NAO Planning Competition 2023

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What is a Choreography?

Choreography involves several elements, including:

1. **Movement Composition:** Designing and arranging movements and steps to create a cohesive dance sequence or routine.
2. **Spatial Design:** Determining how dancers move across the performance space, including formations, patterns, and interactions between performers.
3. **Rhythmic Patterns:** Aligning movements with music or beats, creating a sense of rhythm and synchronization.
4. **Emotional Expression:** Using movements to convey emotions, themes, or narratives to the audience.

Algorithm Workflow

Search Phases:

- **Heuristic Computation:** Utilizes a linear combination of normalized duration and beat-matching positions. (Not optimal)
- **Expand Nodes:** Expands nodes based on the branching factor. Speed up with treelib.

Search Choreography Function:

- **Initial Solution Composition:** Builds the starting move sequence.
- **Search Phase:** Executes the search algorithm to find the optimal sequence.
- **Results Printing:** Displays the best move sequence, total time, beat matching percentage, and other statistics.

Moves and Constraints

Moves:

- **Defined Moves:** Various NaoMove instances representing dance moves with respective durations and conditions.

Constraints:

- **Compulsory Moves:** Initial, mandatory, and final goal positions.

Search Choreography Execution:

- **Computing Sequence:** Displays the ongoing computation progress.
- **Statistics:** Outputs computing time, the number of epochs, best move sequence, and related statistics.

Conclusion

Results and Achievements:

- The algorithm successfully finds an optimal dance move sequence considering time constraints. We don't use it though because hand coding our dance is more fun.

Future Improvements:

- Make the SDK actually work.

Enjoy: https://youtu.be/HusZSzMuhDc