The Magaloff Project: An Interim Report

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2.1 Nikita Magaloff

- Born February 21, 1912 in St. Petersburg.
- Grew up in a musical environment.
- In 1949 he began teaching piano at Geneva Conservatoire until 1960.
- Well known for his performances of Frédéric Chopin.
- Between 1932 and 1991, Magaloff appeared in 36 concerts at the *Wiener Konzerthaus*.
- Nikita Magaloff died December 1992 at 80 years old.
2.2 Vienna concerts 1989

- Magaloff set out to play all of Chopin’s works for solo piano that were published in his lifetime. (Op.1 – Op.64)
- All concerts were played and recorded on the Bösendorf SE which captures every keystroke and pedal movement.
- Each note on and offset is captured and the velocity of the hammer is converted and mapped to 128 Midi loudness values.
- Magaloff played the Vienna concerts Aged 77.
3 Corpus Preparation

- Without reference to the score nothing can be said about how specific elements were realised.
- Automatic matching was decided to be error prone, so the approach was taken to view both the score page and piano roll.
- This required a score representation that contained the musical content along with the geometrical location of every element on the score.
- It took approx a whole person year to align the performed MIDI notes with their scored counterparts.
3.1 Printed score to extended Music XML

- SharpEye Optical Musical Recognition was used to scan 930 pages of sheet music and realise this into the MusicXML format.
- XML format shows is text based and human readable.
- SharpEye native format MRO used to show the score graphically rather than musically.
- The Figure shows an added rest so the middle voice starts on the correct symbol offset.

Top: Score, Bottom: Recognised
3.2 Score- Performance Matching and Graphical Correction

- A process of aligning the score with the performance of a musical piece.
- Each score note is *Matched* or *Omitted* and each performance note is *Matched* or *Inserted*.
- This requires one to one matching of the score and performance.
- One problem was differences between the score Magaloff played and the scanned score.
- These are not counted as performance errors.
24 PRÉLUDES
OPUS 28
A son ami Camille Pleyel - 1839

Agitate

jGraphMatch: for displaying and manually correcting score performance alignments.
3.3 Statistical Overview

- The **Performed notes** is composed of the number of matches, substitutions, insertions, matched grace notes, and trill notes.
- The **Score notes** is composed of the number of matches, substitutions, omissions, and matched and omitted grace notes.

<table>
<thead>
<tr>
<th>Pieces / Movements</th>
<th>155</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score Pages</td>
<td>930</td>
</tr>
<tr>
<td>Score Notes</td>
<td>328.800</td>
</tr>
<tr>
<td>Performed Notes</td>
<td>335.542</td>
</tr>
<tr>
<td>Playing Time</td>
<td>10h 7m 52s</td>
</tr>
</tbody>
</table>

- Matched Notes: 318.112
- Inserted Notes: 12.325
- Omitted Notes: 11.502
- Substituted Notes: 5.105
- Matched Grace Notes: 4289
- Omitted Grace Notes: 449
- Trill Notes: 5923
4 Exploratory Intra-Artist Research

- Studies performed on the data to explore Magaloff’s playing style.
- Public performance demands – motor skills, memory, physical endurance, and stress factors.
- Psychological theory for “Successful ageing” – Selection, Optimisation, and Compensation (SOC Model)
- Implies that older Pianists
  - Play smaller repertoire (Selection)
  - Practice these pieces more (Optimisation)
  - Hide technical deficiencies by reducing the tempo of faster passages while maintaining tempo contrasts. (Compensation)
- Beatroot used to semi-automatically beat track older performances.
- In sum, Magaloff’s Chopin does not seem to corroborate the SOC model
4.2 Error Analysis

- Performance errors occur at all levels of proficiency.
- Magaloff’s performance errors, put lab condition studies into a context of live performance and score.
- The perceptability of an insertion or substitution error is closely related to how loud the wrong note was played in proportion to the other notes in the vicinity and how well the note fits the harmonic context.
- The findings of the live performance corroborate the laboratory findings of Repp(1996).
- It was shown that Magaloff did not reduce his performance tempi even at 77 and that he may have been realising his own musical ideas of Chopin. Further analysis is needed.
4.2 Phase Plane Representations for Visual Analysis of Timing

- Phase-Plane representation of timing data to provide a tool for exploring and understanding data.

Phase-plane trajectories for the timing of two rhythmical patterns: **Overall Average Trajectories**, **Cluster-average trajectories**.
4.2 Towards Comprehensive Inter-Artist Investigations

- Inter-Artist Investigations would be useful for comparison of Magaloff’s style.
- Unfortunately in most cases the only available resource by other pianists are audio recordings.
- This requires manually annotating large audio recordings – one technique for Audio-to-Score alignment is Dynamic Time Warping.
- In the long-term the Magaloff data set will be used:
  - As a ground truth for quantitative evaluation of an alignment system
  - Serves as a basic inter-Artist performance analysis once symbolic data for other artists has been generated.
5 The Magaloff Corpus as Training Data for Expressive Performance Rendering

- Is the problem of automatically generating a performance of a given musical score that sounds as “human” and “natural” as possible.
- A model of the musical elements and structural elements of the score are calculated.
- The model is projected onto performance trajectories for (timings, dynamics etc.)
- Use of the large dataset to create YQX performance rendering system.
• The system core uses a probabilistic model that captures dependencies between score and performance characteristics.

• Uses the Magaloff to predict the most likely performance of a musical score based on the expressive timing, dynamics, and articulation.

• The predicted sequences are projected onto a MIDI representation of the score.
Questions?

Further Reading:

Toward a model of performance errors: a qualitative review of Magaloff’s Chopin, by Sebastian Flossman and Gerhard Widmer.