SHYNGYSKHAN ABILKASSOV

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EDUCATION

Nazarbayev University, Astana *August 2017 - May 2021*
BSc in Robotics and Mechatronics Overall GPA: 3.79, Top 5%
School of Engineering and Digital Sciences Student Council Representative

Nazarbayev University, Astana *August 2016 - May 2017*
Foundation degree program in Physics and Mathematics

ADDITIONAL EDUCATION

IEEE Robotics & Automation Society Summer School on Multi-Robot Systems - Czech Republic, September 14-18, 2020
The Summer School of Machine Learning at Skoltech - Russia, 16-21 August, 2020
AI Summer School 2020 - Singapore, 3-7 August, 2020

RESEARCH OUTPUT

Abilkassov, S., Nurlybayev, A., ... & Shintemirov, A. (2020). **Facilitating Autonomous Vehicle Research and Development Using Robot Simulators on the Example of a KAMAZ NEO Truck**, The 23rd IEEE International Conference on Intelligent Transportation Systems, (ITSC), September 20-23, 2020.

Abilkassov S. **Deep Reinforcement Learning for robot navigation in unknown environments**. Poster presentation at The Summer School of Machine Learning at Skoltech, August 21, 2020.

WORK EXPERIENCE

ALARIS Laboratory June 2020 - Present
Research Assistant at the autonomous skid steering mobile robot-manipulation system

- Implemented a Webots - PPO algorithm training interface for **reinforcement learning** applications
- Trained a mobile robot base for navigation in unknown environments with static and dynamic obstacles avoidance using Advanced Actor-Critic Methods

ALARIS Laboratory December 2018 - May 2020
Research Assistant at the autonomous truck development project

- Led the development and testing team of **autonomous truck model** in Webots simulator.
- Created **ROS based simulation environment** and truck model in Webots and integrated messaging for *LiDAR, Camera, IMU, GPS* for remote data acquisition and control of simulation truck model
- Implemented topic data subscription and publishment for non-ROS environment through **sockets and Flask REST service** for data exchange with web interfaces
- Implemented data communication using WebSockets for **remote goal dispatch, state and path monitoring** on dashboard

Google Summer of Code, JdeRobot May 2019 - August 2019
Open Source developer

- Developed **indoors localization, goal navigation, item pick-and-place logic,** and **resting behaviour** for full scale autonomous task completion for warehouse robot in Gazebo

- Improved local navigation task performance for robot in complex interior environment. Robot reaches desired destination **2 times faster** than previous implementation
- Integrated proper transformations for sensor frames, introduced proper ROS topics messaging and naming, and integrated *SLAM, AMCL, Navigation stack* ROS packages into the Gazebo simulation

Zerde National Infocommunication Holding April 2018 - July 2018
Software Engineer Intern

- Developed user-interface for search and export of documents using Elastic Search in MongoDB database.
- Implemented user activity monitoring web service in internal portal, and designed and created both **REST service and admin interface** using *AngularJS and Java Spring.*

PERSONAL PROJECTS

Driver Drowsiness Estimation
Created an **open-source implementations** of multiple papers on driver drowsiness estimation based on eye region extraction, segmentation, and morphological analysis for estimation of driver drowsiness.

Distracted Driver Posture Classification
Implemented a multi-modal m-CNN for distracted driver posture classification based on two **ResNet50** models trained on self-gathered dataset using transfer learning with a classification accuracy 90%.

IMU Head Tracker interface
Fused data from accelerometer and magnetometer sensors on STM32F3 Discovery module through I2C communication and calibrated it for application control using head position.

ai.ball
Conversational Telegram chat-bot which uses **Naive Bayes algorithm for NLP**, Yandex SpeechKit for speech recognition and synthesis and multiple Flask micro-services for API calls to various services.

ACHIEVEMENTS

Recipient of **full-ride state scholarship** to study at Nazarbayev University
Recipient of Fostering Research and Innovation Potential (FRIP) funding program grant to conduct individual research on topic of "Driver Cognitive Load Estimation"
1st place in HackNU International Hackathon 2019, BTS Digital case
2nd place in Astana Innovations Challenge, Smart Services
2nd place in HackNU 2018 hackathon, ZeroToOneLabs case
Selected poster presenter at highly selective (10%) Skoltech Summer School
Selected participant at highly selective IEEE RAS Summer School, and scored top 5th place in solving the min-max Multiple Traveling Salesman Problems with Neighborhoods (MTSPN) comptetion using two drones.
Fellow recipient of **Bertelsmann Data Science Scholarship**
Country Executive in Kazakhstan at Central Asian Youth Network, established by the OSCE

ADVANCED COURSEWORK

NU: Electrical and Electronic Circuits II, Mechanical Design, Signals and Sensing, System Dynamics and Modeling, Linear Control Theory, Electromechanical Systems, Robotics I: Kinematics and Dynamics, Machine Learning, Robotics II: Control, Modeling and Learning, Human-Robot Interaction, Image Processing, Algorithms, Differential Equations, Probability

Coursera: Machine Learning, Neural Networks and Deep Learning, Introduction to Self-Driving Cars, State Estimation and Localization for Self-Driving Cars

SKILLS

Languages	Python, C++, C, Java, MATLAB, JavaScript(Node.js)
Robotics	ROS, Gazebo, OMPL, Jetson TX2, STM32 Microcontrollers, Raspberry PI
Tools & Technologies	PyTorch, Keras, OpenCV, Openpose, scikit-learn, Git
Databases	NoSQL, GraphQL, Firebase