2015 10th Computing Colombian Conference (10CCC 2015)

Bogota, Colombia
21 – 25 September 2015

IEEE Catalog Number: CFP1522V-POD
ISBN: 978-1-4673-9465-9

TABLE OF CONTENTS

EXECUTABLE CALCULATIONAL SPECIFICATIONS 1
Chaves, F. ; Rocha, C.

FORMAL VERIFICATION OF SAFETY PROPERTIES FOR A CACHE COHERENCE PROTOCOL 9
Ramirez, S. ; Rocha, C.

CALCULATIONAL SOLUTIONS TO COMBINATORIAL PROBLEMS 17
Bohorquez, V.J.A.

COHESION AND COUPLING: A PROBABILISTIC VIEW WITH APPLICATIONS TO SOFTWARE VALIDATION 23
Sanmiguel, J. ; Cardoso, R.

SECURING INTERACTIONS OF ANDROID APPLICATIONS 31
Jimenez, L.M. ; Rueda, S.J.

TOWARDS TESTING VARIABILITY INTENSIVE SYSTEMS USING USER REVIEWS 39
Rodas, J.L. ; Mendez-Acuna, D. ; Galindo, J.A. ; Benavides, D. ; Cardenas, J.

DMLAS: A DOMAIN-SPECIFIC LANGUAGE FOR DESIGNING ADAPTIVE SYSTEMS 47
Bocanegra, J. ; Pavlich-Mariscal, J. ; Carrillo-Ramos, A.

A FRAMEWORK FOR THE GENERATION AND MANAGEMENT OF SELF-ADAPTIVE ENTERPRISE APPLICATIONS 55
Arboleda, H. ; Paz, A. ; Jimenez, M. ; Tamura, G.

ANALYSIS AND DESIGN FOR THE DEVELOPMENT OF SOFTWARE WITH SERVICE-ORIENTED APPROACH: CHARACTERISTICS AND METHODOLOGICAL FRAMEWORK 63
Mestre, M.R. ; Lozano Ballesteros, A.M.

CREATING VIRTUAL STORES USING SOFTWARE PRODUCT LINES: AN APPLICATION CASE 71
Rincon, L. ; Rodriguez, G. ; Martinez, J.C. ; Alvarez, G.I. ; Constanza Pabon, M.

ATAM-AR: ATAM-BASED RECOVERY ARCHITECTURE METHOD 79
Munoz, E.A.G. ; Ordonez Guzman, Y.A. ; Hurtado Alegria, J.A.

METHODOLOGICAL HYBRID SOA+CBSD FOR SERVICES ORIENTED SOFTWARE DEVELOPMENT 86
Maldonado, C.D.A. ; Nieto, L.A.C. ; Cala, D.S.P. ; Diosa, H.A.

A DSL FOR RAPID PROTOTYPING OF CROSS-PLATFORM TOWER DEFENSE GAMES 93
Sanchez, K. ; Garces, K. ; Casallas, R.

ISML: A LANGUAGE AND MDE ENVIRONMENT TO MODEL AND GENERATE WEB APPLICATIONS WITH INTEGRATION OF EXISTING COMPONENTS 100
Franky, M.C. ; Pavlich-Mariscal, J.A. ; Olarte, J.C. ; Acero, M.C. ; Zambrano, A. ; Camargo, J.L. ; Pinzon, J.N.

INNOVA-PROCEDURE: A PROCEDURE TO GUIDE THE INNOVATION OF SOFTWARE DEVELOPMENT PROCESSES IN VSES 108
Anacona, D. ; Bastidas, M.I. ; Pino, F.J. ; Pardo, C.

JSVT4: A REVIEW OF SOFTWARE TESTING BY MEANS OF STATISTICAL METHODS 116
Sanmiguel, J. ; Cardoso, R.

MANAGING TRADE-OFFS AMONG ARCHITECTURAL TACTICS USING FEATURE MODELS AND FEATURE-SOLUTION GRAPHS 124
Chavarriaga, J. ; Noguera, C. ; Casallas, R. ; Jonckers, V.

A PATTERNS CATALOG FOR THE DESIGN AND DEVELOPMENT OF MOBILE APPLICATIONS 133
Gonzalez, R. ; Curiel, M.

MONO+KM: KNOWLEDGE MANAGEMENT IN COLLABORATIVE PROJECT DEVELOPMENT 141
Pedraza-Garcia, Gilberto ; Beltran, Guillermo ; Correal, Dario ; Gonzalez, Osear

M-HEALTH SYSTEM BACKEND SUPPORTED BY AN ACTORS MODEL 150
Acosta, Manuel Alejandro Corredor ; Rengifo, Hector Fabio Cadavid

ECUSI: SOFTWARE TOOL FOR COLLABORATIVE EVALUATION OF THE USABILITY OF INTERACTIVE SYSTEMS 157
Solano, A. ; Ceron, J.C. ; Collazos, C.A. ; Fardoun, H.M.

