CURRICULUM VITAE

Name: Burak Çatalbaş

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EDUCATION

- Sep 2018-Jul 2024 Ph.D. in Bilkent University, Electrical and Electronics Engineering Department, Ankara, Turkey. CGPA: 3.39/4. Scholarship awarded by TUBITAK.

- Sep 2016-Sep 2018 M.Sc. in Bilkent University, Electrical and Electronics Engineering Department, Ankara, Turkey. CGPA: 3.53/4. Scholarship awarded by TUBITAK.

- Sep 2012-June 2016 B.Sc. in Bilkent University, Electrical and Electronics Engineering Department, Ankara, Turkey. CGPA: 3.75/4. Scholarship awarded by Bilkent University.

    - Minor Degree in Bilkent University, International Relations Department, Ankara, Turkey. CGPA: 4/4.

RESEARCH EXPERIENCE

Bahçeşehir University, Computer Engineering Department Istanbul, Turkey, Oct 2025-Present

- Working as an assistant professor in the Computer Engineering Department of Bahçeşehir University.

Postdoctoral Researcher, Georgia Tech August 2024-August 2025

- Worked on bipedal locomotion on granular and rigid surfaces, including 2D and 3D robots; and worked on wheeled robot locomotion on granular surfaces with steep slopes thanks to support of TUBITAK via 2219 scholarship program. Made a presentation in APS 2025 and presented an exhibition demo in the ICRA 2025 conference, where it is chosen as a finalist. Currently, academic journal articles about the work done are in the process of preparation and writing.

A Study on the Novel Methods to Improve the Performances of Artificial Neural Networks and Their Applications 2020-2024

- An ongoing academical work on using various methods for different neural network types and different application areas to improve the performances of artificial neural networks. Specifically, classification and image segmentation tasks are enhanced using convolutional neural networks, and recurrent neural networks are separately used to generate walking parameters for simulations and real-time experiments. Results are obtained for 2D and 3D configurations, using existent and novel methods for artificial neural networks and as success rates for classification tasks and IoU values for image segmentation tasks.

Artificial Neural Network Based Controller Design and Implementation for Two-Legged Robots July 2020-July 2023

- This was a TUBITAK ARDEB project related to identifying and controlling the biped robot model by using recurrent neural networks. In detail, adaptive control of legged locomotion was

performed with neural network-based system identification and controller design. In this way, it was aimed to ease the walking control of legged robots by expanding the range of motion and facilitating their use in many sectors such as manufacturing, service, and defense. RS485 protocol and PyPot library was used and modified respectively, for interfacing Force/Torque sensors and Dynamixel XH-540 servos to the robot controller system.

Improved Artificial Neural Network Training with Advanced Methods 2017-Sept 2018

- Artificial neural networks literature is scanned for every stage of building neural networks, including parameter initializations, loss functions, learning algorithms, activation functions, network layers etc. Data augmentation and other techniques are also tried out with convolutional neural networks, increasing the performance on MNIST and CIFAR-10 datasets. During the study, many novel techniques are found and applied for the first time in our work; Laplacian initialization, SinAdaMax optimizers and many others are tested and compared with existing methods of the neural network literature.

Identification and Adaptive Control of Bipedal Robot Motion With Artificial Neural Networks

2018-Jul 2024

- A novel activation function is introduced for artificial neural networks and using this activation function, different tasks such as image classification and segmentation are completed. In addition to this work, a review of different methods used in the field of neural networks is also included. Afterwards, 2D and 3D robot model simulations are used for generating datasets. These simulations are then used for control, system identification and adaptive control by applying novel methods and schemes. Finally, a 2D physical robot is built for generating a dataset and making system identification by neural networks using these novel methods.

PROJECT EXPERIENCE

CS 559 Course Project, DeepNewton Ankara, Turkey, 2016-2017

- A project team consisting of an electrical and electronics engineer and a computer scientist have generated a physical simulation system using convolutional and recurrent neural networks, to predict physical scenarios with a moving projectile and a set of walls, in 2D resolution.

