OVERVIEW OF RELEVANT LITERATURE

Xuan Sun, Changsheng Ai, Yuzhen Ma, presented ultrasonic detecting method for fat content in milk. The temperature of test sample affects the fat content that are detected by this method. Experiments conducted show that the measure stability of milk sound velocity and the attenuation coefficient is good within 35°C to 45°C temperature range and is relatively bad when temperature is lower than 35°C or higher than 45°C. This method diminishes the impact of temperature and makes the detecting relatively accurate upto 3% and 5% for fat and protein respectively [1].

Dan Peng, Kaina Dong, Xia Li and Kexin Xu, have proposed hybrid algorithm to eliminate the interference of temperature variation and develop the robust calibration models for determining the main components concentration in milk using the near infrared spectra. the three dimensional (3D) spectra including wavelength, temperature and absorbency are constructed. To validate WPNOSC-NPLS algorithm by measuring the fat concentration of milk using the NIR spectra at 25°C, 30°C, 35°C and 40°C. Experimental results indicate that the WPNOSCNPLS algorithm can effectively improve the prediction ability and robustness of the calibration model, indicating that it is an efficient method for dealing with the variation of temperature [2].

Carlos Enrique Carleos Artime, Jes's Angel Baro de la Fuente and Norberto Corral Blanco, presented visible and Near InfraRed (VIS-NIR) spectrometry from 400 to 1100 nm in addition to Partial Least Squares (PLS) method to measure important parameters of non-homogenized fresh milk such as fat, lactose and total protein content. Fresh milk samples taken during milking process were analyzed by means of standard measurement procedures and VIS-NIR spectrometry in order to verify the capabilities and precision of proposed method. An experimental result demonstrates the capability of the method to predict fat and lactose content of milk [3].

Marina Cole, Gurmukh S. Sehra and Julian W. Gardner, described the design and characterization of shear horizontal surface acoustic wave (SH-SA W) devices for the analysis of liquid samples. The design consists of a dual delayline configuration where one delay line is metalized and shielded and the other is left electrically active. Experiments are conducted to characterise the devices in terms of sensitivity, temperature
dependence and mass loading. Tests were promising to discriminate between milk samples with different fat content as well as for dilution test also [4].

Marzuki Khalid and Sigeru Omatu has proposed that a backpropagation neural network can be trained to learn the inverse dynamics model of a temperature control system and than configured as a direct controller to the process. The ability of the neural network to learn the inverse model of the process plant is based on input vectors with no a priori knowledge regarding dynamics. Based on these characteristics, the neural network can be compared with convectional Proportional-plus-Integral controller. He has also shown ti experimentally that the neural network controller performs very well and offers encouraging advantages [5].

Qi Xin, Hou Zhi Ling, Tian Jian Long, Yu Zhu, proposed simple and rapid method for determination of fat and protein content in milk. The system is based on the laser light scattering theory, which is tested for 50 milk samples to detect fat and protein content. The operating principle of the instrument is introduced and the influence of the environmental conditions, such as the homogenization pressure and homogenization temperature, etc. on the result of the test is analyzed found to be reduced. Also the spectroscopy analysis method, the complexity and cost of the instrument used in this study is greatly reduced [6].

Demetri Psaltis, Athanasios Sideris, and Alan A. Yamamura in their paper says that a multilayered neural network processor can be used to control a given plant. They have proposed several learning architectures for training the neural controller to provide the appropriate inputs to the plant so that a desired response is obtained. A modified error-back propagation algorithm, based on propagation of the output error through the plant, is been introduced. They have proposed three control learning methods, describe the error back propagation algorithm, which is the method used to adapt the weights in the neural networks and introduce a modification of error back propagation algorithm that extends its utility to problems where the error signal used to train the network is not the error measured at the output of the network. Also a simulation for a very simple plant to demonstrate the operation of the proposed architectures and training methods is presented[7].
Derrick H. Hguyen and Bernard Widrow proposes that neural network can be used to solve highly nonlinear control problems. How a neural network can learn of its own accord to control a nonlinear dynamic system. An emulator, a multilayered neural network, learns to control the emulator. The self trained controller is then used to control the actual dynamic system. The learning process continues as the emulator and controller improve and track the physical process. The controller is able to guide the truck to the dock from almost any initial position. The methodology shows the control problems that are so complex that analytical design techniques do not exist and may not exit for sometime to come. Neural networks can be used to implement highly nonlinear controllers with weights that can be determined by a self learning process [8].

Jyh-Shing Roger Jang has proposed the architecture and learning procedure underlying Adaptive Neuro Fuzzy Inference System (ANFIS), which is a fuzzy inference system implemented in the framework of adaptive networks. By using a hybrid learning procedure, the proposed ANFIS can construct an input-output mapping based on both human knowledge and stipulated input-output data pairs. The ANFIS architecture is employed to model nonlinear functions, identify nonlinear components on-linely in a control system, and predict a chaotic time series, all yielding remarkable results. System modeling based on conventional mathematical tools is not well suited for dealing with ill-defined and uncertain systems. By contrast, a fuzzy inference system employing fuzzy if-then rules can model the qualitative aspects of human knowledge and reasoning processes without employing precise quantitative analyses [9].

P. P. Bhogle, B. M. Patre, L.M. Waghmare and V. M. Panchade, discussed in this paper a neural fuzzy hybrid technique based an experimental application is studied. Experiments were conducted on a water temperature control system. The control techniques are tested under normal environmental conditions with respect to set-point regulation and load disturbance regulation in real time. This paper has gone over the simplest manner to investigate the connection between fuzzy logic and neural networks[10].