

## Descriptions of Additional Supplementary Files

### Supplementary Movie 1

**Description:** Free-feeding behavior of common marmoset were recorded by four depth cameras. Overlaid images with estimated body motion with four body parts, *Face*, *Head*, *Trunk*, and *Hip* and RGB camera image (left), and top and vertical projection of the trajectories (right).

### Supplementary Movie 2

**Description:** Comparison of the marmoset free-feeding behavior and the synthesized behavior based on the estimated results. Body motion corresponding to the top left RGB video (bottom right), representative motion synthesized from the SMP motion motifs (middle bottom), and stop-motion-like animation synthesized by the conventional posture-clustering method with  $k = 6$  (bottom right).

### Supplementary Movie 3

**Description:** A set of 10 kinds of SMP motion motifs detected from freely moving macaque. Red dots representing the two body parts, *Nose* and *Head*. Horizontal position of *Hip* scaled to zero.

### Supplementary Movie 4

**Description:** A set of 7 types of SMP motion motifs detected from freely moving marmosets after chemogenetic neural manipulation.