TOWARDS TANTALLUC: INTERACTIVE MOBILE AUGMENTED REALITY APPLICATION FOR THE MUSEO DE AMÉRICA IN MADRID 164
Perea-Tanaka, C.F. ; Moreno, I. ; Prakash, E.C. ; Navarro-Newball, A.A.

FAST FUNCTIONAL PROTOTYPING OF USER INTERFACES BASED ON DATAFORM MODELS, A TOOL (TOOLDATAFORM) 172
Giraldo, O.W.J. ; Arias, M.R. ; Collazos, O.C.A. ; Molina, A.I. ; Ortega, C.M. ; Redondo, M.A.
THE MODELS AND THEIR VOCABULARY FOR THE ADAPTIVE AUGMENTED REALITY A^2R 180
Tenemaza, M. ; de Antonio, A. ; Ramirez, J.
INTERACTION TECHNIQUES COMPARISON FOR LEAP MOTION IN VRCOLLAGE APP: COMPARISON BETWEEN CLUTCHING, GO-GO AND SELECTION TECHNIQUES 189
Suarez, J.M.
DESIGN AND CREATION OF A BCI VIDEOGAME TO TRAIN SUSTAINED ATTENTION IN CHILDREN WITH ADHD 194
Munoz, J.E. ; Lopez, D.S. ; Lopez, J.F. ; Lopez, A.
NOTATION PROPOSAL FOR MODELING TANGIBLE USER INTERFACES 200
Cortes-Rico, L.J. ; Florez-Valencia, L.
A PERVASIVE AND UBIQUITOUS MOBILE HEALTH APPLICATION FOR TRACKING PEOPLE WITH DISABILITIES 206
Vergara, J.A. ; Ramirez, Y.M. ; Camargo, J.E.
A MULTIMODAL NOTIFICATION INTERFACE FOR A DRIVER ASSISTANCE SYSTEM 214
Penenory, V.M. ; Gomez, J.A. ; Hurtado, A.F. ; Cabezas, I.M.
INCORPORATION OF HCI: USABILITY VALIDATION IN USE CASES THROUGH THE ACTIVITY TAXONOMY 220
Villegas, M.L. ; Collazos, C.A. ; Giraldo, W.J. ; Gonzalez, J.M.
PERVASIVE MOBILE APPLICATION TO ASSIST ELDERLY PEOPLE WITH COGNITIVE IMPAIRMENT 229
Reyes, A.K. ; Camargo, J.E. ; Diaz, G.M.
ANDROID MANAGEMENT TOOL, THAT CONTROLS ELECTRONIC DEVICES THROUGH A RASPBERRY PI UNDER THE IOT MODEL 237
Diaz Ballesteros, E.A. ; Castro Calderon, C.E. ; Castro Calderon, Y. ; Gomez Strauss, E.
URBAN INFRASTRUCTURE TAXONOMY FOR CITY APPLICATIONS DEVELOPMENT: APPLICATIONS DEVELOPMENT FOR SMART CITIES 245
Agudelo, J.P. ; Castro Barrera, H.E.
URBAN SCREEN INTERACTIVE IN BOGOTÁ: PROPOSAL FOR INTERACTION WITH COLPATRIA TOWER 253
Ruiz Gutierrez, R.A. ; Figueroa Forero, P.A.
EXERGAMES AS A TOOL FOR THE ASSESSMENT OF POSTURAL BALANCE IN A PATIENT WITH MULTIPLE SCLEROSIS: THE ROLE OF BIOMECHANICAL ANALYSIS IN THE QUANTIFICATION OF MOVEMENT 261
Casanova, M.S. ; Munoz, J.E. ; Henao, O.A. ; Lopez, D.S.
COMUNICABILITY OF TWO WEB 2.0 ACCESSIBILITY EVALUATION TOOLS 269
Pascual, A. ; Ribera, M. ; Granollers, T.
BRAIN PUZZLE 3D 273
Nunez, D.H.R. ; Hernandez, C.J.B. ; Forero, P.A.F. ; Tiberio Hernandez Penaloza, J.
MORPHOLOGICAL ANALYSIS FOR AUTOMATIZED VISUAL INSPECTION USING REDUCED HOG 278
Estefany Osorio, A. ; Calvo, S.A.F. ; Holguin L, G.A.
FUNCTIONAL RESTING STATE NETWORKS CHARACTERIZATION THROUGH GLOBAL NETWORK MEASUREMENTS FOR PATIENTS WITH DISORDERS OF CONSCIOUSNESS 286
Martinez, D.E. ; Martinez, J.H. ; Rudas, J. ; Demertzi, A. ; Heine, L. ; Tshibanda, L. ; Soddu, A. ; Laureys, S. ; Gomez, F.
A COMPARATIVE STUDY OF DIMENSIONALITY REDUCTION METHODS FOR P-TYPE BASED CONTOUR REPRESENTATIONS 294
Victorino, J. ; Gomez, F.
RECONSTRUCTION OF LIGHT FIELD WITH SPECTRAL INFORMATION FROM COMPRESSIVE 2D PROJECTIONS 302
Lopez, K.M.L. ; Galvis, L.V. ; Arguello Fuentes, H.
ALGORITHM FOR RICIAN NOISE REMOVING IN MAGNETIC RESONANCE IMAGES BY STATIONARY WAVELETS TRANSFORM AND APPLICATION OF THE BILATERAL FILTER 307
Jaramillo, J.R.
SURFACE RECONSTRUCTION FROM THREE-DIMENSIONAL SEGMENTATIONS USING IMPLICIT FUNCTIONS 317
Gomez-Mora, M. ; Florez-Valencia, L.

