



Hypothesis

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New Approach to Experimental Testing in Cartography



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Content

- Introduction
- Motivation
- Hypothesis - Functionality illustrations
- Examples
- Discussion and Conclusion



Motivation

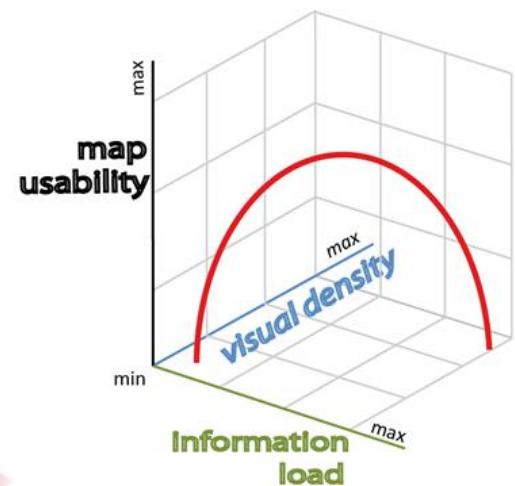
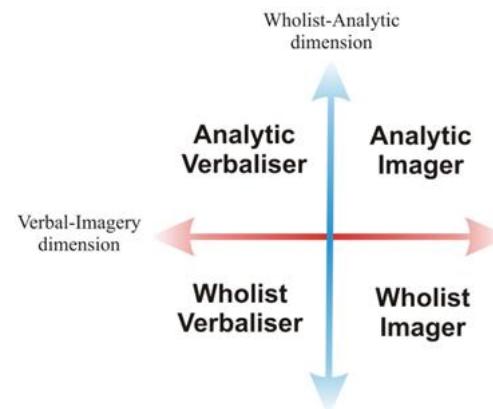
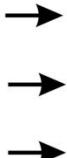
- NEEDS
- Effective data collection platform
- Controlled environment
- Possibility of extensions
- ...

Sada A	Sada B	Význam znaku
		vodní dílo III. kategorie
		čistírna odpadních vod
		místo shromažďování
		místo možného znečištění vody
		mobilní systém
		vojenská pomoc na vyžádání
		propustek bez překážek

Military Topographic Map



Transportation Context Map





Hypothesis

Hypothesis

- Result of extensive collaboration between cartographers and psychologists.