Senior Design Project, Radar Target Simulator Ankara, Turkey, 2015-2016

- In a project team consisting of 6 senior students, a radar target simulator is constructed for FMCW radar system. An imaginary target is constituted for building a system to test automotive radars in 24 GHz frequency, with desired velocity values are entered as input. MATLAB, Java and other software tools are used for project interface, working mechanism and testing schemes, including CAN Bus connection to automotive radars.

Software Project, B-Manager Ankara, Turkey, 2012

- In a project team of 4 students, an offline basketball manager game is created for PCs, using Java programming tools.

PUBLICATIONS

Journal Publications

B. Çatalbaş, Ö. Morgül. "Deep Learning with ExtendeD Exponential Linear Unit (DELU)", Neural Computing and Applications, vol. 35, no. 30, 22705-22724, 2023.

Theses

B. Çatalbaş, "Improved Artificial Neural Network Training with Advanced Methods", M.S. Thesis, September 2018, I. D. Bilkent University, Ankara, Turkey. Available: Link

B. Çatalbaş, "Identification and Adaptive Control of Bipedal Robot Motion With Artificial Neural Networks", Ph.D. Thesis, July 2024, I. D. Bilkent University, Ankara, Turkey.

Peer-Reviewed Conference Papers

B. Çatalbaş, B. Çatalbaş and Ö. Morgül. "The Use of Artificial Neural Networks in Bipedal Robot Motion Control", in 24*th Automatic Control National Conference (TOK)*, pp. 1–4, İstanbul, Turkey, September 2023.

B. Çatalbaş and Ö. Morgül. "A New Initialization Technique: Truncated Towers", in *30th IEEE Signal Processing and Communications Applications Conference (SIU)*, pp. 1–4, Karabük, Turkey, May 2022. DOI: 10.1109/SIU55565.2022.9864714

B. Çatalbaş, **B. Çatalbaş** and Ö. Morgül. "Two-Legged Robot System Identification With Artificial Neural Networks", in *28th IEEE Signal Processing and Communications Applications Conference (SIU)*, pp. 1–4, September 2020. DOI: 10.1109/siu49456.2020.9302094

B. Çatalbaş and Ö. Morgül. "A New Learning Algorithm: SinAdaMax", in *27th IEEE Signal Processing and Communications Applications Conference (SIU)*, pp. 1–4, Sivas, Turkey, April 2019. DOI: 10.1109/SIU.2019.8806259

B. Çatalbaş, B. Çatalbaş and Ö. Morgül. "A New Initialization Method for Artificial Neural Networks: Laplacian", in *26th IEEE Signal Processing and Communications Applications Conference (SIU)*, pp. 1–4, İzmir, Turkey, May 2018. DOI: 10.1109/siu.2018.8404491

B. Çatalbaş, B. Çatalbaş and Ö. Morgül. "Human Activity Recognition with Different Artificial Neural Network Based Classifiers", in *25th IEEE Signal Processing and Communications Applications Conference (SIU)*, pp. 1–4, Antalya, Turkey, May 2017. DOI: 10.1109/siu.2017.7960559

Other Publications

B. Çatalbaş and Y.D. Çetin, "*A Final Report on DeepNewton: Physical Simulations Using Deep Networks*", Project Report at JSDelivr. Available: Link

Scholar Reviewing

Manuscript reviewing of journal articles, for the journal *Transactions of the Institute of Measurement and Control*, 2023-present.

Manuscript reviewing of journal articles, for the journal *Neural Computing and Applications*, 2024-present.

Manuscript reviewing of journal articles, for the journal *Expert Systems with Applications*, 2024-present.

PROFESSIONAL EXPERIENCE

Arçelik AŞ, Hardware Design Department (R&D) Istanbul, Turkey, June-July 2014

- A 4-week summer internship focused on FPGA based systems in Arçelik Television Factory, Hardware Design Department (R&D).

ASELSAN, Radar & Electronic Warfare Systems Vice Presidency Ankara, Turkey, Aug-Sep 2015

- A 4-week summer internship focused on Radar Scan Type detection via radar signal information in REHİS department.

