

Abstract:

This work describes the methods and discusses the problems of the non-destructive automatic evaluation and sorting of fruits and vegetables. It is based on the experience and results obtained by a group of researchers of the UFT-Plovdiv during the creation of the sorting machines ASM 501 (Golden medal at the International Technical Fair in Plovdiv, 1991) and AQS 602 (Best Innovation prize of the “Innovation techniques” in Bordeaux, France, 1996). Both machines are based on an asynchronous electromechanical concept, the main characteristics of this being the high throughput ability of the channels and complex logic control board. The sensory block consists of a photometric camera which scans one-by-one every product that goes through it. The scanned products are analyzed on the basis of their spectral reflection and transmittance at 2-4 wavelengths in the VIS and NIR regions of the electromagnetic spectrum. Along with the purely technical problems and challenges in the creation of such a sorting machine, the work discusses the possibilities that are presented by the new computer-based techniques using built-in artificial intelligence. More specifically, this is demonstrated by the system’s easy re-conditioning and self-learning in working conditions, in relation to the specific properties of the products such as the quality of the incoming products, or the specific demands of the client in the specification of the different quality categories.