

PERSONAL INFORMATION

Horia Cucu

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Date of birth 02/02/1984 | Nationality Romanian

WORK EXPERIENCE

2008 – Present

Associate Professor**University Politehnica of Bucharest, Bucharest (Romania)**

<http://www.upb.ro>

Coordinating various research teams in various artificial intelligence and machine learning research projects applied in speech processing, natural language processing and electronic circuits design and verification.

Teaching: Spoken Language Technology, Microcontrollers and Embedded Systems, Microprocessor Architectures.

Supervising: PhD, MSc and BSc projects in speech technology and embedded systems.

Jun 2023 – prezent

Project Director and Research Engineer in project EFFSIZE - “Efficiency and Effectiveness of Circuit Sizing using Machine Learning Methods”, R&D project for Infineon Technologies Romania & Co. SCS.

Jan 2023 – prezent

Project Responsible and Research Engineer in project AI4TRUST - „AI-based-technologies for trustworthy solutions against disinformation”, R&D project funded by the European Union through Horizon Europe programme, project coordinator Fondazione Bruno Kessler, Trento, Italy

Mar 2023 – Dec 2023

Project Responsible and Research Engineer in project VOITA - “Integrated voice to text analytics system”, R&D project funded by the Romanian Government through UEFISCDI, project coordinator Bold Technologies SRL.

Jun 2022 – Jun 2024

Project Responsible and Research Engineer in project AVESIC - “AI-assisted Verification of Smart Integrated Circuits”, R&D project funded by the Romanian Government through UEFISCDI, project coordinator Infineon Technologies Romania & Co. SCS.

Jun 2022 – May 2023

Project Director and Research Engineer in project EECV-ML-v3 - “Efficiency and Effectiveness of Circuit Verification using Machine Learning Methods v3”, R&D project funded by Infineon Technologies Romania & Co. SCS.

Jun 2021 – May 2022

Project Director and Research Engineer in project EECV-ML-v2 - “Efficiency and Effectiveness of Circuit Verification using Machine Learning Methods v2”, R&D project funded by Infineon Technologies Romania & Co. SCS.

May 2020 – May 2021

Project Director and Research Engineer in project “Efficiency and Effectiveness of Circuit Verification using Machine Learning Methods”, R&D project for Infineon Technologies Romania & Co. SCS.

Sep 2020 – Aug 2022

Project Director in project DAIA - “Artificial intelligence-assisted intelligent integrated circuit design”, R&D project funded by the Romanian Government through UEFISCDI, project coordinator Infineon Technologies Romania & Co. SCS.

Aug 2020 – Jul 2022

Project Manager and Research Engineer in project “Aerosol climatology – from remote sensing measurements to deep learning”, R&D project funded by the Romanian Government through UEFISCDI, project coordinator National Institute of Research and Development for Optoelectronics.

Aug 2019 – Dec 2019

Project Manager and Researcher in project “RISC V-based hardware-software system for Machine Learning Applications”, R&D project for NXP Semiconductors Romania SRL.

Apr 2019 – Jul 2019

Project Director and Research Engineer in project “Non-native English Automatic Speech

