Voice Recognition in Hardware
As an Input Device

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Small sections of incoming audio ($\approx 20ms$) are analyzed and converted into vectors that parameterize the incoming audio.

Each word is composed of a list of these vectors. Endpoints for possible words are determined by the overall energy of incoming audio.

Words trained into the hardware are compared against incoming audio signals using a dynamic time warping algorithm (DTW).
Borrowed from wikipedia
DTW Algorithm

\[
e_{i(j+1)} = d_{i(j+1)} + \min(e_{ij}, e_{i(j-1)}, e_{(i-1)(j-1)})
\]

\[
d_{ij} = d(w_i, s_{j-i})
\]
DTW Control
Mock Layout

Word 0: ######
Word 1: ######
Word 2: ######
Word 3: ######
Word 4: ######
Word 5: ######
Word 6: ######
Word 7: ######
Output Module

- Matched_Word
- Best_Distance
- New_Word_Ready
- Avg_Energy
- Mag_WE
- Mag_Data
- Mag_Addr
- Mel_WE
- Mel_Data_Out
- Word_Addr

- Top Left Sprite
- Bottom Left Sprite
- Top Right Sprite
- Bottom Right Sprite
- XVGA

- Matched_Word

- USB_WE
- USB_Data
Timeline

November 2008

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December 2008

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http://homeschooling.about.com
Thank You For Your Time