

Human-Centered Design and Evaluation of Digitized Cultural Heritage Experiences

Christos A. Fidas

Assistant Professor
Department of Cultural Heritage and New Technologies,
University of Patras

E: fidas@upatras.gr

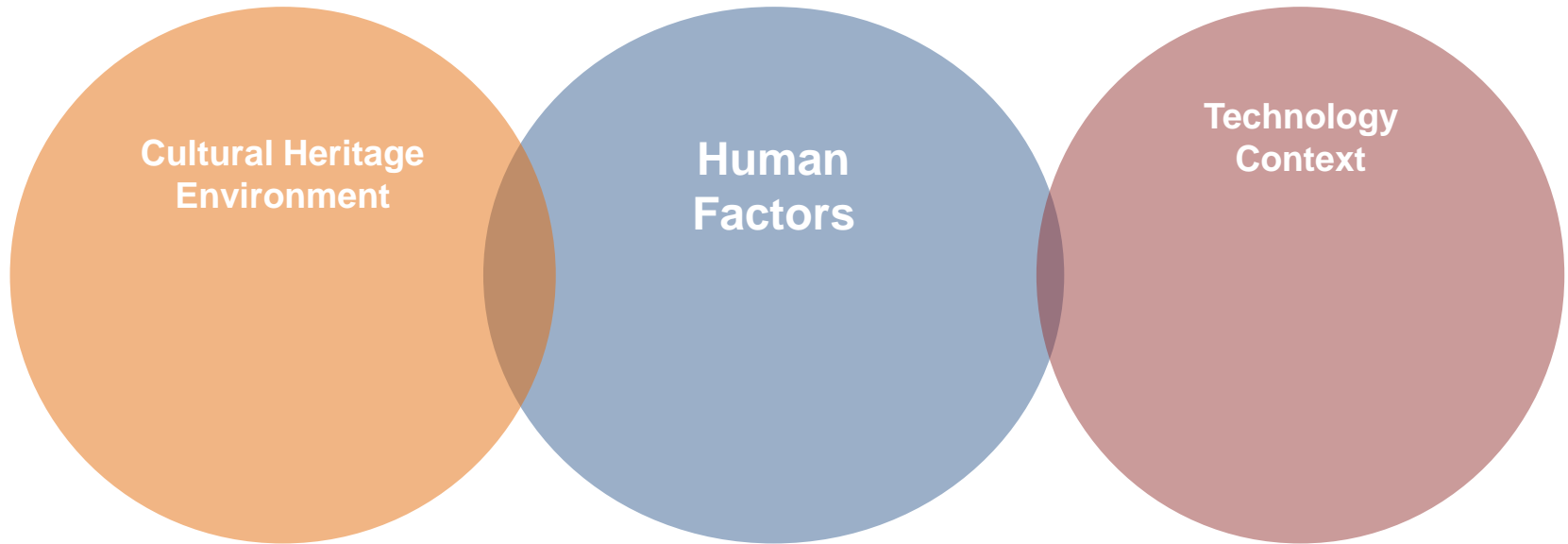
W: <http://www.cfidas.info>

University of Patras:

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What do we mean with the
term **Human-Centered
Design?**

Human Factors in the Design of Digitized Cultural Heritage



Why is it important to
embrace human-factors in
digital cultural heritage
experiences?

A Plethora of Digitized Cultural Heritage Applications...



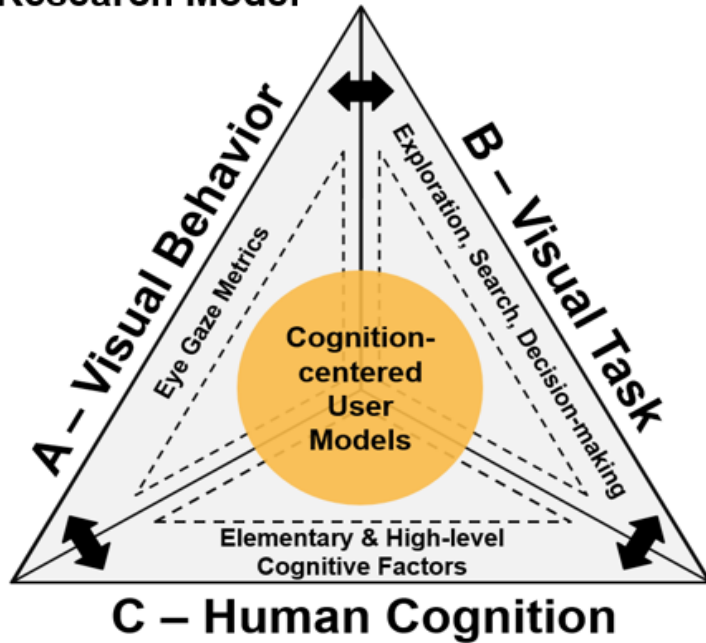
In cultural heritage, **human factors** is dedicated to better understanding **how humans can effectively and efficiently process and comprehend information integrated with the technology**