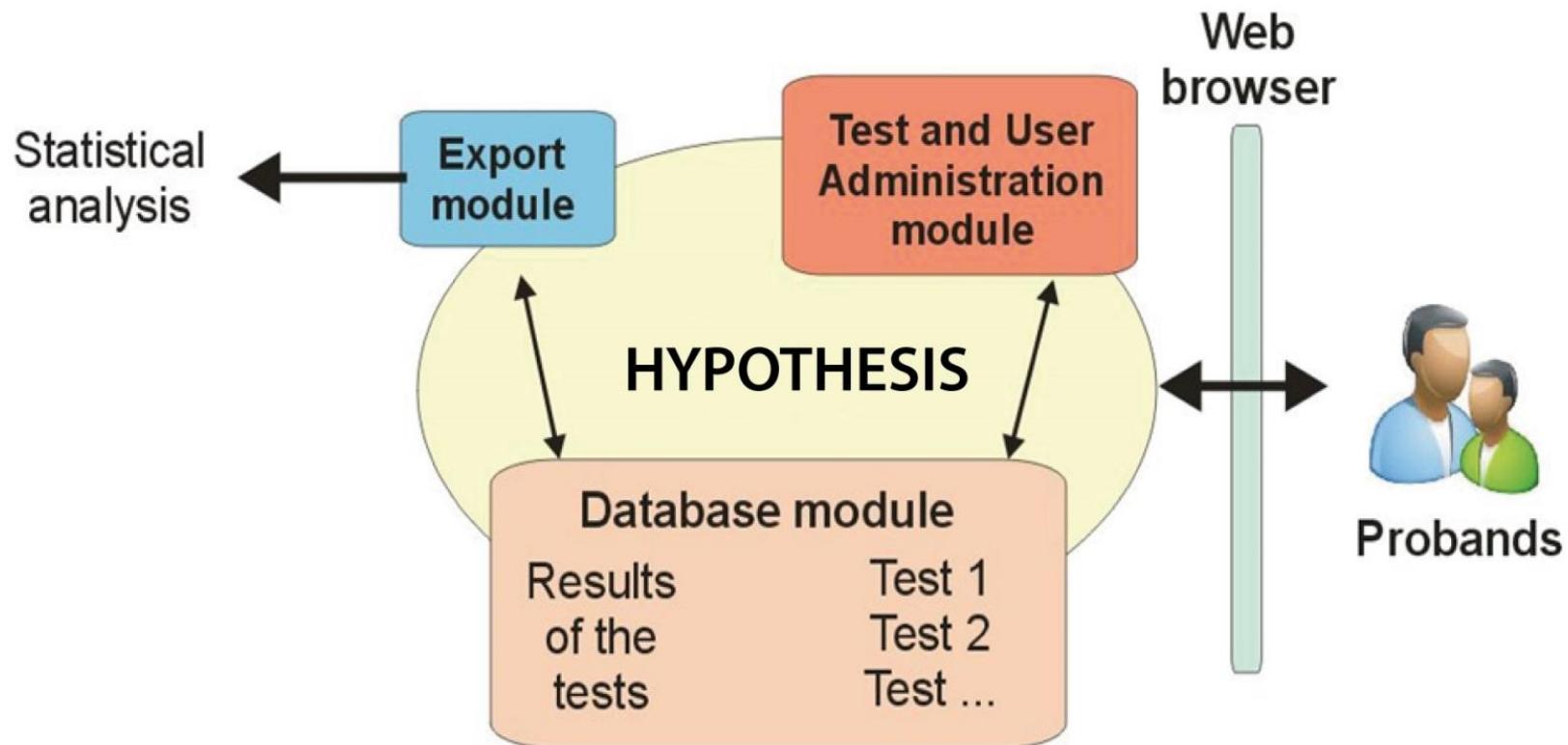
- Interactive web based testing environment.
- Offering new possibilities of combining quantitative and qualitative research methods.
- Designed primarily for the assessment of map usability





Architecture

- Controlled environment





Hypothesis

Hypothesis

WELCOME Hypothesis platform

User Name Password

[Click here to continue as guest.](#)

Hypothesis

Guest ▾

Public

- CBS
CBS
- FLT cz
FLT
- FAB cz
FAB
- CartoA eng
Carto Test A - english version
- CartoB eng
Carto Test B - english version



Hypothesis

Database Module

The screenshot shows the Hypothesis Database Module interface. The left sidebar contains navigation links: File, Edit, View, Project, Tools, Utilities, Help; Start Page; Schema Editor; and a list of connections: SQLite Files, Valentina Files, dev.hypothesis.cz (selected), Bonjour, Bookmarks, Recent Connections, and Recent Databases.

The main area displays the schema editor for the 'hypothesis' database. The 'tbl_slide_content' table is selected, showing a list of XML documents (rows 1-22). A specific row (row 9) is highlighted, and its content is displayed in the 'Query Log...' window:

```
<?xml version="1.0" encoding="UTF-8"?>
<SlideContent TemplateID="57D14257-E79D-499F-9EA1-0BCF186C0BF7">
    <!-- ortofoto -->
    <Bindings>
        <Bind>
            <Label Id="title">
                <Properties>
                    <Caption Value="&lt;h2&gt;Vyzkoušejte si záčvýň (nehodnocený) úkol:&lt;/h2&gt;&lt;br/&gt;&lt;h3&gt;kliknění vyzačte průběhu řeky z bodu A do bodu B. Poslední bod zadějte se stisknutou klávesou Alt.&lt;/h3&gt;"/>
                </Properties>
            </Label>
        </Bind>
        <Bind Id="image_layer">
            <Properties>
                <Url Value="http://hypothesis.cz/gallery/albums/userpics/10001/03a.png"/>
            </Properties>
        </Bind>
    </Bindings>
    <Feature Id="buffer">
        <Geometry Value="POLYGON ((445 114,488 124,566 166,637 223,670 257,657 275,624 238,594 211,528 168,480 146,445 134,445 114))"/>
    </Feature>
    <Feature Id="start_point">
        <Geometry Value="POINT (445 125)"/>
    </Feature>
    <Feature Id="end_point">
        <Geometry Value="POINT (665 270)"/>
    </Feature>
    <Feature Id="start_cross">
        <Geometry Value="MULTILINESTRING ((440 125,450 125),(445 120,445 130))"/>
    </Feature>
    <Feature Id="end_cross">
        <Geometry Value="MULTILINESTRING ((660 270,670 270),(665 265,665 275))"/>
    </Feature>
</SlideContent>
```

