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	Paper Title:	Temperature Acquisition and Control System based on the Arduino	
	<p>Abstract: Our work presents a low-cost temperature acquisition, for incubator system, based on the Arduino hardware platform; both the hardware and software components are detailed, together with experimental evaluation. This system was designed to facilitate the process of identification and control of a temperature of premature infant incubator. The experimental evaluation revealed that this system is not only capable of temperature signal acquisition, for incubator purposes, but it can also be used as a generic platform for other biomedical applications, greatly extending its applicability. In this paper we describe the proposed platform, with special emphasis on the design principles and functionality. System identification results based on least squares algorithm (RLS) to find the ARMAX input-output mathematical model. We opted for the GPC structure for control temperature. The results of implementation in real time on the neonatal incubator were presented and interpreted.</p> <p>Keywords: Arduino, Temperature, Incubator, GPC controller</p> <p>References:</p> <ol style="list-style-type: none"> 1. M. H. LeBlanc, "The physics of thermal exchange between infants and their environment," <i>Med. Instrum.</i>, vol. 21, pp. 11-15, 1987. 2. P. Lourneux, J. Libert, L. Lhyselen, A. L'ek'e, S. Lelanaud, L. Legrugilliers, and V. Bach, "Heat exchanges and thermoregulation in the neonate," <i>ScienceDirect</i>, vol. 16, pp. 1057-1062, 2009. H. Poor, <i>An Introduction to Signal Detection and Estimation</i>. New York: Springer-Verlag, 1985, ch. 4. 3. Lourenc,o, A., Silva, H., and Fred, A. (2011). Unveiling the biometric potential of Finger-Based ECG signals. <i>Computational Intelligence and Neuroscience</i> 4. Medicarduino (2012). Medical and health related projects with arduino. http://medicarduino.net/. 5. Medicarduino (2012). Medical and health related projects with arduino. http://medicarduino.net/. 6. Y. Amer and A. Tawee. A simulation model of infant - incubator - feedback system with humidification and temperature control. Thesis, 2006. 7. D. W. Clarke, C. Mohtadi, and P. S. Tuffs. Generalized predictive control: I. the basic algorithm. <i>Automatica</i>, 23:137-160, 1987. 8. D. W. Clarke, C. Mohtadi and P. S. Tuffs. Generalized Predictive Control - Part I and II", <i>Automatica</i>, 23(2), pp. 137-160, 1987. 9. G. Li, D. P. Stoten and J.-Y. Tu. Model predictive control of dynamically sub structured systems with application to a servo hydraulically actuated mechanical plant. <i>IET Control Theory Appl.</i>, 4(2), pp. 253-264, 2010. 10. Tourneux, P., J.P. Libert, L. Ghyselen, A. Leke andS. Delanaudet al ., 2009. Échanges thermiques et thermorégulation chez le nouveau-né Heat exchanges and thermoregulation in the neonate. <i>Archives Pédiatrie.</i>, 16: 1057-1062. DOI: 10.1016/J.ARCPED.2009.03.014, PMID: 19410440 11. Oliveira, G.H.C., M.F. Amorim and F.J.. Latawiec, 2005. Multiple model identification and control of neonate incubators using laguerre basis. TUO, Poland. 12. Abbas, A.K. and S. Leonhardt, 2009. System Identification of neonatal incubator based on adaptive ARMAX technique. <i>IFMBE Proc.</i>, 22: 2515-2519. DOI: 10.1007/978-3-540-89208-3_603 13. Fukata, K., T. Washio, H. Motoda. and O. Univ., 2006. A method to search arx model orders and its application to sales dynamics analysis. <i>Proceedings of the in 6th IEEE International Conference on Data Mining</i>, Dec. 18-22, IEEE Xplore Press, Hong Kong, pp: 590-595. DOI: 10.1109/ICDMW.2006.10 14. Landau, Y.D. and G. Zito, 2006. <i>Digital control systems</i>. 1st Edn., Birkhäuser, London, ISBN: 1846280559, pp: 484. nngs/ifac2005/Fullpapers/02818.pdf 		1-6
2.	Authors:	Omar E. Elnokity, Imbaby I. Mahmoud, Mohamed K. Refai, Hasan M. Farahat	
	Paper Title:	Hardware Implementation of Virtual Reconfigurable Circuit for Fault Tolerant Evolvable Hardware System on FPGA	
