

MAHMUT KARAKAYA, PH.D.

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MACHINE LEARNING | COMPUTER VISION | IMAGING RESEARCH | MATLAB | PYTHON | C++

SUMMARY OF QUALIFICATIONS

- COMPUTER SCIENTIST and ENGINEER with a doctoral degree and 15+ years of extensive research.
- EXPERT IN MACHINE LEARNING & COMPUTER VISION with algorithm development skillsets; supervised and unsupervised Machine Learning (ML), deep learning, segmentation, classification, and image processing.
- PROFESSIONAL in Python and ML frameworks and libraries: Tensorflow, Pytorch, Keras, Scikit-learn.
- RESEARCHER in Biometrics, Iris Recognition, Medical Imaging, Smart Camera Networks.
- INVENTOR of Imaging Systems & Data Collection platforms and protocols to capture images/videos.
- PROFESSIONAL in Grant Writing & Management of 15+ internal and external funding proposals.
- DIRECTOR of Imaging Research & Intelligent System Lab. Supervised 30+ students. Published 47+ papers.
- EDUCATOR with 10+ years of experience with proven leadership, management, and communication skills.

PROFESSIONAL EXPERIENCE

Assistant Professor, Dept. of Computer Science **2013 – Present**
Kennesaw State Uni. (2020-present) | Uni. of Central Arkansas (2016-2020) | Meliksah Uni. (2013-2016)
Worked as a full-time tenure-track faculty member at several institutions

Postdoctoral Research Associate **2011 – 2013**
Oak Ridge National Laboratory @ Imaging Science and Machine Learning Group
Worked as a post-doc researcher at several machine learning and image processing projects

SELECTED PROJECTS

Biometrics to Improve Standoff Iris Recognition Systems

- Developed ML algorithms to improve the standoff iris recognition for gaze angle and pupil dilation.
- Developed computer vision algorithms for iris segmentation, gaze estimation, and frontal projection.
- Built a data collection platform and software protocols to collect 450,000+ iris images.

Diabetic Retinopathy Detection Using Smartphone-Based Retinal Imaging

- Developed ML solutions for disease prediction on retinal images.
- Designed deep learning frameworks for detection and localization.
- Developed pre-processing and image enhancement algorithms for retina images.

Smartphone-Based Portable Invisible Data Matrix Imaging Systems

- Designed a portable invisible data matrix reader for smartphones using 3D printing, lens, and filter.
- Developed computer vision algorithms to detect and decode invisible data matrix images.

Collaborative Solutions to Smart Camera Networks

- Designed computer vision algorithms for target detection, localization, tracking, and coverage estimation.
- Designed fault detection, correction, and tolerance algorithms.

PATENTS

- "Smartphone-based portable retinal imaging system" Turkey, 2014/00902 2014
- "Invisible data matrix reader system for smartphones" Turkey, 2015/16758 2015

EDUCATION

- Doctorate in Computer Engineering | *University of Tennessee* | Knoxville, TN 2011
- Master's in Electrical Engineering | *University of South Alabama* | Mobile, AL 2007
- Bachelor's in Electronics Engineering | *Fatih University* | İstanbul, Turkey 2005

EXTERNAL GRANTS & AWARDS & HONORS (*Role: Principal Investigator)

\$260,000	Standoff Iris Recognition Systems Using Deep Learning Frameworks	<i>NSF-SaTC*</i>	2020
\$292,000	Development of Retinal Imaging System using Smartphones	<i>NIH-INBRE*</i>	2018
\$67,000	Development of Invisible Data Matrix Reader System with Smartphones	<i>Turkish NSF*</i>	2014
\$50,000	Improving Iris Recognition Algorithms for Non-Ideal Iris Images	<i>Turkish NSF*</i>	2013
	Chancellor's Honor for Extraordinary Professional Promise	<i>University of Tennessee</i>	2010
	Best Paper Award	<i>ACM/IEEE Inter. Conf. on Distributed Smart Cameras</i>	2009

SELECTED PUBLICATIONS (* co-authored)

(out of 47 publications)

- "Iris-Ocular-Periocular: Towards more accurate Biometrics for Off-angle Images" *Journal of Electronic Imaging*, 2021.
- "CNN Based Off-angle Iris Segmentation and Recognition" *IET Biometrics*, 2021. (*)
- "Fragile Bits in Off-angle Iris Recognition", *IEEE Workshop on Biometrics and Forensics*, 2021.
- "Comparison of Smartphone-based Retinal Imaging Systems for Diabetic Retinopathy Detection using Deep Learning" *BMC Bioinformatics*, 2020. (*)
- "Deep Learning Framework for Diabetic Retinopathy Detection with Smartphone-based Retinal Imaging Systems" *Pattern Recognition Letters*, 2020. (*)
- "Effect of Pupil Dilation on Off-angle Iris Recognition" *Journal of Electronic Imaging*, 2019. (*)
- "A study of how gaze angle affects the performance of iris recognition" *Pattern Recognition Letters*, 2016.
- "Collaborative Localization in Visual Sensor Networks", *ACM Tran. on Sensor Networks*, 2014. (*)