A Musical Composition Application Based on a Multiagent System to Assist Novice Composers

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Brief Background

Computational Creativity

- Field widely researched:
  - Telecommunications: Music is a form of information
  - Psychology: Analize the way music affect people
  - Philosophy: Music as a source of human knowledge
- Different approaches:
  - HR system: Machine based on algebra finite.
  - Genetic Algorithms
  - Models of Markov
  - Live Algorithms
  - CPPNs : Special type of ANN based on composing behaviours
  - HS and meta-heuristic algorithms

Creativity and Agents

- Different approaches:
  - Multiagent platform of musical agents
  - Study of composition evaluation through MAS
  - SC-EUNE: Agent who explores unknown environment because of his motivation/curiosity

Introducing our Problem

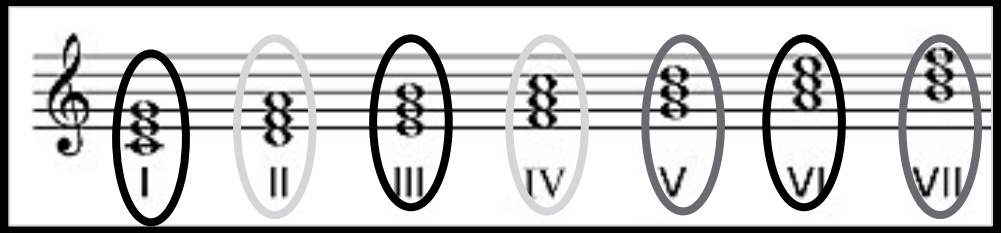
What do we want to make?

- Music students have problems composing melodies with their own instrument.
- Assist composition students to improve his skills
- Build a Multiagent System (MAS) model based on Virtual Organizations (VO) which can compose classical music
- Success criteria:
  - Mathematical function
  - Consonance test
  - Utility test

Modelling our Solution

Algorithm and MAS proposed

Constraints to Study



We look for compose classical music, considering certain rules essential in this type of music:

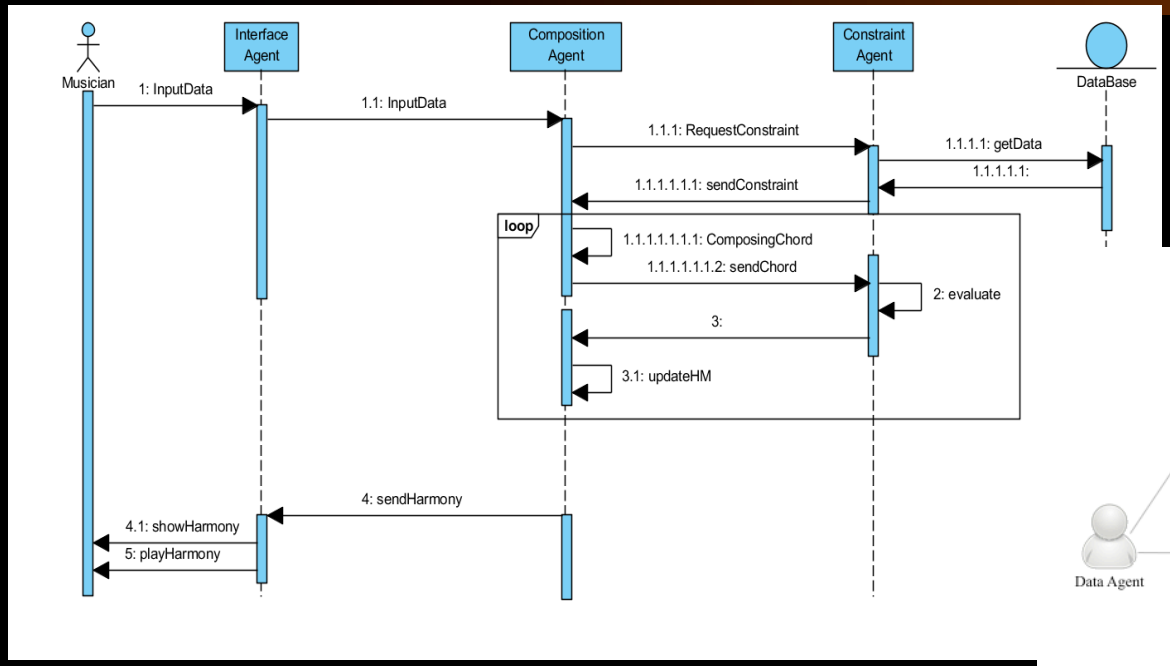
- Parallel 5th or 8th
- Leading-tone Resolution
- Voice crossing
- Dominant Resolution

