1 - 1	pos	Basic	-
Speed_limit _ed3	3	No	Subsets	1 - 1	pos	Basic	-
Number_of_Casualties	33	No	Sequences	1 - 3	pos	Basic	-
Road_Surface_Conditions	5	Yes	Subsets	1 - 1	pos	Basic	-
Weather_Conditions	9	Yes	Subsets	1 - 1	pos	Basic	-
Carriageway_Hazards	6	Yes	Subsets	1 - 1	pos	Basic	-

Literal Coefficient Eq. Class Add Del Up Down

Close

CF-Miner - výstup

Task run

Start: 16.8.2019 18:34:21 Total time: 0h 0m 4s

Number of verifications: 2329

Number of hypotheses: 5 Mode: Standard

Add group | Del group | Edit group

Actual group of hypotheses: All hypotheses

Hypotheses in group: 5 Shown hypotheses: 5 Highlighted: 0

Nr.	Id	Sum	Hypothesis
1	5	2343	**Year / Driver_Home_Area_Type**(*Urban area*) & **Vehicle_Type**(*Motorcycle 125cc and under*) & **Sex**(*Male*) & **Age_Vehicle**(*<3;8)*) & **Speed**(*<30;49>*)
2	4	2277	**Year / Driver_Home_Area_Type**(*Urban area*) & **Vehicle_Type**(*Motorcycle 125cc and under*) & **Sex**(*Male*) & **Age_Vehicle**(*<3;7)*) & **Carriageway_Hazards**(*None*)
3	1	2265	**Year / Driver_Home_Area_Type**(*Urban area*) & **Vehicle_Type**(*Motorcycle 125cc and under*) & **Age_Vehicle**(*<3;7)*) & **Speed**(*<30;49>*)
4	3	2081	**Year / Driver_Home_Area_Type**(*Urban area*) & **Vehicle_Type**(*Motorcycle 125cc and under*) & **Age_Driver**(*18 to 25..36 to 45*) & **Age_Vehicle**(*<3;8)*) & **Speed**(*<30;49>*)
5	2	2080	**Year / Driver_Home_Area_Type**(*Urban area*) & **Vehicle_Type**(*Motorcycle 125cc and under*) & **Age_Vehicle**(*<3;7)*) & **Weather_Conditions**(*Fine no high winds*)

Ve všech případech tři schody dolů

CF-Miner - výstup, detail

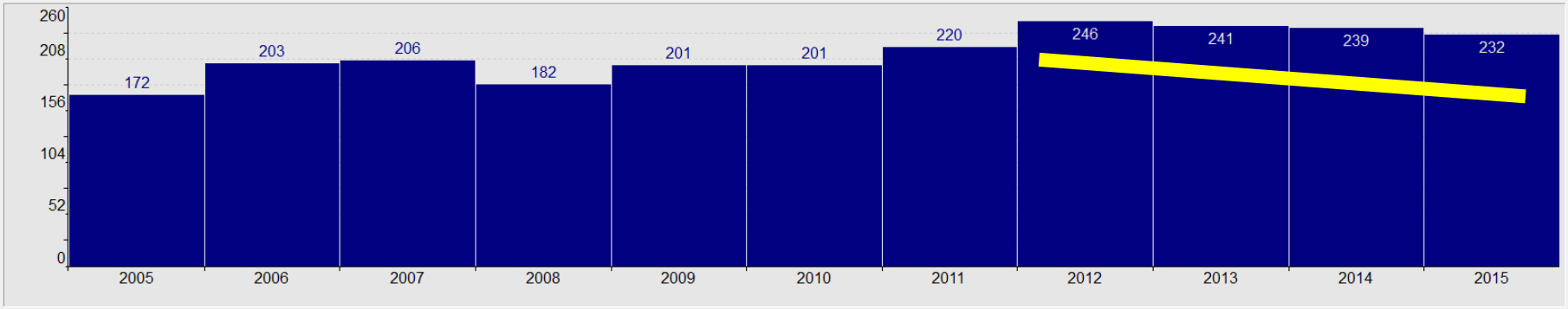
Driver_Home_Area_Type(*Urban area*) & **Vehicle_Type**(*Motorcycle 125cc and under*) & **Sex**(*Male*) & **Age_Vehicle**(*<3;8)*) & **Speed**(*<30;49>*)

ω κ

Attribute: Year: frequencies

Condition: Driver_Home_Area_Type(Urban area) & Vehicle_Type(Motorcycle 125cc and under) & Sex(Male) & Age_Vehicle(<3;5)...<7;8)) & Speed(<30;49>)

TEXT | DATA | FREQUENCIES | PATTDIFF



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Year	172	203	206	182	201	201	220	246	241	239	232

CF-Miner - výstup, detail

Driver_Home_Area_Type(*Urban area*) & **Vehicle_Type**(*Motorcycle 125cc and under*) & **Sex**(*Male*) & **Age_Vehicle**(*<3;8)*) & **Speed**(*<30;49>*)

*** Hypothesis ID: 5

Attribute	Year		
Aggregate function	frequencies		
Condition			
OMEGA -	Conjunction		
	Driver_Home_Area_Type		Urban area
	Vehicle_Type	Motorcycle 125cc and under	
Driver	Conjunction		
	Sex	Male	
Vehicle	Conjunction		
	Age_Vehicle	<3;5)...<7;8)	
Specifics	Conjunction		
	Speed	<30;49>	

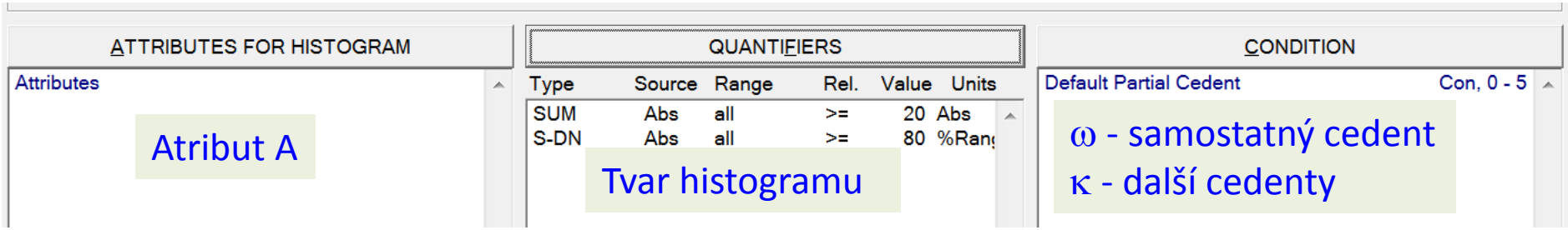
ω

κ

Quantifiers values:

Sum of frequencies	2343	2343	Sum of frequencies from range of categories
Steps-down	3	3	Number of steps-down in frequency of adjectant categories from given range in histogram

Princip řešení - zadání pro CF-Miner



Poznámky:

- Podmínka ω musí být zadána jako samostatný dílčí cedent případně více samostatných dílčích cedentů. Vždy ale tak, aby byla součástí každé relevantní CONDITION
- V příkladu nahoře je uveden jednoduchý příklad takového zadání. Syntax dílčích cedentů ale dává mnoho možností jak to udělat.
- Pokud má být součástí ω základní booleovský atribut s vícekategoriálním koeficientem, je možno naklonovat nový atribut a vícekategoriální koeficient nahradit novou kategorií která vznikne spojením kategorií koeficientu.
- Zadání množiny relevantních booleovských atributů κ se provádí obvyklým způsobem pomocí vhodných dílčích cedentů.