Nikolaos (Nikos) Flemotomos

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in /in/nikosfl

Research

Speech Processing, Recognition, and Understanding, Natural Language Processing,

Speaker Diarization and Identification, Machine Learning for Healthcare Interests

EDUCATION

Ph.D., Electrical Engineering

expected May 2022

University of Southern California, Los Angeles, CA, U.S.A.

Thesis: Roles People Play: Leveraging Speaker Role Information in Speech Processing Applications

M.Sc., Computer Science

Aug 2021

University of Southern California, Los Angeles, CA, U.S.A.

GPA: 3.94/4.00

M.Sc., Electrical Engineering

Dec 2018

University of Southern California, Los Angeles, CA, U.S.A.

GPA: 4.00/4.00

Diploma (5-years degree), Electrical and Computer Engineering

Apr 2016

National Technical University of Athens, Athens, Greece

Thesis: Robust Acoustic Features for Distant Speech Recognition

GPA: 9.34/10.00

Research EXPERIENCE University of Southern California, Los Angeles, CA, U.S.A.

Signal Analysis and Interpretation Laboratory (SAIL)

Graduate Research Assistant

May 2017 to present

Supervisor: Prof. Shrikanth Narayanan

- Developing computational methods to represent intersectional dimensions of identity (e.g., gender, age, social status, profession) to study how such dimensions affect conversational interactions.
- Leveraging speaker role information in various speech processing tasks (e.g., diarization, speech recognition).
- Leading a subgroup that develops a real-world system which, after processing recordings of psychotherapy sessions, gives feedback to the therapist. The system is used for computer-aided therapist training.

Apple, Los Angeles, CA, U.S.A. (home office)

Siri – Automatic Speech Recognition R&D Team

Machine Learning Engineering Intern

May 2021 to Aug 2021

Supervisor: Dr. Arnab Ghoshal

• Explored adaptation methods for end-to-end speech recognition.

Microsoft Research, Bellevue, WA, U.S.A.

Speech and Dialog Research Group

Research Intern May 2019 to Aug 2019

Supervisor: Dr. Dimitrios Dimitriadis

- Worked on speaker identification and diarization in meeting scenarios.
- Proposed a novel algorithm for continuous speaker identification based on memory-augmented neural networks (presented at ICASSP '20).

Czech Technical University in Prague, Prague, Czech Republic

Biomedical Data and Signal Processing Group (BioDat)

Research Intern

Mar 2016 to Jun 2016

Supervisor: Assoc. Prof. Lenka Lhotska

• Developed an algorithm for automatic sleep staging from polysomnographic signals, motivated by ideas used in speech recognition.

National Technical University of Athens, Athens, Greece

Computer Vision, Speech Communication and Signal Processing Group (CVSP)

Undergraduate Research Assistant

Feb 2015 to Mar 2016

Supervisor: Prof. Petros Maragos

- Explored the Teager-Kaiser energy operator for energy estimation in speech signals.
- Developed a system for single-microphone distant speech recognition, comparing various acoustic feature sets, with an emphasis on those based on the AM-FM speech model.

Software

Programming Languages:

SKILLS

Python, UNIX shell scripting, MATLAB, C, R

Tools & Libraries:

Tensorflow, PyTorch, Kaldi, OpenFST, SRILM, LATEX

GRADUATE

Multimodal Probabilistic Learning of Human Communication, Advanced Natural Language Process-COURSEWORK ing, Law and Intellectual Property, Computational Social Sciences, Mathematics of High-Dimensional Data, Machine Learning Theory, Deep Learning, Machine Learning from Signals, Pattern Recognition, Statistics, Probability, Random Processes, Analysis of Algorithms

Teaching

University of Southern California, Los Angeles, CA, U.S.A.

EXPERIENCE

Teaching Assistant

Spring 2019, 2020 & 2021

Speech Recognition and Processing for Multimedia

Society of Astronomy and Space, Volos, Greece

Teaching Assistant

Summer 2011 & 2012

Preparation for the International Olympiad on Astronomy and Astrophysics

Honors and

Myronis Endowed Ph.D. Fellowship

Aug 2021 to May 2022

University of Southern California AWARDS

Annenberg Ph.D. Fellowship

Aug 2016 to Aug 2020

initiation: May 2020

University of Southern California

Phi Kappa Phi

Member (academic honor society)

Gerontelis Graduate Studies Scholarship

Apr 2020

Gerontelis Foundation

Travel Grant

Sep 2018

International Speech Communication Association (ISCA)

