NAO Challenge 2021

Team: JustDanceIt

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INTRODUCTION

The BPM

The **program adapts itself** to the given song **finding the BPM**

The rythm

Movements are adjusted to **music's rythm** using **bars**, aka measures

4/4 time signature

1 bar = 4 BPM

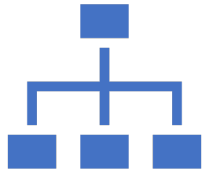
A solution

Starting with the same amount of bars (song length/7) for every sub-plans, an algorithm finds the **intervals** between mandatory movements in which it is not possible to achieve the minimum of 5 movements, due to the **lack of measures**

Adjustments

The **algorithm moves** the needed **bars** from the intervals with exceeding bars to the ones with not enough measures

SEARCH STRATEGY



Nodes are body states

Arcs are movements

Each movement has to **respect preconditions.** The **algorithm** tries to **forecast failures** due to the lack of time, in order to have a drastically **reduced search space**

For a matter of style:

The algorithm tries to generate a **solution** selecting **no repeated movements in the same interval**. If it fails, it will try to generate the solution without this constraint. **Movements** are **selected according to a priority queue**

SEARCH STRATEGY

The number of levels is the number of movements

Limited depth search between mandatory positions

There is an algorithm that a priori forecasts the maximum depth limit with the guarantee that it is greater than 5

Goal test:

The choreography must have at least 5 movements and at the same time it exploits all the bars available **(maximization of the solution)**

It checks whether the last position of the choreography is eligible with the respect to the precondition of the next mandatory position

SEMI-HYBRID SYSTEM

The corrections are performed by a **Pure Reactive System** after the **Limited Depth Planner** has produced the solution

Every movement in the solution should be performed in a fixed number of **bars**

The real **delay** of the move, due to mechanical and software inaccuracies, is calculated by the «time» module in the python library, so the feedback controls and **fixes** the time of the next movement