

# Designing an ergonomic and accessible newsreading experience in virtual reality

- **Topic:** virtual reality, newsreading, ergonomics, accessibility, user experience design
- **City and country:** Sophia-Antipolis, France
- **Team or project in the lab:** Centre de Recherche [Inria Sophia Antipolis – Méditerranée](#), [Biovision Lab](#)
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## General presentation of the topic

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Low-vision conditions such as age-related macular degeneration can result in partial loss of the central visual field, strongly affect patients' daily tasks and routines, and none more prominently than the ability to access text [1]. Though vision aids such as magnifiers, digital screens, and text-to-speech devices can improve overall accessibility to text, newspapers have complex, non-linear, and volatile formatting [3], barring low-vision patients from easy access to essential news content, and is thus a difficult design challenge.

## Objective of the internship

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This project has the goal of using virtual reality technologies to design an ergonomic and accessible newsreading experience for patients suffering from low vision. Based on current understanding on low-vision reading on digital media [1], design principles for improving user experience [4], and existing reading applications in VR for reading [2], the project will be carried out in four steps:

- 1) understanding of low-vision reading and interactive capacities of VR for reading activities,
- 2) prototyping various configurations and proposal of a design blueprint to improve accessibility and ergonomics of an existing VR application, notably with:
  - intuitive page and content navigation gestures and modalities,
  - audio, visual, and haptic indicators to provide feedback on interactions and reading progress, and
  - flexibility to modify and customize visual parameters of the application
- 3) implementing the VR reading platform in *Unity* based on the discussed blueprint, and iteratively improve the design based on pilot studies and expert feedback, and

4) discussion of affordances and limitations of virtual reality as a media for accessible and ergonomic reading.

## Bibliographic references:

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[1] Legge, G. E. (2016). Reading digital with low vision. *Visible language*, 50(2), 102.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5726769/>

[2] Wu, H. Y., Calabrèse, A., & Kornprobst, P. (2021). Towards accessible news reading design in virtual reality for low vision. *Multimedia Tools and Applications*, 1-20. <https://hal.inria.fr/hal-03192461/document>

[3] Wu, H. Y., & Kornprobst, P. (2019). Multilayered Analysis of Newspaper Structure and Design. [Research Report] RR-9281, UCA, Inria. 2019. <hal-02177784> <https://hal.inria.fr/hal-02177784>

[4] Fröjdman, S. (2016). User experience guidelines for design of virtual reality graphical user interfaces controlled by head orientation input. <https://www.diva-portal.org/smash/get/diva2:939381/FULLTEXT01.pdf>

[5] Dingler, T., Li, S., van Berkel, N., & Kostakos, V. (2020, December). Page-Turning Techniques for Reading Interfaces in Virtual Environments. In *32nd Australian Conference on Human-Computer Interaction* (pp. 454-461). <https://nielsvanberkel.com/files/publications/ozchi2020a.pdf>

## For more

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Our first prototype: [CardNews3D software](#)