Joint metaphor

- Rubber-like glue metaphor
  - The user can check the current state with visual and auditory feedback while detaching.
  - When the user
    - moves a part from its initial position:
      - Connection expands and contracts like a rubber band depending on the distance between parts
      - When it returns to the initial position, a clicking sound is provided
      - - releases the part in the effective area:
    - moves the part outside of the effective area:
      - Connection is cut
      - Auditory feedback changes are in synchronization with visual feedback
    - Auditory feedback is provided

- Joint metaphor
  - Joint indicates the point where the user can detach the parts
  - Connection is cut
  - Auditory feedback is provided
  - The difference between Rubber-like glue metaphor and Joint metaphor is:
    - Rubber-like glue metaphor
      - The user can ungroup multiple groups simultaneously with a slapping gesture.
      - Auditory feedback is provided
    - Joint metaphor
      - The user can ungroup multiple groups simultaneously with a slapping gesture.
      - Auditory feedback is provided

From an informal user study

We compared user operations with and without use of the metaphors and collected user comments.
- All users preferred the operations using the metaphors because the beginning and completion of detaching was clearer and the operation was comfortable.

Our method avoids unexpected operations and improve user satisfaction