

FILLIPE DIAS MOREIRA DE SOUZA

CONTACT INFORMATION

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RESEARCH INTERESTS

Pattern Theory, Complex Event Recognition and Representation, Scene Understanding, Human Action/Gesture Recognition, Facial Expression Analysis, Image/Video Analysis.

EDUCATION

University of South Florida (USF), Tampa, Florida USA

Ph.D Candidate, Computer Science and Engineering, From August 2011

- Advisor: Dr. Sudeep Sarkar
- Co-advisor: Dr. Anuj Srivastava (Florida State University)

Federal University of Minas Gerais (UFMG), Belo Horizonte-MG, Brazil

M.Sc, Computer Science, June 2011

GPA: 90/100

Thesis title: *An Evaluation on Color Invariant Based Local Spatiotemporal Features for Action Recognition*

- Advisor: Dr. Arnaldo de A. Araújo
- Co-advisors: Dr. Eduardo Valle and Dr. Guillermo C.-Chávez

CI Brazil Program, Porto Alegre-RS, Brazil

NSCAD, Federal University of Rio Grande do Sul (UFRGS)

Specialization on Design of Digital Integrated Circuit, March 2009 – September 2009

GPA: 89/100

40 hours per week

Federal University of Pernambuco (UFPE), Recife-PE, Brazil

Specialization on Software Testing, Software Engineering, July 2008 – March 2009

Final project title: *Feature Modelling for Test Case Generation in Software Product Lines*

GPA: 93/100

40 hours per week

- Advisor: Dr. Paulo Borba

State University of Santa Cruz (UESC), Ilhéus-BA, Brazil

B.Sc, Computer Science, January 2009

Final project title: *Genetic Algorithms for Parameters Estimation to Solve Differential Equations of Proto-planetary Disks*

GPA: 89.3/100

- Advisor: Dr. Adriano Hoth

SELECTED PUBLICATIONS

- **[P1] de Souza, F.D.M.**; Sarkar, S.; Srivastava, A.; Su, J., Pattern Theory-Based Interpretation of Activities, *Proceedings of the 22nd International Conference on Pattern Recognition (IEEE ICPR '14)* [**Best Scientific Paper Award**] [[PDF](#), [Supplementary Material](#)]

- [P2] Su, J.; Srivastava, A.; **de Souza, F.D.M.**; Sarkar, S., Rate-Invariant Analysis of Trajectories on Riemannian Manifolds with Application in Visual Speech Recognition, *Proceedings of the Conference on Computer Vision and Pattern Recognition (IEEE CVPR '14)* [PDF]
 - [P3] Su, J.; Srivastava, A.; **de Souza, F.D.M.**; Sarkar, S., Rate-invariant comparisons of covariance paths for visual speech recognition, *Proceedings of the 4th National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (IEEE NCVPRIPG '13)*
 - [P4] **Souza, F.**; Valle, E.; Chávez, G.; de A. Araújo, A., An Evaluation on Color Invariant Based Local Spatiotemporal Features for Action Recognition, *Proceedings of the 25th Brazilian Symposium on Computer Graphics and Image Processing (SBC SIBGRAPI '12)*
 - [P5] **Souza, F.**; Valle, E.; Chávez, G.; de A. Araújo, A., Color-Aware Local Spatiotemporal Features for Action Recognition, *Proceedings of the 16th Iberoamerican Congress on Pattern Recognition (IEEE CIARP '11)*
 - [P6] **Souza, F.**; Chávez, G.; Valle, E.; de A. Araújo, A., Violence detection in video using spatio-temporal features, *Proceedings of the 23rd Conference on Graphics, Patterns and Images (SBC SIBGRAPI '10)* [PDF]
 - [P7] Teixeira, B.N.; Oliveira, J.E.E.; **Souza, F.**; Cunha, T.O.; Araújo, A.A.; Okamoto, C.; Figueiredo, L.; Silva, V.O.; Oliveira, I.C.L., News browsing system: multimodal analysis, *Proceedings of the 19th ACM international conference on Multimedia (ACM MM '11)* [**Grand Challenge Award**]
 - [P8] Oliveira, R.S.; Cunha, T.O.; **Souza, F.**; de Oliveira, J.E.E.; de Albuquerque Arajo, A., EVEREVIS: event recognizer in video scenes, *Proceedings of the International Conference on Advanced Visual Interfaces (ACM AVI '10)*
- TECHNICAL REPORTS
- [R1] **Souza, F.**; Valle, E.; Chvez, G.; de A. Araújo, A., Hue Histograms to Spatiotemporal Local Features for Action Recognition [PDF]
 - [R2] Valle, E.; de Ávila, S.; da Luz, A.; **Souza, F.**; Coelho, Marcelo; de A. Araújo, A., Content-Based Filtering for Video Sharing Social Networks [PDF]