Honorable Mention

Sep 2010

4th International Olympiad on Astronomy and Astrophysics

Journal **PUBLICATIONS**

- 1. Z. Chen, N. Flemotomos, K. Singla, T.A. Creed, D.C. Atkins, and S. Narayanan, "An Automated Quality Evaluation Framework of Psychotherapy Conversations with Local Quality Estimates" (under review).
- 2. N. Flemotomos, V.R. Martinez, Z. Chen, T.A. Creed, D.C. Atkins, and S. Narayanan, "Automated Quality Assessment of Cognitive Behavioral Therapy Sessions Through Highly Contextualized Language Representations", PLOS ONE, 2021.
- 3. N. Flemotomos, V.R. Martinez, Z. Chen, K. Singla, V. Ardulov, R. Peri, D. Caperton, J. Gibson, M.J. Tanana, P. Georgiou, J. Van Epps, S.P. Lord, T. Hirsch., Z.E. Imel, D.C. Atkins, and S. Narayanan. "Automated Evaluation of Psychotherapy Skills Using Speech and Language Technologies", Behavior Research Methods, 2021.

4. S.B. Goldberg, N. Flemotomos, V.R. Martinez, M. Tanana, P. Kuo, B.T. Pace, J.L. Villatte, P. Georgiou, J. Van Epps, Z.E. Imel, S. Narayanan, and D.C. Atkins. "Machine Learning and Natural Language Processing in Psychotherapy Research: Alliance as Example Use Case", Journal of Counseling Psychology, 2020.

PEER
REVIEWED
CONFERENCE
& WORKSHOP
PROCEEDINGS

- Z. Chen, N. Flemotomos, V. Ardulov, T.A. Creed, Z.E. Imel, D.C. Atkins, and S. Narayanan. "Feature Fusion Strategies for End-to-End Evaluation of Cognitive Behavior Therapy Sessions", EMBC, 2021.
- 2. N. Flemotomos, P. Georgiou, and S. Narayanan. "Linguistically Aided Speaker Diarization Using Speaker Role Information", *Odyssey*, 2020.

 Best Student Paper Finalist
- 3. N. Flemotomos and D. Dimitriadis. "A Memory Augmented Architecture for Continuous Speaker Identification in Meetings", *ICASSP*, 2020.
- 4. T.J. Park, M. Kumar, **N. Flemotomos**, M. Pal, R. Peri, R. Lahiri, P. Georgiou, and S. Narayanan. "The Second DIHARD Challenge: System Description for USC-SAIL Team", *Interspeech*, 2019
- V.R. Martinez, N. Flemotomos, V. Ardulov, K. Somandepalli, S.B. Goldberg, Z.E. Imel, D.C. Atkins, and S. Narayanan. "Identifying Therapist and Client Personae for Therapeutic Alliance Estimation", *Interspeech*, 2019.
- 6. N. Flemotomos, P. Georgiou, D.C. Atkins, and S. Narayanan, "Role Specific Lattice Rescoring for Speaker Role Recognition from Speech Recognition Outputs", *ICASSP*, 2019.
- 7. N. Flemotomos, Z. Chen, D.C. Atkins, and S. Narayanan, "Role Annotated Speech Recognition for Conversational Interactions", *SLT*, 2018.
- 8. N. Flemotomos, P. Papadopoulos, J. Gibson, and S. Narayanan, "Combined Speaker Clustering and Role Recognition in Conversational Speech", *Interspeech*, 2018.
- 9. N. Flemotomos, V.R. Martinez, J. Gibson, D.C. Atkins, T.A. Creed, and S. Narayanan, "Language Features for Automated Evaluation of Cognitive Behavior Psychotherapy Sessions", *Interspeech*, 2018.
- K. Singla, Z. Chen, N. Flemotomos, J. Gibson, D. Can, D.C. Atkins, and S. Narayanan, "Using Prosodic and Lexical Information for Learning Utterance-level Behaviors in Psychotherapy", Interspeech, 2018.

Invited Talks 1. Alberta Hospital Edmonton/University of Alberta

Sep 2021

Forensic Grand Rounds

Towards Automated Large-Scale Evaluation of Psychotherapy

2. University of Southern California

Apr 2021

Interaction Lab

Who Spoke When? and how speaker roles can help us find the answer

Reviewer

Journals:

Applied Artificial Intelligence, PLOS ONE, Cogent Psychology, Behavior Research Methods

Conferences:

Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)

SERVICE AND VOLUNTARY WORK **USC Behavioral Science Society**

Student executive board member

Dec 2020 to present

Hellenic Student Association of USC

Student volunteer and board member

Jan 2018 to May 2019

IEEE Engineering in Medicine & Biology Society NTUA Student Chapter

President Sep 2014 to Jun 2015 Student volunteer Sep 2013 to Jun 2014