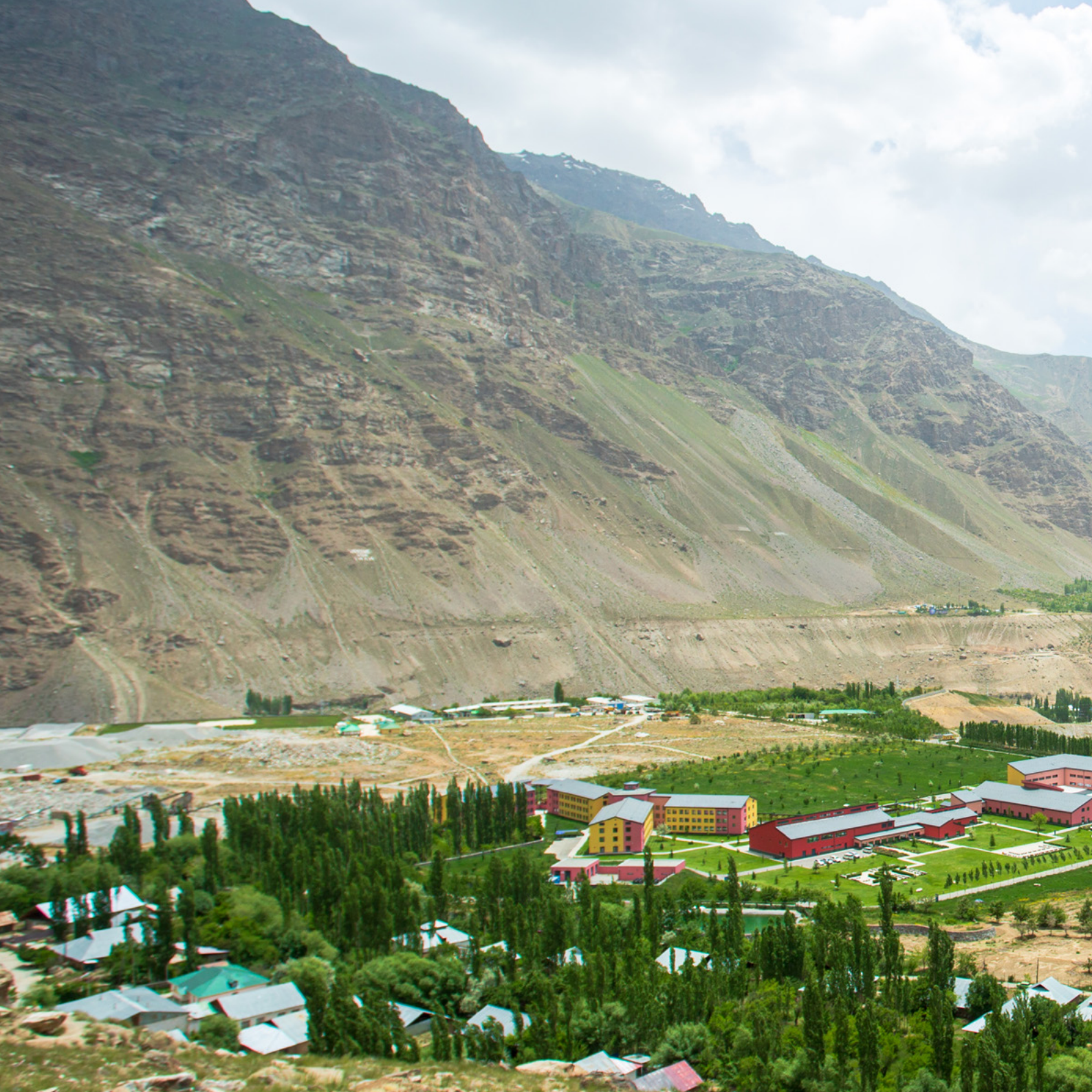
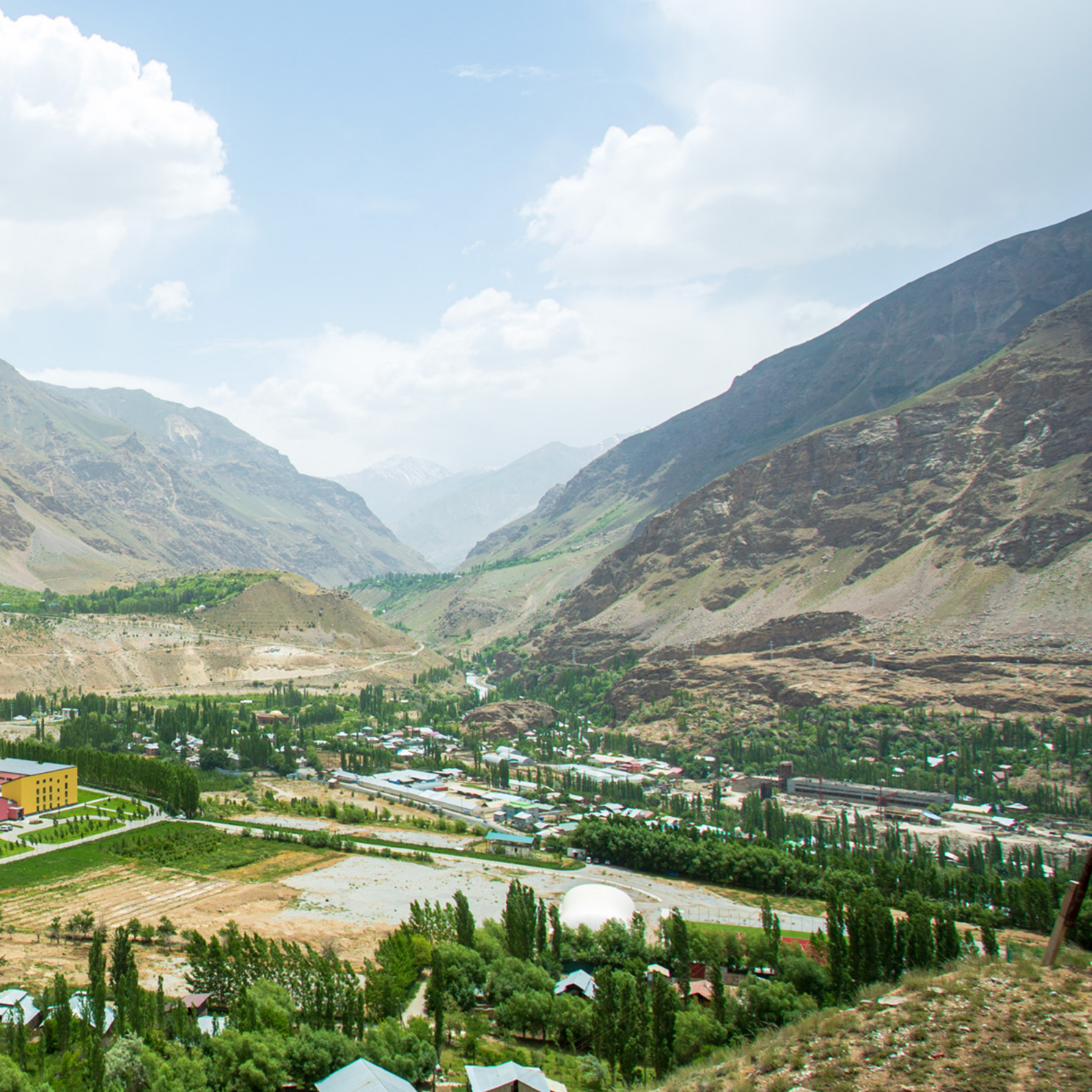
UNIVERSITY OF CENTRAL ASIA

