

國立中央大學

統計研究所

學術演講

主講人：黃怡婷 教授（國立台北大學統計學系）

講題：Using functional data to model trajectories of inertial measurement unit and classify stroke levels

時間：109年12月22日（星期二）上午11：00 ~ 12：00

地點：中央大學鴻經館M429室

茶會：上午 10：30 ~ 11：00 地點：鴻經館 510 室

ABSTRACT

The hand function evaluation is an important rehabilitation assessment for stroke patients. Currently, the evaluation relies subjectively on physicians who make judgments on given actions done by the patients. Inconsistent results can be yielded clinically. Many inertial sensing elements are designed to collect the motion. If such an application can collect data effectively and the data can predict the degree of the stroke, it may reduce wasting the medical resources and accelerate the hand function evaluation process.

Using data gloves designed by inertial measurement unit to collect the movement trajectories of patients, Lin et al. (2017) constructed three important physical features and Lin et al. (2019) constructed the features based on summary statistics. However, the data collected by the inertial measurement unit can have abnormal values when signals are disturbed. To avoid these abnormal data, this paper uses functional data analysis methods to smooth the data. Two basis functions including cubic smoothing splines and Fourier functions are used to fit the data. The corresponding coefficients are the constructed features. Using 5 classification methods, the proposed features are able to effectively classify the degree of the stroke, and also distinguish the effectiveness of sensors.

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