	Recognition System”, R&D project for Amia Software SRL, Bucharest, Romania.
Feb 2019 – May 2020	Project Director and Research Engineer in project “Multi-objective Optimization for Analog / Mixed-Signal Circuit Designs”, R&D project for Infineon Technologies Romania & Co. SCS.
Mar 2018 – Apr 2021	Project Director and Research Engineer in project “ <u>Technologies for automatic annotation of audio data and for the creation of automatic speech recognition interfaces</u> ” within complex project “ <u>Resources and Technologies for Developing of Human-Machine Interfaces in Romanian</u> ”, R&D project funded by the Romanian Government through UEFISCDI, project coordinator Research Institute for Artificial Intelligence, Romanian Academy.
Feb 2017 – Apr 2020	Lead Research Engineer in project “ <u>Intelligent Systems for Video and Audio Analysis — Technologies and Innovative Video Systems for Person Re-identification and Analysis of Dissimulated Behavior</u> ”, R&D project funded by the Romanian Government through UEFISCDI, project coordinator University Politehnica of Bucharest, Bucharest, Romania.
Oct 2014 – Sep 2017	Lead Research Engineer in project “ <u>Automatic Infant Crying Recognition System (SPLANN)</u> ”, R&D project funded by the Romanian Government through UEFISCDI, project coordinator Softwin Group, Bucharest, Romania.
Oct 2014 – Sep 2017	Lead Research Engineer in project “ <u>Romanian Language Phonetic Analysis: Study and applications (AFLR)</u> ”, R&D project funded by the Romanian Government through UEFISCDI, project coordinator Softwin Group, Bucharest, Romania.
July 2014 – Sep 2017	Project Director and Lead Research Engineer in project “ <u>Natural-language, Voice-controlled Assistive System for Intelligent Buildings</u> ”, R&D project funded by the Romanian Government through UEFISCDI, project coordinator University Politehnica of Bucharest. Coordinated a consortium of three institutions and UPB R&D team (7 members). Performed research in distant speech recognition, multilingual speech recognition and spoken term detection.
May 2014 – Nov 2015	Implementing expert in project PRACISIS, FSE – European Structural Funds POS-DRU project, project coordinator University Politehnica of Bucharest. Career-counselled over 45 students.
Jan 2014 – Jan 2016	Research Engineer in project eWALL, R&D project funded by the European Commission through the 7th Framework Programme. Coordinated the development of an audio-based visitor monitoring application, a multilingual spoken command detection system and a cough detection system for monitoring cough crises.
Oct 2013 – Jun 2014	Project Director and Research Engineer in project “ <u>Noise-robust, domain-adaptable, large-vocabulary automatic speech recognition system for the Romanian language (LVCSR-ROM)</u> ”, R&D project funded by the Romanian-American Foundation, Bucharest, Romania. Coordinated a team of four senior researchers. Developed several enhancement modules for the Large Vocabulary Continuous Speech Recognition (LVCSR) system for Romanian language. Created a web-service which provides rich speech transcriptions for multimedia files.
Aug 2007 – Mar 2009	Research Engineer in project <u>PALIROM</u> , R&D project funded by the Romanian Government, project coordinator Softwin Group, Bucharest, Romania. Developed natural language resources for Romanian, implemented and tested a natural language compiler.
Aug 2007 – Mar 2009	Research Engineer in project “ <u>Biometric System for acquisition and verification of dynamic signature (BIOACS)</u> ” R&D project funded by the Romanian Government, project coordinator Softwin Group, Bucharest, Romania. Collected a database of digital handwritten signatures and developed digital signal processing algorithms for handwritten signature recognition.
2012 – Present	Founder & CEO Zevo Technology SRL, Bucharest (Romania) https://zevo-tech.com Identifying potential customers for Zevo’s products and beneficiaries for R&D consultancy projects. Coordinating the development of Zevo’s main products: (i) Zevo Live STT API, (ii) Zevo Live TTS API, (iii) Zevo Speaker Verification API and (iv) Zevo Speech Emotion Recognition API. Leading the software development and research teams in various R&D consultancy projects on deep learning and artificial intelligence applied in speech technology and multimedia processing.
Mar 2021 – Present	Text-to-speech synthesis, Speech to Lips keypoints synthesis for English and Romanian,

R&D consultancy project for Humans DNA SRL, Bucharest, Romania.

Coordinated Zevo R&D team to carry out two deep learning tasks, as follows:

- **Text-to-Speech (TTS) synthesis. Upgraded the TTS application developed in 2020 to use a new TTS architecture, such as FastPitch to provide a faster speaker adaptation mechanism and the possibility to integrate TTS standards, such as SSML. The project included new TTS model training and evaluation tasks.**
- Speech to Lips keypoints synthesis. Design and implementation of a DNN-based software application that generates lips movement (in the form of lips-specific keypoints) using natural or synthesized speech as input. The application is based on open-source DNN design toolkits, such as pytorch and included the design of several new DNN architectures.

Jun 2020 – Sep 2020

Text-to-speech synthesis, Speaker verification and Speech recognition for English and Romanian, R&D consultancy project for Humans DNA SRL, Bucharest, Romania.

