

You Creep Me Out: Avatar Creation Methods, Realism, & the Uncanny Valley



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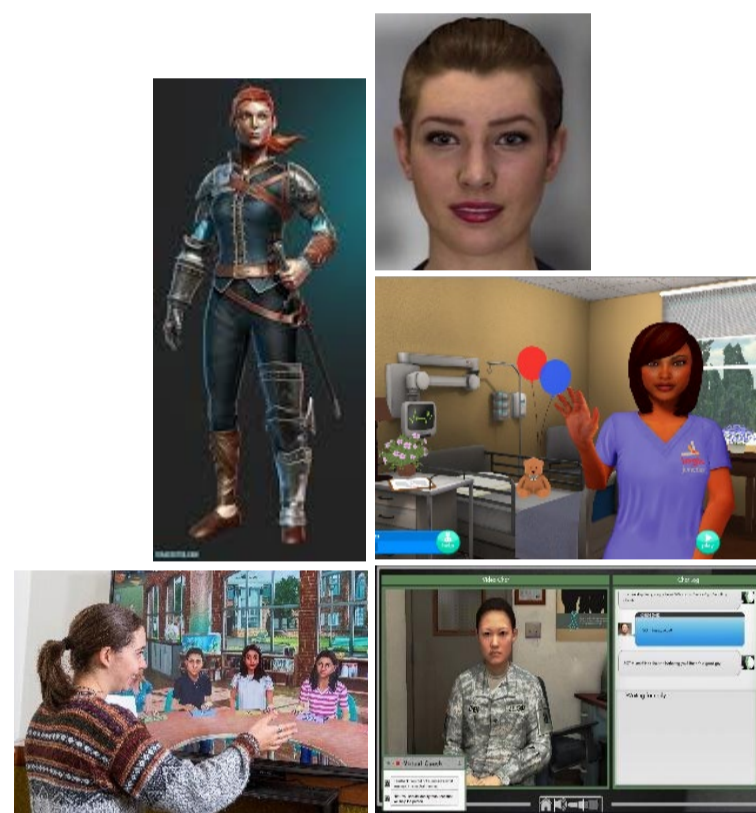
Study Aim

- This study aims to evaluate the perceived realism and uncanniness of avatars (n=10), that have been created using slightly different approaches
- The choice of creation method is often linked to expenditure of time, money, and available resources (including expertise)
- This selection of avatars was presented to (n=2065) participants and ranked by their perceived level of realism and uncanniness

How are avatars used?

There are many ways for avatars to interact with end-users, including:

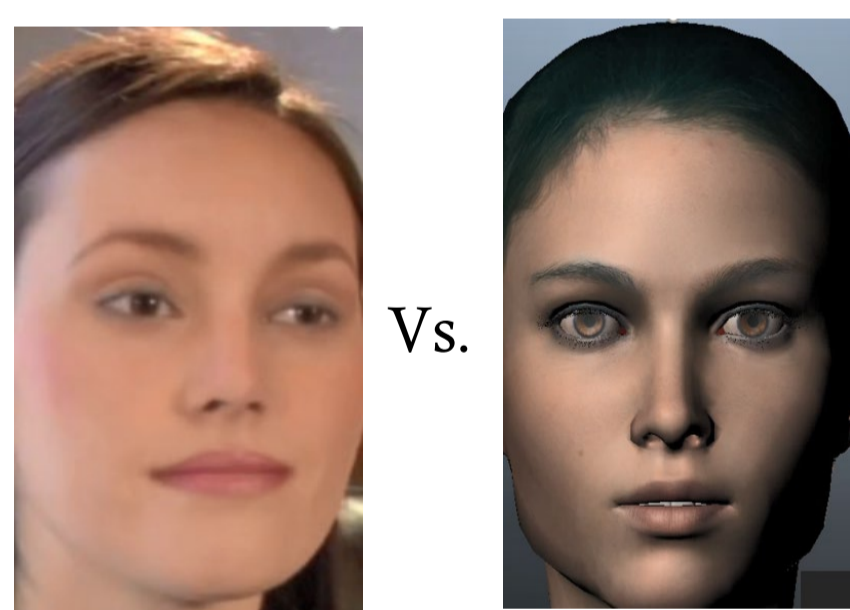
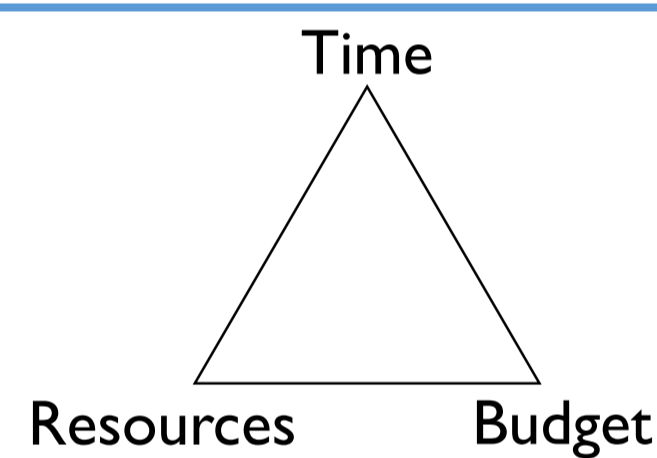
- Virtual assistants
 - (Isbister, Nakanishi, Ishida, & Nass, 2000)
- Teaching or instructing
 - Avatar-augmented role play (Hudson & Hurter, 2016)
 - Pedagogical (Baylor & Kim, 2005)
- Entertainment
 - Movies, television and gaming



