

Facial Information Transfer

Type d'offre : **Master / Master Recherche**

Lieu de travail : **Rennes - Technicolor, Inria (équipe MimeTIC)**

Thème de recherche : **Perception, cognition, interaction**

Responsables scientifiques : **Quentin Avril / Ludovic Hoyet**



Subject

Facial animation is an increasingly important part of the VFX pipeline. Believable virtual characters need to have plausible facial expressions so that the movie audience can relate to them and be immersed in the storyline. But people are extremely sensitive to even fine-scale nuances of facial animation. The VR emergence also strengthens the need for high-fidelity facial animation to improve embodiment of HMD users.

The process of 3D character creation is composed by several stages. One of these is called the rigging and consists in making the 3D character (and face) ready for animation. In this process, the most widespread solution is to use a template fully rigged character and to transfer its whole animation setup onto a newly created mesh. Transferring facial expressions onto different faces is challenging because of the complexity of human faces. The most commonly used technique to animate characters' faces consists in using blend shapes. Blend shapes represent local deformations of the face and are decomposed into single units (using the Facial Action Coding System). They are then combined using blending weights to create facial expressions.

The abovementioned transfer between characters is tough to transfer the full set of blend shapes. However, subtle expressions are still usually lost or incorrectly transferred to different faces. One of the reason for this problem is due to the fact that a FACS unit for a given actor might not be perceived similarly (or with a similar intensity) on a different character. For instance, an "upper lip corner up" activation might correspond to a smile for the actor, but be perceived as a smirk when retargeted on a different face, which therefore changes the content of the animation.

The goal of this internship is to explore how FACS blend shapes can be transferred to different faces while preserving as much as possible the intensity of the facial deformation. The internship will involve amongst other exploring the quality of transfer of such single units, and how they should be topologically deformed for a specific morphology to maximise the transfer of visual information. The internship will also involve designing specific protocols for perceptual evaluations and user experiments to evaluate the visual fidelity of transfers.

Environment

This subject is a collaboration between Technicolor and the MimeTIC team in Inria, co-supervised by Quentin Avril (researcher in Technicolor, specialized in facial animation)

and Ludovic Hoyet (researcher in Inria, specialized in character animation and perception). The candidate will work in both the Technicolor and Inria research centres, located in Rennes. Technicolor and Inria are amongst the leading research centres in Computer Sciences in France.

Requirements for candidacy

- Python language recommended
- Strong background in mathematics
- Interest in User Evaluations and Experimentations
- Skills in Maya and/or Blender would be an advantage

We are looking for motivated candidates, please send CV, motivation letter and any relevant material to: quentin.avril@technicolor.com and ludovic.hoyet@inria.fr

Keywords and References

Facial Animation, Animation Transfer, Character Animation, Perception, User Experimentation

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- [SP04] Robert W. Sumner and Jovan Popović, Deformation Transfer for Triangle Meshes, *ACM Trans. on Graph.* 23, 3. August 2004.

Contacts

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