SCHOOL OF ARTS AND SCIENCES

Diploma Brochure: Class of 2024





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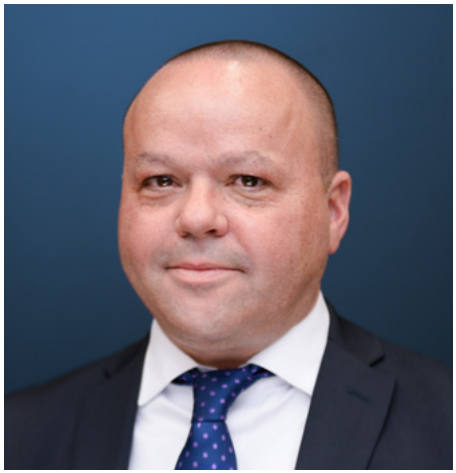
MESSAGE FROM THE ACTING RECTOR OF THE UNIVERSITY OF CENTRAL ASIA



On behalf of the management, faculty, and staff of UCA, I extend my heartfelt congratulations to each of you on the completion of your senior projects. Your achievements are a testament to the dedication, perseverance, and academic rigour you have demonstrated throughout your years at UCA. Well done!

The diversity and quality of this year's projects, ranging from innovative technological solutions, to important environmental evaluations, to vital studies of health policy, are genuinely inspiring, particularly given the exciting, leading-edge methodologies that they draw upon. Your work not only reflects your individual growth and the investment in you of our faculty, but also your commitment to making a positive impact on your communities, particularly in the mountain regions we serve.

Witnessing your journey and the impressive outcomes of your hard work has been a privilege for all of us, but especially for the faculty with whom you have worked so closely. Your projects exemplify UCA's mission of fostering knowledge and developing leaders dedicated to improving the quality of life in the region and doing so through evidence-based research.

As you move forward, I am confident that the skills, knowledge, and experiences you have gained will serve you well in your future endeavours. Retain your commitment to excellence, seek always to make meaningful contributions to society and, above all else, 'dream big' about the differences that you can make.

I wish you health, happiness and continued success.

