



Paper ID: 3011 *Optimal Cutting Speed Selection for Milling with Multi-Criteria Decision using ANFIS based reasoning*

Optimal Cutting Speed Selection for Milling with Multi-Criteria Decision using ANFIS based reasoning

Phatchani Srikhumsuk^a, Siridech Kunhirunbawon^b, Suthep Butdee^a

^aRajamangala University of Technology Krungthep, Research and Development Institute, Thailand

^bPibulsongkram Rajabhat University, Faculty of Industrial Technology, Thailand

Abstract

The milling process is widely used in the most industrial sectors for machined parts because it is more flexible than forming and molding process. However, selection parameters are still inconsistent depending on human experiences which causes inefficiency and less competitiveness particularly in the age of industry 4.0 which manufacturing processes should deal with uncertainty and respond to engineering changes rapidly and timely. The complexity of selection cutting parameters are faced on multi-criteria decision making in order to obtain optimal solutions shortly. This paper proposes ANFIS-based reasoning to obtain the optimal cutting speed based on three critical factors: workpiece material, tools material, and design constraints. It is developed by using the MATLAB toolbox. Fuzzy rules are captured and collected from the text manual and experts at the machining shop. The case study is illustrated by modelling and experiment.

Keywords: ANFIS; Optimal Cutting speed; Multi-Criteria Decision; Milling process





Paper ID: 0613 Prediction of Roasted Coffee Bean Level from A Coffee House-ware Using Fuzzy Logic

Prediction of Roasted Coffee Bean Level from A Coffee House-ware Using Fuzzy Logic

Chaisak Klaidaeng^a, Saichol Chudjuarjeen^{b,*}, Chanida Pomsen^c,
Patipong Charoenwiangnuea^{d,4}

^aDepartment of Hospitality, Faculty of Liberal Arts,

Rajamangala University of Technology Krungthep, Bangkok 10120, Thailand

^bDepartment of Electrical Engineering, Faculty of Engineering,

Rajamangala University of Technology Krungthep, Bangkok 10120, Thailand

^cDepartment of Mechanical Engineering, Faculty of Technical Education,

Rajamangala University of Technology Krungthep, Bangkok 10120, Thailand

^dDepartment of Mechanical Technology, Faculty of Technical Education,

Rajamangala University of Technology Krungthep, Bangkok 10120, Thailand

Abstract

Coffee is currently one of the most popular beverages consumed by people from all over the world. Different types of coffee usually depend on the types of coffee used, the roast level of the beans, the brewing methods used, and additional ingredients added to the coffee. However, the characteristics of coffee are mostly influenced by the roasting processes that bring out the aroma and flavor of the coffee beans. In this study, we design a 2 kW home coffee roaster using heating coils as the heat source and controlled by the fuzzy logic algorithm embedded on the Arduino nano in order to predict the quality of the coffee roast. The quality of the roasted coffee beans is divided into 3 categories; light roast, medium roast, and dark roast. The body roaster machine consists of three parts; a bucket of popcorn, an agitator, and gears, which serves as a rotating drum roaster and reverses the direction of rotation of the impeller. The tank-roasted coffee beans are thoroughly heated by the heating coils, and the impeller is designed to provide an oblique for sweeping tank-roasted coffee beans out of the wall. The experimental study is discussed in detail.

Keywords: Coffee roasting; Microcontroller; Heater coil

