Özge Nilay Yalçın, PhD

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SUMMARY

I am a Postdoctoral Researcher at Simon Fraser University, with a research focusing on modeling conversational and empathic behavior in 3D virtual agents using hybrid AI models. During my PhD work, I was responsible for implementing the architecture for a real-time conversational system with speech and non-verbal emotional behaviors that are automatically generated. I am highly self-motivated and can work without supervision to plan, initiate and realize projects to develop systems and research from start to finish. I am interested in contributing to the field through open-source and sharing my ideas. I have been combining my backgrounds in Management Engineering and Cognitive Science to build and lead an interdisciplinary group of researchers, directing and mentoring undergraduate and graduate students at Simon Fraser University.

SPECIALITIES

- Conducting research starting with establishing theoretical foundations to modeling, designing experiments, data collection, data analysis and publishing
- Working and communicating ideas with interdisciplinary teams
- Leading and mentoring research groups
- Developing and applying statistical modeling and machine learning techniques
- Development of architectures based on human cognitive processes

INTERESTS

- Affective Computing
- Cognitive Modeling
- Human-Computer Interaction
- Embodied Conversational Agents
- Computational Models
- Natural Language Processing (NLP)
- Data Science
- AI Ethics

SKILLS

Technical Skills

- Python, Bash
- NLTK, SciPy, Pandas, Matplotlib
- TensorFlow, Keras, Torch, Theano, Caffe
- OpenCV, PyAudio, CMU Sphinx
- Google Cloud APIs, IBM Watson, AWS, DialogueFlow
- SPSS, R, Tableau, JMP
- Git
- Latex

Toolsets

- Amazon MTurk, PsiTurk, JsPsych
- Experiment Builder, OpenSesame
- USC Smartbody
- ACT-R
- Tobii Studio, Eye-tracker, Tobii Glasses
- Eyelink 1000
- Microsoft Kinect
- Emotiv Epoc+ EEG Headset
- Unity

EDUCATION

Simon Fraser University, Vancouver, Canada *September 2015 - 2019*
PhD in Interactive Arts and Technology
Fall 2015 GPA: 4.00/4.00

Middle East Technical University, Ankara, Turkey *February 2012 - September 2014*
MSc in Cognitive Science
Graduated with Honors
GPA: 4.00/4.00

Istanbul Technical University, Istanbul, Turkey *October 2005 - June 2010*
Bachelor's Degree in Management Engineering
Entering 4th in the faculty
GPA: 2.57/4.00

EXPERIENCE

Developing Interactive 3D Virtual Agents *2019-current*

Joint Post-doctoral Researcher in
Digital Health Circle & iVizLab, Simon Fraser University
Leading and mentoring an interdisciplinary research group for improving interactive systems with affective awareness

• Implementing the Emotion Recognition and Conversational Emotion Expression capabilities for embodied conversational agents using state-of-the-art ML models
• Leading Character Design group:
  - Leading design students to model realistic 3D virtual characters and gesture generation group for body and facial gestures
  - Leading the computer science students for developing behavior synchronization system for Behaviour Mark-up Language (BML) notation
• AI Interaction Applications Group
  - Leading developers for extending the M-PATH system (see below) with conversational interaction functionality
  - Examining the effect of gender appearance in voice-only and embodied agents
  - Examining the design requirements for interactions of embodied agents with elderly

Modeling Empathy in Embodied Conversational Agents *2016-2019*

PhD Thesis, Simon Fraser University
Developed a framework for 3D Virtual Agents with empathy behavior, including real-time conversational abilities with multimodal emotion recognition and expression behavior
Contributions:
• Designing and developing the innovative cognitive architecture - M-PATH
• Facial emotion recognition (OpenCV Haar Cascade for face detection, CNN on Keras with Tensorflow backend, trained on CK+ dataset)
• Speech Recognition (Google Cloud Speech API with streaming input)
• Voice emotion recognition (librosa to extract MFCC features, CNN on Keras with Tensorflow backend, trained on RAVDESS dataset)
• Sentiment Analysis (Modified Vader and SO-CAL sentiment analyzers with NRC Emotion Lexicons for word-level/sentence-level emotion recognition and sentiment analysis)
• Dialogue Manager (Used python NLTK and sklearnIncluding TF-idf, intent/context classification for QA with topic hierarchy, Survey Manager and response classification with fine-tuned BERT with pytorch)
• Behavior Controller system that controls conversational turn-taking and decisions on empathic behavior (mimicry, affect matching, emotion regulation) based on system goals, user model and history of the interaction
• Automated real-time behavior generation for synchronized gestures with speech for 3D Virtual Agent. Generating emotional and personality-based behavior with BML notation to be consumed by the Smartbody or Unity character animation platforms.
• Planning, designing and conducting experiments using the system in real-time and Amazon MTurk. Analysing the data and dissemination of the results in academic journals and venues.

