Music Composition for Dummies

OUR PROJECT

Shi Ling Seow
Yun Wu
Block Diagram of Overall System

Song → Pitch Detector → Buffer → Video Display → Notes
Pitch Detection Methods

- Zero Crossings with noise filter
  - Simple Implementation
  - Extremely sensitive to noise

- Autocorrelation
  - Extremely computationally intensive

- Fast Fourier Transform
  - Moderately computationally intensive
  - Robust

That’s 440Hz !!!
Note: A
Block Diagram of Pitch Detector

Input: Microphone → Analog Amplifier → A/D Converter

A/D Converter → 16 / Left_data_in[19:4]

16 / Left_data_in[19:4] → 64 frequency points

64 frequency points → Fast Fourier Transform

Fast Fourier Transform → Lookup Table

Lookup Table → 64 time samples

64 time samples → RAM

RAM → Control FSM

12-MHz bit clock

Control FSM → 4 / Note

Note → Output: 4-bit note value
• FSM contains minor FSMs which are controlled by a major FSM
• 800 x 600 display, 72Hz
ZBT RAM

- Stores 480000, 24-bit data points (800 x 600 pixels)
- 24-bit to represent pixel colors (8 bits each for Red, Green, and Blue)
- Circular buffer
ROM

- Contains 15 bitmaps (treble clef, notes, barline)
- Pixels represented by zeros and ones (background and foreground)
DEMONSTRATION
PROJECT TIMELINE

• Get the pitch detector and video component working  April 29
• Merge both components using a buffer  May 5
• Test, debug and add more features (hopefully)  May 8