PAVEMENT AND BASE LAYERS LOCAL THICKNESS ESTIMATION USING COMPUTER VISION 324
Brayan, B.A. ; Bladimir, B.C. ; Sandra, N.R.
VIDEO ANALYSIS FOR SEGMENTATION AND CLASSIFICATION OF PLAYERS AT SOCCER GAMES 331
Gomez, C.A.M. ; Trejos, L.L.F. ; Estefany Osorio, A. ; Calvo, S.A.F. ; Holguin L, Mauricio. ; Holguin L, G.A.
IDENTIFYING EVACUATION ROUTES VIA THE P-GRAPH METHODOLOGY 339
Garcia-Ojeda, J.C. ; Bertok, B. ; Friedler, F. ; Argoti, A.
BACTERIA AGENT COLONY INSIDE AN AD-HOC NETWORK 347
Parra Amaris, J.E. ; Checa Hurtado, A.C. ; Ortiz Trivino, J.E.
A MODEL FOR THE REPRESENTATION AND RETRIEVAL OF DIGITAL OBJECTS OF PHYSICAL ACTIVITY EXERCISES 351
Luna, Jaime Alberto Guzman ; Pardo, Ingrid Durley Torres ; Fernandez, Santiago Roman
RATIONAL AGENTS FEDERATION THROUGH NEURAL NETWORKS ASSEMBLY IN THE DIAGNOSIS OF ACUTE CORONARY SYNDROMES 357
Sprockel, J. ; Gonzalez, E.
PROTOTIPO PARA EL RECONOCIMIENTO DE ENTIDADES NOMBRADAS EN EL IDIOMA ESPAÑOL 364
Castillo Molina, C.A. ; Gutierrez, R.E. ; Solarte, O.
JUDICIAL PRECEDENTS SEARCH SUPPORTED BY NATURAL LANGUAGE PROCESSING AND CLUSTERING 372
Calambas, M.A. ; Ordonez, A. ; Chacon, A. ; Ordonez, H.
PRODUCTION SCHEDULING IN FLEXIBLE JOB SHOP SCHEDULING USING AN IMPERIALIST COMPETITIVE ALGORITHM (ICA) MINIMIZING MAKESPAN 378
Beltran Ricaurte, I.I.Brian ; Restrepo, Maria Isabel Londono
ACCELERATING COMMON MACHINE LEARNING ALGORITHMS THROUGH GPGPU SYMBOLIC COMPUTING 387
Diaz, Miguel C. ; Gonzalez, Fabio A. ; Ramos-Pollan, Raul
COMPONENT-BASED VISUAL EVOLUTIONARY COMPUTATION 392
Garzon, L. ; Rodriguez, N. ; Orjuela, H. ; Rojas-Galeano, S.
CAPELA: AN ACTIVE CAMPUS PLATFORM 400
Bello, D.H. ; Jimenez-Guarin, C.
PARTICIPANT SELECTION IN CROWDSENSING ENVIRONMENTS 408
Torres, J.M. ; Pomares, A.
AUTOMATIC GEOLOCATION OF THE SCIENTIFIC KNOWLEDGE: GEOLOCARTI 416
Dario Ramos Vacca, I. ; Bucheli Guerrero, V.A.
A GENOMICS-BASED PROFANITY-SAFE WEB FORUM 425
Mogollon Pinzon, C. ; Rojas-Galeano, S.
CUBILLETES: ADAPTIVE SYSTEM TO SUPPORT EXPERIENTIAL LEARNING IN RECOGNITION AND USE OF MONEY 431
Cubillos Carvajal, A. ; Carrillo-Ramos, A.
GEARMEAPP: MULTIPLATFORM APPLICATION FOR PERSONALIZED PHYSICAL TRAINING, TO SUPPORT THE LEARNING IN THE PHYSICAL ACTIVITY EXECUTION 439
Pinzon, V. ; Hugo, V. ; Barrera-Leon, L.F. ; Gomez Narvaez, C.C.
KUNAYSOFT: ADAPTIVE SYSTEM OF VOCATIONAL GUIDANCE 448
Gonzalez Vargas, J.C. ; Parra Laguna, J.L. ; Carrillo-Ramos, A.
CREATING EDUCATIONAL CONTENT WITH AUGMENTED REALITY APPLYING PRINCIPLES OF THE COGNITIVE THEORY OF MULTIMEDIA LEARNING: COMPARATIVE STUDY TO TEACH HOW TO FLY A DRONE (QUADCOPTER) 456
Salamanca Diaz, D.M.
APPLICATION TO SUPPORT THE PROCESS OF TRAINING SIGN LANGUAGE THROUGH MICROSOFT KINECT® 463
Londono, C. ; Castro, R. ; Bedoya, H. ; Elias, O.
EVALUATION OF THE REFERENCE FRAMEWORK FOR INTEGRATION OF WEB RESOURCES IN DOTLRN 470
Sotelo Gomez, F. ; Ordonez, A. ; Solarte, M.F.
AUTOMATIC PREDICTION OF ITEM DIFFICULTY FOR SHORT-ANSWER QUESTIONS 478
Duenas, G. ; Jimenez, S. ; Baquero, J.
“COUPLING TECHNOLOGIES” FOR DIDACTIC PROPOSALS 486
Lopez, Carolina ; Lopez, Francisco ; Gomez, Tomas ; Bedia, Manuel G. ; Castillo, Luis F. ; Lopez, Jeferson Arango

