Automatic Stuttering Recognition Tool

INVENTORS :
OOI CHIA AI
M.HARIHARAN
LIM SIN CHEE
PROF. DR. SAZALI YAACOB

CONTACT DETAILS :
OOI CHIA AI
PUSAT PENGAJIAN KEJURUTERAAN MEKATRONIK,
UNIVERSITI MALAYSIA PERLIS
KAMPUS ULU PAUH, 02600 ARAU,
PERLIS,MALAYSIA
Tel : +6012-5844183

BLOCK DIAGRAM OF STUTTERING RECOGNITION

INTRODUCTION

Stuttering is a speech disorder where normal flow of speech is disrupted by unintentionally repetitions and prolongations of sounds, syllables, words or phrases and involuntary silent paused or block in communication.

In early stuttering, the proportion of dysfluency such as repetition and prolongation is high.
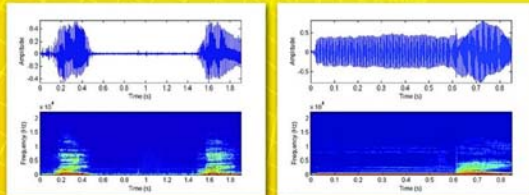
Conventional stuttering assessment
- Speech language pathologist (SLP) identifies dysfluencies by listening to clients' utterance repeatedly.
- SLP is required to count the number of dysfluencies in the clients' utterance.
- SLP classifies the observed stuttering events manually.

Therefore, the drawbacks of conventional stuttering assessment is
- Subjective.
- Inconsistent.
- Time consuming.
- Prone to error.

An automatic stuttering recognition system is developed to count and classify the two types of dysfluencies (repetition and prolongation) automatically.

Graphical representation of the utterance "may": speech signal (top), spectrogram (bottom).
(a) Repetition
(b) Prolongation
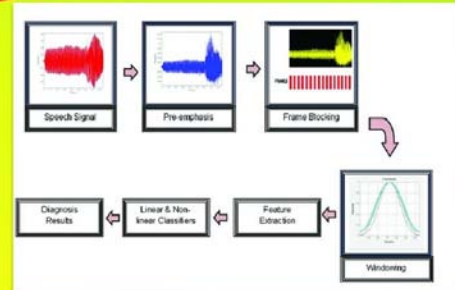
NOVELTY OF THE PRODUCT

An automated stuttering diagnosis system counts and classifies dysfluencies to facilitate SLP's tasks.

An interactive graphical user interface and user-friendly features system is developed.

Digital signal processing techniques (LPCC-Linear Predictive Cepstral Coefficient and MFCC-Mel-Frequency Cepstral Coefficient) are applied.

Linear and non-linear classifiers are employed as decision making techniques.

The system can be modified easily to fulfill the requirement of SLP.

THE CLASSIFICATION RESULT OF K-NN CLASSIFIER.

k	Repetitions	Prolongations	Accuracy
1	93.64	85.91	89.77
2	92.27	83.64	87.95
3	97.27	78.64	87.95
4	97.73	81.82	89.77
5	96.36	76.36	86.36
6	96.82	80.91	88.86
7	97.73	76.36	87.05
8	99.09	79.55	89.32
9	98.64	75.45	87.05
10	99.55	73.18	86.36

THE CLASSIFICATION RESULT OF LINEAR DISCRIMINANT ANALYSIS.

Repetitions	Prolongations	Accuracy
86.82	88.18	87.50

COMMERCIAL POTENTIAL

Target – Hospitals, clinics, speech rehabilitation centers.

Can be used as stuttering assessment tool before and after therapy.

To evaluate the efficacy of different therapies and to find out the suitable therapy techniques for each client .

User-friendly features.

Simple and easy to use. Clients can use it independently without SLP's supervision.

PUBLICATIONS

Lim Sin Chee, Ooi Chia Ai,Sazali Yaacob, *"Overview of automatic stuttering recognition system"*, *International Conference on Man-Machine System 2009 (ICOMMS 2009)*, Univerisiti Malaysia Perlis, Penang, Malaysia, 11-13 October 2009, pg 5B7-1 – 5B7-6, ISBN:978-967-5415-06-7

Lim Sin Chee, Ooi Chia Ai, M.Hariharan, Sazali Yaacob,*" MFCC based Recognition of Repetitions and Prolongations in Stuttered Speech using k-NN and LDA"*, *7th Student Conference on Research & Development (SCOReD 2009)*, Universiti Putra Malaysia, Selangor, Malaysia,16-18 November 2009. *Listed in IEEE Xplore.*

Lim Sin Chee, Ooi Chia Ai, M.Hariharan, Sazali Yaacob,*"Automatic Detection of Prolongations and Repetitions using LPCC"*, *International Conference For Technical Postgraduate (TECHPOS 2009)*,Universiti Malaya, Kuala Lumpur, Malaysia, 14-15 December2009. *Cited in IEEE Xplore.*

ILMU • KEIKHLASAN • KECEMERLANGAN

www.unimap.edu.my