

Control Systems for Laboratories and Plants in Food and Agriculture Industry

The call

We are looking for partners for co-operation, to join a consortium for Integrated Project (IP) or for Net of Excellence (NoE) to submit a collective application for a grant within the Frame Programme 6 of the European Union.

The field of interest

In general, the area is an automatic control of industrial processes, including computer measurements and monitoring. Coupled problems to those are: mathematical modeling, identification and synthesis of control algorithms. The stress is put on difficult cases, when process is strongly nonlinear, model is ill defined and variables are fuzzy. Often it is not possible to measure the process in the real time, and/or there is no direct access to the variable to be measured. Such processes are typical in food and agriculture industry, as well as in chemical installations.

Typically the environment is a continuous one, often it is a multi-phase fluid or mixture of grains.

As a solution, to process data and to control the non-classical algorithms must be adopted, for example based on the Artificial Intelligence Algorithms (like Artificial Neural Networks, Fuzzy and Genetic Algorithms).

Proposal

Air-conditioning of houses, greenhouses and long term stores for food and other biologically active products;
Mathematical modelling of complex and difficult processes, like multi-phase mixtures and fluids identification;
Identification of processes in a real time for the adaptive control;
Automatic control by cheap means and simple elements;

Examples:

- Drying of crops/cereals, where we used neural networks for the fast processing the signals from a set of simple sensors to estimate the real value of the humidity of grains;
- Mixing of food products, where we have analysed a continuous bulk to optimal control by one control loop with one actuator;
- Neutralisation of basic (alkali) sewage, with a great delay time in a control loop;
- Energy saving of an air conditioning in green houses;
- Step motors, fuzzy controllers, PLCs, digital signal processors (DSP), industrial computer networks and other modern software, equipment and instrumentation is what we are familiar with.

Key words

Agriculture,
Automatic measuring systems,
Baking,
Biotechnology,
Chemical and biochemical processes,
Chilling,
Control engineering,
Drying,
Environmental monitoring,
Field buses,
Food quality evaluation,
Frizzing,
Heat and mass transport,
Identification methods for non-linear parameter distributed processes,

Image processing,
Intelligent sensors,
Machine vision,
Measuring and testing,
Measuring networks,
Microclimate control,
Modelling of food, chemical and biochemical processes,
Non-invasive measurement,
Optimal control,
Pollution control
Pollution control,
Product quality control,
Remote sensing,
Sensor and data fusion,
Signal processing,
Storage,
Texture and colour analysis,
Transport,
Water content

Our experience

We have a research and industrial experience in a form of grants and projects for industry details: see <http://tu.koszalin.pl/kpst/>

Our potential: the staff

14 professors, 20 doctors, 70 PhD students

More details: see <http://tu.koszalin.pl/kpst/staff>

Our potential: the labs

Numerous laboratories plus workshop

More details: see <http://tu.koszalin.pl/kpst/labs>

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