europass

Valentina Becchetti

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Date of birth: 09/01/1999 **Nationality:** Italian

WORK EXPERIENCE

[10/2022 – 10/2023]

Software Division in SASA: Sapienza Technology Team

City: Rome
Country: Italy
Designing and programming a robotic arm for a rover prototype, working in team with students from multiple engineering fields.
Site: sasa-aerospace.it/tech-team

EDUCATION AND TRAINING

[01/11/2023 – Current]

PhD in Automatic Control, Bioengineering and Operations Research (ABRO)

University of Rome "La Sapienza"

City: Rome
Country: Italy

[09/2021 – 10/2023]

Master's Degree In Control Engineering

University of Rome "La Sapienza"

City: Rome
Country: Italy
Final grade: 110 Cum laude
Thesis: Dynamic Mode Decomposition for personalized Artificial Pancreas MPC

[09/2017 – 07/2021]

Bachelor Degree in Ingegneria Clinica

University of Rome "La Sapienza"

City: Rome
Country: Italy
Thesis: Analisi e simulazione dell'andamento dell'insulina e del glucosio nel sangue finalizzato al controllo glicemico nei pazienti con diabete mellito di tipo 1

[09/2012 – 06/2017]

Secondary School Diploma in scientific studies

Liceo Scientifico Statale "Amedeo Avogadro"

City: Rome
Country: Italy

[05/2016]

First Certificate in English

Cambridge English Language Assessment

City: Rome
Country: Italy

[22/07/2018 – 12/08/2018]

Grade C1.1

EF International Language Center

City: Manchester
Country: United Kingdom

[28/07/2019 – 18/08/2019]

Grade C1.3

EF International Language Center

City: Toronto
Country: Canada

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s):

English

LISTENING C1 **READING** C1 **WRITING** C1

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

Spanish

LISTENING A1 **READING** A1 **WRITING** A1

SPOKEN PRODUCTION A1 **SPOKEN INTERACTION** A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

Matlab/Simulik | Python Language - Basic knowledge | LaTeX (very good) | Machine Learning

COMMUNICATION AND INTERPERSONAL SKILLS

Adaptability in challenging conditions

Effective Time and Stress Management in a Team Environment

PROJECTS

[10/2023] **Dynamic Mode Decomposition for personalized Artificial Pancreas MPC**

The UVA/Padova simulator provides the most accurate model for effectively representing the insulin-glucose dynamics of individual diabetic patients. As it is highly complex, consisting of 18 strongly nonlinear and time-varying equations, the objective of this work is to linearize it and reduce its dimensionality exploiting Dynamic Mode Decomposition with Control (reaching 6 linear equations). This allows for the synthesis of a controller based on Linear Model Predictive Control to be applied to the original model. This is justified by the need to integrate the control algorithm into portable devices with limited computational capabilities. The proposed dimensionality reduction method is validated through in-vitro simulations showing that an accurate representation of the system dynamics is effectively preserved, while conveniently reducing required computational power.

[06/2023] **Model reduction using DMDc of the pancreas' glucose – insulin dynamics**

The project aim is to reconstruct and reduce thanks to Dynamic Mode Decomposition with Control algorithm a non-linear, time-variant, compartmental model of the glucose-insulin dynamics of a patient with type 1 diabetes that is simulated by the UVA-Padova Simulator. The model is composed by 18 non-linear equations and in the end we retrive 15 linear equations that approximate very well the overall dynamics.

[04/2023] **A fully actuated quadrotor with a propeller tilting mechanism**

A new quadrotor design has been analyzed that uses two additional actuators to control the tilt angles of the propellers relative to the quadrotor body.

The system can be linearized at a higher differential order, resulting in a dynamic feedback linearization controller.

It is visualized and simulated both in Matlab and in the CoppeliaSim environment, and the results of specific tasks demonstrate the effectiveness of the additional actuations, compared to the classical solution.

[02/2023]

Site Diversity in Downlink Optical Satellite Networks through Reinforcement Learning selection techniques

The aim of the project is the problem of allocating the Free Space Optical satellites to the best possible Ground Stations (GSs), considering the availability and the current meteorological condition specific to each GSs. Two Reinforcement Learning (RL) methodologies, Q-learning and SARSA learning, are used to solve the above problem. Through simulations, it is seen that both the RL techniques outperform a baseline method with a fixed allocation choice.

[11/2021] **Visual Servoing with dVRK simulator**

The aim of this project is to perform Image Based Visual Servoing (IBVS) using the Endoscopic Camera Manipulator (ECM) of the da Vinci surgical robot, equipped with two vision sensors. The task is to keep the two end effectors of the Patient Side Manipulators (PSMs) in the center of the field of view of the ECM cameras. Experiments are performed in the CoppeliaSim environment.