The 'tbl_slide_content' table has one row with id=9 and note='10 hanka, zavcina 3 A'. Below the table, the 'tbl_slide_output' table is shown with the following rows:

- tbl_slide_template
- tbl_task
- tbl_task_slide
- tbl_test
- tbl_test_event
- tbl_token
- tbl_user
- tbl_user_permission
- tbl_user_role

Administration Module



Hypothesis

su ▾

My packs

Public

User management

Group management

Exports

Users management

Add

Selected

Update

Delete

Export

ID	Username	Role	Groups	Available packs	Note
5	avcr-001-ZBUJ	USER	avcr2	Visual interpretation - option A	
6	avcr-002-NRCX	USER			
7	avcr-003-RIIT	USER	muff	Visual interpretation - option A	
4	avcr-004-XHAD	USER			
3	avcr-005-IXNQ				
9	cenek				
34	Exp1				
51	franta-001-XOHM				
53	franta-002-XCAY				
60	franta-003-QADY				
50	franta-004-KJGC				
47	franta-005-NTLT				
48	franta-006-EFEP				
54	franta-007-SSGK				
45	franta-008-GURP				
40	franta-009-HJWE				
38	franta-010-HFAJ				
39	franta-011-VTYI				
42	franta-012-MFLG				

Groups management

Add

Selected

Update

Delete

Export

ID	Name	Users	Available packs	Note
2	avcr2	avcr-001-ZBUJ, cenek, su	Visual interpretation - option A	
6	moje.skupina.cenek.2	Exp1, muj.uzivatel.1.cenek, standa		
7	MU_studenti	Multiple users (26)	Multiple packs (11)	pokus
8	MU_yzkmunici	Michal, pepa	GRS	
1	muff	avcr-003-RIIT, su, zbynek	Visual interpretation - option A	55

