Nikos Koukis

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EDUCATION

NAT. TECHNICAL UNIVERSITY OF ATHENS

Diploma in Mech. Engineering
June 2017 | Athens, GR
GPA:8.18 / 10.0

KTH, ROYAL INSTITUTE OF TECHNOLOGY

ERASMUS Exchange program
Jan 2015 - Jun 2015 | Sweeden, SE

LINKS

Github:// **bergercookie**[1]
LinkedIn:// **nikos-koukis**[2]
Stackoverflow:// **bergercookie**[3]

COURSEWORK

University Courses

NTUA

- Introduction to Automatic Control
- Control Systems and Machine Regulations
- Intelligent Control Systems and Robotics
- Numerical Analysis using Fortran
- Operating Systems
- Machine Dynamics I, II
- Machine Elements I, II
- Mechanical Design I, II
- Materials Science
- Advanced Materials
- Manufacturing Processes I, II
- Thermodynamics
- Thermal Turbomachines
- Hydraulic Turbomachines
- Environmental engineering
- Fluid Mechanics
- Electromechanical Power Conversion Systems
- Ergonomics

KTH

- Flight Mechanics (SD2805)
- Computational Fluid Dynamics (SG2212)
- Hybrid and Embedded Systems (EL2450)
- Control Theory and Practice, Advanced Course (EL2520)

PROJECTS EXPERIENCE

MENTOR AT GOOGLE SUMMER OF CODE (GSOC) - MRPT[4]

May 2017 -
Evaluation of student proposals is still running - List of Potential projects[5]

STUDENT AT GOOGLE SUMMER OF CODE (GSOC) - MRPT

May 2016 - August 2016   C++, MRPT
See diploma thesis section for details.

DIPLOMA THESIS - INVESTIGATION, DESIGN AND IMPLEMENTATION OF SINGLE AND MULTI-ROBOT SLAM ALGORITHMS

Oct 2015 - | Control-Systems Lab NTUA[6]   C++, Python, ROS, Gazebo, Ansible
The goals of my diploma thesis are given below:

- Study majority of implemented strategies in single-robot and multi-robot Simultaneous Localization and Mapping (SLAM).
- Based on previous analysis, decide on implementing `graphSLAM` over other SLAM alternatives (particle-filtering/FastSLAM, EKF, EIF, etc).
- Design and implement single-robot graphSLAM as part of my Google Summer of Code (GSoC) internship for the Mobile Robot Programming Toolkit (MRPT). Algorithm utilizes laser scans and (optionally) odometry measurements while the design is easily extensible to other types of sensors (3D point clouds, visual etc.). A robust loop-closure scheme based on the work of Olson[7] was also implemented. Code is successfully incorporated in the MRPT codebase. Single-robot simulation demo - GSOC[8]
  Final GSoC Pull-Request[9]
- Add wrapper code for running graphSLAM in an online (real-time) fashion. ROS[10] was used as the middleware for the inter-process communication and data exchange part. Wrapper classes are publicly available in the mrpt_graphslam_2d directory of mrpt_slam github repository[11]
- Extended graphSLAM code to the multi-robot case using a variation of the algorithm presented by Lazaro et al.[12]
- Intra-robot communication was implemented using the multi-master ROS package (multicast protocol) while the algorithm was tested in the Gazebo[13] simulator.
  Multi-robot Simulation demo[14]
- Algorithm has been tested in a real-time environment with Pioneer-2at and Pioneer-2dx models.
- Link to master thesis[15]

PAPER REVIEWING

Dec 2015 - | Control-Systems Lab NTUA
Successfully reviewed a series of papers in the field of single- and multi-robot simultaneous localization and mapping (SLAM) for occasions such as the *Journal of Intelligent and Robotics Systems 2016, MED 2016, IROS 2017.*

ELECMICROSCOPE2000

Sep 2015 - Oct 2015 | Biolab NTUA   Matlab, Arduino

- Developed the GUI for interacting with embedded arduino code for the control of the microscope platform and shutter
- Written in MATLAB and GUIDE
- The software is open-source, licensed under the BSD 2-clause
- Code and documentation for configuring/using the software can be found here[16]

Independent Coursework

Coursera

- Control of Mobile Robots
- Interactive Programming Using Python
- High Efficiency Scientific Programming
- Computer Networks
- Modelling Engineered Systems
- Nanotechnology: The Basics
- Introduction to Linux
- The Art of Negotiation
- Work Smarter, Not Harder: Time Management for Personal and Professional Productivity

Various

- Operating Systems, NTUA
- Up and Running with Django and Python[17]
- Code Clinic - Python[18]
- Artificial intelligence in Robotics[19]
- Robot mapping, University of Freiburg[20]
- C++: Move Semantics[21]
- Learning Ansible[22]
- Deep Learning[23] [Ongoing]
- Deep Learning with TensorFlow[24] [Ongoing]

SKILLS

Programming - Software

Excellent Knowledge:
C++• Python • ROS • Git • Matlab • Latex
Good Knowledge:
Ansible automation tool • CMake • Gazebo • Fortran • C • Shell Scripting
Familiar:
Objective-C • Make • Vim Scripting • C# • Java

