WORKSHOP

CHALLENGES ON THE ADOPTION OF AI-BASED MUSIC CREATION TECHNOLOGY

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RIO DE JANEIRO, 23-NOV-21
DISCLAIMER

- EXPERIENCE, NOT EXPERIMENTS
- QUESTIONS, NOT ANSWERS
Rationale

We work on a still very subjective domain.

Toy problems simulate some issues.

Industry absorbs research developments.

Adoption is the key challenge to advance in music creation systems.

We have to make real things (music, products, technology).

But artists... rarely.

But real world problems poses the hard issues.

Subjective

Tech
AGENDA

1. Past Projects
2. Current Research
3. Main Challenges
4. Provocation
1 PAST PROJECTS
DACCORD GUITAR

AUTOMATIC ACCOMPANIMENT

Given

HARMONY & RHYTHM

CHORDS

Positions

FINGERING

RHYTHMIC PHRASES

TO

TO

ACCOMPANIMENT
REALTIME AUTOMATIC ACCOMPANIMENT IN AUDIO

(2003 - 2008)

Audio Datasets

ACCOMPANIMENT BUT ALSO...

MUSIC VISUALIZATION MUSIC CREATION

Several techniques for modeling how to generate the accompaniment

Voice

MIR

MIR

Adapted HMMs

Cross Synthesis

Variable order Markovian models

MIR

TO

GENERATE

THE

ACCOMPANIMENT

music VISUALIZATION

GENERATE

THE

MUSIC

CREATION
Terminals

C7M(9) / G(add9) / G/A Em7
F#m7 Em6/G G#/m7(11) / C#7(9)
/ G#m7 / C#7 /

Creation of chord sequences

Useful visualizations
How to generate chord sequences with that?

- Thick lines = conventional
- Thin lines = less conventional
- No lines = unconventional

It's up to the human to choose (conscientiously even with no music theory knowledge) about familiarity vs. surprise.

Lesson 1: Much more pleasing offering a tool to humans than making an automatic solution.
After that...

Meta-Learning + Evolutionary Algorithms

Applications

Music Games

Security

Music Education
LESSON 2: THE NEED TO THINK ABOUT THE IMPACT OF TECHNOLOGIES TO PEOPLE

FLOW MACHINES

Brazilian music

Response to AI bias (Pop, Rock, Jazz)
+19 Singers/Musicians
+600 Recordings
+ Lead Sheets

BRAZYLE

Database of songs
Lesson 3: The need to understand people, their needs, their visions, their problems, their desires

Musicians were suspicious

Promoter (excited about the possibilities)

Human resource (for the money)

Curious (will take a shot, different levels of suspicion)

Probable detractor (reactive to IP rules, someone getting rich upon their work, fear)

Related to
BRASIL IA (ALBUM) + OTHER FLOW MACHINES PROJECTS

for FLOW RECORDS

- 46 POTENTIAL ARTISTS
- 36 ARTISTS CONTACTED
- 5 ARTISTS SHOWED INTEREST
- 2 MADE SOMETHING
- 1 RECORDING

"FEAR OF THE UNKNOWN"

GUINGA
CARLINHOS BROWN
DANIELA MERCURY
OLODUM
SPOK

CURRENT TOOLS DON'T MATCH THEIR CREATIVITY PROCESSES

→ BACK TO BRAZYLE ARTISTS...

LESSON 4: UNDERSTAND AND RESPECT CREATIVE PROCESSES
HISTORY ON THE ADOPTION OF PAST PRODUCTS

DACCORD GUITAR:
RESEARCH WITHIN A COMPANY (LEARNING)
+2 MILLION USERS (2002)

MUSIGAMES (~2009) (ENTERTAINMENT)
1 TOP MUSIC GAME WORLDWIDE (FOR iPAD)
3 TOP 10 MUSIC GAMES WORLDWIDE (iOS)

