IRIIE 2010

الجامعة الإسلامية العالمية ماليزيا
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
يونيورسيتي إسلام انترناسيونل ملايسيا

# IIUM Research, Innovation & Invention Exhibition 2010 (IRIIE 2010)

## ENHANCING QUALITY RESEARCH & INNOVATION for SOCIETAL DEVELOPMENT

## PP-88 Adaptive Speech Synthesis Module With Emotional Expression

***Aisha-Hassan A. Hassim***, *Ahmed Mustafa, Othman O Khalifa*
*Electrical and Computer Engineering, Kulliyyah of Engineering*
*International Islamic University Malaysia*

Computer generated speech replaces the conventional text based interaction methods. Initially, speech synthesis generated human voice that lacked emotional expression. This kind of speech does not encourage users to interact with computers. Emotional speech synthesis is one of the challenges of speech synthesize research. The quality of emotional speech synthesis is judged by its intelligibility and similarity to natural speech.

High quality speech is achievable using the high computational cost unit selection technology. This technology relays on huge sets of recorded speech segments to achieve optimum quality. On the other hand, diphone synthesis technology utilizes computational resources and storage spaces. Its quality is less than unit selection, however, due to the introduction of many digital signal processing algorithms such as the PSOLA algorithm, more natural results was achievable.

Emotional speech synthesis research has two significant trends. The first is unit selection based synthesis that aims to fulfill market needs regardless of resource utilization, and the second is diphone based synthesis that is often non-commercial, and oriented to develop intelligent algorithms that utilizes minimum resources to achieve natural output.

In this work, the possibilities of achieving high quality speech using low computational cost systems are investigated. The diphone synthesis is chosen as the speech synthesis technology. The existing approaches to emotional emulation are analyzed to determine aspects that could be further enhanced. Two aspects are highlighted: formant relation to emotions and the deterministic nature of pitch pattern relation to emotion.

These algorithms do not receive much attention from the existing approaches. Two algorithms are proposed to address these two aspects: formant manipulation, and deterministic pitch pattern generation algorithm. These algorithms are incorporated into one TTS system.

The quality of speech synthesis of the proposed system is evaluated using the recently developed objective evaluation methods. The results show significantly small values of simulation error, the mean square error values for happy, sad, fear and anger emotions respectively are: 0.03225, 0.12928, 0.02513 and 0.02429. This margin of error value provides an evidence of the accuracy of the proposed system.

## PP-105 Newcastle disease vaccines; improvement of virus purification by using high speed centrifugation

***Maizirwan Mel***, *Mohd Ismail Abdul Karim, Mohd Azmir Arifin, Aini Ideris*
*Biotechnology Engineering, Kulliyyah of Engineering*
*International Islamic University Malaysia*

Newcastle disease is one of the main diseases in the poultry industry. The disease has caused severe losses to farmers and governments worldwide. The causative agent for the disease is the Newcastle disease virus (NDV) which is a member of the Paramyxoviridae family. It is one of several serotypes of avian paramyxovirus and is a pathogen of chickens and other animals. NDV are classified into three major pathotypes, depending on the severity of disease produced in chickens. Lentogenic strains do not usually cause disease in adult chickens and are widely used as live vaccines in poultries. Viruses of intermediate virulence that cause respiratory disease are termed mesogenic, while virulent viruses that cause high mortality are termed velogenic. Until now, there is no treatment for the disease. Prevention is to import birds from disease free flocks only or through vaccination that must continue throughout the life of the bird. Most live ND vaccines in field use today are based on lentogenic strains. Vaccines of mesogenic type are still permitted in a few areas. ND vaccines are produced by pure and high quality antigens. There are several methods available to achieve that; sucrose gradient electrophoresis, high speed centrifugation and recently crossflow filtration. In this study, we have optimized the purification of ND virus using high speed centrifugation method. ND virus produced by fermentation in two liter stirred tank bioreactor were purified using high speed centrifugation. The purification experiments were done