Maztro — interface for Humdrum musical databases.
Design Document

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1   Interface Design Concept

Our idea is to create an intuitive interface for interacting with the Humdrum database and toolkit. To realize this task, we figured it might make it intuitive if we use something that looks similar to another familiar search system, such as Google. The user is presented with a similarly minimal looking web application, where instead of querying for text the user is querying for musical notation using a keyboard.

The user interface of Maztro consists of two parts: *hardware* (midi keyboard) and *software* (displayed in a browser). The main parts of user interaction happen at the keyboard. As the user presses the keys of the keyboard, the entered notes appear on the screen in the search bar, and after pressing "Search", the results appear alongside the query. Just as in Google, the page with results still includes the search bar. This way, the user does not have to go back to the search page to do the next query task. Unlike Google however, the search bar will be displayed besides the results, as our search bar includes a piano which requires more vertical space.

The user may reset the provided input by pressing one of the pads on the keyboard. While spending more time with Maztro, he/she discovers more options the pads offer to him thanks to the visual representation of the keyboard displayed on the screen with pads labeled with those options names ("Record", "Play", "Search" etc.). The display of those can be toggled by hovering the mouse over a "help" button. On the other hand, the representation of the keyboard itself is displayed permanently.

The interface provides a visual and sonic feedback to users actions. Keys tapped by the user invoke corresponding piano sounds. The whole recorded sequence of notes can be played back, just as the results returning from the query. Each result is labeled with the title of the piece, its key, opus number and measure range.

2 Sketches

The following sketch shows our initial idea for the interface. The screen consist of two sections, representing users input and query output.
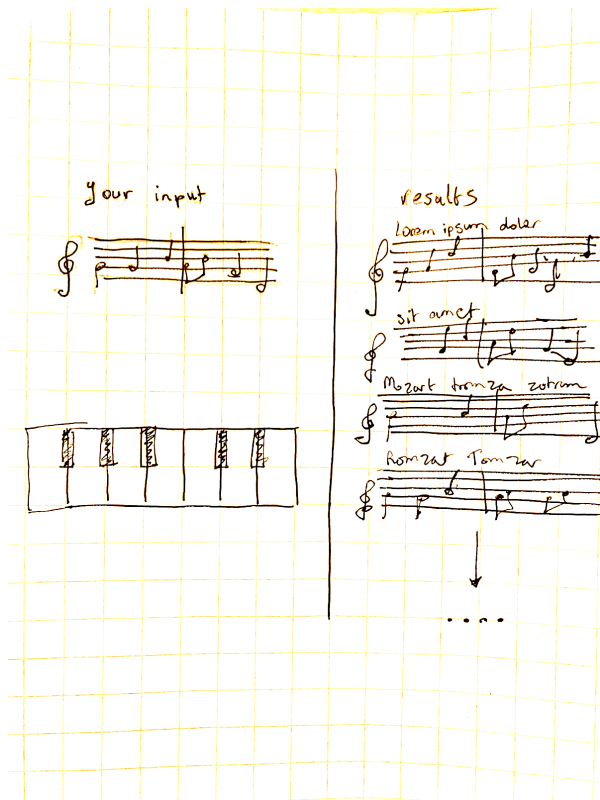

Figure 1: The first sketch of MAZTRO.

Initially, we wanted to always include the keyboard explanation figure (as explained in the Interface Design Concept section) on screen. We created some mock-up displays using MAX/MSP and its BACH library to quickly experiment with layouts of keyboard and note representations.
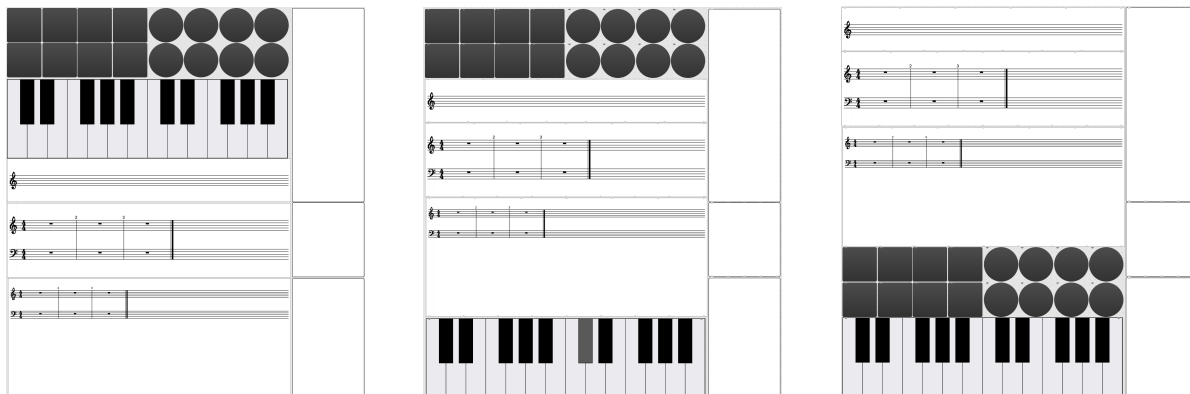

