



D'Groove

SENSORY PERCEPTION AND INTERACTION RESEARCH GROUP

Timothy Beamish • Kees van den Doel • Karon MacLean • Sidney Fels

The World's First Digital Haptic Turntable

HUMAN COMMUNICATION TECHNOLOGIES LABORATORY

Department of Computer Science
Department of Electrical and Computer Engineering



MOTIVATION

- Create an expressive tool that provides Disc Jockeys (DJs) with the advantages of digital music without losing the physical control afforded by traditional turntables
- Make the new interface easier to use and more informative
- Give the DJ more outlets for creative expression

ABSTRACT

D'Groove is a digital haptic turntable. It controls the playback rate of digital music and supports haptic force feedback so the DJ can "feel" various aspects of the song.

D'Groove incorporates more of the DJ's senses (sound, sight and touch) in the task of DJing than does a conventional turntable. The DJ gets information on all three of these channels. This promotes immersion within a task and allows for more expression to occur.

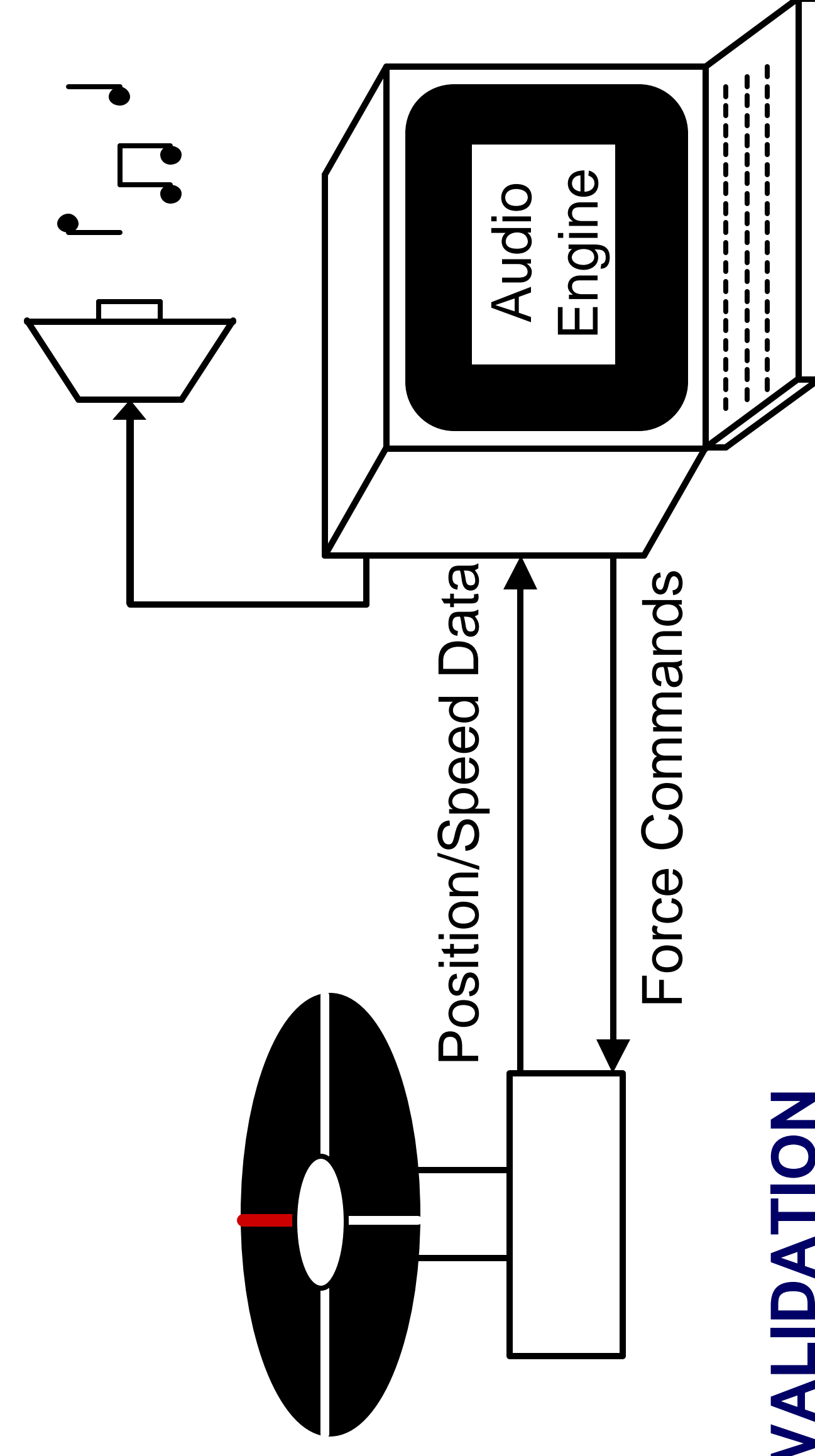
DESIGN

SOFTWARE

- A realtime motor controller with a haptic loop.
- An audio engine capable of playing music at arbitrary speeds.

