

Accepted Manuscript

A Cascaded Recognition Method for Copper Rougher Flotation Working Conditions

M. Lu, Dong H. Xie, Wei H. Gui, Liang H.Wu, Chao Y.Chen, Chun H.Yang

PII: S0009-2509(17)30602-4
DOI: <https://doi.org/10.1016/j.ces.2017.09.048>
Reference: CES 13825

To appear in: *Chemical Engineering Science*

Received Date: 11 April 2017
Revised Date: 27 July 2017
Accepted Date: 26 September 2017

Please cite this article as: M. Lu, D.H. Xie, W.H. Gui, L. H.Wu, C. Y.Chen, C. H.Yang, A Cascaded Recognition Method for Copper Rougher Flotation Working Conditions, *Chemical Engineering Science* (2017), doi: <https://doi.org/10.1016/j.ces.2017.09.048>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



A Cascaded Recognition Method for Copper Rougher Flotation Working Conditions

M. Lu¹, Dong H. Xie¹, Wei H. Gui², Liang H. Wu¹, Chao Y. Chen¹, Chun H. Yang²

(1. School of Information Electrical and Engineering, Hunan University of Science and Technology, Xiangtan 411201, China)

(2. School of Information Science and Engineering, Central South University, Changsha 410083, China)

Abstract: Due to the complex process of copper flotation and the frequently diversified conditions of ore sources, it is difficult to identify rougher flotation conditions and maintain the stability of production process. By deeply analyzing the characteristics of the copper flotation process, the recognition system for working conditions in copper rougher is established and the cascaded recognition method is presented. At the first stage, the recognition model is built to identify feeding ore types based on fusion information of froth image local color features and process parameters. At the second stage, the asymmetry binary tree SVM multi-class classification method with working condition priority rating (WCP-BTSVM) is used to recognize copper rougher flotation conditions. As demonstrated in the industrial experiment, the proposed method can relatively accurate identify the working conditions in copper rougher and thus can provide a solid foundation for decision-making in follow-up process control.

Key words: copper flotation process; visual features; process parameters; data fusion; feeding ore types identification; rougher condition recognition

1 Introduction

In ore treatment and processing, froth flotation is an essential method for beneficiation. The ore pulp inflow into a flotation cell constantly runs into the blown-in air. Consequently, mineral particles with relatively high hydrophobic property are more prone to be absorbed into bubbles. In this way, when froths laden with mineral particles come up to the upper part of pulp, they are scraped off by a scraper and ultimately, different types of mineral particles can be separated. The overall flotation process is composed of various workflow units including grinding, grading, rougher, cleaning, and scavenging, etc. and thus is a complex non-linear multivariable process

Download English Version:

<https://daneshyari.com/en/article/4763815>

Download Persian Version:

<https://daneshyari.com/article/4763815>

[Daneshyari.com](https://daneshyari.com)