

Hasnain Irshad Bhatti

<http://hasnainirshad.github.io>

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EDUCATION

- **Korea Advanced Institute of Science and Technology** Daejeon, KR
Ph.D. in Electrical Engineering (Advisor: Prof. Jaekyun Moon) Mar. 2022 – present
- **Korea Advanced Institute of Science and Technology** Daejeon, KR
M.S. in Electrical Engineering, Percentage: 91.33% (Advisor: Prof. Jaekyun Moon) Sept. 2020 – Feb. 2022
Dissertation Title: Decoupled Training of Neural Networks with Periodic Knowledge Distillation
- **University of Engineering and Technology, Lahore** Lahore, PK
Bachelor of Science in Electrical Engineering; GPA: 3.825/4 , Double Gold Medalist Oct. 2016 – July. 2020

RESEARCH EXPERIENCE

- **MoonLab, KAIST** Daejeon, KR
Lab Researcher Jan 2021 - Present
 - **Decoupled Training of Neural Networks:** Developed a decoupled training strategy to bridge performance gap of layer-wise training and backpropagation using periodic global knowledge sharing.
 - **Federated Learning:** Alleviating system heterogeneity issues in FL. Specifically, devising novel update schemes to reduce communication burden at the edge devices.
 - **Split Learning and Data Selection:** Devised a low-cost activation level sample selection strategy by utilizing intermediate embeddings for communication efficient SL.
- **Al-Khawarizmi Institute of Computer Science, UET Lahore** Lahore, PK
Research Intern April 2019 - Dec 2019
 - **Accident Detection:** Developed real time accident detection technique using deep learning and computer vision that detects and forensically analyze the accident scene. Deployed it on Nvidia Jetson nano.
 - **Depth Estimation:** Estimated depth of vehicles on the road from monocular camera using vanishing points of the road and exploiting geometrical approaches. Implemented depth estimation using blur content in the images.
- **Advanced Communication Laboratory, LUMS** Lahore, PK
Research Intern July 2019 - Dec 2019
 - **Breathing Rate Estimation:** Worked on the estimation of breathing rate of a person using RSS(received signal strength) of WiFi signals.
 - **Modeling Complex Environment:** Modeled and evaluated the channel for complex environmental factors in the breathing rate estimation and extended the model to incorporate multi-person scenario.

PUBLICATIONS

- Dong-Jun Han, **Hasnain Irshad Bhatti**, Jungmoon Lee, and Jaekyun Moon, "Accelerating Federated Learning with Split Learning on Locally Generated Losses", ICML Workshop on Federated Learning for User Privacy and Data Confidentiality, July 2021.

TEACHING EXPERIENCE

- **UET Lahore, Electrical Engineering Dept** Lahore, PK
Teaching Assistant, Introduction to Programming Fall 2019
- **UET Lahore, Electrical Engineering Dept** Lahore, PK
Teaching Assistant, Digital Systems Fall 2018

ENGINEERING PROJECTS

- Crime Scene Detection and its analysis using deep learning.
- Multipurpose Wheelchair (Joystick and Remote Control) with Raspberry Pi.
- Two-wheel self-balancing robot using STM32 micro-controller.
- Smart Switch Board (for Home Automation) using TIVA Launchpad TM4C123G.
- Remote controlled Dimming Circuit using TM4C123G.

SOCIAL WORK

- **Shaukat Khanum Memorial Cancer Hospital** Lahore, PK
Organizer and Volunteer *Aug 2018*
A science outreach workshop organized and volunteered for cancer diagnosed children. Demonstrated various science experiments using electronic circuitry and microcontrollers to captivate the interest of children and motivate them towards scientific education.
- **UET Primary School** Lahore, PK
Science Communicator *Aug 2018 - July 2019*
Volunteered for weekly continuous science outreach work for primary school kids. Taught children basic science concepts with the help of microcontroller based advanced visual projects. Organized various fun and informative science activities to provoke scientific thinking.
- **Education for Every Child Foundation** Lahore, PK
Social Worker *Dec 2017 - Nov 2019*
Volunteered as director education to help make the quality of education better for deserving children. Designed curriculum for primary school students. Involved in the charity collection, books and uniform purchase and other fund collection campaigns.

HONORS AND LEADERSHIP

- **Vice President Operations:** IET On Campus UET Lahore, 2019-2020.
- **Director Education:** Education for Every Child Society, 2019-2020.
- **Dean's roll of honor:** Fall 2016, Spring 2017, Fall 2017, Spring 2018, Fall 2019.
- **Best Microprocessor Project Award:** Electrical Engineering Dept, UET Lahore, 2018.
- **Scholarship Recipient:** Pakistan Engineering Congress (2018, 2019).
- **Award:** Laptop from Prime Minister Laptop Scheme based on excellence, 2018.
- **Head Robotics:** IET On Campus UET Lahore, 2018-2019.

PROGRAMMING SKILLS

- **Languages:** Python, Pytorch, C, Java, Verilog, x86 assembly, SQL **Microcontrollers:** RPI, STM32, Tiva-C series, Intel Cyclone-V, Arduino