

VR Hair Salon for Avatars

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While hair is an essential component of virtual humans, it is also one of the most challenging and time-consuming digital assets to create. Existing automatic techniques lack the generality and flexibility for users to create the exact intended hairstyles. Meanwhile, manual authoring interfaces often require considerable skills and experiences from character modelers, and are difficult to navigate for intricate 3D hair structures. We propose an interactive hair modeling system that can help create complex hairstyles that would otherwise take weeks or months with existing tools. Modelers, including novice users, can focus on the overall intended hairstyles and local hair deformations, as our system intelligently suggests the desired hair parts. Our method combines the flexibility of manual authoring and the convenience of data-driven automation. Since hair contains intricate 3D structures such as buns, knots, and strands, they are inherently challenging to create from scratch using traditional 2D interfaces. Our system provides a new 3D hair authoring interface for immersive interaction in virtual reality (VR). We use a strip-based representation, which is commonly adopted in real-time games due to rendering efficiency and modeling flexibility. The output strips can be converted to other hair formats such as strands. Users can draw high-level guide strips, from which our system predicts the most plausible hairstyles in the dataset via a trained deep neural network. Each hairstyle in our dataset is composed of multiple variations, serving as blendshapes to fit the user drawings via global blending and local deformation. The fitted hair models are visualized as interactive suggestions, that the user can select, modify, or ignore. We conducted a user study to confirm that our system can significantly reduce manual labor while improve the output quality for modeling a variety of hairstyles that are challenging to create using existing techniques.