Analytica Acta-2013

OMICS Group Conferences
Accelerating Scientific Discovery

4th International Conference and Exhibition on
Analytical & Bioanalytical Techniques

October 15-17, 2013 Las Vegas, NV, USA

Neural networks and FET sensors combined: A tool to accurately classify and quantify molecules

Jose S. Torrecilla
Complutense University of Madrid, Spain

Abstract

In the biomedical field, artificial neural networks (ANNs) have been employed as powerful chemometric tools for numerous applications, from early diagnosis of diseases to defining the most appropriate treatment for determined patient groups. This is possible because ANNs rely on and excel at discovering nonlinear relationships inside enormous databases to create estimative mathematical models.

On the other hand, field-effect transistor (FET) sensors are widely applied to process medical and biochemical samples due to the fact that they are able to provide specific signals for determined molecules and even for different concentrations of the same compound. A great advantage that FET sensors have is that through molecular engineering, various organic compounds can be used to functionalize the sensors, allowing a wide range of possibilities. FET sensors originate large databases when, for instance, a sample from a patient is passed through them. This data can be processed with ANNs, which, in the end, should lead towards an accurate classification and quantification of the sample analyzed. The study of the results provided by the ANN can be used to identify the FET sensor that is best suited to solve a particular problem. To do so, results such as accuracy, applicability, and generalization capability are looked into.

To sum up, by combining FET sensors and ANNs, it is more than likely to come across an extremely accurate method that may not only identify or classify a molecule, but additionally determine its concentration in a certain sample.

Biography

José S. Torrecilla received his B.Sc. and Ph.D (with honors) in Chemical Engineering from the Complutense University of Madrid (UCM) and developed his postdoctoral studies at Queen's University of Belfast (United Kingdom) and Spanish Science and Technology Ministry. Afterwards, he received his B.Sc. in Prevention of Labor Risks. Currently, he is an Associate Professor and Researcher in the UCM. His research fields are mainly focused on developing mathematical models and designing chemometric tools in different fields (chemical engineering, food, health, etc.) He has published over 70 papers in reputable journals and has been serving as a distinguished editorial board member.