	<p>Abstract: This research verify and describes a Virtual Reconfigurable Circuit (VRC) that designed and implemented for a Fault Tolerant Evolvable Hardware (EHW) system used to calculate the thermal power output of Egypt's second Training and Research Reactor (ETRR2) during operation. This circuit have three measured input signals from the reactor core: inlet temperature T_{in}, outlet temperature T_{out}, mass flow rate Q, and one output, which is the calculated thermal power. In any time the true thermal power reading should be available even one input signal get lost due to a problem in its transducer, or wire cutting, ...etc. Typically, this is the function of that Fault Tolerant EHW system. The VRC design will implemented over ordinary Field Programmable Gate Array (FPGA) chip. Reducing the FPGA's configuration bits length++ is the main advantage of using VRC. Most VRCs done before used logic based function elements, while in this work, an arithmetic based elements are used, to accommodate the application nature. The design is fully synthesized on ALTERA Cyclone IV GX Family, and the design gave promising results when targeted to the EP4CGX30CF23C6 FPGA chip.</p> <p>Keywords: Egypt's second Training and Research Reactor, Evolvable Hardware, Fault Tolerant, Virtual Reconfigurable Hardware,.</p> <p>References:</p> <ol style="list-style-type: none"> 1. D.Dhanasekaran, K. Boopathy Bagan, E.Ravi, "Fault Tolerant System Design using Evolved Virtual Reconfigurable Circuit,"<i>IJCSNS International Journal of Computer Science and Network Security</i>, vol. 6 No. 5A, pp. 64-72, May 2006. 2. Chu Jie, Man Meng-Huam Liu Shang-He, Wei Miang, Yuan Liang, Ju Zheng Quan, Chang Xiao-Long, "Self-Recovery of Motor Control Circuit Based on MFNNVRC," <i>American Journal of Engineering and Technology Research</i>, Vol. 11, No. 9, pp. 2589-2593, 2011. 3. Roland Dobai, Lukas Sekanina," Towards Evolvable Systems Based on the Xilinx Zynq Platform," <i>Evolvable Systems (ICES)</i>, 2013 IEEE International Conference, IEEE, 10.1109/ICES.2013.6613287, pp. 89-95, April 2013. 4. Wang, J., Incheon, Chen, Q.S., Lee, C.H, "Design and implementation of a virtual reconfigurable architecture for different applications of intrinsic evolvable hardware," <i>IET Comput. Digit. Tech.</i>, Vol. 2, No. 5, pp. 386-400, 2008. 5. Sekanina, L., Friedl, S., "On routine implementation of virtual evolvable devices using COMBO6," <i>Evolvable Hardware</i>, 2004. <i>Proceedings. 2004 NASA/DoD Conference, IEEE</i>, 10.1109/EH.2004.1310810, pp. 63-70, June 2004. 		7-10

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	Authors: Annan Sharafi, Hamid Sarkheil, Mohammad Kazem Hafizi	
	Paper Title: Inverse Least-Squares Modeling of Induced Polarization and Resistivity Data to Explore Copper Deposits in the Sarbisheh Ophiolites, Iran	
3.	<p>Abstract: Since the resistivity and induced polarization, methods have an important role for exploration of copper mineralization. Kuh Kheyri area is located south of Sarbisheh in south Khorasan province. This area is located in sheet 1:250000 of Brijand and 1:100000 Sahlabad. The existence of volcanic rocks like Andesite, and the metallic mineralization with small to large sizes in this type of rocks, has made this area quite remarkable of having mining potential. Since surface exploration, methods like geology and geochemistry are not solely capable of determination of depth, direction and dip of mineralization, the geophysical methods can be effective. By taking into consideration the physical changes of existing rocks in the area and also the sulfide mineralization in it, the Induced polarization and resistivity method was used for determination of those areas having low resistivity, and high induced polarization was carries out to distinguish the anomaly zones. The array was used is Dipole-Dipole with 40 meters electrode spacing and 20 meters bond spacing. Four pseudo sections with 100 meters distance of each other as parallel and also two perpendicularly pseudo sections with 50 meters distance from each other are designed and carried out. The total 1218 Induced polarization and electrical resistivity points was measured. The pseudo section of IP and RS was measured and least-squares inversion modeling sections with topographic correction was done with Res2div software and then the results was explained and analyzed. The studies has shown that according to surface geological evidences compared with induced polarization sections and resistivity, the maximum amount of chargeability in 3sections with minimum resistivity have good relative accordance and in the other 3 sections, the resistivity is high probably due to the open spaces or silicification of mineralizes zones in this 3 sections, causing the increase of resistivity. In general, according to surface geological and geophysical results, this area has a very good potential for copper mineralization.