Acoustic Applications Research Cluster

Introduction

This cluster is formed to carry out education, fundamental research and applications of acoustics as well as support its use in industry. Active research on various engineering disciplines from noise reduction or cancellation, measuring sound for automobile engine state diagnostics and investigating pipe conditions for cracks or corrosion is being pursued.

Classification of various Bahasa Melayu dialects of Northern Peninsular region through frequency spectrum measurement can potentially provide better understanding on how particular words are pronounced. Classification of the English phonemes or Bahasa Malaysia utterance can be utilized on forensic application in knowing certain attributes from voice samples. This cluster promotes research in multi-disciplinary areas and fields. As such the cluster applies tools from signal processing, acoustic and acoustic related signals, psychology parameters and other fundamental theories into research. On the applied side, the cluster has developed and created products that can benefit the local industries and improve social output.

Objectives

• To attract researchers in the field
• To build up national & international co-operation with industry & fellow institutes
• To lead in acoustic technology and applications area
• To enhance publication output in terms of refereed journal articles

Research Interest Areas

Acoustic and Impact Analysis	Sound Modeling and Processing	Signal Processing
• Condition Monitoring	• Speech Recognition	• Artificial Intelligence
• Acoustic Emission	• Speech-Text Translation	• Image Processing
• Engine Diagnosis	• Speech Pathology	• Biometric Security
• Crashworthiness		
• Material testing		
• Thermo acoustic		

Roadmap & Direction of Cluster

1. Sound Modeling and Processing
2. Acoustic and Impact Analysis

↓

Intelligent Acoustic Application Systems
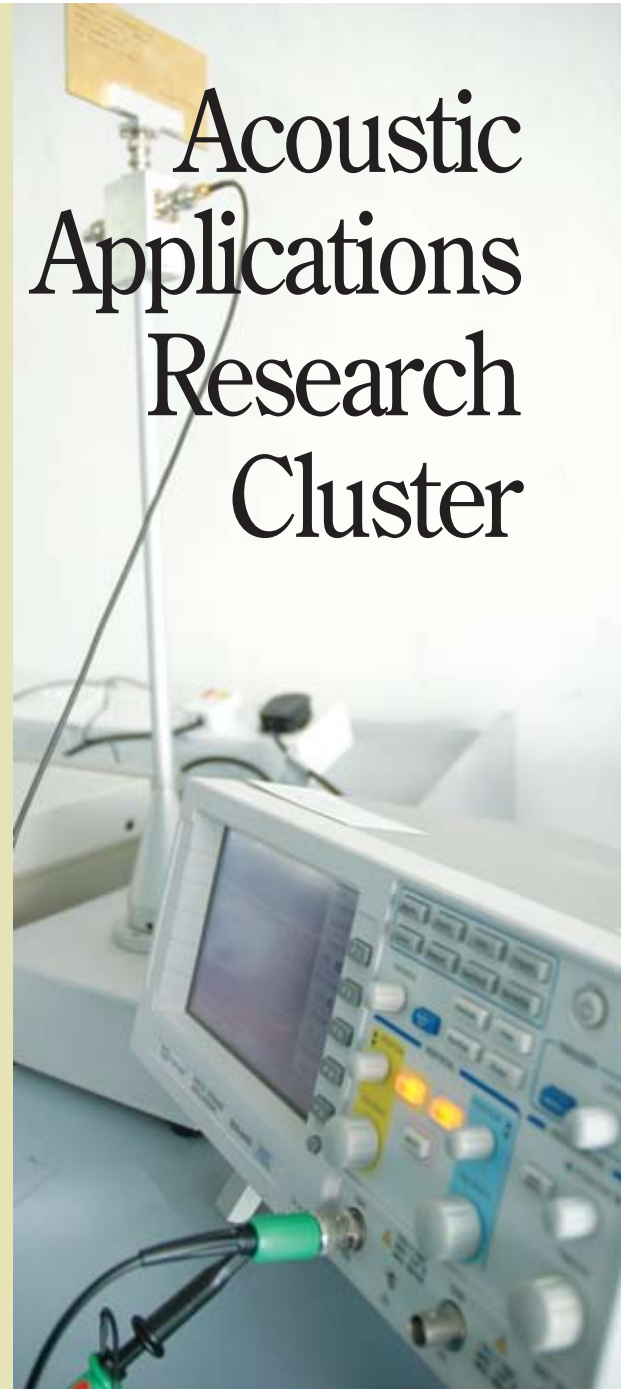
→ Patent, Commercialization

Acoustic Institute
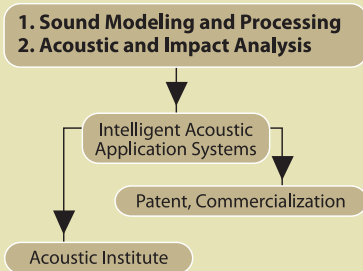
Current Projects

• Neural Networks For Classroom Speech Intelligibility Modeling

• The Impact Strengths Research of Solid Materials by Hopkinson Techniques

• An Investigation on Crashworthiness Assessment of Virtual New-Born Chilt Dummy using Numerical Models

• Neuro Modeling and Active Vibration control scheme of flexible vibrating structures

• A fundamental analysis of corrosion levels in steel pipes using acoustic emission techniques

• Fundamental Analysis of Stress Waves generated from cracked composite pipelines

• Development of Ultrasonic Tomographic Imaging Instrument for Measuring Oxygen Transfer Rate in Bioreactors

• A Study of Ultrasonic Repeller Effect on Drosophila Melanogaster

• Study of feature extraction algorithms for different English dialects in Malaysia

Future Projects

• Sound power level predictions for industrial machinery

• Sea bed mapping using ultrasonics

• Psycho-acoustics study for social behavior

• Development of a new thermoacoustic jet engine and a new thermoacoustic refrigerator.

List of Achievements

Competition	Researcher & Co-researchers	Research Title	Medal
ITEX 2007	Dr. Paulraj M.P, Prof. Dr. Sazali Yaakob, Nor Shaifudin Abd. Hamid.	An Inteligent Vehicle Fault Diagnosing System	Gold
	Hema C.R, Dr. Paulraj M.P, Prof. Dr. R. Nagarajan.	Intelligent Sensors for Reversing Vehicles	Gold
MTE 2008	Dr. Paulraj M.P	An Expert System for Motorbike Engine Fault Diagnosis	Silver
	Prof. Dr. R. Nagarajan	GPS Controlled Walking Robot with Rotating Ultrasonic Sensor For Collision Aviodance And Map Building	Silver

Contact

Prof. Dr. Sazali Yaacob
Head of Cluster
Acoustic Applications Research Cluster,
Universiti Malaysia Perlis (UniMAP),
Bangunan Pengkalan Indah, Jalan Pengkalan
Asam, 01000 Kangar, Perlis Indera Kayangan.
Tel : 04-979 8499
Fax : 04-979 8142