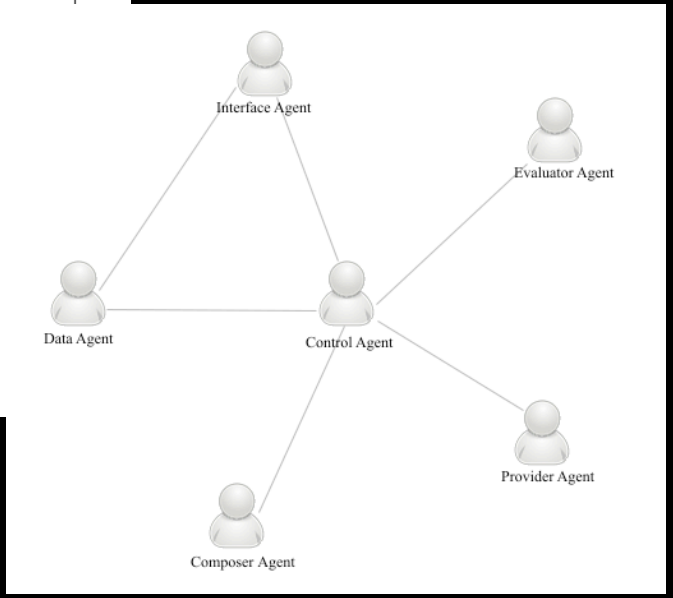
Also, exists rules not-written as for example, aesthetic, large intervals or use of tension.

Virtual Organizations and MAS

- Study of Roles:
  - Composer Role: BDI Architecture
  - Evaluator Role: BDI Architecture
  - Interface Role
  - DataSupplier Role
  - Control Role
- BDI Architecture: Deliberation and Planning
  - Composer Agent: the composer agent has as a goal or “desire” to minimize the value of the optimization function. She has to make some rules or “intentions” (that is, the algorithm), starting from its “beliefs” or its initial stage.
  - Evaluator Agent: has as a “desire” to classify the chord made by the composer agent. To achieve this goal, it has to follow its “intentions”, starting with its “beliefs”

Building our project: MAS

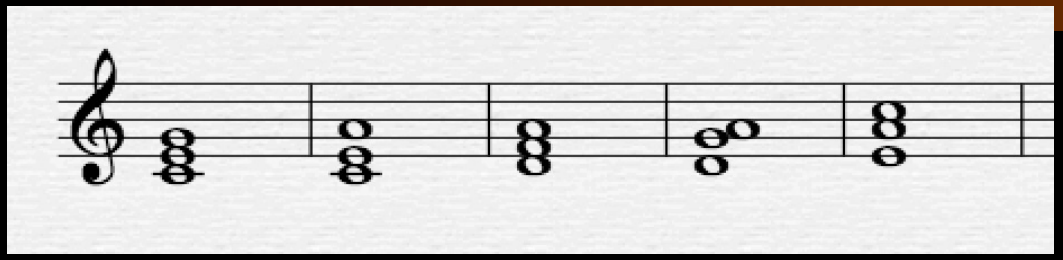




Results and Conclusions

Discussion and future work

Constraints to study



- Study of rules: Study about what rules are accomplished
- Study of consonance: two experts and two non-experts has evaluated the harmony.
- Study of the application: two composers used our method and evaluated the results on a scale of 1-10. The first evaluated the result with a 6 and the second with a 7, which we consider as acceptable in our first approach to the system.
- VO: the process of identifying and organizing roles helped to improve the management and thus to improve efficiency. The MAS structure: allows us to make an extensible and scalable system as we change rules, constraints and behavior, with little effort, searching new ways of mixing different techniques, or even tools in the composition.
- BDI Architecture: suited for the solution we were seeking.

Thank you!