DESCRIPTION OF A SYSTEM FOR DETERMINING THE LEVEL OF STUDENT LEARNING FROM THE POSTURE EVALUATION 491
Diaz, C. ; Hincapie, M. ; Guerra, W. ; Moreno, G.
VIRTUAL REALITY IN THE TREATMENT OF CYNOPHOBIA 499
Benavides, C.
ZETEMA: A WEB SERVICE FOR AUTOMATIC SHORT-ANSWER QUESTIONS GRADING 504
Mancera, Sergio ; Jimenez, Sergio ; Gonzalez, Fabio A.
HETEROGENEOUS BIBLIOGRAPHIC DATABASE QUERY SYSTEM PROTOTYPE 509
Marquez Windgasse, J.A. ; Duarte-Amaya, D.H.
SOLUTION TO CALCULATE THE STRATEGIC ALIGNMENT: APPLIED TO A COMPANY IN THE POWER SECTOR 518
Canas, M. ; Pena, Y. ; Correal, D. ; Gonzalez, O.
SIMULATING THE BUSINESS MODEL CANVAS USING SYSTEM DYNAMICS 527
Romero, M.C. ; Villalobos, J. ; Sanchez, M.
TOWARDS BUSINESS PROCESS ARCHITECTURE ANALYSIS 535
Suarez, M. ; Sanchez, M. ; Villalobos, J.
ELECTRONIC HEALTH RECORD AS AN EHAAS HISTORIA CLÍNICA ELECTRÓNICA COMO SERVICIO DE SOFTWARE EN LA NUBE 543
Bernardo Villa, Luis ; Cabezas, Ivan ; Cruz, Juan
3D SEISMIC MODELING USING HYBRID ARQUITECTURES 551
Nino, D. ; Carreno, J. ; Trigos, W. ; Gelvez, S. ; Gonzalez, H. ; Barrios, C.
LESSONS LEARNED IN THE DESIGN AND IMPLEMENTATION OF A PRIVATE CLOUD FOR HIGH-PERFORMANCE COMPUTING USING OPENSTACK IN EXISTING UNIVERSITY INFRASTRUCTURE 558
Caliz Ospino, R.A. ; Perez Arteaga, P.F. ; Perez Castillo, J.N.
INDEXING GPU ACCELERATION FOR SOLUTIONS APPROXIMATION OF THE LAPLACE EQUATION 568
Tamayo Monsalve, M.A. ; Tabares Soto, R. ; Liliana Montes Castrillon, N. ; Osorio, G.
A MOBILE CLOUD COMPUTING-BASED SYSTEM FOR CHILD BEHAVIOR'S AND MENTAL DISORDER'S TRACKING 575
Pussey, C.S. ; Camargo, J.E. ; Diaz, G.M.
EVALUATING THE MONOLITHIC AND THE MICROSERVICE ARCHITECTURE PATTERN TO DEPLOY WEB APPLICATIONS IN THE CLOUD 583
Villamizar, M. ; Garces, O. ; Castro, H. ; Verano, M. ; Salamanca, L. ; Casallas, R. ; Gil, S.
Author Index