APPENDIX

Some parts of this thesis were published in Journal of Chemometrics

Krongchai C., Funsueb S., Jakmunee J. and Kittiwachana S., "Application of multiple self-organizing maps for classification of soil samples in Thailand according to their geographic origins", J. Chemom., vol. 31, 2016, pp. 1–10.

RESEARCH ARTICLE

Application of multiple self-organizing maps for classification of soil samples in Thailand according to their geographic origins

Chanida Krongchai | Sujitra Funsueb | Jaroon Jakmunee | Sila Kittiwachana

Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai, 50200 Thailand

Correspondence
Sila Kittiwachana, Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai, 50200 Thailand.
Email: silacmu@gmail.com

Multiple self-organizing maps (SOMs) were applied to classify soil samples according to their geographic origins. The soil physical and chemical parameters, including textures, pH, and chemical nutrients, were analyzed and used for establishing the chemometric models. To determine the optimum size and arrangement of the maps, we adapted a growing self-organizing map algorithm. To evaluate the reliability of the models, we calculated statistic indices based on the majority vote including percentage predictive ability, percentage model stability, and percentage correctly classified using a bootstrap methodology. For means of comparison, we also used linear discriminant analysis, quadratic discriminant analysis, partial least squares-discriminant analysis, soft independent modeling of class analogy, counter propagation network, supervised Kohonen network, and *k*-nearest neighbors. In comparison to a single SOM, multiple SOMs clearly provided better classification results. The extension of multiple SOMs also led to the best discrimination of the soil origins.

KEYWORDS
artificial neural networks, classification, multiple self-organizing maps, soil, Thai jasmine rice

CURRICULUM VITAE

Author's Name   Miss Chanida Krongchai

Date/Year of Birth   November 30th , 1991

Place of Birth   Phayao Province, Thailand.

Education

2010-2013   Bachelor of Science in Chemistry (1st Class Honor), Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai, Thailand.

2014-2017   Master degree in Chemistry, Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai, Thailand.

Scorelarship

2010-2017   The Development and Promotion of Science and Technology Talents Project (DPST), the government of Thailand.

Experiences

2016-2017   Research training under the litle of "Measuring Insulin Association and Aggregation using Anisotropy Resolved Multidimensional Emission Spectroscopy (ARMES)", Nanoscale Biochemistry Laboratory, School of Chemistry, National University of Ireland-Galway, Galway, Ireland.

65

2013	Research training under the litle of "Application of Central Composite Design for Optimization of the Removal of Humic Substances using Coconut Copra", Soil Laboratory, Department of Chemistry, Faculty of Resource and Technology, University Malaysia Sarawak, Sarawak, Malaysia.
2012	Internship student, "Investigation of Table Sugar as a Dosimeter based on Electron Spin Resonance Spectroscopy", High Dose Gamma Ray Laboratory, Office of Atoms for Peace, Bangkok, Thailand.

Award

2014	Best oral presentation in Chemistry under the topic of " Effects of N and Na on Yield and 2-Acetyl-1-Pyrroline (2-AP) Quantity in Grains of a Fragrant Rice (Pathum Thani 1)", Faculty of science, Chiang Mai University, Thailand.

Attended Conferences

2015	Poster presentation under the topic of "One Class Classification for Distinguishing among the Soil Samples from some Provinces in the North and Northeast of Thailand", Chemometrics in Analytical Chemistry (CAC 2015), Shangsha, Hunan, China.

Plublications

2016	C. Krongchai, S. Funsueb, J. Jakmunee and S Kittiwachana. Application of multiple self organizing maps for classification of soil samples in Thailand according to their geographic origins. Journal of Chemometrics, Vol.31, pp. 1-10.

2016   S. Funsueb, C. Krongchai, S. Mahatheeranont and S. Kittiwachana. Prediction of 2-acetyl-1-pyrroline content in grains of Thai Jasmine rice based on planting condition, plant growth and yield component data using chemometrics. Chemometrics and Intelligent Laboratory Systems, Vol. 156, pp. 203-210.

2015   T.Z.E. Lee, C. Krongchai, N.A.L. Mohd Irwn Lu, S. Kittiwachana and S.F. Sim. Application of central composite design for optimization of the removal of humic substances using coconut copra. International Journal of Industrial Chemistry, Vol. 6, pp. 185-191.

67