TURMA DO SOM (2012)
+50,000 STUDENTS

(LEARNING + ENTERTAINMENT + CREATION - FOR KIDS)
Turma do Som

Platform

Interactive Cartoons

Social Network

Creation Tool

Games
<table>
<thead>
<tr>
<th>Rough Estimations</th>
<th>Effort</th>
<th>Pedagogical Importance</th>
<th>Total Use</th>
<th>Average Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactive Cartoons</td>
<td>24.3%</td>
<td>30%</td>
<td>50% - 80%</td>
<td>34% - 41%</td>
</tr>
<tr>
<td>Games</td>
<td>56.4%</td>
<td>30%</td>
<td>40% - 72%</td>
<td>16% - 21%</td>
</tr>
<tr>
<td>Platform + Social Network</td>
<td>17.3%</td>
<td>10%</td>
<td>15% - 25%</td>
<td>15% - 25%</td>
</tr>
<tr>
<td>Creation Tool</td>
<td>1.9%</td>
<td>30%</td>
<td>25% - 35%</td>
<td>25% - 35%</td>
</tr>
</tbody>
</table>

Lesson 5: Listen to the importance other people give to your work
① Games were overrated
   - Better to make a few good games

② Creation (Authoring) Tool
   Are as engaging as games
   - More replay value
     (open world)

01. Beauty
02. Immersion
03. Intellectual Problem Solving
04. Competition
05. Social Interaction
06. Comedy
07. Thrill or Danger
08. Physical Activity
09. Love
10. Creation
11. Power
12. Discovery
13. Advancement and Completion
14. Application of an Ability
CURRENT RESEARCH
Computational Creativity

Music/Audio Games
Image/Video/Animation
Text/Lyrics

MIR
Audio Analysis for Music & Podcasts

Music Visualization

Innovation/Entrepreneurship

ED·Tech & Tech·ED

Music Education
Gamification
Games for Cognitive Psyc

User Experience for Extended Realities

Music Humanomática

Extension/Events
Scitec·Ps SBCM CECM MARTE
2 QUESTIONS PERTINENT TO THIS WORKSHOP

1) CO-CREATIVELY PROCESSING TAKING INTO ACCOUNT

- This is my belief and interest

- BUT ALSO

- USER EXPERIENCE
  - Joy
  - Control
  - Sense of belonging

- TECHNIQUES
  - Deep learning
  - Markovian

- EVALUATION
  - Quality
  - Quantity
  - Diversity
  - Novelty

- EXPLICABILITY...

*LESSON 6: LESS FOCUS ON QUALITY & AUTOMATIC SYSTEMS, MORE ON USER EXPERIENCE & CO-CREATION
2) **New Forms of Visualizing Music**

- A writing system (notation) is a natural interface to co-creation systems.

- *But we take for granted using scores* and *few people can read music*.

- *Remember*: systems are not only for musicians.

- *Also*: notation generates bias.

- Scores has limited expressiveness.
**Lesson 7: New Visualizations May Establish New Interfaces**
3 MAIN CHALLENGES
• FEAR OF THE UNKNOWN
• TECHNOPHOBIA
  ▶ AI IS GONNA TAKE THEIR PLACE
  ▶ TECH INDUSTRY IS A VILAIN
  ▶ THINK IT IS TOO DIFFICULT
  ▶ UNFAMILIAR TO NEW PARADIGMS

EXTRINSIC ISSUES

• ECONOMIC VISION
  ▶ "SOMEBODY WILL GET RICHER USING ME"
**PERSONA: MUSICIAN**

- Aesthetics
  - Style
  - Quality of sound, synthesis, mastering

- Disconnection to the tools
  - Fully automatic systems do not engage

  **CO-CREATION**

**INTRINSIC ISSUES**

- Do not feel the resulting music as his/hers

  **OPEN WORLD IS MORE THAN HIGHLY PARAMETRIZED**

  It allows users to explore a space

- Fear of others not considering him/her as the author
PERSONA: MUSICIAN

- THE CREATIVE PROCESS IS NOT APPROPRIATE
  - RESISTANCE TO CHANGE OR
  - NEW PROCESS IS LESS ENJOYABLE

ACTUAL RESULTS STILL NOT IMPRESSIVE

INTRINSIC ISSUES

→ WE HAVE TO WORK MORE ON INTERFACES
**Persona: Non-Musician**

- **Who is this?**

  - We never detailed it because we are too focused on creating for musicians.

