Abdurrahim Yilmaz

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Summary

- Experience on Computer Vision, Deep Learning, and Time Series Analysis
- Experience on Dataset Collection, Preprocessing and Preparation
- Experience on Complex Robotic and Mechatronic Systems Mathematical Modelling and Simulation
- Experience on Digital Holography and Interferometry

Skills

- Experience on programming languages: Python, C, C++, C#, Matlab, Assembly, CCS C
- Libraries and frameworks: TensorFlow, Keras, scikit-learn, OpenCV, AForge, EmguCV, Qt, .Net
- Mechatronics Engineering, System Innovation and Micro-Nano Robotics Background
- Creative Problem Solving for Complex Mechatronics Systems
- Theoretical and Technical Experience on Sensor and Communication Systems
- Experienced in several major manufacturing process: CNC, Laser Cutter, 3D printer
- Experience on design programs: SolidWorks
- Experience on engineering programs: COMSOL Multiphysics, ANSYS, Matlab, Simulink, Proteus, ImageJ
- Perform and assist laboratory cell culture
- Experience on project writing

Education

2020–2022 : **MSc**, *in Mechatronics Engineering Department Yildiz Technical University, YTU, GPA − 4.00/4.00*.

Thesis Title: **Linear and Rotational Motion of An On-Chip Microrobot: Applications on Wound Scratching Process and Multi-Flow Mixing**.

2016–2020 : **BSc**, *in Mechatronics Engineering Department Yildiz Technical University, YTU, GPA − 3.25/4.00, 3rd degree on department*.

Thesis Title: **Incubator Compatible Holographic Imaging System**.

Publications

Journals:

2022 R. Varol, Z. Karavelioglu, S. Omeroglu, G. Aydemir, A. Karadag, H. E. Meco, G. C. Kocal, **A. Yilmaz**, M. E. Oruc, G. B. Esmer, Y. Basbinar, and H. Uvet. Holographic cell stiffness mapping using acoustic stimulation. *Accepted, Nature Communications*, 2022.

2022 **A. Yilmaz**, Z. Karavelioglu, G. Aydemir, A. A. Demircali, R. Varol, A. Kosar, and H. Uvet. Microfluidic wound scratching platform based on an untethered microrobot with magnetic actuation. *Sensors and Actuators B: Chemical*, 2022.

2022 **A. Yilmaz**, F. Goktay, R. Varol, G. Gencoglan, and H. Uvet. Deep convolutional neural networks for onychomycosis detection using microscopic images with koh examination. *Mycoses*, 2022.

2022 **A. Yilmaz**, G. Gencoglan, R. Varol, A. A. Demircali, M. Keshavarz, and H. Uvet. Mobileskin: Classification of skin lesion images acquired using mobile phone-attached hand-held dermoscopes. *Journal of clinical medicine*, 2022.

2021 M. I. Ozmen, **A. Yilmaz**, C. Baykara, and O. A. Ozsoysal. Modelling fuel consumption and nox emission of a medium duty truck diesel engine with comparative time-series methods. *IEEE Access*, 2021.

2021 T. Abbasiasl, H. E. Sutova, S. Niazi, G. Celebi, Z. Karavelioglu, U. G. Kirabali, **A. Yilmaz**, H. Uvet, O. Kutlu, S. Ekici, M. Ghorbani, and A. Kosar. A flexible cystoscope based on hydrodynamic cavitation for tumor tissue ablation. *IEEE Transactions on Biomedical Engineering*, 2021.

Preprints:

2022 Bilici N. Varol R. Yilmaz A. Kirabali U. G. **A. Yilmaz** Ay, F. C., H. Uvet. Study on the Concept, and Development of a Mobile Incubator. https://arxiv.org/abs/2208.09697, 2022.

2021 **A. Yilmaz**, A. Tekeci, M. E. Ozyetkin, A. A. Demircali, K. Unsal, and H. Uvet. The Effect of Pore Structure in Flapping Wings on Flight Performance. https://arxiv.org/abs/2106.04390, 2021.

2021 **A. Yilmaz**, M. Kalebasi, Y. Samoylenko, M. E. Guvenilir, and H. Uvet. Benchmarking of Lightweight Deep Learning Architectures for Skin Cancer Classification using ISIC 2017 Dataset. https://arxiv.org/abs/2110.12270, 2021.

2021 **A. Yilmaz**, A. A. Demircali, S. Ozkasap, L. Yorgancioglu, H. Uvet, and G. Aydemir. Mechatronic Investigation of Wound Healing Process by Using Micro Robot. https://arxiv.org/abs/2108.02162, 2021.