MAJOR RESEARCH PROJECTS

Ontology based Perceptual Organization of Audio-Video Events using Pattern Theory NSF Grant [P1] September, 2012 - Present

It is natural that events of interest in observed scenes manifest themselves across multiple sensing modalities - vision, hearing, smell, etc. The remarkable perceptions of audio-video signals by natural systems, such as humans, also points to superiority of inferences drawn across modalities. It, therefore, seems natural to enhance performance of automated systems by using joint, cross-modal statistical inferences. However, the detection, organization, and understanding of cues and events in real-world scenarios are difficult tasks. This project seeks to develop a pattern-theoretic framework for achieving these goals. The main research items are: (1) development of mathematical quantities to represent audio and visual events and their spatiotemporal relations, (2) use domain-specific ontologies to impose semantic structure and to incorporate prior knowledge, and (3) derive algorithms for Bayesian inferences using efficient adaptations of Markov Chain Monte Carlo sampling.

Automatic Indexing, Tracking, and Detection of Objects in Digital Videos

FAPEMIG Grant [P7] [P8]

March, 2009 - June, 2011

The goal of this project was to develop a multimodal analysis system capable of combining audio

and visual features for categorization and indexing of topics appearing in news video. The system was primarily intended for retrieval and browsing in news video archives. The system consisted of integrating the following main components: i) shot categorization by audio transcription, ii) static and dynamic summaries of complete news clips, iii) segmentation using face detection, iv) indexing by face, v) categorization of shots into indoors and outdoors scenes, and vi) audio transcription for topic search by keywords.

ACADEMIC
EXPERIENCE

University of South Florida, Tampa, Florida USA
Research Assistant under Dr. Sudeep Sarkar **Summer 2011 - Present**

- Worked on the problem of facial analysis for sign language sentence recognition.
- Currently working on the NSF Grant described above: **Ontology based Perceptual Organization of Audio-Video Events using Pattern Theory**

University of South Florida, Tampa, Florida USA
Teaching Assistant for Network Security **Fall 2012**
Shared responsibility for assisting students, proctoring exams, and grading homework and programming assignments.

University of South Florida, Tampa, Florida USA
Teaching Assistant for Software Testing **Fall 2012**
Shared responsibility for assisting students, and grading homework assignments.

University of South Florida, Tampa, Florida USA
Instructor for Program Design **Summer 2012**

- Taught full time course (C programming, programming organization, and design of fairly large/complex programs)
- Assisted undergraduate students at office hours and online
- Assessed students' performance with 10 sets of homework, 4 in-class exams and 4 programming assignments
- Introduced new concepts of Computer Programming for about 54 students

University of South Florida, Tampa, Florida USA
Teaching Assistant for Software Engineering **Spring 2012**
Share responsibility for assisting students, and grading homework assignments.

University of South Florida, Tampa, Florida USA
Teaching Assistant for Computer Network 1 **Fall 2011**
Share responsibility for assisting students, and grading homework assignments.

Federal University of Minas Gerais, Belo Horizonte, Minas Gerais Brazil
Teaching Assistant for Image Processing **Fall 2010**
Share responsibility for assisting students, and grading exams and homework assignments.

PROFESSIONAL
EXPERIENCE

Jasper Automation Design Ltda., Belo Horizonte-MG Brazil
Test Engineer **August, 2010 - December, 2010**
Manual and automatic testing of features for EDA tools that test Integrated Circuits and do formal verification, writing of regression test cases, coding of scripts to automate functional testing of features (in Perl, Shell Script, and Tcl/Tk), and maintenance of a test script generator (in Haskell).

SumSYS Ltda., Belo Horizonte-MG Brazil

Software Engineer

September, 2009 - June, 2011

Developing and designing algorithms for image and video processing features, including scene classification, event recognition, video segmentation, video summarization.

Motorola Ltda., at CIn/UFPE, Recife-PE Brazil

Test Engineer

July, 2008 - March, 2009

Designing test plans and test cases (using JAVA), software testing (Unit Testing, Functional, Integration, Performance, Quality Metrics).

All-purpose Communication & Exchange, Itabuna-BA Brazil

English Teacher

February, 2008 - July, 2008

Teaching English using Communicative Approach for basic- and intermediate-level students.

