Say Hi to Eliza
An Embodied Conversational Agent on the Web

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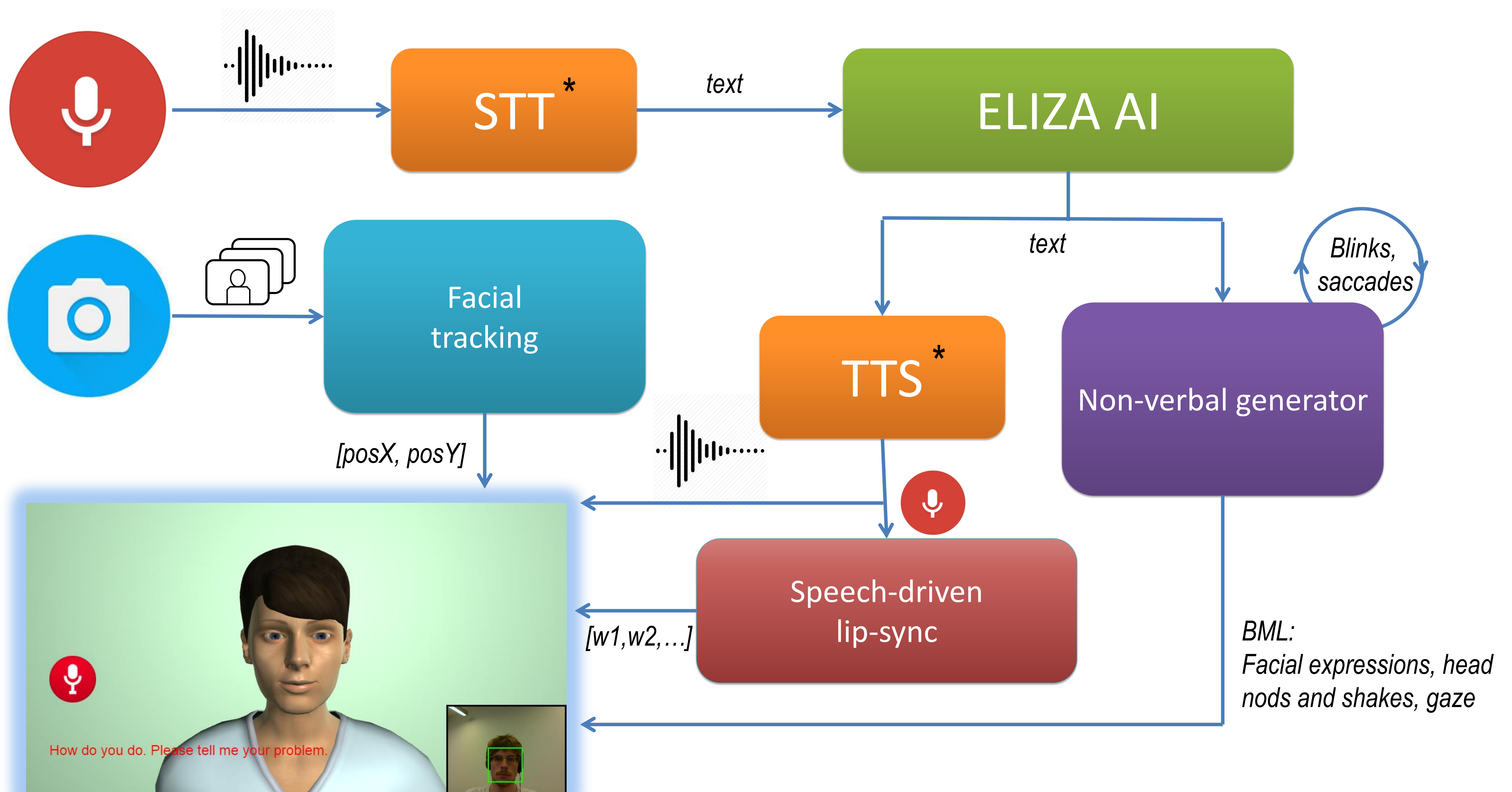
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MOTIVATION

- Web-based Embodied Conversational Agents (ECAs) are **accessible** from any device via the web browser and internet access, with no installation required besides the web browser itself and irrespective of the operating system, hence broadening their use in society.
- **Web technologies** nowadays permit to create and support ECAs with relatively little effort, without the need of installing extra plugins like Adobe Flash or Unity Web Player.
- **Large user studies** with web-based ECAs can be done easily as only a web link to the application is needed to run it.
- ECAs can be significant when simulating ecologically valid environments for **hearing aid research**.