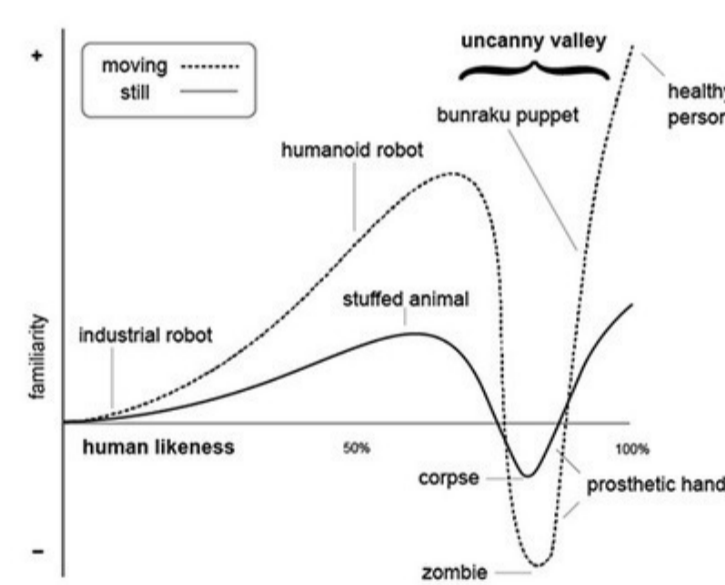
What are the major problems for avatar creation?

There are 3 **key issues** for avatar creators:

- Available **Resources** to create the avatars
- The resulting level of **Realism**
- The affect of **Uncanniness** on end-users

