

# Muhammetmyrat Yarmatov

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## EDUCATION

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- **Ulsan National Institute of Science and Technology (UNIST)** Ulsan, South Korea  
*Bachelor's Degree in Electrical and Computer Engineering* *August 2017 - August 2021(Exp)*
  - **First Major:** Electrical Engineering
  - **Second Major:** Computer Science and Engineering
  - **Related Coursework:** Artificial Intelligence, Computer Vision, Data Mining, AI Programming, Control, Signals and Systems, Algorithms, Data Structures, Object Oriented Programming, Computer Networks, Digital System Lab, Digital Logic, Probability and Random Process, Linear Algebra, Differential Equations, Calculus 1 and 2, Engineering Programming, Entrepreneurship and Big Data, etc.
  - **Courses in Progress:** Computer Architecture, Communications and Information Theory, Information Visualization, Electrical Engineering Programming
  - **UNIST Global Dream Scholarship:** Free tuition fee + monthly stipend.
  - **GPA:** 3.69 (92.9%)

## EXPERIENCE

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- **Research Assistant** Ulsan, South Korea  
*"AI, Robotics, and Transportation" Lab, UNIST* *October 2020 - Present*
  - Research: Autonomous vehicles and traffic management.
  - Projects: Fault detection for autonomous vehicles. Detecting full attributes of partially occluded cars.
- **Teaching Assistant** Ulsan, South Korea  
*"Artificial Intelligence Programming" courses, UNIST* *September 2019 - Present*
  - Assisting professor during the classes, and grading exam papers
  - Teaching concepts that students struggle with, and organizing weekly problem-solving sessions
- **Summer Research Intern** Hong Kong  
*"Robotics, Perception, and AI" lab, The Chinese University of Hong Kong* *June 2019 - August 2019*
  - Research: Robotic perception, prediction, and decision making
  - Project: Airport service robots that collect and distribute passenger trolleys autonomously
- **Undergraduate Research Intern** Ulsan, South Korea  
*"Advanced Information Systems" lab, UNIST* *October 2019 - February 2020*
  - Research: Learning-based intelligent systems. Deep reinforcement learning in robotics
  - Project: Autonomous drones that help people in rural areas, disaster scene, etc. (e.g. providing internet)

## HONORS & AWARDS

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- **NAVER-UNIST Undergraduate Research Poster Award:** Finalist
- **Google Developers Group:** Speaker in the "Age of AI" sessions
- **Certificate of Excellence from UNIST:** English Public Speaking
- **National Physics Olympiad 2017:** Absolute winner (Gold medal)
- **National Physics Olympiad 2016:** Absolute winner (Gold medal)
- **47th International Physics Olympiad (Zurich, Switzerland; Liechtenstein):** National representative
- **48th International Physics Olympiad (Yogyakarta, Indonesia):** National representative
- **18th Asian Physics Olympiad (Yakutsk, Russia):** National representative

## SKILLS

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- **Programming languages:** Python, C/C++, Java, MATLAB
- **Frameworks:** PyTorch, TensorFlow, Keras, OpenCV, Scikit-Learn, spaCy, AirSim simulator, Raspberry Pi, OrCAD
- **Languages:** English(Fluent), Turkish(Fluent), Korean(Basic), Russian(Basic), Turkmen(Native)

## VOLUNTEERING EXPERIENCE

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- **UNIST Robotics Club** Ulsan, South Korea  
*Electrical and Computer Engineer* *September 2018 - Present*
  - Lead several projects related to running robots, drones, raspberry pi, etc.
  - Helped club members to implement circuit designs and develop codes to control robots.
- **Google Developers Group (GDG)** Ashgabat, Turkmenistan  
*Speaker, Organizer* *May 2020 - Present*
  - Gave a speech about basics of AI and its applications to the GDG community.
  - Organized Machine Learning workshops, and study jams.

## ONGOING PROJECTS

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- **Wind Estimation and Trajectory Optimization in Drones (UAVs):**

## FINISHED PROJECTS

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- **Airport Service Robots:** We built service robots that autonomously collect and distribute passenger trolleys in busy airports. I developed deep learning based computer vision algorithms that would enable robots to detect, classify, and track idle trolleys using state-of-the-art object detection architectures such as RCNN, Faster-RCNN, and YOLOv3. We collected a huge amount of data not only in the airport but also in various different places such as car parks.
- **Object Recognition/Classification using BOW, and Deep Learning with CNN:** I implemented several state-of-the-art methods of computer vision for object recognition and classification problem using 20 Objects and CIFAR10 datasets.

The first one was a Bag-of-visual-words model. For the feature extraction part, I used OpenCV's ORB method which is a fusion of FAST key-point detector and BRIEF descriptor with many modifications. Then for learning a visual dictionary, I used the K-Means clustering algorithm. To represent images by frequencies of visual words and to find the nearest codeword for images, I used the k-Nearest Neighbors algorithm and applied level-0 and level-1 extension of histograms. Then I trained an SVM model with Intersection Kernel by using the descriptor we have created and target labels.

The second one was a Deep Learning with CNN method. First, I created a class using PyTorch with Convolutional Neural Network layers (CNN), Fully Connected layers (FC), and an application of the Forward propagation. After loading the dataset and converting it to Tensors, I trained my model by applying forward/backward propagation with the CrossEntropyLoss loss function and Adam optimizer to minimize the error.

- **Graduate Admissions Prediction:** I developed a model that estimates the students' chance of getting admitted to US universities based on their academic background. I used Machine Learning algorithms such as Linear Regression, SVM, and Random Forest for the prediction. The results were not so good because the dataset (from "The Grad Cafe") had so many outliers. After doing some data pre-processing, the best accuracy was achieved with SVM.
- **Math Word Problem Solver:** We made an application which can help primary school students to solve math word problems. Our application solves the given problem and shows its solution to users. We used various methods of NLP such as Named Entity Recognition, HMM, etc. with a powerful library for NLP: spaCy.
- **eDoctor:** Misdiagnosing diseases that have similar symptoms outside of a medical setting can be fatal. Therefore, I proposed a user-friendly mobile application as a solution to this problem. The application utilizes classification algorithms of machine learning such as k-Nearest Neighbors, Decision Tree, and SVM to diagnose diseases based on users' answers to guiding questions.
- **Smart Camera:** I conducted research on video processing and feature extraction methods to make surveillance cameras smart enough to detect car accidents and immediately summon an ambulance to save lives.

## PUBLICATIONS AND CONFERENCES

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- **Adaptive Mobile Learning in the nearby wisdom app:** International Seminar on Intelligent Technology and Its Application (ISITIA 2018), Bali, Indonesia, IEEE. DOI: 10.1109/ISITIA.2018.8711368, Authors: H. Hermawan, R. Werdani, J. Chu, A. Darmawati, M. Yarmatov.
  - **Acceptance of e-commerce in rural level:** 12th Asia-Pacific Productivity Conference (APPC 2018), Seoul, Korea. Authors: H. Hermawan, D. Ismoyo, M. Yarmatov.
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