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Jose M. Rivera-Rubio

Curriculum Vitae

Research summary

My main research interests are in the fields of image processing, computer vision, graphics and pattern recognition. Particularly, I explore techniques that use biologically inspired algorithms and mathematical models to engineer solutions to a broad range of problems from indoor localization to object recognition.

Education

2011 – Present **Ph.D. candidate in Computer Vision**, *Imperial College London*.
My thesis work is focused on the development of Computer Vision and Pattern Recognition algorithms for appearance-based visual localization. Particularly, I'm interested in biologically inspired methods that can also work in other fields such as object recognition. My research also involves extensive use of Machine Learning algorithms both for supervised and unsupervised learning (e.g. neural networks, SVMs, multivariate regression, LDA, clustering methods, etc.).
Additionally, I have extensive experience in developing benchmarks for appearance-based methods. I have contributed the benchmark pipeline code and novel datasets for hand-held object recognition (`http://short.bicv.org`) and visual localization from wearable cameras (`http://rsm.bicv.org`).

Supervisor: Dr Anil A. Bharath

2012 **International Computer Vision Summer School**, *University of Catania, Italy*.

2010 – 2011 **MSc Biomedical Engineering**, *Imperial College London*, Overall mark of 71% awarded the top mark (A) in 7/11 subjects.
Dissertation: Features for the visual biopsy of polyps. Designed image processing algorithms to extract features of endoscopy images and trained machine learning algorithms to provide classification.
Supervisor: Dr Anil A. Bharath

2003 – 2009 **MEng Electrical and Electronic Engineering**, *University of Seville*, Spain, 1st class. Specialised in Computing, Signal Processing and Radiocommunications.
Dissertation: IP Multimedia Subsystem (IMS), the network convergence enabler
Supervisor: Dr Alejandro Carballar *Examiners:* Dr Antonio Estepa, Dr Rafael Bachiller

2009 **Mobile Communications Expert Course — Technologies and Mobile Applications: GPRS/UMTS**, University of Seville and Vodafone Spain Foundation, Researched on IP Multimedia Subsystem. Developed and simulated Java code for IMS service deployment on Ericsson SDS simulator.

1999 – 2003 **Secondary studies and Spanish Bachillerato**, IES Albero College, Physics, Chemistry, Maths, Biology, plus History, Spanish, English, French and Graphic design at the A2 equivalent level. Grade: 9.2/10.

Experience

2014 **Summer Intern**, The MathWorks, Cambridge, UK.

Development/Application Engineering team. Developed MATLAB and Simulink models that interface with a variety of sensors and actuators connected to target hardware (Arduino and Raspberry Pi) using I2C as communication protocol and automatic C code generation for deployment on target hardware:

- Contributed the C code to interface the I2C Linux kernel tools allowing for code generation and deployed use on Raspberry Pi.
- Added MATLAB and Simulink support to 6 different sensors and actuators.
- Developed MATLAB OOP classes and examples for individual sensor/actuator operation.
- Created Simulink sensor and actuator integration models: 10-DOF inertial measurement unit (IMU) sensor fusion model with 3D visualization, pan and tilt unit using microservos.
- Developed prototypes of hardware camera stabilisation using microservos and IMU readings, and object tracking camera using object tracking algorithms and I2C microservos.

I also expanded two current examples from the Computer Vision toolbox providing a more robust object tracking technique and adding face tracking to the face recognition demo.

October 2011 – Present **PhD researcher**, *Imperial College London*, PI: Dr Anil A. Bharath.