**How can we practically
consider** human-factors in
digital cultural heritage
experiences?

Eye-Gaze Driven Research Model

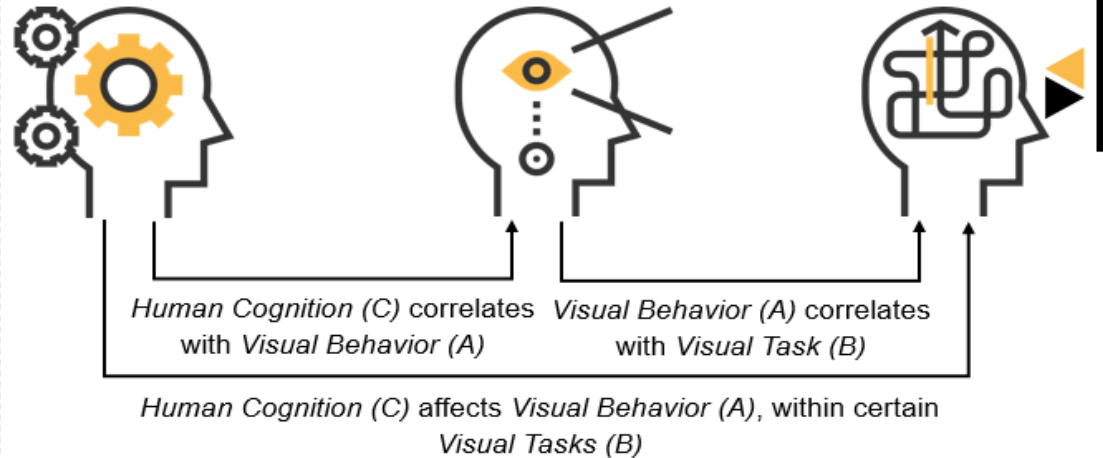
Research Model



Eye Gaze-driven Cognition-centered Modelling Approach

Cognitive Typologies

- **Cognitive Abilities:** Speed & Control of Processing, Working Memory
- **Cognitive Styles:** Verbal/Imager, Wholist/Analyst



Research questions

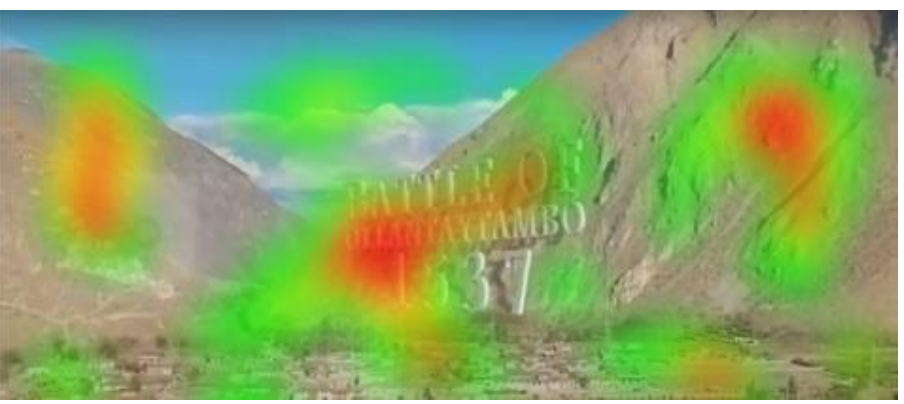
- Do human cognitive differences correlate with visual behavior within cultural heritage interaction contexts?

