Digital Whiteboard

Nathan Davis
Shaun Foley
The Digital Whiteboard

- Takes motion data from two axis accelerometers
- Position Information and Gesture Recognition to control interaction with whiteboard
- Functionality includes: freehand drawing or erasing, copy and paste, and interpretation of multiple movements as commands.
Overview

Accelerometers

Filters

Integrators

Action Evaluator

Whiteboard Controller

VGA Display
Motion

Block Diagram:
- Accelerometers (ADXL204EB) connected to A/D (AD7811)
- Serial Interface
- Low Pass Filter
- Integrator (produces X and Y velocity)
- Integrator (produces X and Y position)
- Angle and Distance
  - X and Y Position
  - Theta
  - Distance
  - Velocity

Outputs:
- X and Y Position
- Theta
- Distance
- Velocity
Detail

**Integrator**

- Input
- +
- Accumulator
- Integrated Output

**FIR Filter**

- Input
- Conv
- +
- Accumulator
- Filtered Output
Action Evaluator

x, y, z (16)
theta_{x,y,z} (4)
vel_{x,y,z} (6)
D (6)

clk, reset (to all blocks)

Movement Evaluator

36
8 idx
36 ideal
36 weights
5 mnum

max mnum

Action Evaluator

8 idx
40 seq
6 anum

action
en
to whiteboard module

Movement ROM

36
- param deltas
*
param score
>
>
Max Register

score
mnum

++

clk, reset (to all blocks)
Whiteboard Controller

- Command Interpreter
  - clk, reset (to all blocks)
  - x, y (16)

- Overlay Buffer
  - go
  - busy
  - func

- Shape Drawer
  - shape
  - x (10)
  - y (10)

- Status Buffer
  - mode
  - x (10)
  - y (10)

- Board Buffer
  - data
  - x (10)
  - y (10)

- Coordinate Trans.
  - data
  - x (10)
  - y (10)

- Coordinate RTrans.
  - idx
  - x (10)
  - y (10)

- VGA
  - px (10)
  - py (10)
  - to monitor