MACHINERY FOR AUTOMATIC SELECTION OF SILKWORMS: VISION ALGORITHMS, NEURAL NETWORK AND AUTOMATION SOLUTION

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INTRODUCTION:

A machinery that implement the selection and assignment of   a certain class of purity to silkworms in industrial environment, through implementation of vision algorithms and application of new method of control to handle the queue wait.

AIM:

Improve efficiency of European silk industry, which is strongly penalized by the oriental concurrency. We look for a lower manufacturing cost in long term, to increase amount of silkworm analyzed per hour. This is the bottleneck of Italian silk industry today, so the final aim is to create an alternative to imported product.

MATERIALS & METHODS

There are several implementation of vision algorithms for the recognition of imperfection in general surface and even in silkworm, but is not so easy to make a system that is able to treat various Kg/hour, with behavior that is unchanged by the environment in which it works. We use professional camcorders, an embedded computer and graphic card for implementation of neural network able to adapt to every environment, be auto adaptive and improve its performance. For studying the flow of silkworm in development phase, it as been used an approximation of the discrete dynamic system represented by silkworm arriving, making it seems like a continuous system, using Markov chain to simulate the response time of the machinery and identify a good approximation of the real flow of silkworm.

RESULTS

It improves drastically the result obtained by other solution, it was also a perfect test for many types of camcorders and lighting techniques specifically useful for emphasize some aspect of object instead of others.

CONCLUSION

The flow obtained by the machinery is near 15Kg/hour of silkworms elaborated and direct to a proper class of purity.

KEYWORDS:

Automation; vision algorithms; neural network; system identification technique

BIOGRAPHY

Stefano D'Amico Stefano D'Amico has completed his master's degree at 24 years from University of Tor Vergata in Rome, taking an interest in control technique and operative research. He has always worked during his study: first making an educational kit to introduce elementary school student to coding and robotics (through Arduino), then offering courses about Arduino in some high schools of Rome, making student able to realize some simple project on their own. Even before ending his master degree, he has been haired by a society which deals with Industrial installation and numerical control. Occasionally he still public some articles and guide for Arduino or coding on portals which deals with scientific publication.