DETERMINATION OF THE CHANGE IN VOLUME AND STABILITY OF BEER FOAM BY DIGITAL IMAGE PROCESSING

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Abstract

Beer is one of the oldest and most widely-consumed low-alcoholic beverage. Beer production takes an important place in food industry worldwide. There are many different types of beer depending on the fermentation technology and some visual characteristics, such as color and turbidity. Beers are differentiated commonly according to the fermentation process, which can be categorized in three categories - with upper or low fermentation and naturally fermented beer. The quality of beer is assessed by a set of sensory characteristics such as appearance, taste, aroma and texture. The appearance of the beer is related to the color, foam and clarity of the product. Changes in the volume and the height of beer foam affect one of the most important organoleptic indicators - the stability of beer foam. The aim of this paper is to study the change in the volume of beer foam over time, using techniques for computer processing of two-dimensional images and taking into account changes in the height of beer foam.

Three different brands of beer are bought from the marketplace and are tested. A digital camera and an appropriate experimental setting are used for capturing videos in order to examine the changes in the volume and stability of beer foam. The videos are divided into frames at regular intervals of time. A computer program is developed for automatic determination of the change in the volume of the liquid and the volume of the foam over time. Digital image processing is applied to the obtained frames.

The developed computer program is tested by processing images of beer samples and appropriate algorithms for segmentation computer vision techniques. As a result, changes in the height of the beer foam and liquid phase are observed and the volume of both is calculated.

Based on the obtained results, it is concluded that the created experimental setup and computer program can be successfully used to qualify the beer by the volume and stability of beer foam.

Key words: Beer quality, Beer foam, Foam stability, Digital image processing, Food quality control, Computer vision.