Expressive Dance Motion Generation

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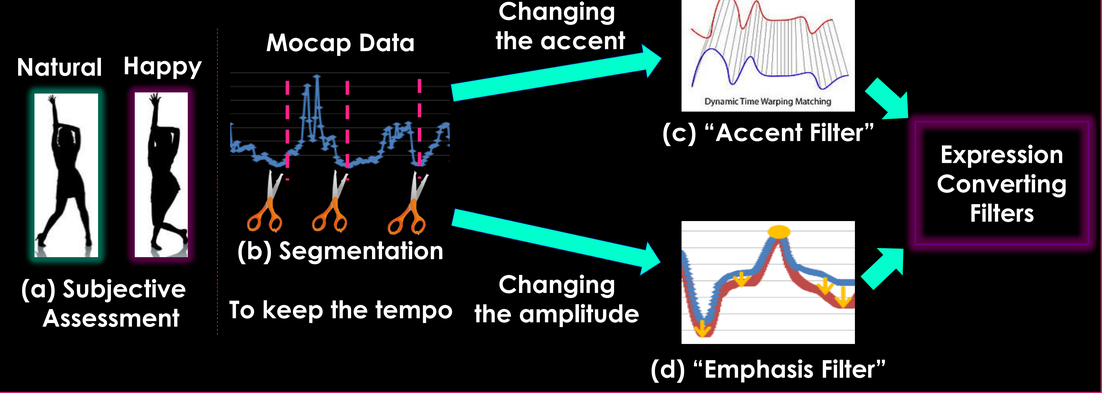
1. Introduction

- **Goal**
  Transform arbitrary dance motion
  into more expressive dance motion by filtering in accent and power
- **Features**
  - The expression conversion rule is extracted by analyzing motion capture data
  - Original dance motion is converted to expressive dance to keep the tempo

2. Work Flow



3.1 Subjective Assessment

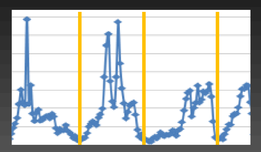
- **Aim**
  Examined the criteria that viewers use to judge expression
- **Result**
  Viewers focused on accent and dynamic motion

3.2 Segmentation

- **Divide a series of dance motion into several segments**
  Depending on Weight Effort's minimum points

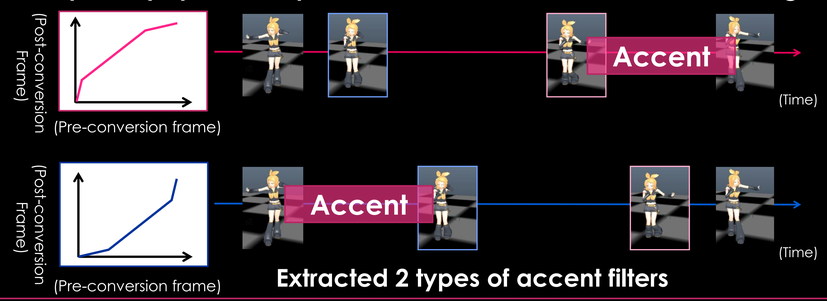
$$W(f) = \sum_{i=1}^{N} \gamma_i \sum_{j=\{x,y,z\}} |\theta_{ij}(f) - \theta_{ij}(f-1)|$$

θ : degree of each joint
γ : weight



3.3 Accent Filter

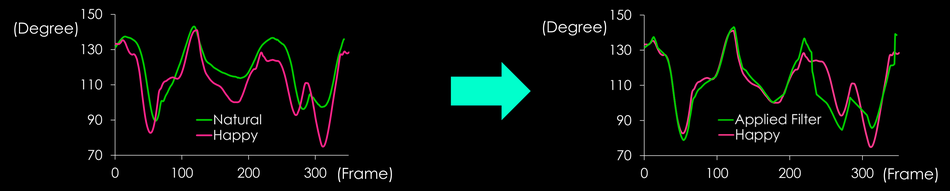
- **Finding the timing pattern by Dynamic Time Warping(DTW)**
  To avoid the discontinuity of motion, before doing DTW
  up-sampled by Spline interpolation and decided the threshold of angular velocity



Extracted 2 types of accent filters

3.4 Emphasis Filter

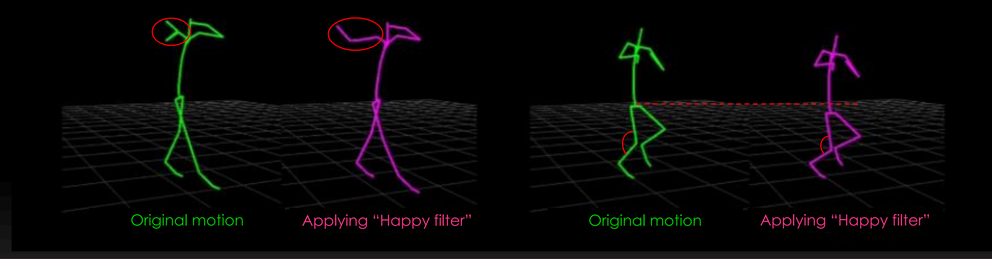
- **Defining a converting filter of the amplitude of motion**
  Calculated the average ratio among the knee angels in "Natural" and "Happy"



Linear interpolation between the minimum and maximum points

4. Result

- **Applying expression converting filters to arbitrary dance motion**



5 Future Work

- **Changing the other criteria (Ex: joints of motion data, Arms' movement)**
- **Generating dance motion to fit the music mood**