

ABSTRAK

PRINCIPAL COMPONENT ANALYSIS-DECISION TREE UNTUK KLASIFIKASI KOPI LUWAK DAN NON LUWAK MENGGUNAKAN *ELECTRONIC TONGUE*

Oleh :

Muhammad Rangga Satriyo

14/364123/PA/15906

Kopi luwak merupakan jenis kopi yang dihasilkan oleh proses fermentasi di dalam sistem pencernaan hewan luwak. Tingginya permintaan pasar terhadap kopi ini dikarenakan ketersediaan biji kopi luwak terbatas membuat harganya menjadi mahal, sehingga menimbulkan banyaknya pemalsuan. Uji keaslian kopi luwak dengan analisis kandungan senyawa kopi menggunakan metode spektometri massa memerlukan biaya besar dan tenaga ahli. Instrumen alternatif *Electronic Tongue* dengan metode *Principle Component Analysis (PCA)-Decision Tree* digunakan untuk klasifikasi kopi luwak dan nonluwak berdasarkan pola rasa (*taste*).

E-tongue dengan 16 sensor campuran *Oleic Acid(OA)* dan *Triethyl Methyl Ammonium Chloride (TOMA)* digunakan untuk mengukur rasa masing-masing 50 kopi luwak dan nonluwak. Sampel kopi seberat 0.75gr yang telah dihaluskan diseduh dengan 100ml *aquades* pada suhu 100°C. Respon sensor yang terbentuk diekstrak cirinya dengan mengambil rata-rata respon per pengambilan. Klasifikasi dilakukan dengan mereduksi matriks dimensi matriks ordo 100x16 menggunakan PCA.

Hasil penelitian menunjukkan dengan PCA, sampel kopi luwak dan nonluwak dapat terploting. Selanjutnya, klasifikasi *decision tree* dengan reduksi dimensi, akurasi klasifikasi meningkat dari 73.3% menjadi 86.67%. Hal ini menunjukkan akurasi *e-tongue* dapat ditingkatkan melalui kombinasi PCA dan *Decision Tree*, disamping itu *e-tongue* dengan variasi sensor OA dan TOMA dapat digunakan untuk klasifikasi kedua sampel tersebut.

Kata kunci : kopi luwak, *electronic tongue*, *Principle Component Analysis*, *Decision Tree*.

ABSTRACT

PRINCIPAL COMPONENT ANALYSIS-DECISION TREE FOR LUWAK COFFEE CLASIFICATION USING ELECTRONIC TONGUE

Created by:

Muhammad Rangga Satriyo

14/364123/PA/15906

Luwak coffee is a type of coffee produced by the fermentation process in the digestive system of mongoose animals. The high market demand for this coffee, increasingly requires limited civet coffee to make prices expensive, giving rise to the amount of counterfeiting. Test the authenticity of civet coffee by analyzing the composition of coffee using the mass spectrometry method requires large costs and experts. Electronic Tongue alternative instrument with the Principles Component Analysis (PCA) method - Decision Tree is used for the classification of civet and non-civet coffee based on taste patterns.

E-tongue with 16 sensors mixed with Oleid Acid (OA) and Trioctyl Methil Ammonium Cholride (TOMA) was used to measure the taste of each of the 50 civet and non-civet coffee. Coffee bean samples (0.75gr) which have been mashed are brewed with distilled water (100ml) at 100 ° C. The sensor of the formed response is extracted by taking the average response per take. Classification is done by reducing the matrix dimension of the order 100x16 using PCA.

The results showed that with PCA, samples of civet coffee and non-civet coffee could be plotted. Furthermore, classification of decision trees with dimension reduction, The classification accuracy increased from 73.3% to 86.67%. This shows that the accuracy of e-tongue can be increased through a combination of PCA and Decision Tree, besides that e-tongue with variations of OA and TOMA sensors can be used to classify the two samples.

Keywords : Luwak Coffee, *electronic tongue*, *Principle Component Analysis*, *Decision Tree*.