

# Footstep Parameterized Motion Blending using Barycentric Coordinates

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This paper presents a real-time animation system for fully-embodied virtual humans that satisfies accurate foot placement constraints

for different human walking and running styles. Our method offers a fine balance between motion fidelity and character control, and can efficiently animate over sixty agents in real time (25 FPS) and over a hundred characters at 13 FPS. Given a point cloud of reachable support foot configurations extracted from the set of available animation clips, we compute the Delaunay

triangulation. At runtime, the triangulation is queried to obtain the simplex containing the next footstep, which is used to compute

the barycentric blending weights of the animation clips. Our method synthesizes animations to accurately follow footsteps, and

a simple IK solver adjusts small offsets, foot orientation, and handles uneven terrain. To incorporate root velocity fidelity, the method is further extended to include the parametric space of root movement and combine it with footstep based interpolation. The

presented method is evaluated on a variety of test cases and error measurements are calculated to offer a quantitative analysis of the results achieved.