Nicola Davanzo

CURRICULUM VITAE
(Updated September 21, 2022)

Contact Information

Post-Doctoral researcher
at Laboratorio di Informatica Musicale (LIM)
Università degli Studi di Milano
Department of Computer Science
Via Giovanni Celoria 18
I-20133 Milano (Italy)

Supervisor: Prof. Federico Avanzini

Actual research project: Design, development and evaluation of interfaces for Accessible Digital Musical Instruments.

Abstract: *The project aims to develop innovative interfaces for accessible digital musical instruments using recently developed sensors and technologies such as eye trackers, head trackers, breath sensors, electromyographic sensors etc. Focus is placed on the development of interfaces dedicated to people with quadriplegic disability. Priority is given also to keeping technology costs low, by using sensors already available on the mass market or by developing low cost open-source sensors and toolkits. The project includes the exploration of the related theoretical topics, new computer interaction methodologies for quadriplegic users and the development and testing of novel accessible digital musical instruments and interfaces. This project is inspired by my master thesis work and is framed in the context of Laboratorio di Informatica Musicale (LIM), in the research branches of Human-Computer Interaction (HCI) and Sound and Music Computing (SMC). Collaboration is sought with disabled musicians and rehabilitation institutes to access experimental samples.*

Research interests

- Accessible Digital Musical Instruments
- Sound and Music Computing
- Human-Computer Interaction

Personal research goal: developing new technologies with high, direct and positive social impact.

Higher Education

2018 – 2022
Ph. D. in Computer Science.
University of Milan, Laboratorio di Informatica Musicale, Dipartimento di Informatica, Milan (Italy)
Title of dissertation: "Accessible Digital Musical Instruments for Quadriplegic Musicians"
Supervisor: Prof. Federico Avanzini
Age at graduation: 30 | **Official duration**: 3 years
Graduation date: April 22, 2022

2015 – 2018
Master (*laurea specialistica/magistrale*) degree in Computer Engineering.
University of Pavia, Dipartimento di Ingegneria Industriale e dell'Informazione, Pavia (Italy)
Classification: LM-32 - 2nd level degree in Computer engineering
Title of dissertation: "Development and Testing of Graphical Interfaces for Eye-Controlled Musical Instruments"
Supervisor: Prof. Marco Porta
Co-supervisor: Prof. Mauro Mosconi
Age at graduation: 25 | **Official duration**: 2 years
Graduation date: February 26, 2018
Final mark: 107/110

2011 – 2015
Bachelor degree (*laurea triennale*) in Ingegneria Elettronica ed Informatica *(EN: Electronics and Computer Engineering)*.
University of Pavia, Dipartimento di Ingegneria Industriale e dell'Informazione, Pavia (Italy)
Classification: L-8 - 1st level degree in Information technology
Title of dissertation: "Realizzazione di un Software di Scrittura Tramite Eyetracking *(EN: Development of a Software for Writing Through Eyetracking)*"
Supervisor: Prof. Luca Lombardi
Age at graduation: 23 | **Official duration**: 3 years
Graduation date: July 16, 2015
Final mark: 94/110

Further education

2006 – 2011
Scientific Certificate.
Institute of Higher Education *(Liceo Scientifico-Tecnologico)* Alfieri Maserati, Via Mussini 22, 27058 Voghera (PV), Italy.
Type of secondary school diploma: Italian secondary school diploma
School-leaving examination mark: 96/100

Visiting periods

March 4, 2019 – March 8, 2019
NordicSMC Winter School
University of Oslo, RITMO Centre for Interdisciplinary Studies in Rhythm, Time and Motion, Oslo, Norway.

Computer skills

- Front-end and Back-end Programming (see languages below);
- Object Oriented Programming, Design Patterns and Agile Software Development;
- Development with microcontroller boards (e.g. Arduino, Raspberry);
- Computer Vision algorithms and basics of 3D modeling;
- Internet infrastructure and protocols;
- Basics of web development;
- Basics of robotics (path-finding algorithms, navigation, etc.);
- Basics of CPU architecture;
- Basics of parallel programming;
- Basics of Information Security;
- Basics of industrial process control;
- Image editing;

Programming and markup languages: Java, Java EE, C, C++, C♯, Python, Basic (.NET), Javascript, Assembly (MIPS), HTML, CSS, PhP, LaTeX.

Language skills

Italian: native;
English: fluent (written/spoken);
Esperanto: basic (written/spoken).

Soft skills

Creativity and intuition; Brainstorming; Fast learning; Planning; Information and knowledge management; Working under pressure.

