Considering Visual Search Abilities in Eye Tracking User Studies

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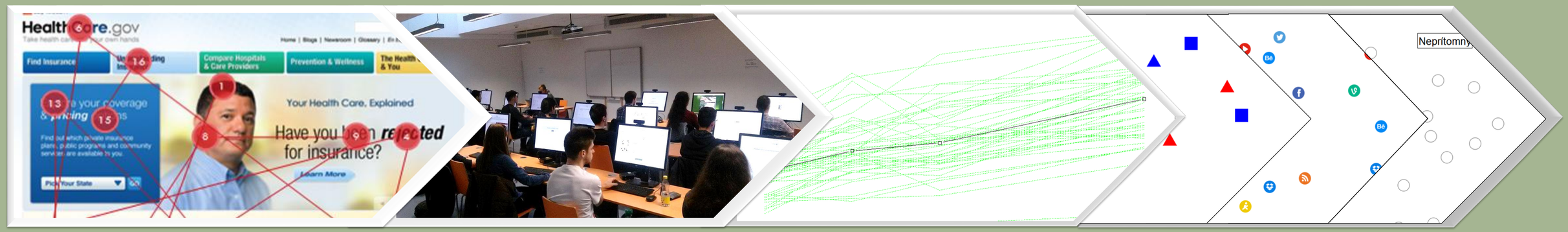
Realize **QUANTITATIVE EXPERIMENT** using **EYE TRACKING**

Create **CALIBRATION** set of **VISUAL SEARCH TASKS**



Focus on measuring **FINDABILITY** on websites

EVALUATION of participant's **VISUAL SEARCH ABILITIES**

AIMS

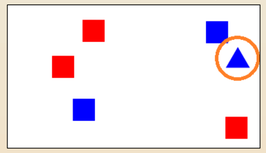
- ▶ Evaluate participant's visual search abilities
- ▶ Create special visual search task and use it as kind of a CALIBRATION before the UX testing
- ▶ **IMPROVE FINDABILITY MEASURES**

METHOD

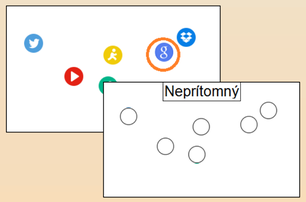
- ▶ **IMPLEMENT** visual search tasks
- ▶ **REALIZE** quantitative experiment
- ▶ **EVALUATE** of user's visual search abilities
- ▶ **VERIFICATE** of correlation between our evaluation and measured RTs/fixations on websites
- ▶ **CREATE** calibration set of visual search tasks

EXPERIMENT

STIMULI: 96 (+10 in tutorial)
SET SIZES: 6, 12, 18, 32



STIMULI: 48 (+10 in tutorial)
SET SIZES: 32, 64



STIMULI: 15 (no tutorial)

QUANTITATIVE experiment in UX Class:

1. Standard visual search task
2. Visual search for the icon from the web environment
3. Tasks on measuring findability of element on a website

MEASURES:

- ▶ Reaction time (RT) [1]
- ▶ Number of fixations prior to the indicating the end of the search

UX Class

- ▶ Capacity of 20 participants
- ▶ Tobii X2-60 (60 Hz) eye trackers
- ▶ Data collection - Built software infrastructure

VERSIONS	PARTICIPANTS	PARTICIPANT'S DATA USED
2	65	45

RESULTS

Fixation ALGORIGHM:
Eye MMV Toolbox [2] for MATLAB®

- ▶ Spatial parameters tolerance: t1 = 0.032, t2= 0,016
- ▶ Minimum fixation duration threshold: 100 ms

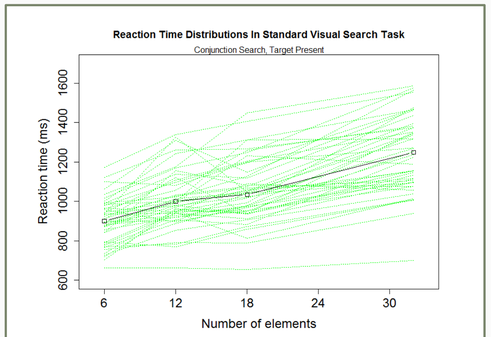
EVALUATION of participant:

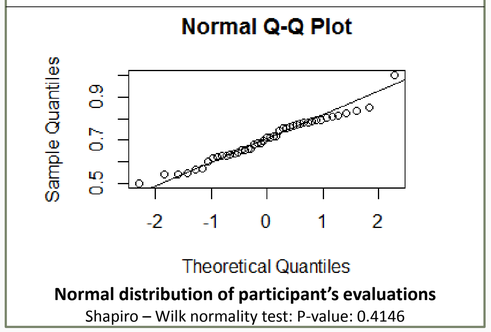
1. **For each stimulus Sy and for each participant Px:** calculate, how good the ability of the visual search of the participant Px on the stimulus Sy is in compare to the other participants from our experiment:

$$e_{P_x,S_y} = 1 - \frac{t_{P_x,S_y} - t_{min,S_y}}{R_{S_y}}$$

where: *RSy* - range of the measured RTs, *tpx,sy* – RT of participant *Px* on stimulus *Sy*, *Tmin,Sy* – minimal RT on stimulus *Sy*

2. **For each participant:** take the median value





Normal distribution of participant's evaluations
Shapiro – Wilk normality test: P-value: 0.4146

[1] Wolfe, J., T. Reaction time distributions constrain models of visual search, *Vision Research 50*, (2010), 1304-1311
[2] Krassanakis V., Filippakopoulou V., Nakos B. EyeMMV toolbox: An eye movement post-analysis tool based on a two-step spatial dispersion threshold for fixation identification. *Journal of Eye Movement Research 7*, 1 (2014), 1-10

If you have any questions or comments, do not hesitate to contact me: **majka.dragunova@gmail.com**