Prof. Irina Muresanu
Concert Violinist
Associate Professor of Violin and Chamber Music
muresanu@umd.edu
www.irinamuresanu.com
Lecture 12-01-2024
Colloquium 'Arts Meet Sciences'

MUSIC EDUCATION FOR ALL THROUGH PERSONALIZED
AI AND DIGITAL HUMANITIES

Learning how to play a musical instrument is a lengthy and complex endeavor. Besides daily practicing, traditional classical instrumental instruction relies upon weekly 1:1 individual lessons, under the supervision of an expert teacher who demonstrates the materials, verbally explains the steps involved in acquiring and perfecting technical skills, visually observes the student's movements on the instrument, and listens to the sounds produced to give the student feedback. The student is expected to retain the information received in the lesson, practice unsupervised for the remainder of the week, and show progress in the following lesson. The instructor's main challenge is having to assess the student's progress and retention only during the limited time of the lesson, while the student doesn't have the benefit of feedback outside the lesson time.

Even so, private instruction is costly, and only accessible to a small and privileged part of the world population. The Covid-19 pandemic provided an unexpected opportunity to reevaluate and shift this paradigm, as instructors turned to technology to provide remote music lessons. This context demonstrated the clear need and tremendous opportunity to reach the underrepresented student population with music education while developing new technology for teaching and learning.

Using the insights we have gained as virtual educators, since 2020 and building on our existing research, our team proposes to develop an Artificial Intelligence (AI) platform, V**AI**olin, that will democratize music education. The platform's main functions will be to: 1) Monitor and provide feedback to the students' playing in real-time, through computational auditory and visual analysis 2) Offer a large corpus of open-access scholarly digitized exercise materials (études), ontologically categorized and with matching video tutorials 3) Evaluate students' skills using Machine Learning (ML) and give personalized feedback and educational material suggestions. This platform will integrate technology into the mechanism of learning an instrument and use AI to assist in the process of mastering principles and skills, facilitating self-analysis, and enhancing independent learning. Our work will impact music students (especially those who are self-taught), as well as teachers and parents of young musicians worldwide. Our project demonstrates a decisive stance against the inequality inherent in traditional music instruction and aims to build an innovative method to share music with our communities, including those who are so often left out and behind.