Figure 2: MAZTRO as a partly working MAX/MSP patch with three different configurations of the keyboard virtual representation.

It turned out, that explicitly stated pad labeling do not have to be visible at all times and can be hidden. The third iteration took place within the WEBFLOW environment, providing both the immediate visual output and a HTML/CSS encoding.

3 Interface Display

In our final draft of the browser interface we took inspiration from the GOOGLE opening page, both in the terms of minimal and light *amor vacui* visuals and functional philosophy.
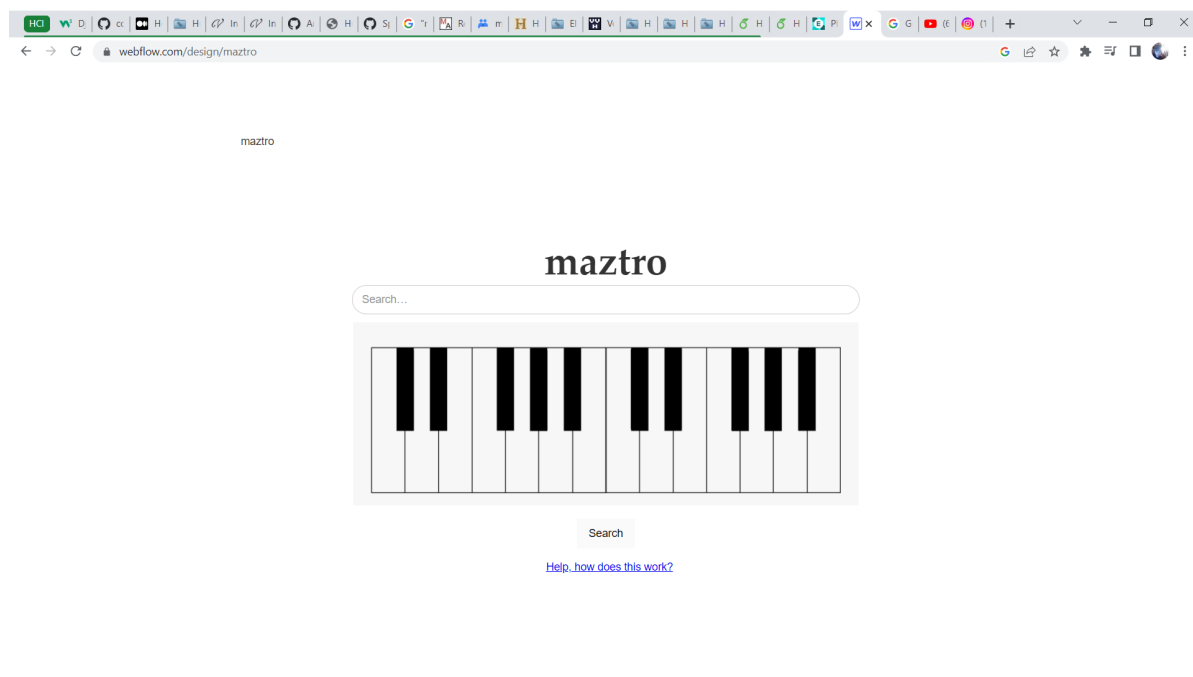

Figure 3: GOOGLE-inspired opening screen.

In contrast to the GOOGLE vertical display of results below the user text input window, taking into account the previous iterations of the interface we retained the result display on the right side of the screen.

The black & white colour palette is a conscious choice, relating directly to the outlook of paper sheet music, where colours are absent.
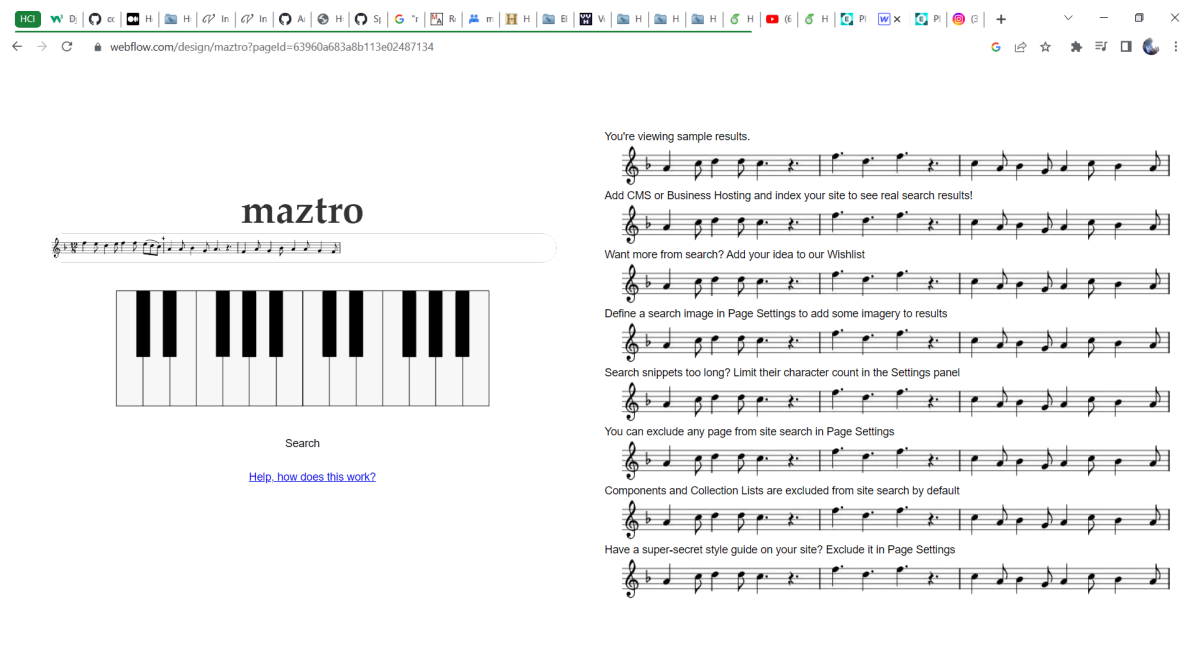
Figure 4: Third iteration of the MAZTRO's layout using WEBFLOW. Clicking on the help text (in blue) shows the explanation as shown in Figure 5.

In the figure above, we intend to make the right half of the screen (displaying the results) to be scrollable, while the left half (displaying the keyboard and the query) stays fixed.
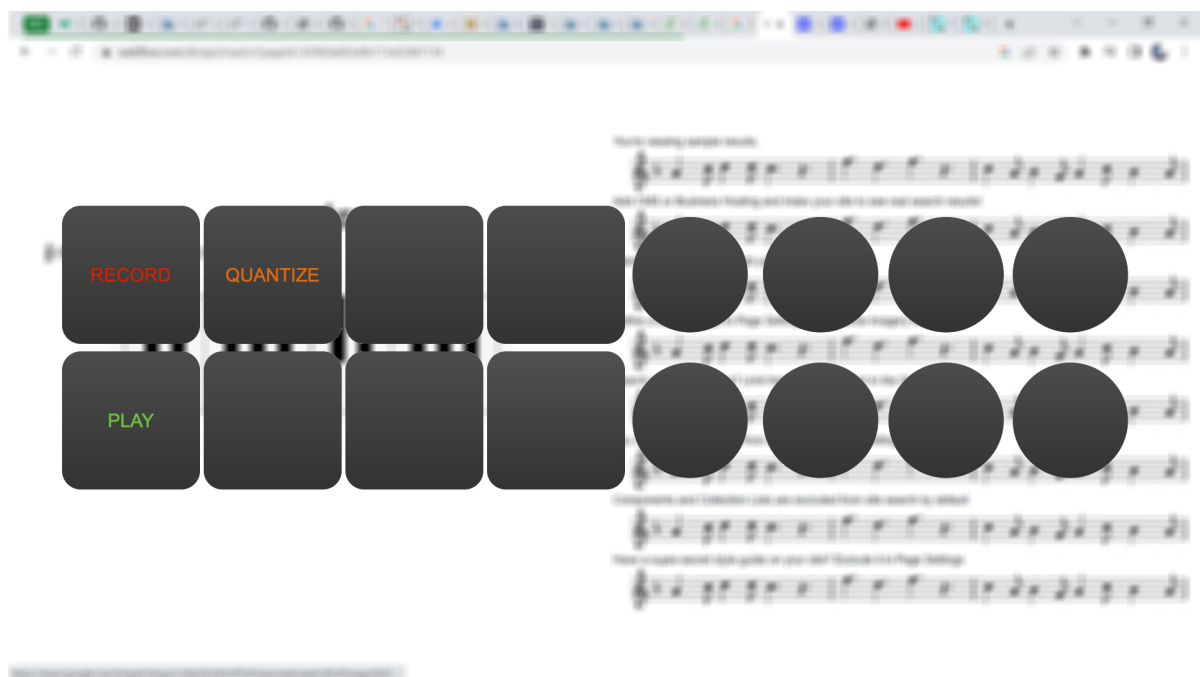

Figure 5: Visual feedback on mapping of the keyboard's pads with corresponding functions.

4   User analysis

We hope the user evaluation provide us an insight into the specific problems we formulated in our project plan. The final report will include user analysis with respect to the following issues:

- Do users intuitively understand the behaviour and interaction flow based on MAZTRO's perceived affordances?

- Can people with a background in music find a musical score of their choice using MAZTRO?

- Do the users without a background in music find the software entertaining to the degree that they would like to interact with it in the future?

- Does learning about new functionalities happens before user gets fatigued.

We do not agree with the statement, that a tool focused so intensely on music score notation must be created having only professional musicians in mind. Therefore, we seek for a persona, who would mediate between a professional and a curious amateur.

Persona

Eva is a doctor of medical sciences. When she was a child, her father encouraged her to take piano lessons. Due to the school and other additional exercises, she attended those lessons intermittently and soon abandoned the idea. Now, when she is in her mid-thirties and her career has significantly flourished, she decided to give the second chance to the opportunity she had missed as a child. She needs some advice on how to begin again her adventure with the classical piano repertoire.

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5   Usability Specifications

In consequence, our usability tests address mainly the issues regarding the user interaction with the graphical and keyboard tactile interface. We focus on measuring user satisfaction from app exploration instead of aiming at fine-tuning the app in context of music theory and professional research. In order to do this, we make use of the questionnaire accompanying System Usability Scale[1].

The user assesses the provided statements using 5-degree scale ranging from "strongly disagree" to "strongly agree".

General question

1. *I think that I would like to use this system frequently.*

2. *I found the system unnecessarily complex.*

3. *I thought the system was easy to use.*

4. *I think that I would need the support of a technical person to be able to use this system.*

5. *I found the various functions in this system were well integrated.*

6. *I thought there was too much inconsistency in this system.*

7. *I would imagine that most people would learn to use this system very quickly.*

8. *I found the system very cumbersome to use.*

9. *I felt very confident using the system.*

10. *I needed to learn a lot of things before I could get going with this system.*

On top of this general questionnaire, we append a few questions about the relationship of the test subject to the world of music:

Problem-specific questions

1. *I have taken music lessons for a long period of time.*

2. *It has been a while since I took my last music lesson.*

3. *I am an active music performer.*

4. *I am a professional musician.*

5. *I am confident with reading piano sheet music.*

6. *When I see piano sheet music, I can imagine how it sounds like.*

During the user evaluation, we would like to take note of measures about the application responsiveness and user path finding to the core functionalities:

Measurement

🕐 what is the average speed of the database query task performance?

🕐 how long does it take for a user to notice the MIDI enabled navigation shortcuts?

References

[1]   John Brooke. "SUS: A quick and dirty usability scale". In: *Usability Eval. Ind.* 189 (Nov. 1995).