TECHNICAL
SUMMARY

- Programming Environment: NetBeans, Eclipse, Microsoft Visual Studio;
- Programming Languages: C/C++, Python;
- Scripting Languages: MATLAB, Shell Script;
- APIs: OpenCV, MPI;
- Document Markup Language: \LaTeX ;
- Web Technology: HTML, XML;
- Operating Systems: Unix/Linux, Windows;
- Applications: MS (Word, Excel, Powerpoint, Visio)
- Past experience with:
 - Programming Languages: JAVA, Perl, Haskell, Assembly (MIPS and Intel 8086);
 - Scripting Language: Tcl/tk;
 - API: OpenGL;
 - Hardware Description Languages: Verilog, System Verilog;
 - Database: SQL, PL/SQL;
 - Modeling: UML;
 - Compiler Tools: LEX, YACC;
 - Applications: Gnuplot;
 - Operating Systems: FreeBSD;
 - Other Tools: Icarus, Dev C/C++, Weka.

PROFESSIONAL
ACTIVITIES

External reviewer for conferences:

- Brazilian Symposium on Computer Graphics and Image Processing (SIBGRAPI 2012)
- International Conference on Pattern Recognition (ICPR 2014)
- Workshop on Applications of Computer Vision (WACV 2013, 2014)

External reviewer for journals:

- Patter Recognition Letters (PRL 2013)
- International Journal of Applied Pattern Recognition (IJAPR 2013)
- International Journal of Pattern Recognition and Artificial Intelligence (IJPRAI 2014)
- Transactions on Pattern Analysis and Machine Intelligence (TPAMI 2014)
- Transactions on Circuits and Systems for Video Technology (TCSVT 2014)

HONORS AND
AWARDS

- **IEEE ICPR 2014: Best Scientific Paper Award**
Track 2: Pattern Recognition and Machine Learning
Title: Pattern Theory-Based Interpretation of Activities [P1]
- **ACM MM 2011: Multimedia Grand Challenge, 2011**
Special Prize on the Best Integration of Multimedia Media
Title: News Browsing System: Multimodal Analysis [P7]
- **3rd at the University Programming Contest, UESC, 2007**
- **Research Support Foundation of the State of Minas Gerais (FAPEMIG)**
 - Industrial Technological Development Scholarship, M.Sc. Research **September, 2009 - June, 2011**
- **National Science and Technology Foundation (CNPq)**
 - Industrial Technological Development Scholarship, CI Brazil Program, NSCAD/Inf/UFRGS & Cadence **March, 2009 - August, 2009**
 - Industrial Technological Development Scholarship, Internship Program, CIn/UFPE & Motorola **June, 2008 - February, 2009;**
 - Research Scholarship for Scientific Initiation (PIBIC) **July, 2006 - June, 2008.**
 - Based on academic performance, UESC

EXTRACURRICULAR
ACTIVITIES

Graduate Student Ambassador

University of South Florida, 2013 to Present

The Graduate Student Ambassadors Program at the University of South Florida provides opportunities for graduate students to advise the Dean of the Office of Graduate Studies and to be actively involved in building a graduate community by creating a network for communication and assistance among prospective, current and former graduate students.

Treasurer of the Student Chapter of the IEEE Computer Society at USF

University of South Florida, 2013 to Present

Junior University Company, UESC - TecnoJr

TecnoJr is a junior company recognized as an extension project of the State University of Santa Cruz. It was founded by University's students of CS in 2002. Essentially, TecnoJr provides high quality IT services to the regional community for more reasonable prices for being a nonprofit corporation. Additionally, TecnoJr offers courses that are meant to qualify the University's students in technologies that are valuable in the IT market.

- Position: Director of Human Resources (2006 - 2007)
- Responsibilities included being advisor of trainees, scheduling meetings, organizing events and trainee recruitment process, being the official representative of the organization in external meetings, archiving company's paperwork, and writing proposals for IT courses.

CONFERENCE
ORGANIZATIONS

Volunteer Services Coordinator

- 2014, IEEE International Joint Conference on Biometrics (IJCB), Clearwater, FL USA
- 2013, IEEE Workshop on Applications of Computer Vision (WACV), Clearwater, FL USA

Program Chair

- 2006, University Programming Contest at UESC

Volunteer

- 2005, 5th Informatics Week at UESC

LANGUAGES

- Portuguese (Native)
- English (Fluent)
- French (Basic: Speaking, Writing and Listening)
- Spanish (Basic: Speaking, Listening)

REFERENCES

Dr. Sudeep Sarkar

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Computer Science and Engineering
University of South Florida
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sarkar@cse.usf.edu

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