Export Module



Tests export

Visual interpretation *

May 10, 2015 - 11:33:24

May 16, 2015 - 11:33:27

Selected

Export



SU

My packs

Public

User management

Group management

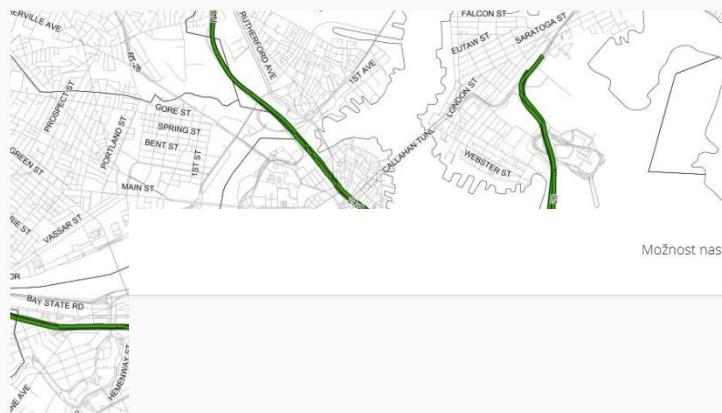
Exports

test_id	date	user_id	event_id	pack_id	pack_n	branch_id	branch_n	task_id	slide_id	slide_name	branch_o	task_o	slide_o	event_time	event_type	event_name	event_dat	output_v	output_v	output_v	output_v	output_v	output_v
590	21.05.2014 11:45:10.10	1175	373110	6	GRS	6	GRS	23	uvod	176 GRS, uvod	1	1	1	0	1	START_TEST							
590	21.05.2014 11:45:10.10	1175	373111	6	GRS	6	GRS	23	uvod	176 GRS, uvod	1	1	1	8	31	AFTER_RENDER	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:45:10.10	1175	373112	6	GRS	6	GRS	23	uvod	176 GRS, uvod	1	1	1	0	100	BUTTON_CLICK	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:45:17.17	1175	373113	6	GRS	6	GRS	23	uvod	176 GRS, uvod	1	1	1	7146	50	ACTION	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:45:17.17	1175	373114	6	GRS	6	GRS	23	uvod	176 GRS, uvod	1	1	1	7153	2	FINISH_SLIDE	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:45:17.17	1175	373115	6	GRS	6	GRS	23	uvod	176 GRS, uvod	1	1	1	7573	3	NEXT_SLIDE	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:45:17.17	1175	373116	6	GRS	6	GRS	23	uvod	177 GRS, ucitel	1	1	2	7587	31	AFTER_RENDER	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:45:17.17	1175	373117	6	GRS	6	GRS	23	uvod	177 GRS, ucitel	1	1	2	7586	100	BUTTON_CLICK	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:46:27.27	1175	373118	6	GRS	6	GRS	23	uvod	177 GRS, ucitel	1	1	2	77222	50	ACTION	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:45:17.17	1175	373119	6	GRS	6	GRS	23	uvod	177 GRS, ucitel	1	1	2	7586	100	BUTTON_CLICK	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:46:28.28	1175	373120	6	GRS	6	GRS	23	uvod	177 GRS, ucitel	1	1	2	77882	50	ACTION	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:45:17.17	1175	373121	6	GRS	6	GRS	23	uvod	177 GRS, ucitel	1	1	2	7586	100	BUTTON_CLICK	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:46:28.28	1175	373122	6	GRS	6	GRS	23	uvod	177 GRS, ucitel	1	1	2	78039	50	ACTION	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:45:17.17	1175	373123	6	GRS	6	GRS	23	uvod	177 GRS, ucitel	1	1	2	7586	100	BUTTON_CLICK	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:46:28.28	1175	373124	6	GRS	6	GRS	23	uvod	177 GRS, ucitel	1	1	2	78164	50	ACTION	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:45:17.17	1175	373125	6	GRS	6	GRS	23	uvod	177 GRS, ucitel	1	1	2	7586	100	BUTTON_CLICK	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
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590	21.05.2014 11:45:17.17	1175	373127	6	GRS	6	GRS	23	uvod	177 GRS, ucitel	1	1	2	7586	100	BUTTON_CLICK	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
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590	21.05.2014 11:47:34.34	1175	373129	6	GRS	6	GRS	23	uvod	177 GRS, ucitel	1	1	2	143873	2	FINISH_SLIDE	version="						
590	21.05.2014 11:47:34.34	1175	373130	6	GRS	6	GRS	23	uvod	177 GRS, ucitel	1	1	2	144286	3	NEXT_SLIDE							
590	21.05.2014 11:47:34.34	1175	373131	6	GRS	6	GRS	23	uvod	178 GRS, zak	1	1	3	144302	31	AFTER_RENDER							
590	21.05.2014 11:47:34.34	1175	373132	6	GRS	6	GRS	23	uvod	178 GRS, zak	1	1	3	144302	100	BUTTON_CLICK	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:47:47.47	1175	373133	6	GRS	6	GRS	23	uvod	178 GRS, zak	1	1	3	156906	50	ACTION	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:47:47.47	1175	373134	6	GRS	6	GRS	23	uvod	178 GRS, zak	1	1	3	156914	2	FINISH_SLIDE	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:47:47.47	1175	373135	6	GRS	6	GRS	23	uvod	178 GRS, zak	1	1	3	157328	3	NEXT_SLIDE							
590	21.05.2014 11:47:47.47	1175	373136	6	GRS	6	GRS	23	uvod	179 GRS, zak2	1	1	4	157343	31	AFTER_RENDER							
590	21.05.2014 11:47:47.47	1175	373137	6	GRS	6	GRS	23	uvod	179 GRS, zak2	1	1	4	157343	100	BUTTON_CLICK	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
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590	21.05.2014 11:48:02.02	1175	373141	6	GRS	6	GRS	23	uvod	180 GRS, vysvetl	1	1	5	171933	31	AFTER_RENDER							
590	21.05.2014 11:48:02.02	1175	373142	6	GRS	6	GRS	23	uvod	180 GRS, vysvetl	1	1	5	171933	100	BUTTON_CLICK	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						
590	21.05.2014 11:48:04.04	1175	373143	6	GRS	6	GRS	23	uvod	180 GRS, vysvetl	1	1	5	174563	50	ACTION	<?xml version="1.0" encoding="UTF-8"?><EventData><Source Type=						

Poslední bod linie nebo polygonu zadejte dvojklikem.

