

# Mobile-to-Mobile Communication for Lung Sound Auscultation: A Preliminary Study of Perspective on Auto-regression Model

**Bing-Yuh Lu \***, **Chin-Yuan Lin\***, **Yigh-Pyne Lin\***, **Ming-Chia Lim\*\***,  
**Tung-Lai Hu\*\***, **Yun-Lin Mao\*\*\***, **Ming-Kwen Tsai\***, **Shui-Ken Wei**

*\*Department of Electronic Engineering, Tunghan University, Taiwan, ROC*

*\*\* National Taipei University of Technology, Taiwan, ROC*

*\*\*\*Institute of Industrial Management, Tunghan University, Taiwan, ROC*

**franklinlu888@outlook.com, cylin@mail.tnu.edu.tw, yplin@@mail.tnu.edu.tw, tsaoduva@gmail.com,**  
**jameshu@ntut.edu.tw, s49933089@gmail.com, mktsai@mail.tnu.edu.tw, skwei@@mail.tnu.edu.tw**

**Abstract**—This study employed the correlation coefficients analysis of time sequence, spectrogram, and auto-regression model of signals which were the lung sounds of subject end, and distant end where the sound was transmitted by mobile-to-mobile communication. The results presented that the correlation coefficients of time sequence, spectrogram, 4-order coefficients of auto-regression model were 0.36, 0.69, and 0.82 in the bell filtering mode, and 0.28, 0.69, and 0.81 in the diaphragm filter mode. Based on the high correlation coefficients of the spectrogram, and 4-order coefficients of auto-regression model, we believe that the mobile-to-mobile communication is a feasible method for distant lung sound auscultation.

**Keyword**— mobile, communication, lung sound, auscultation, correlation, signal processing

**Bing-Yuh Lu** is an associate professor at Department of Electronic Engineering, Tunghan University, Taiwan, Republic of China.

**Chin-Yuan Lin** is an instructor at Department of Electronic Engineering, Tunghan University, Taiwan, Republic of China.

**Yigh-Pyne Lin** is the head of Department of Electronic Engineering, Tunghan University, Taiwan, Republic of China.

**Ming-Chia Lin** is a Ph. D. student of National Taipei University of Technology, Taiwan, Republic of China.

**Tung-Lai Hu** is a Professor of National Taipei University of Technology, Taiwan, Republic of China.

**Yun-Lin Mao** is a MBA student of National Taipei University of Technology, Taiwan, Republic of China.

**Shui-Ken Wei** is the vice President of Tunghan University, Taiwan, Republic of China.

**Ming-Kwen Tsai** is an assistant professor at Department of Electronic Engineering, Tunghan University, Taiwan, Republic of China

**Shui-Ken Wei** is the vice President of Tunghan University, Taiwan, Republic of China