HARDWARE

- A brushless DC motor fitted with sensors and a record platter.
- A circuit board to interface the motor with the computer



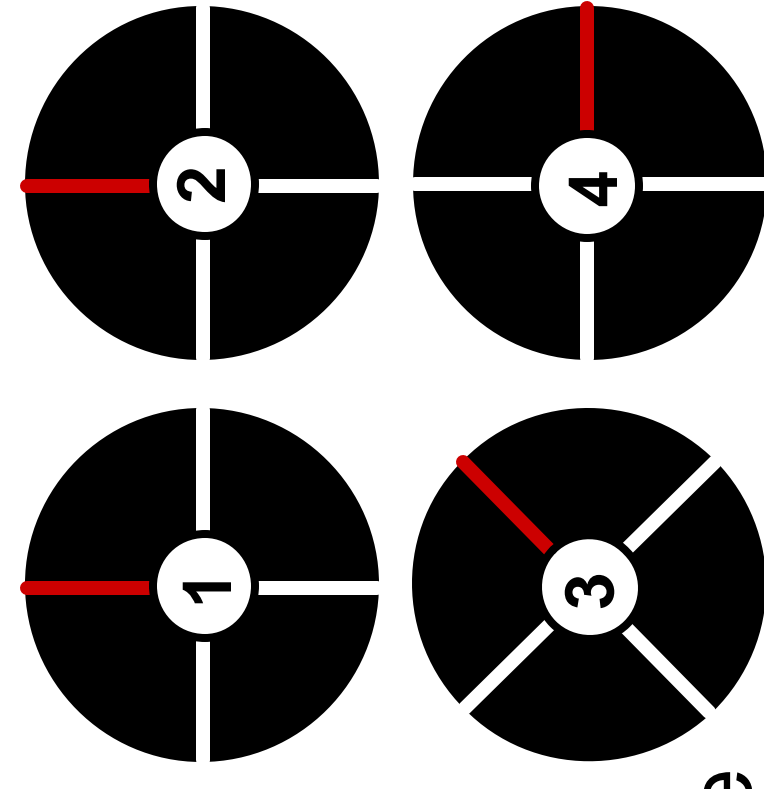
VALIDATION

- User study with real DJs

FEATURES

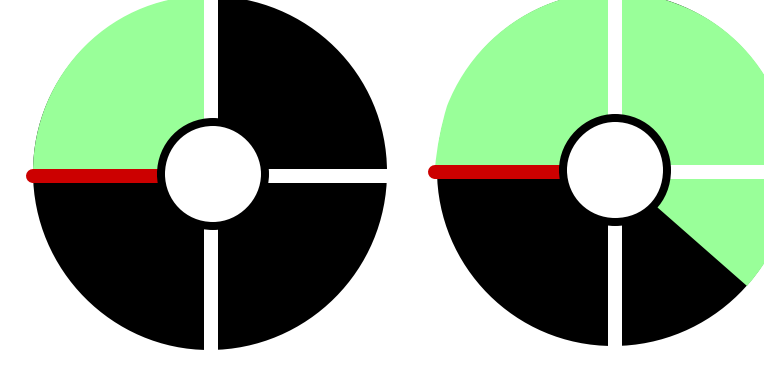
Visual Beatmatching Aid

One revolution of the turntable plays exactly four beats in the song. Thus, turntable 1 is matched with turntable 2. Turntable 3 is half a beat ahead of turntable 1. Turntable 4 is one beat ahead of turntable 1.



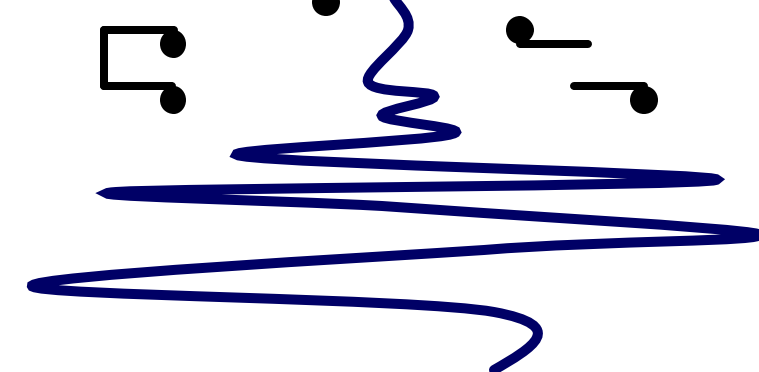
Adjustable playback/rotation ratio

We can customize how much rotation is required to play a certain sound sample. The green sample here can be played in 45° or stretched to 225°. Scratch DJs can define how much movement they want per sample.



