

DAFTAR ISI	HAL
PEMUTUAN BUAH MANGGA BERDASARKAN PENAMPAKANNYA MENGGUNAKAN PENGOLAHAN CITRA Sorting And Grading Of Mango Based On Their Phisycal Appearances Using Image Processing Usman Ahmad, I Dewa Made Subrata dan Sinta Gunayanti	1~8
MODEL SISTEM KENDALI SUHU BANGSAL BUDIDAYA ULAT SUTERA (BOMBIX MOREI L.) Model Of Temperature Control System For Silkworm Cultivation Nanik Purwanti, Budi I. Setiawan Dan Leopold O. Nelwan	9~17
PENENTUAN TIME-DOMAIN SPECIFICATIONS PADA SISTEM KENDALI LINEAR Determination Of Time-Domain Specifications Of Linear Control System Budi I. Setiawan	18~25
ANALISIS LAJU VENTILASI ALAM PADA SINGLE SPAN GREENHOUSE, CIKABAYAN, KAMPUS IPB DARMAGA Meiske Widyarti, Herry Suhardiyanto dan Iin Sundani Muliawati	26~37
RANCANGAN SISTEM DRAINASE DI AREAL PARKIR GRAHA WIDYA WISUDA KAMPUS IPB DRAMAGA, BOGOR Dedi Kusnadi Kalsim, Meiske Widyarti dan Ahmad Tusi	38~47
IDENTIFIKASI TINGKAT KETUAAN DAN KEMATANGAN JERUK LEMON (CITRUS MEDICA) MENGGUNAKAN PENGOLAHAN CITRA DAN JARINGAN SYARAF TIRUAN Indentification Of Maturity And Ripeness Of The Lime (Citrus Medica) Using Image Processing And Artificial Neural Network Dhami Johar Damiri, Usman Ahmad dan Suroso	48~60
PERBANDINGAN TEKNIS <i>MODIFIED COLD STORAGE</i> DENGAN MESIN PEMBEKU KOMBINASI UNTUK PEMBEKUAN IKAN PATIN Technical Comparison of Modified Cold Storage with Mechanical Combination Freezer for Pangasius Fillet Sholahuddin, Armansyah H.Tambunan, dan Odang Carman	61~76

Sorting And Grading Of Mango Based On Their Phisycal Appearances Using Image Processing

Usman Ahmad, I Dewa Made Subrata dan Sinta Gunayanti

Abstract

Manual sorting and grading of fruits are subject to inconsistency from person to person, as well as from region to region. As a result, it is difficult to obtain an exact separation among the necessary quality grades as they are required. Using image processing, a CCD camera can be used to replace human visual judgement in sorting and grading of fruits based on their physical appearances. This task can be performed by extracting the necessary quality parameters of the fruit from the image. This research is aimed to develop a system for automatic sorting and grading of mango fruits based on their physical appearances using image processing. The mango, Arumanis and Gedong varieties, were used as object in the experiment. The Arumanis were divided into three grades of quality and a reject one, while the Gedong were divided into two grades of quality and a reject one. The images of mangoes, then, were captured one by one using a CCD color camera, saved into files, and were analyzed using a computer program. Image processing was conducted to analyze the area of the fruit, the color and textures of its skin from the images. Based on the distribution of each quality parameter, the thresholding value for each was determined and an automatic sorting and grading algorithm was developed. The accuracy of automatic sorting and grading using the developed algorithm was determined by comparing the results with carefull manual sorting and grading. The results showed that both methods of sorting and grading agreed each other at the accuracy level of 69.4% for Arumanis, and 74.3% for Gedong.