In case of a strong correlation:

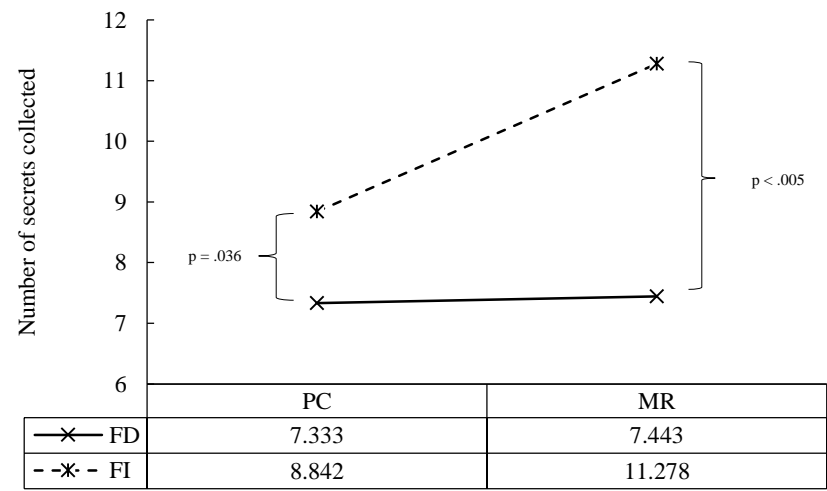
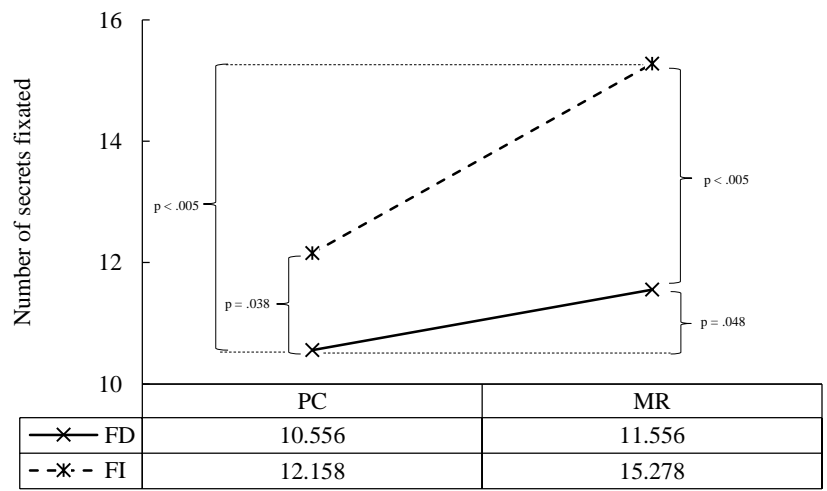
- Does human cognitive differences affect interaction behavior and / or knowledge acquisition within cultural heritage interaction contexts?
- Can we create in run-time efficiently and effective cognition-centered user models?

Do human cognitive differences correlate with visual behavior?

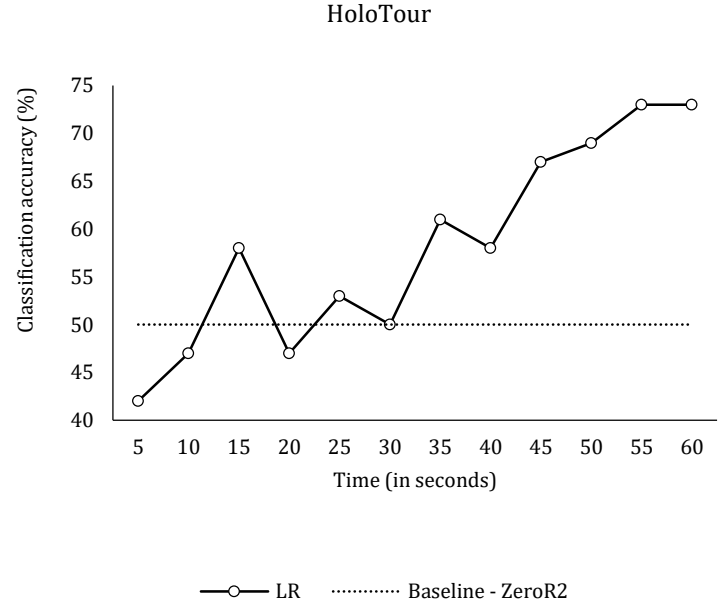
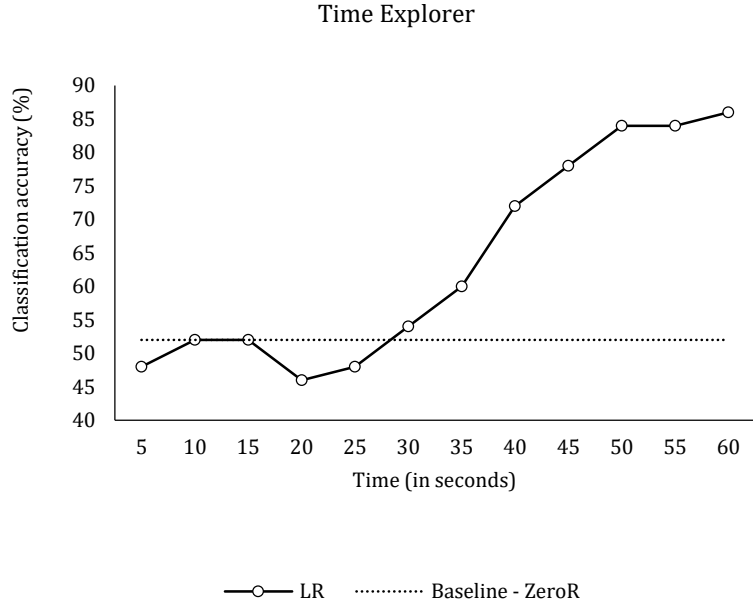
HoloTour is a playful audiovisual three-dimensional virtual tourism application