Nápověda

Interactive stimuli



Možnost nastavení mapy, obsahu

Zákre
s linie typ 1

Zá

Zákre
s linie typ 2

Zá

Zvolte vrstvy mapy:

- státy
- názvy / zkratky států
- vodní toky
- významná města



pokračování dále

Nápověda

Video

Sledujte video.

Do videa lze kliknout.



Další>

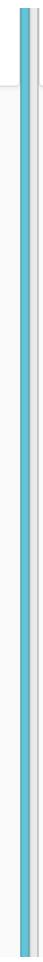
(Geo)collaboration

Počkejte na ostatní.

Uživatel 2



Uživatel 3



Zakreslete výšku předchozího objektu do červeně označené oblasti.

Uživatel 2

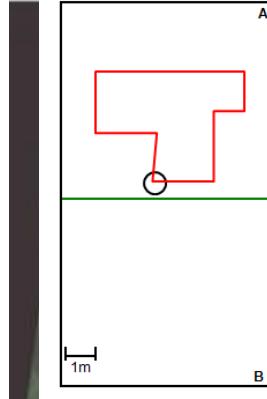
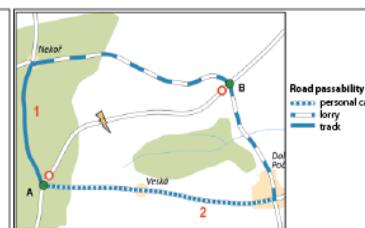
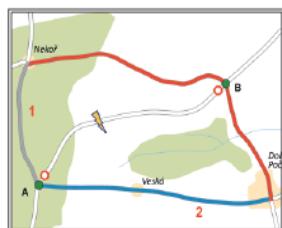
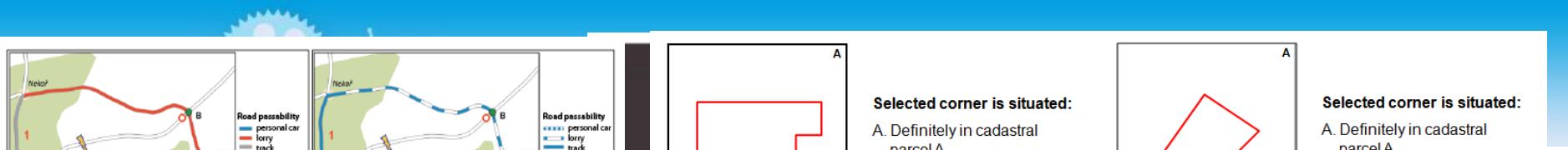


Uživatel 3

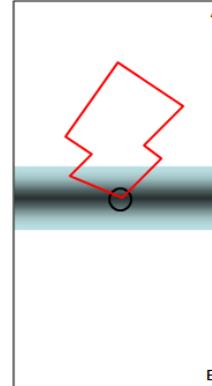


Přerušit

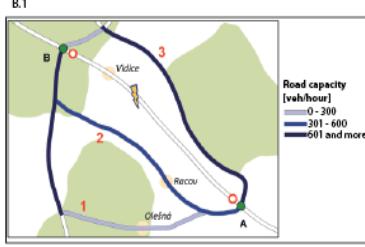
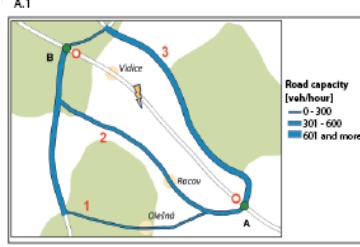
Přerušit



