

Kresimir Petrinc

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Career Objective: DPhil in Engineering Science

Research Interests: Robotics and Vision (Image Processing)

Education: **Master of Science** in Electrical Engineering, November 2004.
Bachelor of Science in Electrical Engineering, November 1999.
University of Zagreb, Faculty of Electrical Engineering and Computing, Croatia.

Work Experience:

July 2006 – present

Systems Engineer. Software Imaging, Oxford, U.K.
Researcher and software developer of new XPS render library for PrintMagicXPS SDK to support Windows Vista.

December 1999 – June 2006

Research and Teaching Assistant at the Department of Control and Computer Engineering, Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia. Member of Laboratory for Robotics and Intelligent Control Systems (LARICS).

Visiting Researcher. Department of Design and Technology, Faculty of Science and Technology, Anglia Ruskin University, Cambridge, U.K. (October 2005 – June 2006).

Teaching experience:

Teaching assistant for the following undergraduate courses:

- Nonlinear and Optimal Control
- Intelligent Control Systems
- Servo Systems

Academic and commercial projects (selection):

- *Holistic Modelling of a Fuel Cell Power System and FPGA Controller using Handel-C (Anglia Ruskin University, UK, 2005 – present)*
Development of a fuel cell power system, consisting of 2.5kW fuel cell stack, buck converter, PI controller and a pulse-width modulator (PWM). The system design is physically implemented in hardware onto a RC203 development board containing a Virtex II Xilinx FPGA using Celoxica Handel-C and DK4 design and modelling environment.
- *Image Processing and Automated Guided Vehicle Control (LARICS, Croatia, 2005)*
Developed MS Visual C++ application for controlling a mobile robot which uses a web camera as its only sensor. The real-time application processes the image from the camera and identifies a previously defined pattern using a Sobel filter, Gradient filtering and circular Hough transformation.
- *Expert System for Internet-based Supervision and Control for the Fish-farming Industry (Fish-farm Riba plc., Croatia, 2004-2005)*
Developed MS Visual C++ application for on-line data monitoring, display and analysis (calculation of amount of food to be given to fish, control and monitoring of aerators, giving orders to final users, activation of alarm in case of error and data exchange with server over

TCP/IP). Advantages: 35% less food for the same fish growth, healthier fish and cleaner environment.

- *Automated Guided Vehicle Control System (Sitek S.P.A., Italy, 2003-2004)*
Developed a simulator of floor shop layout with robotic manufacturing cells and Automated Guided Vehicles (AGVs) that commute between dynamically determined starting and end nodes. The simulator enables a more efficient planning of the manufacturing process, the optimization of the number of AGVs for a given floor shop, and makes for easy modifications before the real system is implemented.
The simulator is a Windows application developed in Microsoft Visual C++. AGVs and other objects in the scene are represented in OpenGL space and driven with OpenGL functions.
- *Servo Control of Meteorological Radar Antenna (Exor, Croatia, 2003)*
Developed MS Visual C++ application for meteorological radar antenna positioning. GUI for setting reference positions and speeds, and for visualisation of key system variables. Application contains a cascade control loop with on-line trajectory planning control.
- *Integrated Control of Robotized Plants (Sitek S.P.A., Italy, 1999-2003)*
Developed part of C++ application for virtual reality modelling of multi-robot work cells and off-line trajectory planning. It is a tool for the simple creation and editing of virtual multi-robot work cells, planning off-line trajectories and simulation and animation of robot movements (robot dynamics, control and collision detection).

Computer skills: C/C++ (Microsoft Visual C++ 6.0 and Microsoft Visual Studio .NET 2005), MATLAB, MFC, COM, STL, OpenGL, Handel-C.
Familiar with Java, Tcl/Tk, VRML, XML, and others.

Programming skills:

- Modelling and simulation of control systems
- Image processing (pattern recognition)
- Expert systems (rule-based systems)
- Path tracking design (pure pursuit and others)
- Trajectory planner design (3+ DOF robots using Taylor, Ho&Cook, and other methods)
- 3D rendering and OpenGL with user interaction
- Creating client-server applications using Windows Sockets, multi-threading
- Communication with external devices (RS232/RS485, CAN, Modbus, TCP-IP and OPC)
- Programming Xilinx FPGA using Handel-C and PAL
- Programming PIC16F876 and Siemens C167CR microcontrollers
- Work on SCM04, SCM10, TIO03 and TIO05 boards
- Conventional controller design (PID and others)
- Fuzzy Logic controller design
- Kalman filter design

Awards: Silver plaque "Josip Loncar" award for a distinguished MSc Thesis, University of Zagreb, Faculty of Electrical Engineering and Computing 2004-2005

Languages: English (IELTS 7.5), Croatian (native speaker).