Publications

Articles in journals

Davanzo N. & Avanzini F. (2020). *«Hands-Free Accessible Digital Musical Instruments: Conceptual Framework, Challenges, and Perspectives».* IEEE Access 8 (2020): 163975–95. Web: https://ieeexplore.ieee.org/document/9179732/

Conference papers

Davanzo N., Dondi P., Mosconi M. & Porta M. (2018). *«Playing Music with the Eyes through an Isomorphic Interface».* In Proc. of the Workshop on Communication by Gaze Interaction, 1–5. Warsaw, Poland: ACM Press, 2018. Web: https://dl.acm.org/doi/10.1145/3206343.3206350

Davanzo N. & Avanzini F. (2020). *«A Dimension Space for the Evaluation of Accessible Digital Musical Instruments».* In Proc. 20th Int. Conf. on New Interfaces for Musical Expression (NIME '20). Web: https://www.nime.org/proceedings/2020/nime2020_paper41.pdf

Davanzo N. & Avanzini F. (2020). *«A Method for Learning Netytar: An Accessible Digital Musical Instrument»*: In Proceedings of the 12th International Conference on Computer Supported Education, 620–28. Prague, Czech Republic: SCITEPRESS - Science and Technology Publications, 2020. Web: http://dx.doi.org/10.5220%2F0009816106200628

Davanzo N. & Avanzini F. (2020). *«Experimental Evaluation of Three Interaction Channels for Accessible Digital Musical Instruments».* In Proc. '20 Int. Conf. on Computers Helping People With Special Needs, 437–45. Online Conf.: Springer, Cham, 2020. https://doi.org/10.1007/978-3-030-58805-2_52

Davanzo N. & Avanzini F. (2021). *«Resin: a Vocal Tract Resonances and Head Based Accessible Digital Musical Instrument».* In Proc. '21 AudioMostly conference. Online Conf. (Conference proceedings to be published).

Davanzo N., De Filippis M., Avanzini F. (2021). *«Netychords: an Accessible Digital Musical Instrument for playing chords using gaze and head movements».* In Proc. '21 Int. Conf. on Computer-Human Interaction Research and Applications (CHIRA '21). Online Conf. (Conference proceedings to be published).

Conference presentations

Davanzo N. & Avanzini F. (2020). *«A Dimension Space for the Evaluation of Accessible Digital Musical Instruments».*
Conference name: 20th Int. Conf. on New Interfaces for Musical Expression (NIME '20).
Conference place: Royal Birmingham Conservatoire, England (Online Conference).
Conference dates: July 21-25, 2020.
Type: oral presentation.

Davanzo N. & Avanzini F. (2020). *«A Method for Learning Netytar: An Accessible Digital Musical Instrument».*
Conference name: 12th International Conference on Computer Supported Education (CSME '20).
Conference place: Prague, Czech Republic (Online Conference).
Conference dates: May 2-4, 2020.
Type: oral presentation.

Davanzo N. & Avanzini F. (2020). *«Experimental Evaluation of Three Interaction Channels for Accessible Digital Musical Instruments».*
Conference name: '20 Int. Conf. on Computers Helping People With Special Needs (ICCHP '20).
Conference place: Lecco, Italy (Online Conference).
Conference dates: September 9-11, 2020.
Type: oral presentation.

Davanzo N. & Avanzini F. (2021). *«Resin: a Vocal Tract Resonances and Head Based Accessible Digital Musical Instrument».*
Conference name: '21 AudioMostly conference (Online Conference).
Conference place:
Conference dates: September 9-11, 2020.
Type: oral presentation.

Davanzo N. & Avanzini F. (2021). *«Experimental Evaluation of Three Interaction Channels for Accessible Digital Musical Instruments».*
Conference name: 5th International Conference on Computer-Human Research and Applications (CHIRA '21).
Conference place: Online Conference.
Conference dates: October 9-11, 2020 (Programmed, to be held).
Type: oral presentation.

Thesis supervision

2019
Type: Bachelor degree thesis
Student: Anna Fusari
Dissertation title: "Reimplementazione web di uno strumento musicale virtuale per il superamento delle disabilità motorie" *(EN: Web re-implementation of a virtual musical instrument for overcoming motor disabilities*)"
Supervisor: Prof. Luca Andrea Ludovico
Co-supervisor: M. Sc. Nicola Davanzo

2019
Type: Bachelor degree thesis
Student: Mattia Galante
Dissertation title: "Metodi di Interazione Alternativi per Strumenti Musicali Digitali Accessibili *(EN: Alternative Interaction Methods for Accessible Digital Musical Instruments*)"
Supervisor: Prof. Federico Avanzini
Co-supervisor: M. Sc. Nicola Davanzo

2020
Type: Bachelor degree thesis
Student: Matteo De Filippis
Dissertation title: "Un Metodo di Interazione per l'Esecuzione di Accordi in un'Interfaccia Musicale Operata Tramite Eye Tracking *(EN: An Interaction Method for Playing Chords in a Musical Interface Operated Through Eye Tracking*)"
Supervisor: Prof. Federico Avanzini
Co-supervisor: M. Sc. Nicola Davanzo

2020
Type: Bachelor degree thesis
Student: Fabrizio Doretto
Dissertation title: "Analisi di Usabilità e Design Partecipativo di uno Strumento Musicale Digitale Accessibile Presso un Centro Socio-Riabilitativo *(EN: Usability Analysis and Collaborative Design of an Accessible Digital Musical Instrument in a Social Rehabilitation Center*)"
Supervisor: Prof. Federico Avanzini
Co-supervisor: M. Sc. Nicola Davanzo

Other Interests

Music (composition, guitar, innovative instruments);
Psychology (Jungian theories, human social networks, evolutionary psychology).