Coordinated Zevo R&D team to carry out three speech processing tasks, as follows:

- **Text-to-Speech synthesis. Design and implementation of a DNN-based software application that generates English and Romanian speech utterances based on text input in these languages. The voices used for speech synthesis were provided by the beneficiary. The application was based on commercially viable open-source toolkits, such as Tacotron 2 and Flowtron**
- Speaker verification. Design and implementation of a DNN-based software application that identifies the speech segments where a target speaker speaks. The search was performed within a large dataset of multi-speaker audio recordings. The target speaker was identified based on a sample of 60 seconds.
- Speech transcription. Design and implementation of a DNN-based software application that transcribes into text any speech utterances in English. The transcription includes timestamps and reliable word-level confidence scores. The segments with transcription confidence very high, as provided by two complementary transcriptions systems are marked explicitly. The application was based on commercially viable open-source toolkits, such as Kaldi and ESPnet.

Nov 2019 – Mar 2020

Automatic speech transcription for non-native English, R&D consultancy project for ELSA Corp, Delaware, USA.

Coordinated Zevo R&D team to conduct over 100 training experiments on non-native English speech transcription models. The native language of the speakers was predominantly (50%) Vietnamese, but in total, the training and evaluation datasets included speakers with over 25 accents.

Delivered several Kaldi NN3T3 speech transcription models, including acoustic and languages models, for non-native English speech. Increased the performance of the beneficiary's models by >60% (WER decreased from 41% to 16%).

May 2017 – May 2019

**Project Manager and Lead Research Engineer
Autonomous Systems**

Coordinated a team of research engineers to create an audio-visual speech recognition system.

Jan 2011–Feb 2011

IT Consultant

RSM Scot SRL, Bucharest (Romania)

<http://www.rsmscot.ro/>

Designed and implemented a web-based, employees time-tracking application. Technologies used: Java, PostgreSQL, Linux.

Oct 2009–Jun 2010

IT Consultant

Grob Technologies Inc., Arlington, Massachusetts (USA)

<http://www.grobtech.com>

Designed and implemented several software components for a web application performing semantic evaluation of Social Networking Content from Twitter, Facebook, and various blogging sites. Technologies used: Java, ActiveMQ, JMX, REST, JSON, PostgreSQL, Linux.

Jan 2006–Jan 2009

Software Engineer

Ubicore Technology, Bucharest (Romania)

Implemented video processing algorithms on a novel massive-parallel computing architecture.

Designed and implemented a distributed computing application for highly computational tasks.

Developed of a complete debugger tool for a new computing architecture (including GUI, debug features and debug protocols).

Technologies used: C/C++, Java, JNI.

EDUCATION AND TRAINING

Oct 2008–Oct 2011

PhD in Electronics and Telecommunications

University Politehnica of Bucharest, Bucharest (Romania)

Graduated with the "very well" jury appreciation.

Thesis title: "Towards a speaker-independent, large-vocabulary continuous speech recognition system for Romanian".

Created the first Large vocabulary Continuous Speech Recognition (LVCSR) system for the Romanian language.

Oct 2003–Jun 2008

MSc in Applied Electronics

University Politehnica of Bucharest, Bucharest (Romania)

Graduated with 9.56/10.00, a "Top of Class" degree and outstanding performances in subjects like Microcontroller Architectures, Information Technology, Digital Signal Processing, Image Processing and Object-Oriented Programming.

PERSONAL SKILLS

Mother tongue(s)

Romanian

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
French	A2	B1	A1	A2	B1

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages

Communication skills

Active listening, Public speaking, Verbal and written communication, Stress management, Ability to adapt to multicultural environments, Non-verbal communication.

Organisational / managerial skills

Leadership, Organization and delegation, Project management, Team management, Business development, Forward planning and strategic thinking, Problem solving and decision-making, Commercial awareness, Mentoring.

