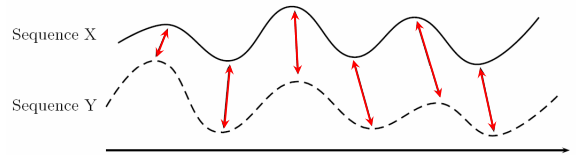


Dynamic Time Warping

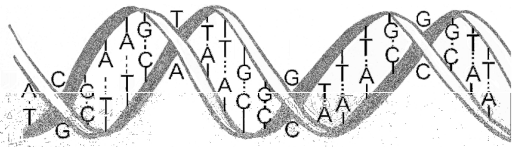


Alignment



2

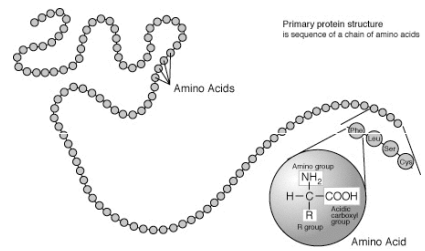
Alignment



DNA = Sequence of Nucleotids

3

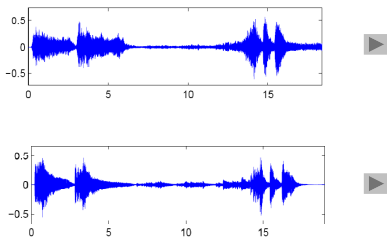
Alignment



Protein = Sequence of Amino Acids

4

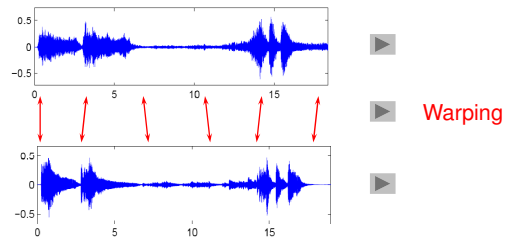
Alignment



Music = Sequence of Audio Samples

5

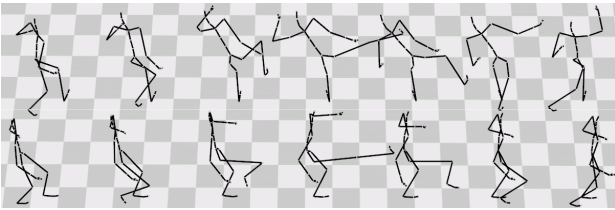
Alignment



Music = Sequence of Audio Samples

6

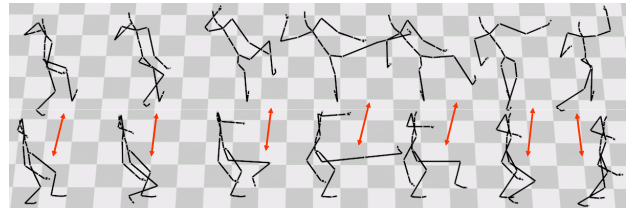
Alignment



Motion = Sequence of Poses

7

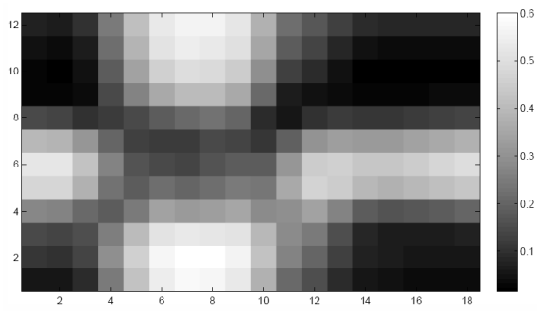
Alignment



Motion = Sequence of Poses

8

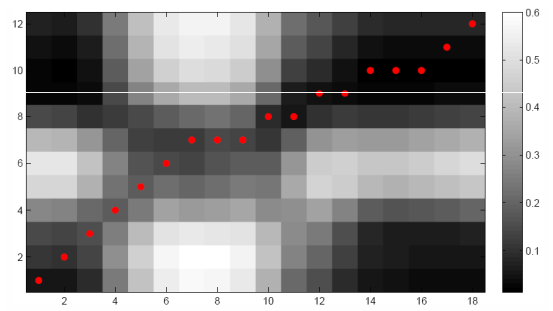
Cost Matrix



9

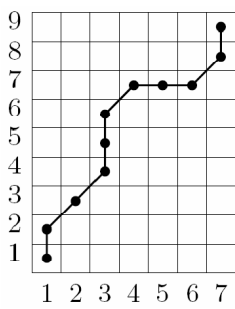
Cost Matrix

Cost-minimizing warping path



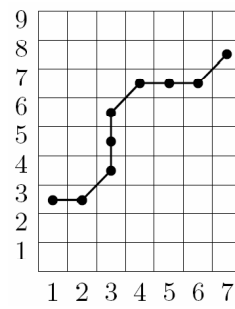
10

Warping Path



11

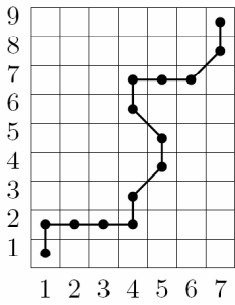
Warping Path



Violation of
Boundary Condition

12

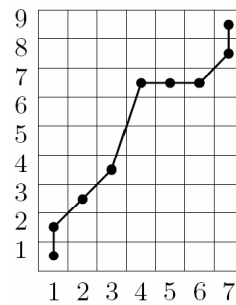
Warping Path



Violation of Monotonicity Condition

13

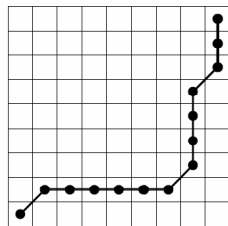
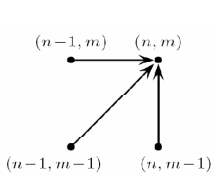
Warping Path



Violation of Step Size Condition

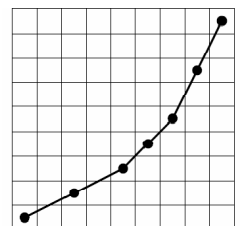
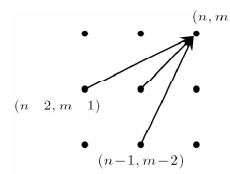