2021 **A. Yilmaz**, D. Bayraktar, M. Akman, C. Sahinoglu, and H. Uvet. Gesture Classification using Machine Learning with Advanced Boosting Methods. https://vixra.org/abs/2105.0176, 2021.

2020 **A. Yilmaz**, A. A. Demircali, S. Kocaman, H. Uvet. Comparison of Deep Learning, and Traditional Machine Learning Techniques for Classification of Pap Smear Images. https://arxiv.org/abs/2009.06366, 2020.

Conference Proceedings:

2021 **A. Yilmaz**, A. A. Demircali, B. Baban, S. Ozkasap, Y. Samoylenko, K. Chadha, and H. Uvet. Numerical Analysis of Micromixer Based on Microrobots. TIPTEKNO21, 2021.

2021 H. Demirci, **A. Yilmaz**, M. E. Oruc. Production of Thermal Imprint Apparatus for Micro, and Nano Molding. 5. GTU Graduate Research Symposium, 2021.

2021 Attendant, biomedical devices and artificial intelligence in clinics symposium. 2021.

2020 R. Varol, S. Omeroglu, **A. Yilmaz**, M. E. Oruc, G. B. Esmer, and H. Interferometric Measurement of Refractive Index Change of Tumor Cells Under Electrical Fields. Uvet. In *Digital Holography and Three-Dimensional Imaging*, pages HTh4H–2. Optical Society of America, 2020.

2019 A. A. Demircali, T. Vatansever, E. Saruhan, **A. Yilmaz**, B. A. Yildiz, B. Guner, M. Kesen, K. Erkan, and H. Uvet. Increasing Longitudinal Forces of Microrobot Using with Diamagnetic Levitation. TOK2019, 2019.

2019 A. A. Demircali, T. Vatansever, E. Saruhan, **A. Yilmaz**, B. A. Yildiz, B. Guner, M. Kesen, K. Erkan, and H. Uvet. A Highly Accurate Microrobot Position Control in Liquid Laminar Flow. TOK2019, 2019.

2019 A. A. Demircali, T. Vatansever, E. Saruhan, **A. Yilmaz**, H. Gules, and H. Uvet. Increasing Longitudinal Forces of Microrobot Using with Diamagnetic Levitation. INSI2019, 2019.

2019 A. A. Demircali, T. Vatansever, E. Saruhan, **A. Yilmaz**, H. Gules, and H. Uvet. Motion Control of Microrobot in Laminar Flow. INSI2019, 2019.

2018 A. A. Demircali, **A. Yilmaz**, H. Uvet. Microrobot Orientation Control with Laser, and Visual Feedback. pages 65–69. TORK2018, ISTANBUL, TURKEY, 2018.

Submitted Journals:

2022 R. Varol, **A. Yilmaz**, Z. Karavelioglu, S. Omeroglu, A. A. Demircali, G. B. Esmer, and H. Uvet. Interferometric measurement of refractive index change distribution of cells under electrical fields. *(Under Review)*, 2022.

2022 R. Varol, **A. Yilmaz**, Z. Karavelioglu, S. Omeroglu, G. Aydemir, M. E. Oruc, Y. Basbinar, and H. Uvet. Classification of cellular trajectories subject to acoustic drifting forces. *(Under Review)*, 2022.

2022 **A. Yilmaz**, M. I. Hayiroglu, R. Varol, A. A. Demircali, and H. Uvet. Machine learning approach on high risk treadmill exercise test to predict obstructive coronary artery disease by using p, qrs, and t waves' features. *(Under Review)*, 2022.

2022 **A. Yilmaz**, G. Gencoglan, S. Pekcan Yasar, A. A. Demircali, and H. Uvet. Derm14 dataset and subgroup classification of skin lesions using dermoscopic images. *(Under Review)*, 2022.

Patent and Review Service:

• 12/2020, National Patent, An Electro-Holographic Microscopy System that can Separate Cells and Microorganisms According to the Refractive Index, (No:2020/19536)

• 05/2020, Ad hoc reviewer for International Journal of Imaging Systems and Technology.

Experience

08/2022 – present ***Research Assistant in Bundeswehr University Munich***, *Munich, GERMANY*.
Developing deep CNN, GAN, and computer vision algorithms for augmented microscopy.

06/2022 – present ***Engineering Manager in Advanced Systems and Innovation Laboratories (TUBITAK 1001, Project no: 121E683)***, *Istanbul, TURKEY*.
Leading the artificial intelligence projects in sports and medicine.

