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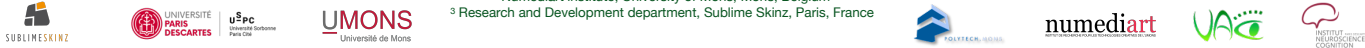
# A dynamic approach of searching behaviour in webpages

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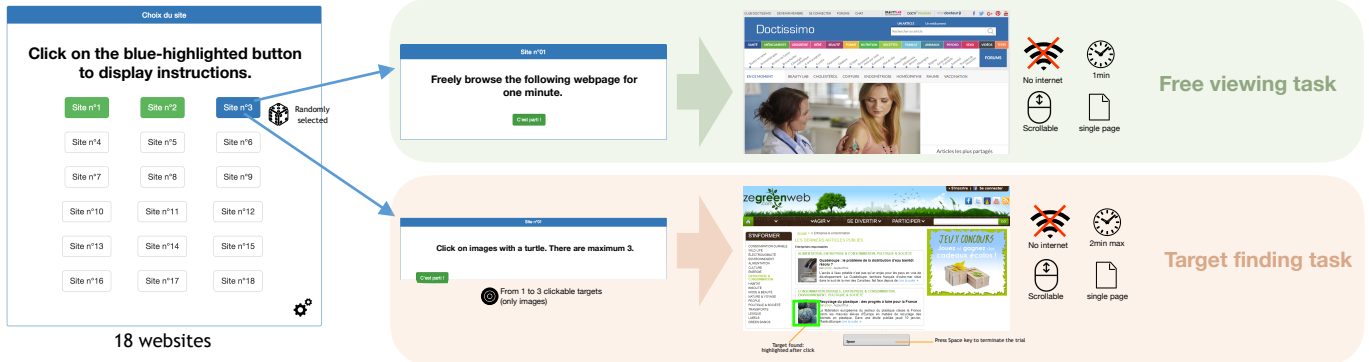
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## INTRODUCTION

The visit of a webpage is driven by multiple bottom-up and top-down factors, such as the inner characteristics of the webpage, the goal or the user profile. In the present experiment, we studied static and dynamic goal's effects on participants' visual behaviour while browsing webpages. In order to achieve this, we asked them to carry out two kinds of tasks: Free Viewing task and Target Finding task.

## METHODS



### ► Participants

- 16 participants.
- Normal or corrected-to-normal vision.
- 6 ♂; 10 ♀; ~23 y.o.

### ► Stimuli

- Mean height of 6505px.
- Width of 1920px.
- Scrollable.
- Fully offline.
- Single page.

### ► Apparatus

- EyeLink 1000 (SR Research®).
- 24.5-inch screen size.
- Temporal resolution of 1KHz.
- 144Hz screen's refresh rate.
- Spatial resolution of 0.05°.
- 1920x1080 of screen resolution

## RESULTS

### ► Does the task influence eye movements ?

As shown in **table 1**, the scanpath length is longer during Free Viewing condition. This can be explained by the fact that this condition was standardized to 1 minute exactly while Target Finding condition duration was up to the participant finding the target(s). At the opposite, other variables are higher during Target Finding but no conclusion can be given.

Global analyses show the influence of the task on eye movements but the scanpath is dynamic and change over time. With this type of analysis it is difficult to understand the behaviour of a participant while browsing.

### ► Explore or Exploit ?

#### Visual exploration modes

**Exploit/Focal:** long fixations (>180ms) followed by short saccades (<5°).

**Explore/Ambient:** short fixations (<180ms) and large saccades (>5°).

(Unema et al., 2005)

In order to better understand this dynamic, we looked for visual exploration modes during the browsing of the webpage. As formalized by (Unema et al., 2005), there is two visual exploration modes: Exploit or Focal and Explore or Ambient. These modes could help to have a more precise understanding of the scanpath's dynamic. To do so, we used (Dehais et al., 2015) version of (Goldberg and Kotval, 1999) ratio as described in **Figure 1**.

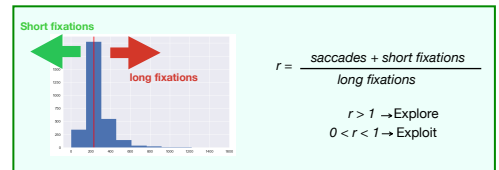


Figure 1: Classification methods and explore/exploit ratio computing.

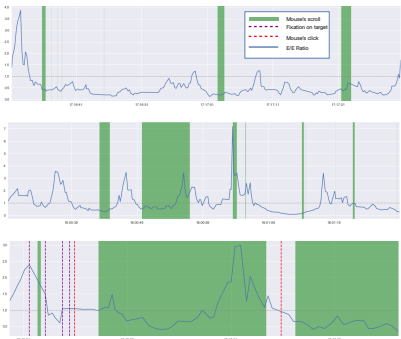


Figure 2: Ratio in Free viewing condition. (a) is a Free Viewing exploration on a website with a lot of text and (b) is a Free Viewing task on a website with many images and (c) is Target Finding task.

As you can see in **Figure 2**, the switch between the two modes changes in frequency and intensity according to the task. This switch occurs for two kind of reasons in both case: **bottom-up** or **top-down** stimulation. What change is the importance of one compared to the other depending on the task and stimulus.

We observed the following behaviours:

#### Target Finding

- Clicks are 80% of the time performed during exploit mode ( $r < 1.5$ ).
- Neither the scroll or the click on a target could explain the switch between the two modes.

#### Free Viewing

- Explore mode during the first 2 seconds is not systematic, specially when the user scroll within these 2 seconds.
- Explore mode is more intense during Free Viewing (higher peaks).
- In addition of the task and content, eye position in the page influence the dynamic of the exploration ( $F=0.004$ ,  $PR<F$ ).

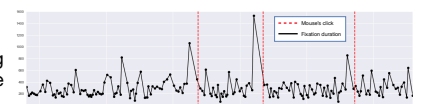


Figure 3: Clicks and fixation duration.

## CONCLUSION

Preliminary results showed the influence of the task on the scanpath length, the spatial dispersion of the fixations and the amplitude of the saccades. However, scanpath's characteristics evolve during the navigation which highlighted explore/exploit modes. Further analyses suggest that the scanpath's dynamic is also influenced by the target detection. In our future work, we will investigate the bottom-up influence and mix it with the top-down to better explain participants behaviour during target-finding condition.

## References

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