

# Canvas: Touchscreen Inspired Musical Instrument

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## Abstract

Mobile music applications are typically quite limiting to musicians, as they either attempt to mimic non-touch screen interfaces or do not offer enough control. Canvas is a musical interface that was built specifically for the touchscreen. Its layout contains all notes in a given major key, and allows users to generate audio by touching and drawing.



Fig. 1 – the Canvas interface running on an iPad, with a screen cover to provide tactile feedback when playing the instrument

## Current Implementation

- Produces different tones on taps and motions
- Allows pitch slides inside the triangular region between adjacent notes
- Layout allows easy scales, chords, and trills.
- Maps pitch to location, while velocity controls both volume and the amount of harmonics in the voice
- Laser-cut screen protectors provide topographical pitch differentiation offering haptic feedback useful for synchronizing timing when using multiple fingers

Rate the following musical interfaces:	piano	guitar	canvas	trumpet
ease of playability	5.0	5.4	3.6	7.3
musical flexibility	7.9	7.1	5.3	6.7
tonal complexity/depth	7.7	7.4	4.9	5.3
payoff of regular practice	8.6	7.3	5.9	5.7

Table 1 – results from a user survey, data taken from seven test subjects



## Motivations

- Touchscreen-native musical interface (nonskeuomorphic)
- Full user control of synthesized audio

Canvas is designed specifically to take advantage of a multi-touch interface, allowing the user to control multiple facets of the audio in real time.

## Future Directions

User feedback has suggested that while the current implementation does not offer enough depth, future improvements could make Canvas worthwhile for professional musicians.

- Optimize the drawing functionality. This has been implemented, but noticeably slows down the application's sampling rate.
- Map additional audio attributes to the interface.
- Enable the use of multiple devices to control the same instrument. This will allow musicians to manipulate audio in real time, which should be particularly useful in performances.

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