Heatmaps of (a) field-independent and (b) field-dependent in the mixed-reality environment. Field-independent individuals visually explored larger areas of field-dependent players (HoloTour is a playful audiovisual three-dimensional virtual tourism application developed by Microsoft.)

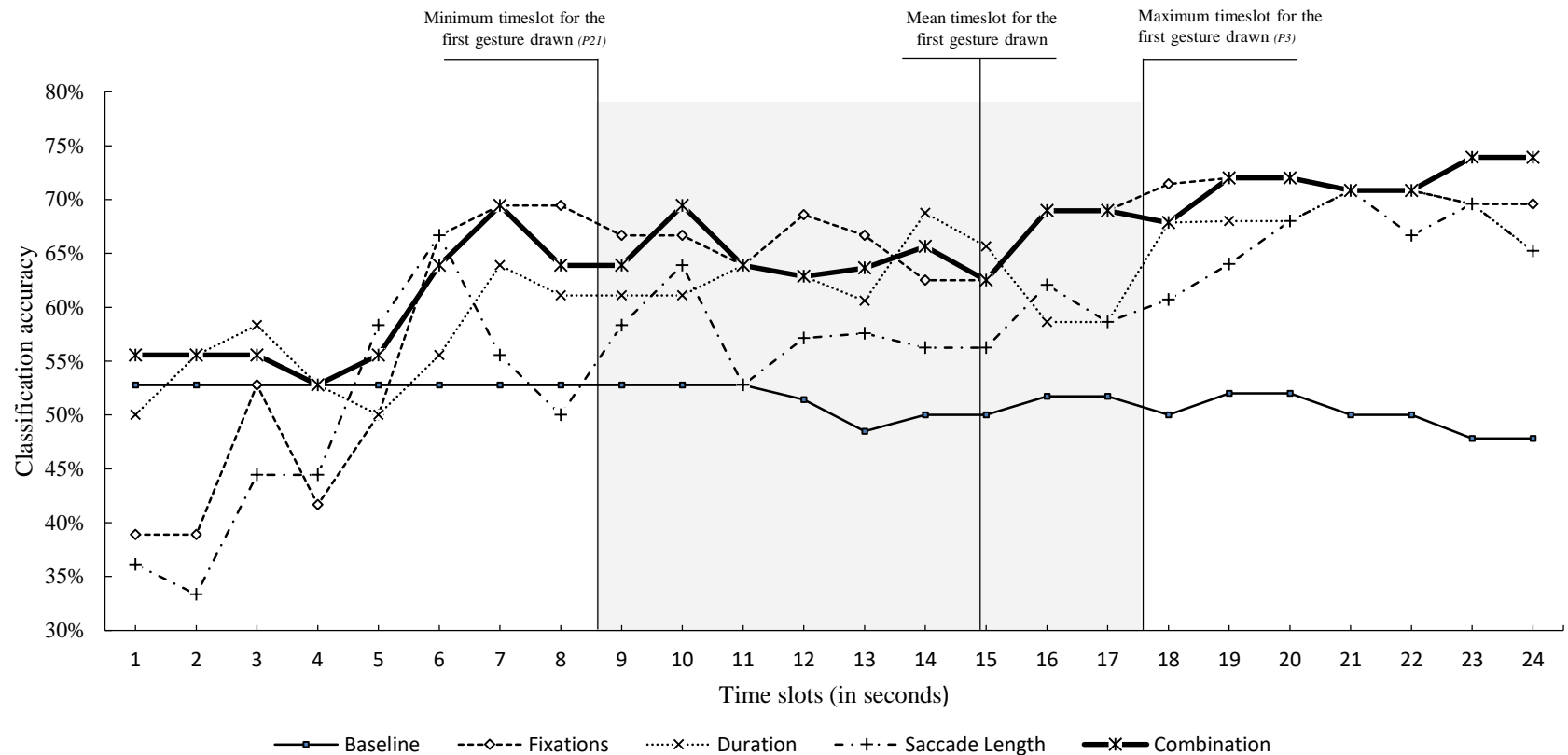


Effectiveness and efficiency in classification experiments



George E. Raptis, Christina Katsini, Marios Belk, Christos Fidas, George Samaras, and Nikolaos Avouris. 2017. **Using Eye Gaze Data and Visual Activities to Infer Human Cognitive Styles: Method and Feasibility Studies**. Proceedings of the 25th Conference on User Modeling, Adaptation and Personalization - UMAP '17, ACM Press, 164–173. <http://dx.doi.org/10.1145/3079628.3079690>.

In another domain: Graphical User Authentication



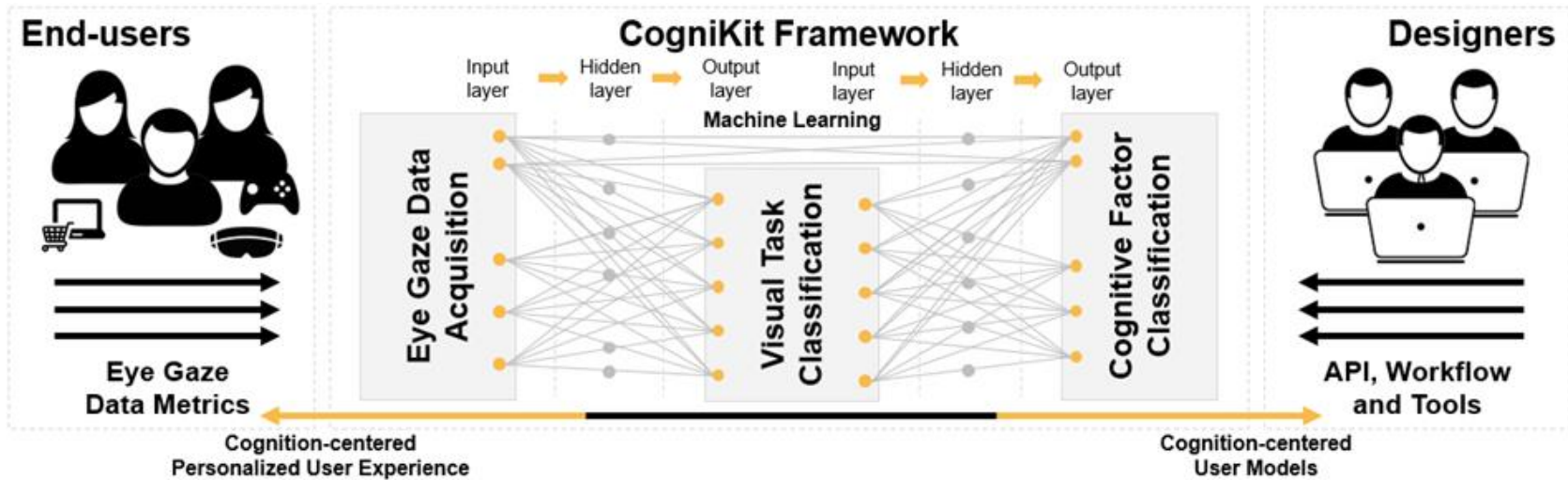
- Katsini, C., Fidas, C., Raptis, G., Belk, M., Samaras, G., & Avouris, N. (2018). Influences of human cognition and visual behavior on password security during picture password composition. *ACM SIGCHI Human Factors in Computing Systems (CHI 2018)*, ACM Press (to appear)
- Katsini, C., Fidas, C., Raptis, G., Belk, M., Samaras, G., Avouris, N. (2018). Eye gaze-driven prediction of cognitive differences during graphical password composition. *ACM SIGCHI Intelligent User Interfaces (IUI 2018)*, ACM Press (to appear)
- Belk, M., Fidas, C., Germanakos, P., Samaras, G. (2017). The interplay between humans, technology and user authentication: a cognitive processing perspective, *Computers in Human Behavior*, 184-200.

Finishing up

Cultural heritage digitized content is processed on a **cognitive level by end-users**



Human cognitive characteristics as an important human factor in the design of cultural heritage interactive systems



Personalize the visual and interaction design to the individuals' preferred cognitive processing characteristics

thank you for your attention
questions?

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