  - Industry is taking the lead.
PERSONA: NON-MUSICIAN

- TOO MANY USES AND OBJECTIVES

"AUTOMATIC MUSIC PIECE FOR A GAME?"

"ROYALTY FREE MUSIC FOR YOUTUBE VIDEOS?"

"WOULD LOVE TO CREATE MUSIC BUT DON'T HAVE THE KNOWLEDGE/SKILLS?"

→ WHICH ONES?

- CREATION
  - BY
  - CURATION
- MELODY TO
  - MUSIC
- LYRICS TO
- FULL ARRANGEMENT
PROVOCATION
We don't know the barriers of adoption.

And we don't seem to bother.

Co-creation seems to be part of the solution.

But even enthusiasts are not using the available co-creation tools.

Are we working on the "good" tasks?

We need to create bridges to communicate better with people from other fields.

Co-creation seems to be appropriation.

Intelectual property agency.
SOME IDEAS
**Empathy Maps**

- Which personas?
- How they feel about music creation and about these technologies?
CREATE ENJOYFUL BUT NOT TOO OBVIOUS CHORD SEQUENCE

EXPLORE RHYTHMIC PHRASES

WRITE NEW LYRICS WHICH FIT THE MOOD OF THE MUSIC

CREATE A MELODY FITTING MOOD, HARMONY, RHYTHM AND METRIC

METRIC ADJUSTMENT

EMBELISHMENTS
EX.: DISSONANCE

MODIFICATIONS
BRING MORE STRANGENESS AND SURPRISE

PROCESS DESIGN / ELICITATION
THE SEARCH FOR A RIFF → Brinco Strutctypge → <⊥dias
THE SEARCH FOR A GROOVE

BLING STRUCTURE

GIVE IT MEANING (LYRICS)

ARRANGEMENT

IN GROUP OR SIMULATING WITH SYSTEMS
Use AI to generate music examples

Choose ideas

Try good transitions (give it coherence)

Give it structure

Give it meaning

Use AI to help with lyrics

Create melodic structure

Adaptation

Poems + Music
Journey Maps

Online Shopping Customer Journey Map

<table>
<thead>
<tr>
<th>Stages of Journey</th>
<th>Motivation</th>
<th>Searches for Websites</th>
<th>Browses the Site</th>
<th>Evaluates Products</th>
<th>Pay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activities</td>
<td>Wants to buy a Christmas gift for a friend</td>
<td>Searches products keywords on search engines</td>
<td>Clicks the 1st ad result</td>
<td>Checks online again and go to the 1st original result</td>
<td>Opens a product page to check product details</td>
</tr>
<tr>
<td>Feels</td>
<td>Very Happy</td>
<td>Overall Satisfied</td>
<td>Unhappy</td>
<td></td>
<td>Processes to pay a preferred product</td>
</tr>
<tr>
<td>Experiences</td>
<td>Excited to give a surprise to the friend.</td>
<td>Happy to see many options.</td>
<td>Happy with the informative shopping websites.</td>
<td>Frustrated about reviews from other customers.</td>
<td>Satisfied with bank card payment.</td>
</tr>
</tbody>
</table>

80%
Creating a Song with Digital Tools (Journey Map)

1. Idea
2. Experiment some chords
3. Sing a melody
4. Choose rhythmic
5. Create lyrics
6. Choose parameters
7. Adjust lyrics/melody
8. Improvements & embellishments
9. Check for plagiarism
10. Sing & play it
If we detect tasks (and sub-tasks and sub-sub-tasks) where the experience of creating music (including with digital tools) which are considered bad, uncomfortable, where the user feel incompetent, adoption can be significantly improved.
THANKS