LANGUAGES

English: C2 Proficiency
Greek: Native Language
German: B1 Proficiency

SUPPLEMENTARY

Public Speaking • Scientific Computing • MS Office • SolidWorks • Vim Editor

SPERMPROJECT

Oct 2015 - Jan 2016 | Biolab NTUA   Python, Matlab, Java

- Design the hardware and software for a sperm-test device. The goal of the device is to offer an in-house cost-affordable alternative to the costy, and often uncomfortable for the patient, procedure of laboratory sperm exam
- Design in CAD the device for magnification
- Code an android application, which is to run on the phone of the consumer's phone
- Implement a client-server protocol for sending a video of the sperm sample to an external server for image analysis. Implemented, so that the computational/time requirements are independent of the consumer's android device. The server side module was written in Python while the client was an android application (Java).
- Boilerplate code of the image analysis algorithm for extracting total population and sperm motility statistics from the given video
- Information about the overall project can be found here[25] while the code is can be accessed from Github:
    - Android App[26]
    - SpermProject server application[27]

PUMP3000

May 2014 – July 2014 | Biolab NTUA   Python, Qt

- As an individual Project, I developed an interactive GUI for controlling Cavro XP 3000 Pump[28] series.
- The software is currently used in medical projects in the bioengineering laboratory of the mech. engineering department of NTUA
- The UI was written in Python with the use of Qt and PySide.
- The software is open-source, licensed under the BSD 2-clause.
- Code and documentation for configuring/using the software can be found **here**[29]

CONTROL OF MIMO FOUR-TANK PROCESS

Jun 2015 | Control Theory Advanced Course, KTH   Matlab

Experimented with the behavior of advanced control theory strategies on a 4 water-tank process.

- The goal was to drive the level of the 2 lower tanks by controlling the voltage of two corresponding pumps.
- Implemented decoupling decentralized control scheme and Glover-McFarlane robustness method
- The controllers were developed using the MATLAB technical programming Language

AERODYNAMIC AND CONTROL ANALYSIS OF J35 DRAKEN[30]

Spring 2015 | Flight Mechanics, KTH   Matlab

PID DIGITAL CONTROL OF PIONEER-3DX

Spring 2015 | Hybrid and Embedded Systems, KTH   C

PATTERN RECOGNITION AND LINE-FOLLOWER ROBOT: DRK8080[31]

Aug 2013 | Universitatae Politechnica Din, Timisoara   C#

AWARDS

Year	Scope	Description
2014	European	Represented Greece in EBEC[32] Final, Riga, 4th/13 overall
2014	National	European BEST Engineering Competition (EBEC), National Winner
2011	National	The Big Moment For Education, EUROBANK National Examinations Award

EXTRA-CURRICULAR ACTIVITIES

Year	Description
2008-2011	Team Captain in National School Basketball Tournaments
2004	Avlonarion Chess Tournament Champion
2003	Avlonarion Chess Tournament Finalist

Notes

[1] http://bergercookie.github.io

[2] http://linkedin.com/in/nikos-koukis-a1564885

[3] http://stackoverflow.com/users/2843583/bergerrcookie

[4] http://mrpt.org

[5] https://github.com/MRPT/mrpt/wiki/Ideas-page-for-MRPT-Google-Summer-of-Code-2017

[6] http://controlsystemslab.gr

[7] https://april.eecs.umich.edu/pdfs/olson2009ras.pdf

[8] https://www.youtube.com/watch?v=Pv0yvlzrcXk

[9] https://github.com/MRPT/mrpt/pull/308

[10] http://ros.org

[11] http://github.com/mrpt-ros-pkg/mrpt_slam

[12] https://webdiis.unizar.es/~mtlazaro/papers/Lazaro-IROS13.pdf

[13] http://gazebosim.org

[14] https://www.youtube.com/watch?v=4RKS2jrvsYE

[15] http://147.102.51.10:3000/bergercookie/mr-slam-thesis-text/src/master/report.pdf

[16] https://github.com/bergercookie/ElecMicroscope

[17] https://www.lynda.com/Django-tutorials/Up-Running-Python-Django/386287-2.html

[18] https://www.lynda.com/Python-tutorials/Code-Clinic-Python/163752-2.html

[19] https://www.udacity.com/course/artificial-intelligence-for-robotics--cs373

[20] https://www.youtube.com/watch?v=U6vr3iNrwRA&list=PLgnQpQtFTOGQrZ4O5QzbIHgl3b1JHimN_

[21] https://www.linkedin.com/learning/c-move-semantics?trk=publicProfile-public_profile_v3_desktop-learningFeedm011:a001--379654_learning

[22] https://www.linkedin.com/learning/learning-ansible

[23] https://classroom.udacity.com/courses/ud730

[24] https://www.udemy.com/deep-learning-with-tensorflow/learn/v4/content

[25] http://biotech-ntua.wikispaces.com/Project_20152016_Spermodiagram

[26] https://github.com/bergercookie/SpermProject

[27] https://github.com/bergercookie/SpermProject_server

[28] http://blog.mbedded.ninja/wp-content/uploads/2013/03/cavro-xp-3000-syringe-pump-operators-manual.pdf

[29] http://bergercookie.github.io/Projects/Pump3000/

[30] https://github.com/bergercookie/flight-mechanics

[31] https://www.best.eu.org/event/details.jsp?activity=afdp71v

[32] https://ebec.best.eu.org/index.php/about-ebec/