During my PhD I have been involved in the following projects:

- Hippocampal models for localization: Proposed a biologically inspired method that uses neural networks to improve the visual recall of already visited places.
- Appearance-based indoor localization from wearable cameras: Developed a state-of-the-art pipeline for appearance-based localization in indoor spaces. This included the development of new descriptors based on filtering techniques that improved the performance on very ambiguous localization data, i.e. indoor corridors.
- Sparse coding for localization: Adapted successful techniques in image compression and denoising to create "dictionaries of places" for learning a representation of different routes inside a building.
- The RSM dataset of "visual paths" for benchmarking visual localization algorithms. It contains more than 1.8 km of video sequences captured with mobile and wearable devices along 6 indoor locations. I developed a benchmark to evaluate different methods using C++ and MATLAB.
- A house-hold products dataset (the SHORT-100 dataset). SHORT-100 contains more than 150,000 images capturing usage particularities of blind and partially sighted people.
- Picture This... project. Developed an Android app and C++ (OpenCV) backend to provide user localization based on image-matching against a previoulsy acquired dataset.

October 2008 – February 2010 **Research Assistant**, *The Minerva Project: Vodafone Spain, regional Government and University of Seville R&D project*, PI: Dr Alejandro Carballar.

This initiative funded my final year project. I researched on the IMS protocols and worked on R&D project monitoring and management. I was able to work in a multidisciplinary environment, studying the applications of my main research topic in other areas of interest such as Bioengineering or Social Services.

March – July 2010 **IT Coordinator (Erasmus intern)**, *Auto ID Services Ltd.*, St. Helens, UK.

Internet and VoIP network and systems administration, mobile computing, IT security. Training and induction of new staff, documentation and IT strategy. Complete development of the new website.

Publications

I have authored 6 peer-reviewed conference proceedings articles in top Computer Vision and Image Processing conferences. I have also a journal article under review. For a more comprehensive list of my publications, please visit Imperial College's BICV group publications website `http://www.bicv.org/publications/` or my own page `http://joserivera.org/publications/`.

Computer skills

Advanced	MATLAB & SIMULINK, Linux (server and desktop), LaTeX, GIT, SVN, Office Suites, Microsoft Windows, Mac OS. Computer hardware and support,
Intermediate	C,C++, JAVA, OPENCV,PYTHON, HTML, Inkscape,
Basic	ROS, R, Gimp, Adobe Creative Suite.

Grants and Awards

2014 **Imperial College Trust**, *Conference funding*.

2014 **IEEE WACV conference travel grant**, *Funding for travel to Colorado, USA, to present at the 2014 IEEE WACV conference*.

2013 **V&L Net Pump-Priming 2013-1 Grant**, *EPSRC Network on Vision and Language (V&L Net)*, Riccardo Secoli and **Jose Rivera-Rubio**.

2013 **Highly Commended Prize in the Poster Competition**, *Imperial College Graduate School Summer Research Symposium*, Awards given to the best 10 posters among more than 100.

2011 – 2014 **EPSRC PhD studentship**, *Imperial College London Department of Bioengineering*, Awarded one of three studentships among more than 120 candidates.

2010 **Erasmus Placement grant**, *European Union*, This studentship funded my placement at a UK company.

2007 – 2008 **SICUE/SENECA Scholarship**, *Spanish Education Ministry*, Scholarship and bursary to spend my MEng 5th and final year in Carlos III University of Madrid, Spanish top university in Computing.

2003 **Best performance award**, *Andalousian Regional Government*, Awarded with a best performance prize at college level and granted funding of first year tuition fees at university.

Communication Skills

2015 **Oral presentation at The National Archives**, London, UK, Title of the talk: 'Perceptually Similar Search".

2014 **Oral presentation at the Winter Conference on Applications of Computer Vision**.

2013 **Oral presentation at the International Workshop on Assistive Computer Vision and Robotics**, *ICIAP 2013*, Naples, Italy, Title of the talk: 'Mobile Visual Assistive Apps:Benchmarks of Vision Algorithm Performance ".

Languages

Spanish	**Mother tongue**	
English	**Full professional proficiency**	*TOEFL iBT 114/120*
French	**Intermediate proficiency**	*Completed 4 years at the Official School of Languages*
Chinese (Mandarin)	**Elementary proficiency**	*Completed 2 years of the language course at University (9/10)*
German	**Elementary proficiency**	*Completed 1 year of the language course at University (7/10)*

References

References are available upon request.