Bahçeşehir University, Computer Engineering Department Istanbul, Turkey, Oct 2025-Present

- Working as an academician in the Computer Engineering Department in Bahçeşehir University.

TEACHING EXPERIENCE

- Teaching Assistant, EEE 212 Microprocessors – 2014-2015 Fall, 2014-2015 Spring, 2015-2016 Fall, 2015-2016 Spring.

- Teaching Assistant, EEE 342 Feedback Control Systems – 2017-2018 Fall, 2017-2018 Spring, 2018-2019 Fall, 2018-2019 Spring, 2019-2020 Fall, 2019-2020 Spring, 2020-2021 Fall, 2020-2021 Spring, 2021-2022 Fall, 2021-2022 Spring, 2022-2023 Fall, 2022-2023 Spring, 2023-2024 Fall, 2023-2024 Spring.

- Lecturer, SEN 1011 Introduction to Programming (Python), 2025-2026 Fall (ongoing).

SKILLS

- Experienced in machine learning algorithms such as Artificial Neural Networks, specifically Convolutional Neural Networks and Recurrent Neural Networks.

- Experienced in Java, Python, MATLAB, C++ (including CUDA), VHDL, PIC C, 8051 Assembly programming languages.

- Experienced in Spyder, PyCharm, Visual Studio, MATLAB, Simulink, Android Studio, Jupyter Notebook, Xilinx, Proteus ISIS, 5Spice Analysis, JCreator, Microsoft Office, Wireshark, MPLAB IDE, CCS C, CodeBlocks compiling programs etc.

- Experienced in Windows, Debian and Mac operating systems.

- Experienced in mobile application programming using Java.

- Experienced in Circuit and PCB design, power electronics, microprocessor and FPGA programming.

- Experienced in Jetson, Raspberry Pi motherboards and Navio2 flight controller.

ACHIEVEMENTS & AWARDS

- TUBITAK Scholarship for Postdoctoral Research under 2219 Program, 2024-2025
- TUBITAK Scholarship for Doctoral Degree under 2211-E Program, 2018-Present
- TUBITAK Scholarship for Master's Degree under 2210-A Program, 2016-2018
- TUBITAK, International Unmanned Aerial Vehicle Turkey Competition, Fixed Wing Category, Third Prize, 2016.
- Bilkent University, full scholarship of Ph.D. degree in Electrical and Electronics Engineering, 2018-Present
- Bilkent University, full scholarship of M.Sc. degree in Electrical and Electronics Engineering, 2016-2018
- Bilkent University, full scholarship of B.Sc. degree in Electrical and Electronics Engineering, 2012-2016
- Annual "Golden Youth" Award, Türkiye İş Bankası, 2012.
- 2012 YGS – LYS (University Qualification Exams of Turkey); 23rd rank on Quantitative Score, 12th rank on Verbal Score amongst 2.126 million participants in Turkey.
- Graduate Research Conference, Bilkent, Best Oral Presentation Award, 2024

LANGUAGES

Turkish (Native), English (Fluent), German (Beginner)

CLUB MEMBERSHIPS

IEEE Bilkent Robotics and Automation Society	Sep 2012-Jul 2024
Bilkent Robotics Club	Sep 2012-Jul 2024
GazeteBilkent	Sep 2015-Jul 2024

PERSONAL INFORMATION

Date of Birth: 22 February 1996

Place of Birth: Istanbul-Turkey

Nationality: Turkish

Hobbies: History, Basketball, Swimming, Chess and RC Piloting

REFERENCES

- Asst. Prof. Bahadır Çatalbaş, Yildiz Technical University, Department of Control and Automation, E-mail: bahadir.catalbas@yildiz.edu.tr, Tel: +90 534 926 42 90

- Prof. Dr. Ömer Morgül, Bilkent University, Electrical and Electronics Engineering Department, EE408, E-mail: morgul@ee.bilkent.edu.tr, Tel: +90 312 290 15 29
- Prof. Dr. Nail Akar, Bilkent University, Electrical and Electronics Engineering Department, EE504, E-mail: akar@ee.bilkent.edu.tr, Tel: +90 312 290 23 37