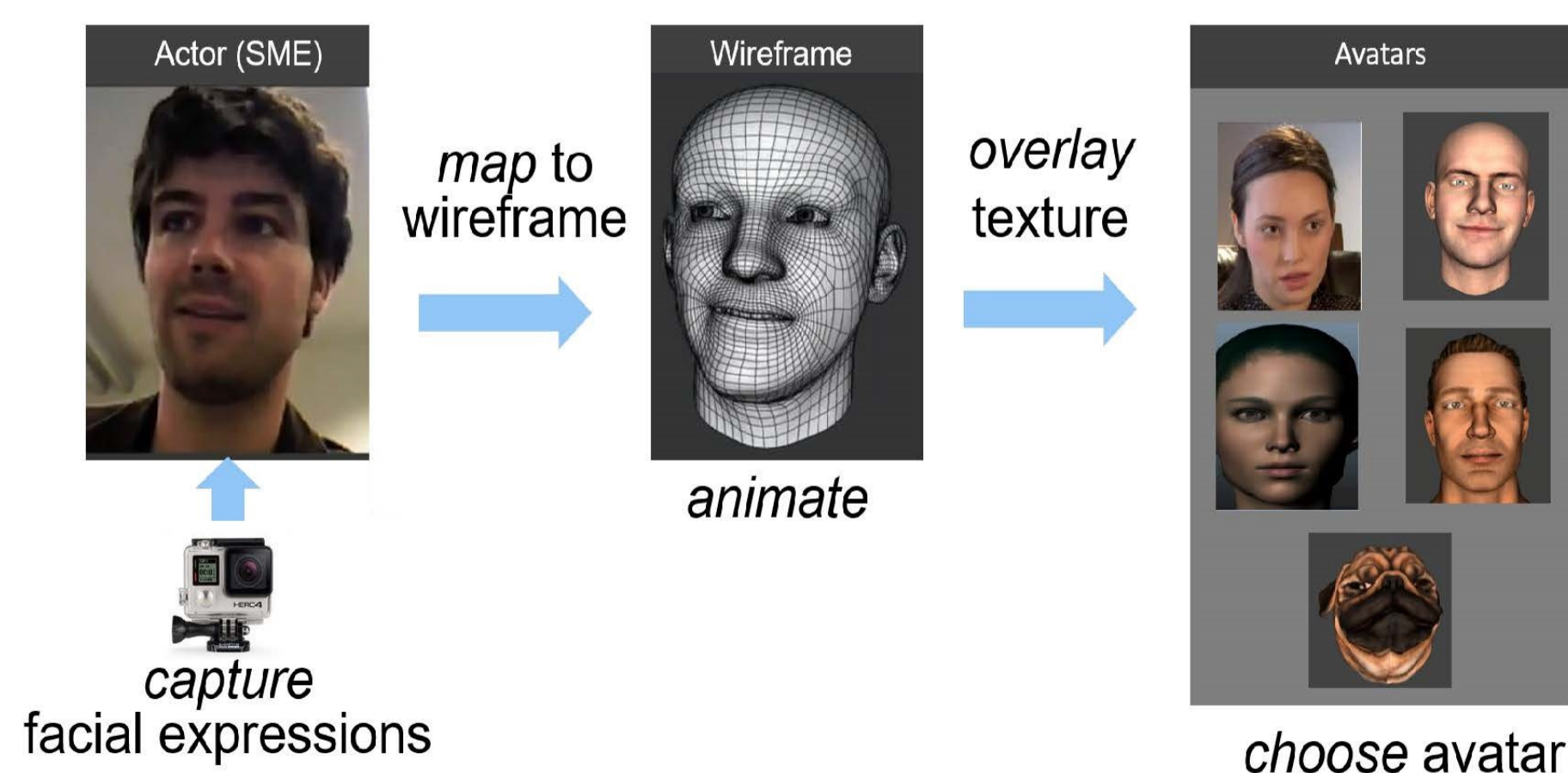


Different levels of realism



The Uncanny Valley, Mori, 1970

Motion Capture: the 'quick and easy' solution?



Motion Capture can be thought of as a **five stage process** (Gleicher, 1999):

- Planning
- Capturing movement
- Cleaning the data
- Editing the captured movements
- Mapping the movements to a character

Note that, stages 4-5 can be an iterative process, which may make motion capture a time consuming process

Data Collection

- Using Amazon's Mechanical Turk (Mturk) (n=2065) participants were paid 30USCents to complete a survey that asked them to rank a set of avatars by how realistic and uncanny or eerie they are (See the set in the Results Section)
- This survey was approved by the University of Newcastle's Ethics Committee in March 2018 and was conducted under the Ethics Approval Number (H-2015-0163)



Results and Key Findings

- The following table shows the avatars ranked by their perceived level of **realism** and **uncanniness**

Rank	Realism Rankings			Uncanniness Rankings		
	Avatar	Info	Mean(SD)	Avatar	Info	Mean(SD)
Most		Rose DaFEx	2.67 (2.199)		Victor Faceware	4.99 (2.505)
2		Rycroft DaFEx	3.06 (2.147)		Ira USC	5.14 (2.805)
3		Ira USC	3.53 (2.020)		Emily USC	5.37 (3.006)
4		Emily USC	3.57 (2.085)		Leo FaceShift	5.47 (2.739)
5		Victor Faceware	6.06 (1.915)		Rycroft DaFEx	5.51 (3.114)
6		Ilana Faceware	6.12 (1.938)		Macaw FaceShift	5.52 (2.571)
7		Macaw FaceShift	7.07 (1.919)		Rose DaFEx	5.65 (3.360)
8		Leo FaceShift	7.08 (2.027)		Jacqueline 3D Avatar Store	5.66 (3.214)
9		Liliwen ModCom	7.56 (2.404)		Liliwen ModCom	5.83 (2.799)
Least		Jacqueline 3D Avatar Store	8.27 (2.122)		Ilana Faceware	5.87 (2.324)

Realism

- Realism ranks are statistically significantly different $X^2(9) = 8819.897, p < .000$
- Avatars from the same source/creation method are adjacent in the rankings, demonstrating perceived realism differences may be related to creation tool. For example, Emily (M= 3.57, 2.085) was created using extensive scanning and lighting to create a high-resolution mesh compared to Jacqueline (M= 8.27, 2.122) who was created using an off the shelf tool and a GoPro on a laptop

Uncanniness

- Uncanniness ranks are statistically significantly different $X^2(9) = 156.254, p < .000$
- Despite being considered the most realistic, human actors (Rycroft and Rose) are ranked as more uncanny than some avatars, potentially caused by uncertainty of their 'human' status
- Creation method may not be the primary marker of uncanniness

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For more information:

