



MusicAir: A Glimpse into the Potential of Future TUI

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ABSTRACT

musicAir is an interactive gesture-based interface that allows users to create music out of thin air in a fun and engaging way. Hand and finger gestures map to visuals and sounds with an interface that invites multiple users to create music together.

* Implemented w/Leap Motion Technology



PROBLEM STATEMENT

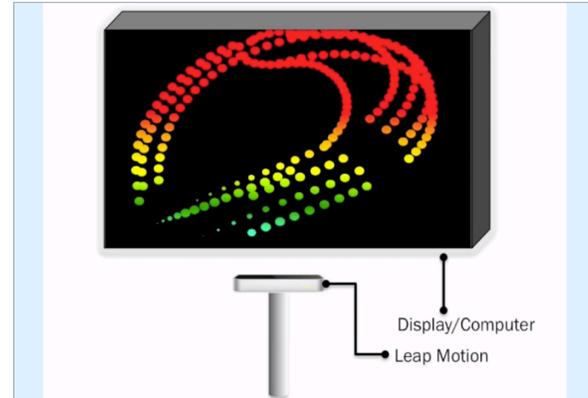
Traditionally, making music requires musical skill and years of practice. musicAir provides users with no prior musical background the means to create music through a fun, collaborative experience. Gestures intuitively map to visuals and sounds in an interface that also invites users to work together. A group of users can use the system simultaneously, encouraging people to collaborate and build off each other's work, fostering a greater creative environment. musicAir also attracts a greater audience by inspiring participants to engage in the experience through observation. Simply by watching someone else use the system, one learns how to use it themselves.

JAVASCRIPT, HTML5

The program is essentially drawing on an HTML5 canvas using physical coordinates detected by Leap Motion.

Leap Motion provides frame data at a rate of 290 frames per second.

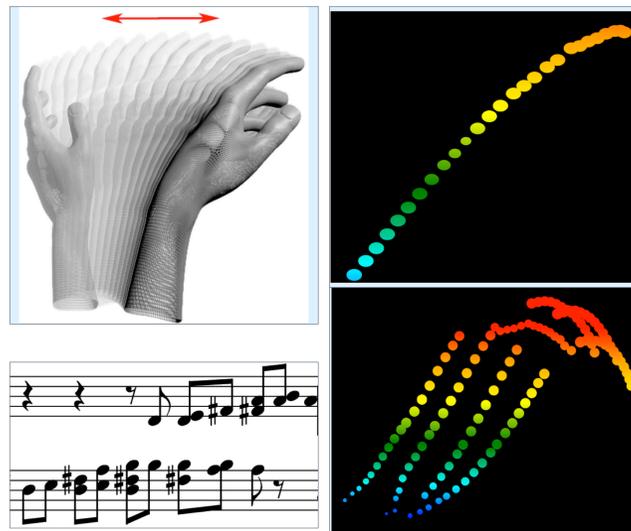
INTERFACE SETUP



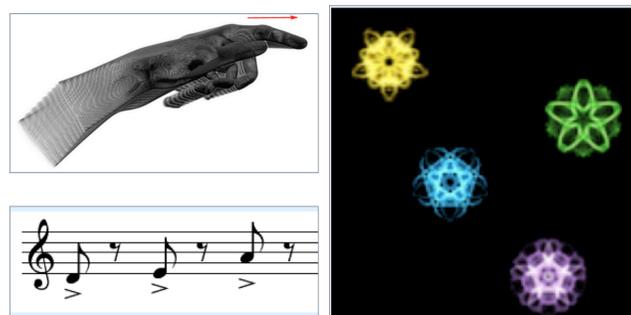
The user stands in front of the screen and waves hand in range of Leap Motion sensor. Music and visuals occur in real time.

GESTURES & CORRESPONDING VISUAL EFFECTS

SWIPE - String of Notes

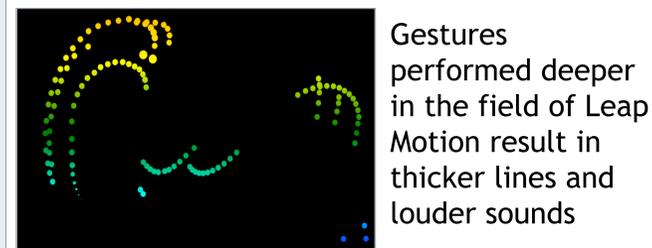


TAP - Discrete Notes

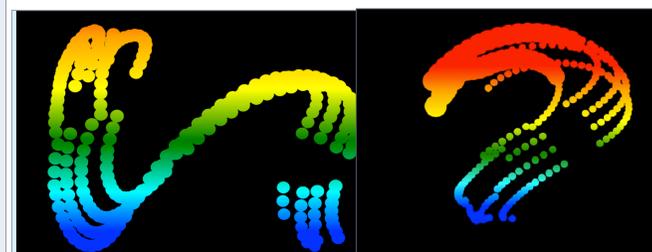


IMPLEMENTATION

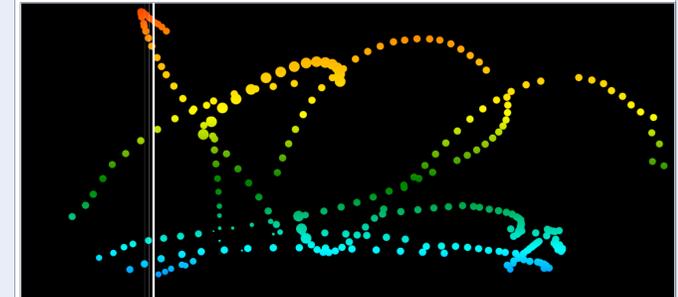
1. We decided to use a major pentatonic scale in D (D, E, F#, A, B) because all notes sound pleasing and interesting together. We have three octaves of these three notes and we distributed these 15 notes across the Y-axis of Leap Motion's display range, so that as the user traverses vertically, a string of notes will play.
2. Each note is generated by its own sound file that is played when a gesture occurs at a given height. If a gesture occurs at a given height multiple times in a row, the sound file is played repeatedly. This places the focus on melody, but it is one of the next steps to have notes of different values, allowing users to have sustained notes and create more interesting rhythms.
3. We assigned a color to each section to represent pitch visually and consistently.
4. A finger tap outputs a single musical note and is represented by a star on the screen (see left column) creating a color that corresponds with its designated note section.
5. A finger wave outputs a stream of sound and is represented by a line of dynamic thickness and gradient colors that will trace the finger's motion through the different note sections.



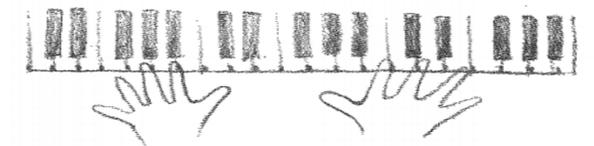
Gestures performed deeper in the field of Leap Motion result in thicker lines and louder sounds



GOING FUTURE



Live loop mode: Users add to existing melody to make more complex. A vertical line moves horizontally across screen to represent time.



Change instruments: Make a motion that represents a different instrument to change the sound gestures create. For example, a violin or piano motion.

REFERENCES

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