AI-generated Anonymization in VR Journalism *2017-current*

Research Assistant, Simon Fraser University
2017-18 Knight Foundation / Google News Lab / Online News Association Journalism Grant
Developed computational abstraction techniques to generate videos and images that will best convey the emotional information
Contributions:
• Video segmentation using saliency models in Caffe
• Style transfer and abstraction of the images using Painterly model
• Development of interactive system using Kinect and movement analysis
• Planning, designing and conducting experiments using the system in real-time and Amazon MTurk. Analysing the data and dissemination of the results in academic journals and venues.

Eye tracking patterns for development of object and face expertise *2016-2017*

Research Assistant, Simon Fraser University

Comparison of attention and search behavior of children with autism spectrum disorder

Contributions:

- Designing the experimental setup on EyeLink equipment using Experiment Builder in Python
- Evaluating the collected data with pandas, scipy and matplotlib

Error Recovery in Speech Recognition Systems *2015-2016*

Research Assistant, Simon Fraser University

Investigating the sources of error in speech recognizers and build efficient systems for error recovery

Contributions:

- UI design for error recovery list-based system using kivy in Python
- Setting up speech recognizer using CMU Sphinx

Investigation of Cognitive Processes in Reading *2014-2015*

Research Assistant, Middle East Technical University

Developing a corpus of Turkish reading patterns, consisting of fixation location, duration and saccadic amplitude information for both silent and oral reading using eye-tracking

Contributions:

- Preparation of a corpora of words and sentences to be used in the experiment, based on their frequency of use and grammatical properties
- Experimental data collection using Eye-Tracking equipment
- Modeling the reading patterns in Turkish reading process with Linear Mixed Models and Statistical Methods by using the collected data
- Dissemination of the results in academic venues

Modeling and Predicting the Effect of Culture in Communication: A Mixed Study Using Naming Game and Social Networks *2013-2014*

MSc Thesis, Middle East Technical University

Using multi-agent simulation of a variation of Naming Game with social links to model information diffusion in social platforms

Contributions:

- Mining Twitter data based on hashtag use on popular political topics
- Cleaning and anonymizing the collected data
- Analyzing and modeling the change in the usage of hashtags using Naming Game paradigm, based on social network analysis in Gephi
- Visualization of the simulation using NetworkX

Automatic Song Tagging and Recommendation System *2013*

Middle East Technical University

Classifying music data according to mood and genre by using supervised learning to be used in recommendation systems

Contribution:

- Data collection, cleaning, sampling and annotation
- Applying Audio Feature Extraction methods to extract low-level features from audio samples
- Clustering the samples in Weka with kNN
- Recommendation system via calculating similarity based on mood and genre

EMPLOYMENT

Simon Fraser University, Surrey, Canada *Sep 2019 - current*

Postdoctoral Researcher

Simon Fraser University, Surrey, Canada *Sep 2016 - 2019*
Research Assistant under supervision of Prof. Dr. Steve DiPaola

Simon Fraser University, Surrey, Canada *Sep 2016 - 2017*
Teaching Assistant of *Introduction to Cognitive Science* course
Instructor Jeremy Turner

Simon Fraser University, Surrey, Canada *Sep 2015 - Sep 2016*
Research Assistant under supervision of Prof. Dr. Wolfgang Stuerzlinger

Middle East Technical University, Ankara, Turkey *Oct 2014 - 2015*
Research Assistant under the supervision of Assist. Dr. Cengiz Acartürk
Received full Tübitak Scholarship

Botègo, Yapayzeki Yazılım Ltd. Şti., Istanbul, Turkey *Aug-Sep 2009*
Intern
• Developing intelligent virtual assistants for company websites

Continental Mechanical Components GmbH, Roding, Germany *Jul-Aug 2008*
Intern
• Involved in two R&D projects and quality assurance of diesel pumps

ACADEMIC SERVICE AND MEMBERSHIPS

Association for Computing Machinery (ACM) SIGCHI & ACM-W Membership 2018 - current
Women in Machine Learning (WiML) Membership 2019 - current
Women in Computing Science Member and Mentor at SFU 2019 - current
Organizing Committee of Biologically Inspired Cognitive Architectures Conference (BICA) 2019
Cognitive Science Society Student Member 2018 - 2019
SFU Graduate Student Society Councillor 2017 - 2019