06/2020 – 07/2022 ***Research Assistant in The Scientific and Technological Research Council of Turkey (TUBITAK 1003, Project no: 116E743)***, *Istanbul, TURKEY*.
Measuring the mechanical cell stiffness of circulating tumor cells using acoustic signals and digital holography.
Data preprocessing, collection, preprocessing, dataset preparation, and developing deep learning model for various tasks such as dermatophytes classification from microscopic images, tumour detection and segmentation from histopathological slides.

12/2019 – 06/2020	**Research Engineer in ASELSAN A.S.**, *Ankara, TURKEY*. Developing deep reinforcement learning models for agile drones. Designing and manufacturing agile drones and its test bench.
08/2019 – 09/2019	**Intern in Baykar Defence**, *Istanbul, TURKEY*. Developing a low-level augmented reality program to improve visual performance of pilots.
07/2019	**Intern in ASELSAN A.S.**, *Ankara, TURKEY*. Antenna azimuth position controller design and its implementation.
01/2019	**Intern in YTU**, *Istanbul, TURKEY*. Design flapping wing aerial vehicle by mimicking birds and its fabrication.
09/2017 – 06/2018	**Software Developer in Turkish Airlines Aviation Academy**, *Istanbul, TURKEY*. Touch panel design, its wireless communications and improving an efficiency of electronic devices.
06/2017 – 06/2020	**Student Assistant in The Scientific and Technological Research Council of Turkey (TUBITAK 1003, Project no: 116E743; TUBITAK 1001, Project no: 113E584)**, *Istanbul, TURKEY*. Measuring the refractive index of circulating tumor cells under electric field using digital holography. Micro robotic arm design, production, and contactless manipulation with visual feedback. Control, design, and manufacturing of flapping wing UAV.

Projects Involved

- Design, control, and manufacturing of thermal imprint apparatus. (SolidWorks, C#)
- 3D surface modelling software by using laser sensor with 49kHz measuring rate at nanometer resolution. (C/C++)
- Design, Manufacturing, and Wireless Communication of a Smart Watch for Newborn. (C, ESP8266)
- Augmented reality calculator and car plate recognition program and GUI (C#).
- Term Projects: 1-Obstacle avoiding robot (C). 2-Simple IoT project (C#, ESP8266). 3-Design, analysis, and simulation of a portable crane (SolidWorks, MATLAB). 4-Wireless communication of lighting systems for road (ZigBee, 16F877A, CCS C). 5-Wireless electromyography device (C, NodeMCU, ESP8266). 6-Design of automated guided vehicle. 7-Fuzzy logic based reinforcement learning (Python, MATLAB).

Awards

2020	Yildiz Technical University–Outstanding Achievement Scholarship, 3rd degree of department
2019	The Scientific and Technological Research Council of Turkey (TUBITAK) 2209-B Support to Participation in International Scientific Activities Program, "Imaging and Analysis of Changing of Cell Refractive Index by using Digital Holographic Microscopy"
2019	The Scientific and Technological Research Council of Turkey (TUBITAK) 2209-B Support to Participation in International Scientific Activities Program, "Incubator Compatible Holographic Imaging System"
2019	2nd Paper Award TOK 2019 (Turkish National Committee for Automatic Control) for the paper entitled "Increasing Lateral Force of Microrobot Using Passive Diamagnetic Levitation"
2018	Best Paper Award TORK 2018 (Turkey Robotics Science Conference) for the paper entitled "Orientation Control of a Microrobot in Microfluidic Environment"

References

- Dr. Huseyin Uvet, BSc and MSc Research Advisor, Associate Professor of Mechatronics Engineering at Yildiz Technical University/Turkey, huvet@yildiz.edu.tr, +(90) 533 385 30 23
- Dr. Gulsum Gencoglan, Research Advisor, PhD in Basic Oncology and MD Professor of Department of Dermatology and Veneorology at Istinye University and Liv Hospital/Turkey, gulsum.gencoglan@istinye.edu.tr
- Dr. Ali Anil Demircali, Research Advisor, Department of Radiology, Molecular Imaging Program at Stanford (MIPS), Stanford University School of Medicine, alianil@stanford.edu

Others:
- Member of YTU's Advanced Systems and Innovation Laboratories (ASIL) since 2017.
- I have co-supervised more than 20 undergraduate researchers since 2017.
- Interests: Roadtrip, Motorcycle, Tennis.