14

Variation of Step Size Condition



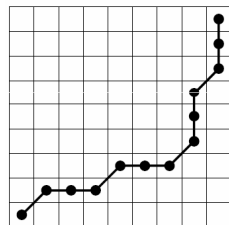
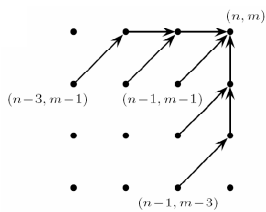
15

Variation of Step Size Condition



16

Variation of Step Size Condition

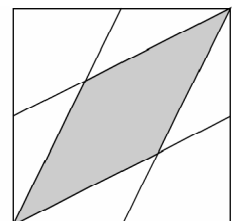
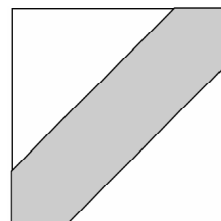


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Strategy: Global Constraints

Sakoe-Chiba band

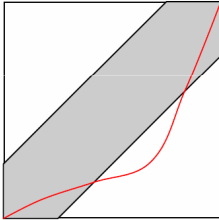
Itakura parallelogram



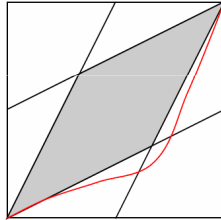
18

Strategy: Global Constraints

Sakoe-Chiba band



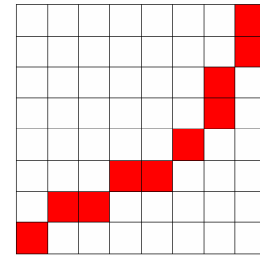
Itakura parallelogram



Problem: Optimal warping path not in constraint region

19

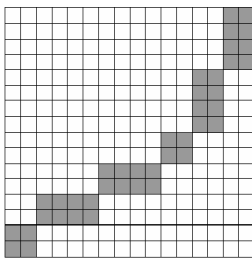
Strategy: Multiscale Approach



Compute optimal warping path on coarse level

20

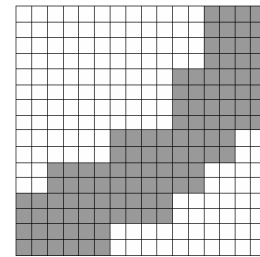
Strategy: Multiscale Approach



Project on fine level

21

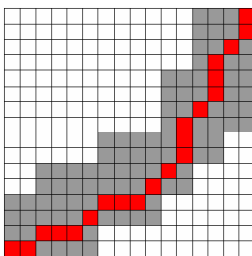
Strategy: Multiscale Approach



Specify constraint region

22

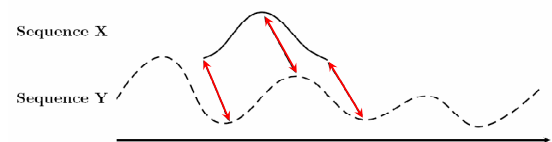
Strategy: Multiscale Approach



Compute *constrained* optimal warping path

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Subsequence DTW



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