Digital competence

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem solving
Proficient user	Proficient user	Independent user	Proficient user	Proficient user

Digital competences - Self-assessment grid

Deep learning: pytorch, tensor flow, deep neural network architectures and hyper-parameter tuning

Software engineering: python, Java, C/C++, SQL, Matlab, HTML, bash scripting, assembly (x86, 8051)

Operating systems: Linux and Microsoft Windows

Text/graphics editing: Microsoft Office (Word, Excel, PowerPoint), GIMP

ADDITIONAL INFORMATION**Publications (selection)**

- Oneață, Dan, Beáta Lőrincz, Adriana Stan, and Horia Cucu. "FlexLip: A Controllable Text-to-Lip System." *Sensors* 22, no. 11 (2022): 4104. ISI IF 3.847.
- Jain, Rishabh, Mariam Yahayah Yiwere, Dan Bigioi, Peter Corcoran, and Horia Cucu. "A Text-to-Speech Pipeline, Evaluation Methodology, and Initial Fine-Tuning Results for Child Speech Synthesis." *IEEE Access* 10 (2022): 47628-47642. ISI IF 3.476.
- Boldeanu, Mihai, Mónica González-Alonso, Horia Cucu, Corneliu Burileanu, Jose Maria Maya-Manzano, and Jeroen Buters. "Automatic Pollen Classification and Segmentation using U-nets and Synthetic Data." *IEEE Access* (2022). ISI IF 3.476.
- Georgescu, Alexandru-Lucian, Alessandro Pappalardo, Horia Cucu, and Michaela Blott. "Performance vs. hardware requirements in state-of-the-art automatic speech recognition." *EURASIP Journal on Audio, Speech, and Music Processing* 2021, no. 1 (2021): 1-30. ISI IF 2.114.
- Boldeanu, Mihai, Horia Cucu, Corneliu Burileanu, and Luminița Mărmureanu. "Multi-Input Convolutional Neural Networks for Automatic Pollen Classification." *Applied Sciences* 11, no. 24 (2021): 11707. ISI IF 3.476.
- Dan Oneață and Horia Cucu, "Multimodal speech recognition for unmanned aerial vehicles," *Computers & Electrical Engineering* 90 (2021): 106943. ISSN: 0045-7906. doi: 10.1016/j.compeleceng.2020.106943. ISI IF 2.663.
- Caranica, Alexandru, Dan Oneață, Horia Cucu, and Corneliu Burileanu. "Confidence Estimation for Lattice-based and Lattice-Free Automatic Speech Recognition." *University "Politehnica" of Bucharest Scientific Bulletin, Series C*, vol. 83, issue 3, pp. 155-170, Bucharest, 2021, ISSN 2286-3540.
- Gheorghe Pop, Horia Cucu, Dragoș Burileanu, Corneliu Burileanu, "Cough Sound Recognition in Respiratory Disease Epidemics," in *Romanian Journal of Information Science and Technology*, vol. 23, no. S, pp. S77–S89, 2020, ISSN 1453-8245, ISI IF 0.661.
- Ciprian V. Pop, Andi Buzo, Cristian Diaconu, Georg Pelz, Horia Cucu, and Corneliu Burileanu, "Application-Aware Estimation of the Junction Temperature Swing under Active Cycling," in *University "Politehnica" of Bucharest Scientific Bulletin, Series C*, vol. 82, issue 1, pp. 131-142, Bucharest, 2020, ISSN 2286-3540.
- Valentin Andrei, Horia Cucu, Corneliu Burileanu, "Overlapped Speech Detection and Competing Speaker Counting – Humans Versus Deep Learning," in *IEEE Journal of Selected Topics in Signal Processing*, vol 13, issue 4, pp. 850-862, Aug 2019, ISSN 1941-0484, doi:10.1109/JSTSP.2019.2910759, ISI IF 6.688.
- Ciprian V. Pop, Andi Buzo, Georg Pelz, Horia Cucu, Corneliu Burileanu, "The Estimation of the Lifetime Variation for Power Devices," in *IEEE Transactions on Device and Materials Reliability*, vol. 19, iss. 4, pp. 654-663, Dec 2019, ISSN 1530-4388, doi:10.1109/TDMR.2019.2940672, ISI IF 1.583.