Praktikum Pengenalan Bahasa Alami

Pertemuan Pertama: Pengenalan Fungsi Dasar Pemrosesan Suara di Matlab

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Fungsi wavrecord

- Digunakan untuk merekam suara
  - y = wavrecord(n, Fs)
  - y = wavrecord(…, ch)
  - y = wavrecord(…, ‘dtype’)

Parameter Fs dan ch

- **y = wavrecord(n,Fs)**
  - Merekam sebanyak *n* sampel sinyal audio.
  - Jumlah titik sampel per detik sebanyak Fs.
  - Nilai *default* Fs ialah 11025 Hz.
- **y = wavrecord(...,ch)**
  - Menggunakan sebanyak *ch* kanal input dari perangkat audio.
  - Mono: *ch* bernilai 1.
  - Stereo: *ch* bernilai 2.
  - Nilai *default* ch ialah 1.

Parameter dtype

- **y = wavrecord(...,'dtype')**
  - Menggunakan tipe data tertentu untuk menyimpan nilai suara pada setiap titik sampel.
  - 'dtype' dapat bernilai:
    - 'double' -> 16 bit per titik sampel (nilai *default*).
    - 'single' -> 16 bit per titik sampel.
    - 'int16' -> 16 bit per titik sampel.
    - 'uint8' -> 8 bit per titik sampel.

DTYPE	Bits/sample	Y's Data range
'double'	16	-1.0 <= Y < +1.0
'single'	16	-1.0 <= Y < +1.0
'int16'	16	-32768 <= Y <= +32767
'uint8'	8	0 <= Y <= 255

Sampling Rate

- Jumlah pengambilan titik sampel suara dalam per detik.
- Nilai standar yang digunakan: 8000, 11025, 22050, dan 44100 titik sampel per detik.
- Setiap titik sampel pada suara stereo terdiri atas dua buah nilai, sementara suara mono hanya satu nilai.
- Kolom pertama suara audio akan diperdengarkan di bagian kiri perangkat, sedangkan kolom kedua diperdengarkan di bagian kanan perangkat.

Contoh

- **X1 = wavrecord(5*11000,11000)**
  - Merekam 11000 titik sampel per detik, selama 5 detik.
- **X2 = wavrecord(5*11000,11000, 2)**
  - Menggunakan tipe suara stereo.
  - Using 2 channels → stereo
- **X3 = wavrecord(5*11000,11000, 'uint8')**
  - Menggunakan *unsigned integer* 8 bit.
  - Nilai per sampel maksimum sebesar 255.

wavplay

- Memainkan berkas suara yang tersimpan di vektor *y*
  - wavplay(y, Fs)
  - wavplay(…,'mode')
- *Sampling rate* ditentukan oleh Fs.
- Nilai default: 11025 Hz.
- Dapat memainkan audio mono maupun stereo.
- Jika stereo, *y* harus berupa matriks dua kolom.

wavplay

- wavplay(...,'mode') specifies how wavplay interacts with the command line, according the string 'mode'.
- The string 'mode' can be:
  - 'async' (default value): You have immediate access to the command line as soon as the sound begins to play on the audio output device (a nonblocking device call).
  - 'sync': You don't have access to the command line until the sound has finished playing (a blocking device call).

Contoh Penggunaan

- wavplay(X1,11000)
- wavplay(X2,11000)
- wavplay(X3,11000)

Plot

- Menggunakan fungsi plot di Matlab
- Contoh:
  - x=wavrecord(5*44000,44000);
    - plot(x);
  - y=wavrecord(5*44000,44000,2);
    - figure, plot(y(:,1))
    - hold on
    - plot(y(:,2),'g')
    - hold off