Playback of Digital Audio

D'Groove can play almost any digital format, allowing DJs to easily play their own custom sounds. This also makes adding digital audio effects easy.



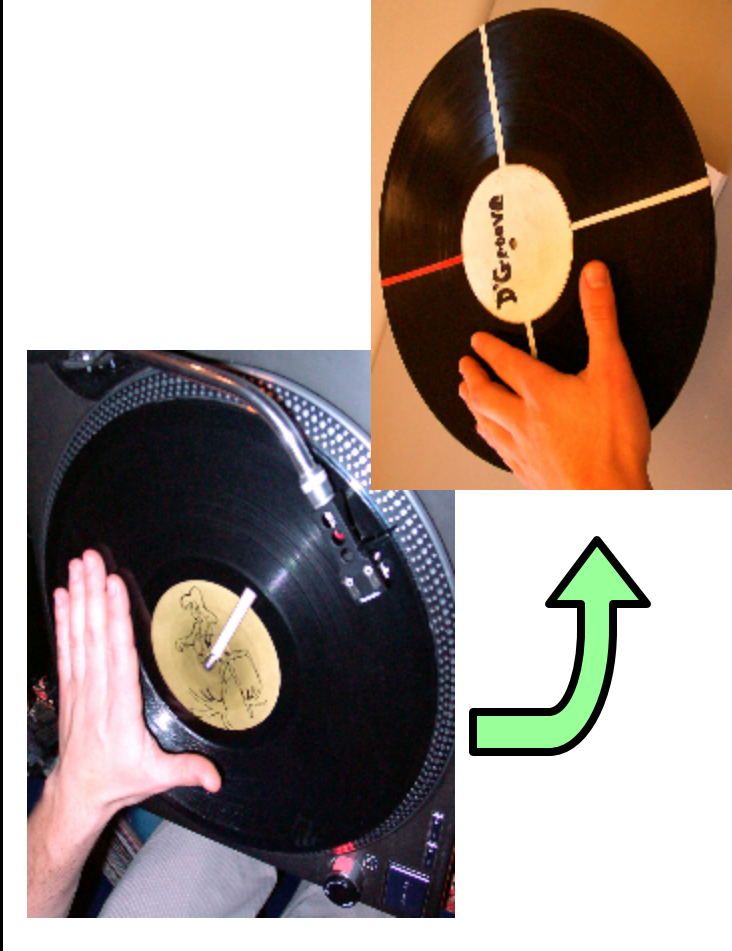
Robust Music Media

Vinyl is expensive and cumbersome. DJs require 30-50 records for a show. D'Groove promotes mobility and saves money on vinyl.



Replication of Turntable

Our interface mimics the traditional vinyl turntable, preserving the visual appeal and making the transfer of skills easy.



Music Preservation

Vinyl has a short lifespan and is damaged with each use. Needles also require replacement. D'Groove boasts lossless music preservation.

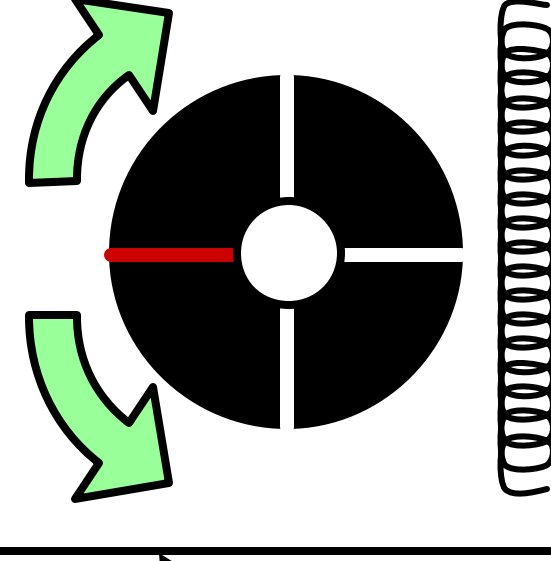


Creative Haptic Effects

D'Groove boasts various haptic modes such as:

Scratching a Spring

We can make the platter spring back and forth. This is useful for scratch DJs who want to pluck the platter for new sounds.



Bumps for Beats

We can produce bumps around the platter that correspond to the beats in the music. Thus, the DJ can "feel" the beats.