</p> <p>Keywords: Copper, Induced Polarization, Least-Squares Inversion, Resistivity, Kuh Khayri.</p> <p>References:</p> <ol style="list-style-type: none"> 1. Van Blaricom, Richard, (1980) - Practical geophysics: Northwest Mining Association, 303 p. 2. Christensen NB, Sorensen KI, (1998) - Surface and borehole electric and electromagnetic methods for hydrogeological investigations. – <i>European Journal of Environmental and Engineering Geophysics</i> 3: 75–90. 3. Sorensen K.I., Auken E., Christensen N.B., Pellerin L., (2005)- An Integrated Approach for Hydrogeophysical Investigations: New Technologies and a Case History. – In Butler D K (ed.) <i>Near-Surface Geophysics 2, Investigations in Geophysics</i> 13: 585–603. Society of Exploration Geophysics. 4. Sumner, J.S., (1976) - Principles of induced polarization for geophysical exploration: Elsevier, 277 p. 5. Osiensky, I.L., and Donaldson, P.R., (1994) - A modified mise-a-la-masse method for contaminant plume delineation: <i>Ground Water</i>, v. 32, no. 3, p. 448-457. 6. Takin, M., (1972) - Iranian geology and continental drift in the Middle East. <i>Nature</i>, 235: 147-150. 7. Stöcklin, J., (1968) - Structural history and tectonics of Iran : A review. <i>American Association of Petroleum Geologists Bulletin</i>, 52: 1229-1258. 8. Stöcklin, J., (1974) - Possible ancient continental margin in Iran. In: Burk, C. A. and Drake, C. L., (eds). <i>The geology of continental margins</i>. Berlin, Springer, 873-887. 9. Arvin, M. and Robinson, P. T., (1994) - The petrogenesis and tectonic setting of lavas from the Baft ophiolitic mélange, southwest of Kerman, Iran. <i>Canadian Journal of Earth Sciences</i>, 31 : 824-834. 10. Lippard, S. J., Shelton, A. W., and Gass, I. G., (1986) – The ophiolite of northern Oman. <i>Geological Society of London, Memoir</i> 11. 11. Babazadeh, S. A. and De Wever, P., (2004a) – Radiolarian Cretaceous age of Soulabest radiolarites in ophiolite suite of eastern Iran. <i>Bulletin de la société géologique de France</i>, 175(2): 121-129. 12. Tirrul, R., R. Bell, R.J. Griffis, and V. E., Camp, (1983) – The Sistan suture zone of eastern Iran. <i>Geological Society of America Bulletin</i>, 94 : 134-150. 13. Beurrier, M., C., Bourdillon-De-Grissac, P. De Wever and Lescuyer, J. L., (1987) - Biostratigraphie des radiolarites associées aux volcanites ophiolitiques de la nappe de Samail (Sultanat d’Oman) : conséquences tectogénétiques. <i>Comptes Rendus de l’Académie des Sciences, Paris</i>, 304 (2) : 907-910. 14. Babazadeh, S. A. & De Wever, P., (2004b) - Early Cretaceous radiolarian assemblages from radiolarites in the Sistan Suture (eastern Iran). <i>Geodiversitas</i>, 26(2) : 185-206. 15. ABEM. (1995) -Instruction manual for Terameter SAS 4000, ABEM Instrument AB, 91 p. 16. Lock M. H., (2002) – User manual for Res2div&3div Ver.3.5. Geotomo softwar. 17. Hoover, D.B., Heran, W.D., and Hill, P.L., eds., (1992) - The geophysical expression of selected mineral deposit models: U.S. Geological Survey Open-file Report 92-557, 129 p. 18. Sarkheil, H., Hassani, H., (2009) - A new design for geoelectric surveying and inverse 1D and 2D modeling: the case of Karongah lead-zinc mine, Kerman, Iran, 9th International Multidisciplinary Scientific Geo-Conference & EXPO SGEM 2009, 14-19 June 2009, Bulgaria, pp. 637-641. 19. deGroot-Hedlin, C. and Constable, S., (1990) - Occam's inversion to generate smooth, two-dimensional models form magnetotelluric data. <i>Geophysics</i>, 55, 1613-1624. 20. Sasaki, Y., (1992) - Resolution of resistivity tomography inferred from numerical simulation. <i>Geophysical Prospecting</i>, 40, 453-464. 21. Loke, M.H., (2001) - Tutorial : 2-D and 3-D electrical imaging surveys. Geotomo Software, Malaysia. 22. Loke, M.H., Acworth, I. and Dahlin, T., (2003) - A comparison of smooth and blocky inversion methods in 2D electrical imaging surveys. <i>Exploration Geophysics</i>, 34, 182-187. 	11-14