Keywords: image processing, mango, automatic sorting and grading

Model Of Temperature Control System For Silkworm Cultivation

Nanik Purwanti, Budi I. Setiawan Dan Leopold O. Nelwan

Abstract

Temperature is one of environmental parameter that determines optimum growth of silkworms (*Bombix morei* L.). Starting from the first to the fifth stages silkworms need different temperature conditions decreasing from 29 °C to 22 °C, and on the contrary, the humidity to increase from 90% to 65%. These conditions are difficult to be met by common silk growers using the existing techniques. In one of the grower locations in Bogor, the temperature variably fluctuated in the range of 20-30 °C while the humidity was above 80%. These conditions resulted in high mortality and low quality of cocoon. This research attempted to design a control system to condition the temperature for the optimum growth of silkworms. Mathematical models were developed based on heat-transfers incorporated with fuzzy logic control system. Experimental works were carried out by mean of a small wood-box (length 65 cm, width 55 cm and high 75 cm) with one shelve in the middle. This shelve can accommodate 125 silkworms. Heat source than can generate cool or warm air was installed in the back wall. The verification result show the mathematical model was considerably conformed to the experimental with R equals to 0.961 and RMSE equals to 0.19. Furthermore, the designed controller enabled to meet the requirement of temperature condition for each stage as well as for the whole stages. Finally, a computer application was created, and it can be used as a technical tool for, e.g., a feasibility study to apply a control system in silkworm cultivation.

Keywords: silkworm, environment, temperature, modeling, fuzzy logic control

Determination Of Time-Domain Specifications Of Linear Control System

Budi I. Setiawan

Abstract

It is of important to design a controller subjected to specific requirements. Once after the controller has been applied, however, it is necessary to re-check whether the controller has achieved the specific targets. This paper aims at developing techniques to analyze the performances of a linear controller. The performance specifications to be concerned here are Time to Overshoot, Delay Time, Rise Time, Settling Time, and Dominant Time Constant during transient stages. For this purpose, a simple computer application program was developed in form of spreadsheets. This program can be used as a tool to determine the performance of a control system.

Keywords: Linear Control System, Time-domain Specifications, Spreadsheet Computer Program

Meiske Widyarti, Herry Suhardiyanto dan Iin Sundani Muliawati

Abstract

Greenhouse is commonly used to protect plants from unexpected weather condition. In this research, natural ventilation's rate in a single span greenhouse owned by Faculty of Agriculture at Cikabayan IPB has been measured. Theoretical equations is used for this research's method to find the natural ventilation's rate than the findings are verified. This research also evaluated the block plan design. Temperature, humidity, wind velocity and direction, solar radiation, air pressure's data are measured using a weather station at two greenhouses building. The data were processed by a computer program using visual basic language. This research found that the neutral plane is located at 3, 5 meter up from greenhouse's floor; it means that these greenhouse's side walls are only functioned as an air inlet. It is found that in a wind speed  $>2$  m/s, either in low radiation ( $<500$  W/m<sup>2</sup>) and high radiation ( $> 500$  W/m<sup>2</sup>), the natural ventilation's rate is very fluctuated inside the two greenhouses. This shows that the ventilation system has not been appropriate yet. Between the calculated and the measured natural ventilation's rate show an error not more than 30%, it means that the develop equation can be used to predict the natural ventilation rate inside a single span greenhouse. The micro climate inside greenhouse I and II are equal. It means that greenhouse's lay out has already been appropriate.

Dedi Kusnadi Kalsim, Meiske Widyarti dan Ahmad Tusi

Abstract

Sistem drainase yang ada di areal parkir Graha Widya Wisuda (GWW) belum mampu menampung limpasan air hujan, sehingga menyebabkan terjadinya genangan seluas 0.25 ha dengan tinggi genangan 20 ~ 40 cm. Hal ini disebabkan oleh kondisi outlet drainase yang tidak terawat dan tidak adanya boks kontrol. Saat ini hanya mampu mengalirkan debit 0.07 m<sup>3</sup>/det akibat sedimentasi di gorong-gorong setebal 34 cm. Dalam rancangan drainase ini air limpasan akan dibuang ke danau kampus dengan dimensi saluran b=1 m, h = 0.56 m, FB = 0.34 m dan V=2m/det (persegi) dan  $\theta = 1$  m, V=1.9 m/det (culvert / gorong-gorong) dengan Q= 1.15 m<sup>3</sup>/det dan S = 0.004 dengan 3 alternatif trase saluran. Dalam perancangan ini digunakan periode ulang 25 th. Rumus eksperimental intensitas hujan yang cocok digunakan di wilayah Dramaga adalah  $I = \frac{a}{t + b}$  (Talbot) atau dengan rumus Mononobe :

