Dynamic Time Warping

DNA = Sequence of Nucleotids

Protein = Sequence of Amino Acids

Music = Sequence of Audio Samples
Alignment

Motion = Sequence of Poses

Cost Matrix

Cost-minimizing warping path

Warping Path

Violation of Boundary Condition
Warping Path

Violation of Monotonicity Condition

Variation of Step Size Condition

Variation of Step Size Condition

Strategy: Global Constraints

Sakoe-Chiba band
Itakura parallelogram
Strategy: Global Constraints

Sakoe-Chiba band  Itakura parallelogram

Problem: Optimal warping path not in constraint region

Strategy: Multiscale Approach

Compute optimal warping path on coarse level

Strategy: Multiscale Approach

Project on fine level

Strategy: Multiscale Approach

Specify constraint region

Strategy: Multiscale Approach

Compute constrained optimal warping path

Subsequence DTW