4.	Authors: S. Arun, N. Yashwanth	
	Paper Title: Experimental and Comparison Studies on Drying Characteristics of Grapes in a Solar Tunnel Greenhouse Dryer Coupled with and without Biomass Backup Heater	
	<p>Abstract: A natural convection solar tunnel greenhouse dryer coupled with biomass heater was designed and developed in Nallampalli region of Pollachi, Tamil Nadu (India) and also a natural convection solar tunnel greenhouse dryer without biomass heater was designed and developed in Negamam region of Pollachi, Tamil Nadu (India) for carrying out the experimental and comparison studies of drying characteristics of grapes during the month of May, 2014. About 50kgs of fresh and good quality grapes were loaded into those dryers and it was repeated for</p>	15-21

three trails. The mass of fuel added to the biomass heater was about 7.5kg/hr. The biomass heater was ignited when there is a fall in sunshine (after 5PM) in order to maintain the temperature inside the dryer and the fuel used is the remains of the coconuts such as coconut fronts, coconut husk, coconut shell and firewood. The solar tunnel dryer coupled with the biomass heater dried the grapes which has an initial moisture content of 80% (w.b.) to a final moisture content of 10% (w.b.) over a time period of 30 hours whereas the solar tunnel greenhouse dryer without the biomass heater took 55hours for reducing the moisture content of the grapes to the same level. The reduced drying time in the solar tunnel greenhouse dryer coupled with the biomass heater than that of the dryer without the biomass heater is due to the effect of biomass heater that is responsible for the constant increase in temperature inside the dryer which is made possible by supplying sufficient heat during the night time (after 5PM) where there would be a drop in sunshine. Also, the quality of the grapes obtained from the solar tunnel greenhouse dryer coupled with biomass heater was found to be superior to that of the grapes obtained from the solar tunnel greenhouse dryer without the biomass heater which is due to the high temperature and low relative humidity prevailed all the time inside the dryer irrespective of fall in sunshine.

Keywords: Biomass heater, drying time, grapes, moisture content, open sun drying, product quality, solar tunnel greenhouse dryer, sunshine.

References:

1. S. Jairaj, S. P. Singh, K. Srikant, "A review of solar dryers developed for grape drying", Solar Energy, 2009, vol. 83 (9), pp. 1698-1712.
2. Mahmutoglu Teslime, Ferhunde Emir, Y. Birol Saygi, "Sun/solar drying of differently treated grapes and storage stability of dried grapes", Journal of Food Engineering, 1996, vol. 29 (3-4), pp. 289-300.
3. Garima Narang, J. P. Pandey, "Optimization of Osmotic Dehydration Process of Grapes Using Response Surface Methodology", Focusing on Modern Food Industry, 2013, vol. 2(2), pp. 78-85.
4. H. Hamdy, El-Ghetany, "Experimental investigation and empirical correlations of thin layer drying characteristics of seedless grapes", Energy Conversion and Management, 2006, vol. 47, pp. 1610-1620.
5. N. S. Rathore, N. L. Panwar, "Experimental studies on hemi cylindrical walk-in type solar dryer for grape drying", Applied Energy, 2010, vol. 87, pp. 2764-2767.
6. L. M. Diamante, P. A. Munro, "Mathematical modeling of the thin layer solar drying of sweet potato slices", Solar Energy, 1993, vol. 51, pp. 271-276.
7. S. Azzouz, A. Guizani, W. Jomaa, A. Belghith, "Moisture diffusivity and drying kinetic equation of convective drying of grapes", Journal of Food Engineering, 2002, vol. 55, pp. 323-330.
8. V. T. Karathanos, V. G. Belessiotis, "Sun and Artificial air drying kinetics of some agricultural products", Journal of Food Engineering, 1997, vol. 31, pp. 35-46.
9. Yaldiz Osman, Can Ertekin, H. Ibrahim Uzun, "Mathematical modeling of thin layer solar drying of sultana grapes", Energy, 2001, vol. 26, pp. 457-465.
10. Garima Narang, J. P. Pandey, "Optimization of Osmotic Dehydration Process of Grapes Using Response Surface Methodology", Focusing on Modern Food Industry, 2013, vol. 2(2), pp. 78-85.