$$I = \frac{R}{24} \left( \frac{24}{T_c} \right)^m \text{ dengan } m = 0.0757 \ln(t) + 0.485. \text{ Pengukuran waktu konsentrasi dengan}$$

rumus Kirpich dan pengukuran di lapangan tidak berbeda jauh, dengan perbedaan sebesar rata-rata sebesar 0.47 menit. Berdasarkan perhitungan rancangan anggaran biaya dengan analisa BOW, maka biaya yang dibutuhkan untuk pembuatan drainase tipe A (persegi terbuka) lebih besar dari pada tipe B (persegi tertutup) dan tipe C (gorong-gorong/ tertutup). Biaya operasi dan pemeliharaan tipe A lebih murah dari pada tipe B dan C.

Kata Kunci : drainase, intensitas hujan, rancangan, biaya.

IDENTIFIKASI TINGKAT KETUAAN DAN KEMATANGAN JERUK LEMON (CITRUS MEDICA) 48~60  
MENGUNAKAN PENGOLAHAN CITRA DAN JARINGAN SYARAF TIRUAN

Indentification Of Maturity And Ripeness Of The Lime (Citrus Medica) Using Image  
Processing And Artificial Neural Network

Dhami Johar Damiri, Usman Ahmad dan Suroso

Abstract

The Object of this study is to identify the maturity and ripeness of lime (Citrus medica) using image processing and artificial neural network. Image processing algorithm was developed and applied to 150 samples of lime from three level of maturity and ripeness; mature, ripe and over ripe based on their harvest time. The area, shape factor and color indexes were extracted from sample images using the developed image processing algorithm. The features extracted from the image processing were used as input to develop artificial neural network that modeled into 4, 5, 7 and 9 input with the level of maturity and ripeness as output. Neural network training program used value of momentum constant 0.8, learning rate value constant 0.8, sigmoid function value 1 and 2000 iteration. The result showed that the use of 4, 5, 7 and 9 image processing features as input on 3, 6, 9 and 12 hidden layer provided the highest accurateness of 100 % in classifying the lime based on its maturity and ripeness.

Keywords : image processing, neural network, lime, maturity, ripeness

Technical Comparison of Modified Cold Storage with Mechanical Combination Freezer for  
Pangasius Fillet

Sholahuddin, Armansyah H.Tambunan, dan Odang Carman

Abstract

Freezing is commonly used for long-term storage of fish and its products. That requires both freezer and cold storage facility in small-scale industries. Both process (freezing and cold storage) often accomplished in a cold storage for cost reason. In this research a commercial cold storage was modified to be useable for freezing and the result was compared with a previously design freezer. The freezer was designed by combining air blast and contact plat freezing method. Performance test showed that heat transfer coefficient of modified cold storage ( $8.1 \text{ W/m}^2 \text{ }^\circ\text{C}$ ) was better than unmodified cold storage ( $3.5 - 5 \text{ W/m}^2 \text{ }^\circ\text{C}$ ). Temperature decrease of fillet by modified cold storage ( $19.5 \text{ }^\circ\text{C/hr}$ ) was better than unmodified cold storage ( $11.9 \text{ }^\circ\text{C/hr}$ ), but smaller then combination type freezer ( $50.0 \text{ }^\circ\text{C/hr}$ ). Freezing rate of combination type freezer was  $0.37 \text{ cm/hour}$ , which is categorized as slow freezing.

Keywords: freezing, modified cold storage, combination freezer, and freezing rate.