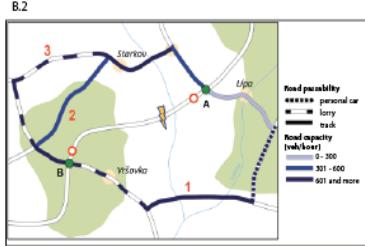
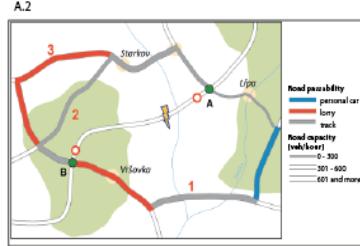
- Selected corner is situated:**
- Definitely in cadastral parcel A
 - Probably in parcel A
 - Equal chance of being in either parcel
 - Probably in parcel B
 - Definitely in cadastral parcel B



- Selected corner is situated:**
- Definitely in cadastral parcel A
 - Probably in parcel A
 - Equal chance of being in either parcel
 - Probably in parcel B
 - Definitely in cadastral parcel B



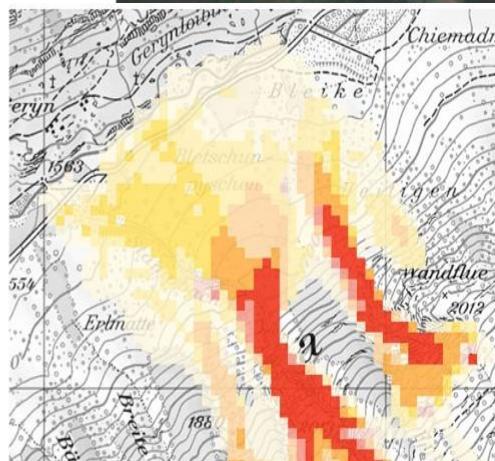
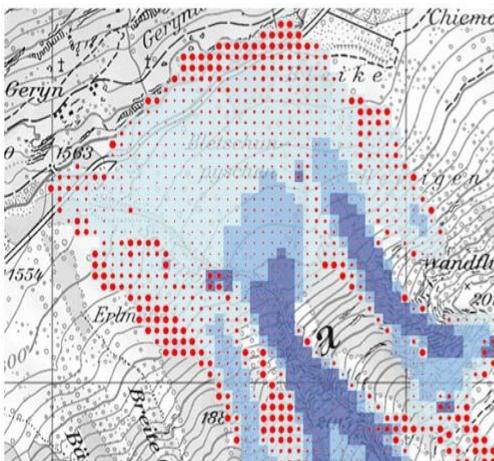
B



B

A.3

B.3

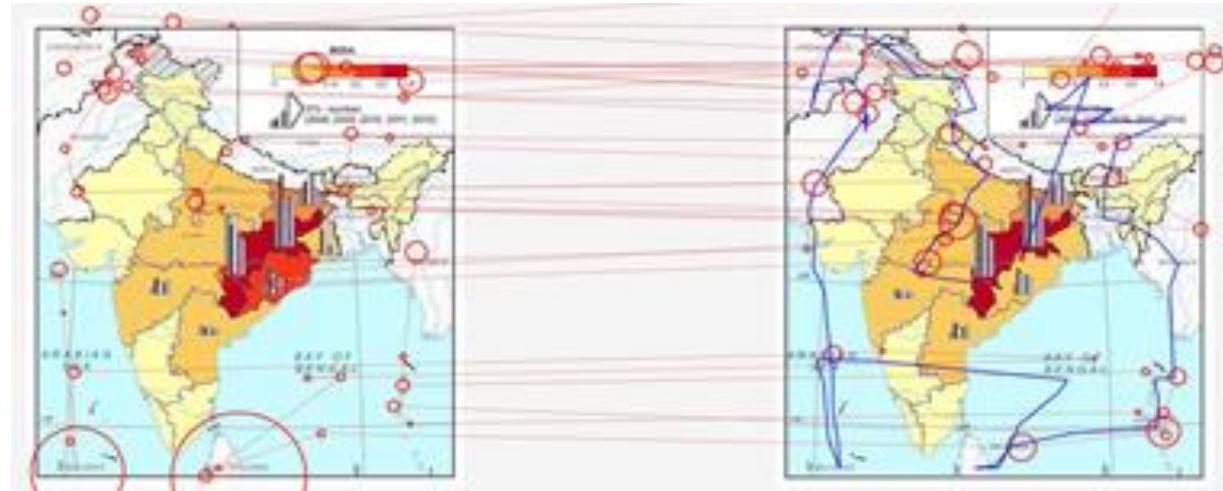


Sada A	Sada B	Význam znaku
Wavy line	III	vodní dílo III. kategorie
Square	1	čistírna odpadních vod
Yellow circle with black dot	E 1	místo shromažďování
Triangle	■	místo možného znečištění vody
M with arrow	•••	mobilní systém
Box with X	▽	vojenská pomoc na vyžádání
Circle with dot	○	propustek bez překážek