Menampilkan dalam satu figure multiple signal

Plot

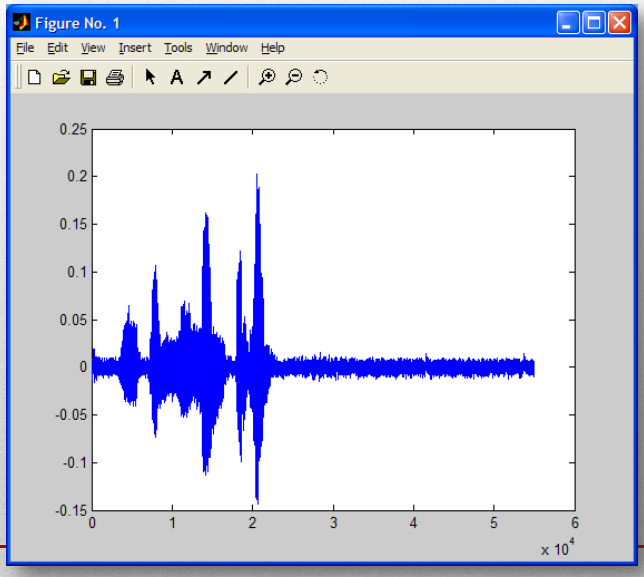
Figure No. 1
File Edit View Insert Tools Window Help
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
0 1 2 3 4 5 6
x 10^4

Plot

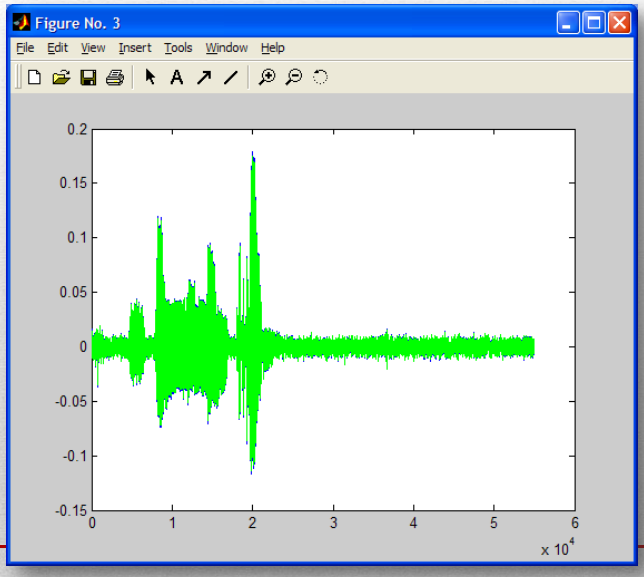
Figure No. 3
File Edit View Insert Tools Window Help
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
0 1 2 3 4 5 6
x 10^4

wavwrite

- Fungsi untuk menyimpan suara ke berkas Microsoft WAVE (.wav)
  - wavwrite(y,'filename')
  - wavwrite(y,Fs,'filename')
  - wavwrite(y,Fs,N,'filename')

- **Perhatikan spesifikasi saat kita merekam suara**
- **Lakukan kustomisasi**

wavwrite

- wavwrite supports multi-channel WAVE data, with up 32 bits per sample and supports writing 24- and 32-bit .wav files.
- wavwrite(y,'filename') writes a WAVE file specified by the string filename. The data should be arranged with one channel per column. Amplitude values outside the range [-1,+1] are clipped prior to writing.
- wavwrite(y,Fs,'filename') specifies the sample rate Fs, in Hertz, of the data.
- wavwrite(y,Fs,N,'filename') forces an N-bit file format to be written, where N <= 32.

Contoh

- wavwrite(x,'mysignal.wav');

wavread

- Membaca berkas Microsoft WAVE (.wav)
  - y = wavread('filename')
  - [y,Fs,bits] = wavread('filename')

wavread

- wavread supports multi-channel data, with up to 32 bits per sample and supports reading 24- and 32-bit .wav files.
- y = wavread('filename') loads a WAVE file specified by the string filename, returning the sampled data in y. The .wav extension is appended if no extension is given. Amplitude values are in the range [-1,+1].
- [y,Fs,bits] = wavread('filename') returns the sample rate (Fs) in Hertz and the number of bits per sample (bits) used to encode the data in the file.

Membangkitkan Sinyal

- Membangkitkan sinyal
  - t = 0:0.001:1;
  - x = sin(2*pi*50*t) + sin(2*pi*120*t);
  - figure, plot(t,x);
- Menambahkan noise
  - y = x + 0.5*randn(size(t));
  - figure, plot(t, y);

TUGAS DI RUMAH

- Lakukan Perekaman Suara

  - Kata : SAYA, CINTA, ILKOM, FMIPA, IPB,
  - Simpan dalam format .wav
  - 3 detik, Fs = 11000, mono, ‘double’
  - Minggu Depan Wajib Dibawa fail tersebut

TERIMA KASIH