COMPONENTS

- **Listening and Speaking:** Web Speech API for STT and TTS using Google Chrome's services.
- **Understanding, thinking and replying:** ELIZA [1] as artificial conversational entity and rule-based behaviors described in [2] for gaze and head motions.
- **Embodiment:** support, real-time rendering and animations with **WebGLStudio** [3]; speech-driven lip-sync [4] with the Web Audio API; valence-arousal model for facial expressions [5]; and facial tracking with the jsfeat library [6] implemented with Web Workers.
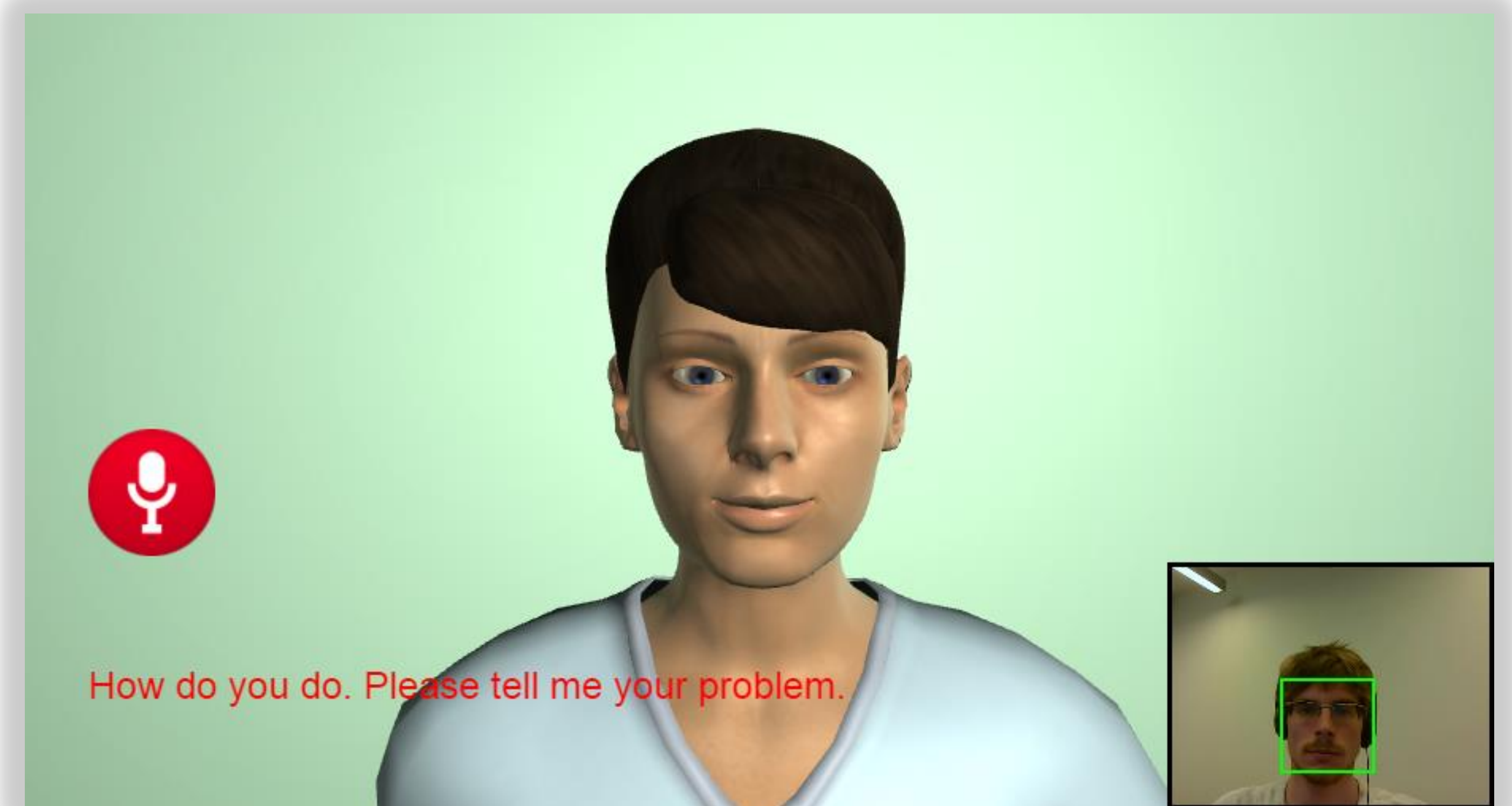
ARCHITECTURE

INTERFACE

RESULTS

Each component was tested over 100 interactions with a PC (Windows 8 x64 2.50 GHz, Nvidia GeForce GT 750M) with Google Chrome and a internet connection of 45 Mbps. The total processing time of an interaction with the system (when the subject stops to speak to when the agent starts to speak) had a mean of 392.66ms with a standard deviation of 254.09ms. Thus, the waiting time to get a reply would be **less than a second**, an acceptable delay in a natural human conversation.

*Server side in Chrome (Web Speech API)

WEB LINK

https://webglstudio.org/gerard/eliza/

REFERENCES
[1] Weinzembaum, J.: ELIZA A Computer Program for the Study of Natural Language Communication Between Man And Machine. In: Communications of the ACM, 9 (1), pp. 36{45 (1966)
[2] Ruhland K., Peters C. E., Andrist S., Badler J. B., Badler N. I., Gleicher M., Mutlu B., McDonnell R.: A Review of Eye Gaze in Virtual Agents, Social Robotics and HCI: Behaviour Generation, User Interaction and Perception. In: Computer Graphics Forum 34, 6, 299{326. (2015)
[3] Agenjo, J., Evans, A., Blat, J.: WebGLStudio: a pipeline for WebGL scene creation. In: Proceedings of the 18th International Conference on 3D Web Technology, 79{82. (2013)
[4] Llorach, G., A. Evans, J. Blat, G. Grimm, V. Hohmann. Web-based live speech-driven lip-sync. In: 8th International Conference on Games and Virtual Worlds for Serious Applications (VS-Games) (2016)
[5] Romeo, M.: Automated Processes and Intelligent Tools in CG Media Production. PhD thesis, 119-148 (2016)
[6] Zatepyakin E.: JavaScript Computer Vision library (jsfeat), https://github.com/inspirit/jsfeat