11. Mohsen Esmaili, Rahmat Sotudeh-Gharebagh, Mohammad A.E. Mousavi, Ghader Rezaazadeh, "Influence of dipping on thin-layer drying characteristics of seedless grapes", Biosystems Engineering, 2007, vol. 98, pp. 411-421.
12. O. Dissa, D. J. Bathiebo, H. Desmorieux, O. Coulibaly, and J. Kouliadiati, "Experimental characterization and modelling of thin layer direct solar drying of Amelie and Brooks mangoes", Energy, 2011, vol. 36(5), pp. 2517-2527.
13. R. P. F. Guin'e, D. M. S. Ferreira, M. J. Barroca, and F. M. Goncalves, "Study of the drying kinetics of solar-dried pears", Biosystems Engineering, 2007, vol. 98(4), pp. 422-429.
14. M. Aktas, I. Ceylan, and S. Yilmaz, "Determination of drying characteristics of apples in a heat pump and solar dryer", Desalination, 2009, vol. 238, pp. 266-275.
15. A. O. Dissa, J. Bathiebo, S. Kam, P. W. Savadogo, H. Desmorieux, and J. Kouliadiati, "Modelling and experimental validation of thin layer indirect solar drying of mango slices", Renewable Energy, 2009, vol. 34(4), pp. 1000-1008.

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Keywords: Biomass heater, drying time, moisture content, open sun drying, product quality, red chillies, solar tunnel greenhouse dryer, sunshine.

	<p>References:</p> <ol style="list-style-type: none"> 1. S. Desai, V. Palled, and M. Anantachar, "Performance evaluation of farm solar dryer for chilly drying", <i>Karnataka Journal of Agricultural Sciences</i>, 2009, vol. 22(2), pp. 382–384. 2. S. Mangaraj, A. Singh, D. V. K. Samuel, O. P. Singhal, "Comparative performance evaluation of different drying methods for Chillies". <i>Journal of Food Science and Technology</i>, 2001, vol. 38 (3), 296–299. 3. M. A. Hossain, J. L. Woods , B. K. Bala, "Thin layer drying of Thai red chilli" , <i>ADC</i> 333-335. 4. B. K. Bala, M. R. A. Mondol, B. K. Biswas, B. L. Das Chowdury, & S. Janjai, " Solar drying of pineapple using solar tunnel drier", <i>Renewable Energy</i>, 2003, vol. 28, pp.183-190. 5. T. Y. Tunde-Akintunde, "Mathematical modeling of sun and solar drying of chilli pepper", <i>Renewable Energy</i>, 2011, vol. 36 (8), pp. 2139–2145. 6. J. Kaewkiew, S. Nabneaan, and S. Janjai, "Experimental investigation of the performance of a large-scale greenhouse type solar dryer for drying chilli in Thailand", <i>Procedia Engineering</i>, 2012, vol. 32, pp. 433–439. 7. M. A. Hossain and B. K. Bala, "Drying of hot chilli using solar tunnel drier", 2007, <i>Solar Energy</i>, vol. 81 (1), pp. 85-92. 8. O. Dissa, J. Bathiebo, S. Kam, P. W. Savadogo, H. Desmorieux, and J. Koulidiati, "Modelling and experimental validation of thin layer indirect solar drying of mango slices", <i>Renewable Energy</i>, 2009, vol. 34(4), pp. 1000–1008. 9. M. Aktas,, I. Ceylan, and S. Yilmaz, "Determination of drying characteristics of apples in a heat pump and solar dryer", <i>Desalination</i>, 2009, vol. 238, pp. 266–275. 10. R. P. F. Guin'e, D. M. S. Ferreira, M. J. Barroca, and F. M. Goncalves, "Study of the drying kinetics of solar-dried pears", <i>Biosystems Engineering</i>, 2007, vol. 98(4), pp. 422–429. 11. S. R. Desai, Vijaykumar and T. Guruswamy, "Multi rack solar dryer for fig drying. In :Proc. of All India Seminar on Advances in Agricultural Mechanization organized by Institutions of Engineers (I) in association with KAEA, Bangalore from 27 – 28 December, 2002, pp: 161-168. 12. A. O. Dissa, J. Bathiebo, S. Kam, P. W. Savadogo, H. Desmorieux, and J. Koulidiati, "Modelling and experimental validation of thin layer indirect solar drying of mango slices", <i>Renewable Energy</i>, 2009, vol. 34(4), pp. 1000–1008. 					
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