Examples

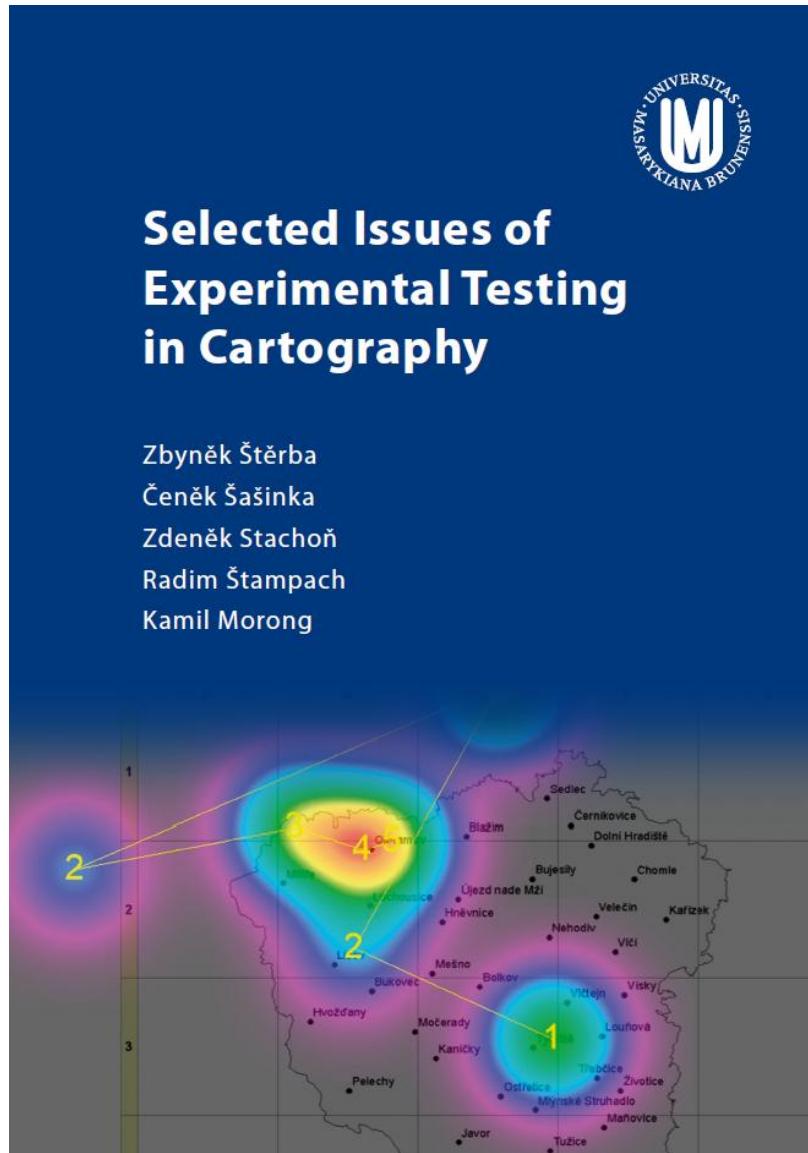
Conclusions

- Hypothesis
 - interactive web based testing tool was designed and an early prototype developed.
- Ready to test a wide variety of inputs from different fields of science.
- Both static and interactive.
- Available for cooperation



Publication

- ŠTĚRBA, Z., ŠAŠINKA, Č., STACHOŇ, Z., ŠTAMPACH, R., MORONG, K.,
Selected Issues of Experimental
Testing in Cartography. first. Brno:
Masaryk University, 2015. 107 s. ISBN
978-80-210-7909-0.
- Download at:
- <https://munispace.muni.cz/index.php/munispace/catalog/book/670>



Thank you for attention!!



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