Publications:

K. Petrinc, M. Cirstea, "Holistic modelling of a fuel cell power system and FPGA controller using Handel-C", IEEE IECON'06, Paris, France, November 7-10, 2006.

N.Smolic-Rocak, S.Bogdan, Z.Kovacic, K.Petrinc, "String Algebra-based Approach to Dynamic Routing in Multi-LGV Automated Warehouse Systems", IEEE 2006 CCA/CACSD/ISIC, Munich, Germany, October 4-6, 2006.

K.Petrinec, Z.Kovacic, "The application of spline functions and Bézier curves to AGV path planning", CD-ROM Proceedings of the IEEE International Symposium on Industrial Electronics ISIE 2005, Dubrovnik, Croatia, June 20-23, 2005

T.Reichenbach, Z.Kovacic, K. Petrinec, "On-line collision free trajectory generation using virtual models as space occupancy sensors", Annals for DAAAM 2004 & Proceedings of the 15th International DAAAM Symposium, Vienna, Austria, November 3 - 6, 2004

Z.Kovacic, Z.Petrinec, K.Petrinec, "A Transfer of Technology from Academy to Industry an Example: Internet-based Expert System for Freshwater Fish-farming", Rediscover 2004 Southeastern Europe, USA, Japan and European Community Workshop on Research and Education in Control and Signal Processing , Cavtat, Croatia, June 14-16, 2004

S.Bogdan, Z.Kovacic, K.Petrinec, N.Smolc-Rocak, "Path Following, Routing and Scheduling in Multi-AGV Systems", Rediscover 2004 South-eastern Europe, USA, Japan and European Community Workshop on Research and Education in Control and Signal Processing , Cavtat, Croatia, June 14-16, 2004

K.Petrinec, Z.Kovacic, A.Marozin, "Simulator of Multi AGV Robotic Industrial Environments", CD-ROM Proceedings of the IEEE International Conference on Industrial Technology ICIT'03, Maribor, Slovenia, December 10-12, 2003

K.Petrinec, Z.Petrinec, Z.Kovacic, B.Zupan, "Experimental Validation of an Internet-based Expert System for the Fresh-water Fish-Farming Industry", CD-ROM Proceedings of the IEEE International Conference on Computational Cybernetics ICC3 2003, Siofok, Hungary, August 29-31, 2003

K.Petrinec, Z.Petrinec, Z.Kovacic, "Multivariable Measurements and Observations in the Freshwater Fish-farming Industry: An Internet-based Expert System", Proceedings of the 12th IMEKO TC4 International Symposium, Part 2, pp.473-476, Zagreb, Croatia, September 25-27, 2002

K.Petrinec, Z.Petrinec, Z.Kovacic, "An Expert System for Freshwater Fish-farming Industry", CD-ROM proceedings of the 15th Triennial World Congress of the International Federation of Automatic Control, Barcelona, Spain, July 21-26, 2002

Z.Kovacic, S.Bogdan, K.Petrinec, T.Reichenbach, M.Puncec, "Leonardo - The Off-line Programming Tool for Robotized Plants", CD-ROM Proceedings of the 9th Mediterranean Conference on Control and Automation, Dubrovnik, Croatia, June 27-29, 2001

N.Smolc-Rocak, S.Bogdan, K.Petrinec, Z.Kovacic, "Object-oriented programming approach to dynamic simulation of flexible manufacturing systems", CD-ROM Proceedings of the 9th Mediterranean Conference on Control and Automation, Dubrovnik, Croatia, June 27-29, 2001

Z.Kovacic, K.Petrinec, "Implementation of the Adaptive Kalman Filter for Noise-burdened Servo Applications", The 11th International Conference "Electrical Drives and Power Electronics", pp.99-102, Dubrovnik, Croatia, October 9-11, 2000

Referees:

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