VISION BASED CROSS SECTIONAL AREA ESTIMATOR FOR INDUSTRIAL RUBBER PROFILE EXTRUSION PROCESS

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by

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DECLARATION

The work submitted in this dissertation is the result of my own investigation, except where otherwise stated.

It has not already been accepted for any degree, and is also not being concurrently submitted for any other degree.

UOM Verified Signature

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10/02/2011

We/I endorse the declaration by the candidate.

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Dr. Nalin Wickramarachchi

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Abstract

This thesis presents a research work which was carried out to develop a vision based cross sectional area profiling system suitable for continuous rubber profile extrusion processes. Rubber profiles are mostly used in rubber track production industry as a semi finished raw material. The linear volume of these profiles is a very important parameter for overall quality controlling of track production process. In order to maintain the linear volume it is a must that the cross section be measured and maintained within limits. Since the profile is continuously extruded by profile extruders, the profile cross section area measurement is best to be done in an online basis than off-line basis. A computer vision based online measurement system was developed which consists of a line laser projected on to the profile while a low cost digital camera observes the projection of this laser line on the profile. A vision software to be used in the system was also developed to interpret the captured cross section images in real time and produce numerical measurements and finally display on a computer with graphical user interface. The developed system is capable of measuring trapezoidal shape cross sections at a maximum rate of 6 measurements per second with repeatability error limited to ±2% which preferably satisfies state of art rubber extrusion process quality controlling requirements. It can be concluded that with suitable further improvements, the technology can be integrated to extruder controlling systems as a feedback signal to control its output profile dimensions.

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