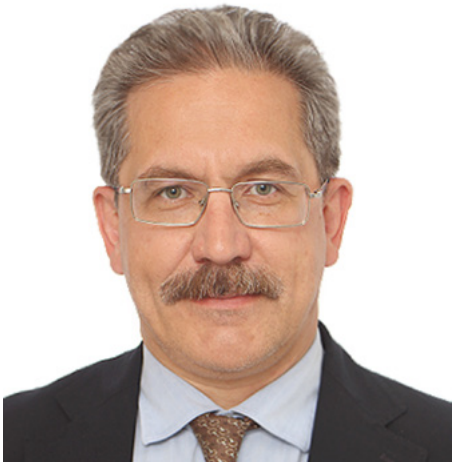
Prof. Christopher Gerry
Acting Rector
University of Central Asia

MESSAGE FROM THE DEAN OF THE SCHOOL OF ARTS AND SCIENCES

It is a distinct pleasure and joy for me to present the capstone project abstracts of the fourth graduating cohort of UCA's School of Arts and Sciences. These theses and capstone projects showcase the work the graduates have done with the support and guidance of the faculty during their five years of study at UCA. They demonstrate the skills the graduates have acquired throughout the entire learning process at the University.

These theses and capstone projects can be developed further into full-scale academic or commercial products. The skills they have obtained will stay with them for a very long time, no matter what they choose to do next or what journey they prefer to embark on after graduation.

To the readers of this brochure, I would like to express how proud we are to have graduates of this caliber. To the alumni, I wish you every possible luck and success in what you will do with your knowledge and skills. I am confident that your future will be very bright.



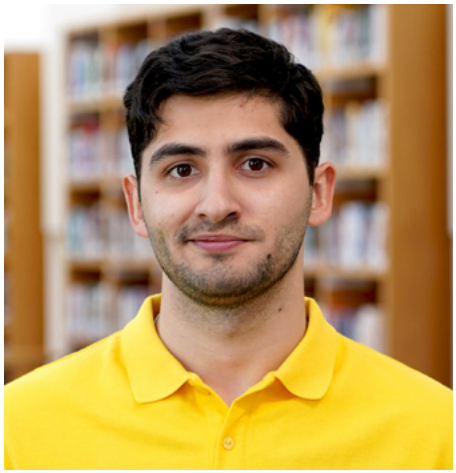
Prof. Maxim Khomyakov
Dean of the School of Arts and Sciences
University of Central Asia

Communications & Media

DOCUMENTARY FILM

“BREATH IN: THE TOXIC LEGACY OF COAL”

RUSTAM PALLAEV



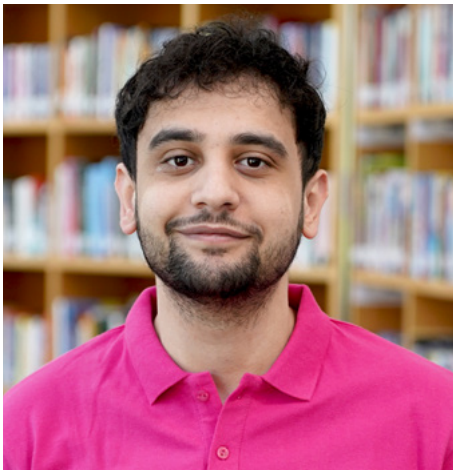
The idea of this final year project came up with an incentive to give something back to the Naryn community. The purpose of this was to find out where I can implement maximally my communication and media skills that I gained in the last five years to make a project that will contribute in some way to the lives of the people of Naryn. Thus, I decided to make a documentary that raises awareness about a particular problem in the region that was neglected for decades. With the advent of the cold season, Naryn residents started to notice a strange smell in the morning and late evenings. The smell might be confused with the childhood aroma of the upcoming New Year, but it is a dirty smog (sulfur dioxide) in the air caused by coal burning. Burning coal becomes a cornerstone of wintertime identity in Naryn as it hides behind comfort and warmth, an everyday routine of warming houses that is more complex than it seems to be. The burning of coal increases the emissions of carbon dioxide that ultimately influence the atmosphere and might potentially lead to climate change in the region, a mountainous area that is very fragile for upcoming consequences that will affect the whole of Kyrgyzstan and Central Asia.

Keywords: *Heating System, Gasification, Hydro power station, insulation, mitigation methods, carbon dioxide, respiratory diseases, Kara-Keche, Melting Glaciers.*

BOOK

SONGS OF DEMOLITION

MOHAMAD HASHEM



The war in Syria started in 2010 and claimed the life of hundreds of thousands of Syrians during a decade long conflict. As I was born and raised my entire life in Syria, living my life before the war in Damascus and during it in the state of Hama, I have experienced the pleasure of living in the country before the war as well as the painful struggle of trying to survive through the conflict.

As I have seen throughout the years, most media coverage about Syria and the Syrian war focuses on the conflict and on its effects on the country as a whole. So, I wanted to create a project which focuses on the people who went through the conflict, on the human factor of the country's struggle. I believe this side of the conflict has been under-represented in the media.

The book features five stories and three poems to represent different aspects of how the war affected ordinary people, and how the effects of it bled into the lives of Syrians regardless of whether they were safe from the immediate dangers of the war.

Surviving the war also created survivor's guilt – for those people left unaffected, with some losses, or simply still alive.

The project explores those less represented aspects of conflict and tells stories that show the struggles and lives of the people throughout the conflict and war.

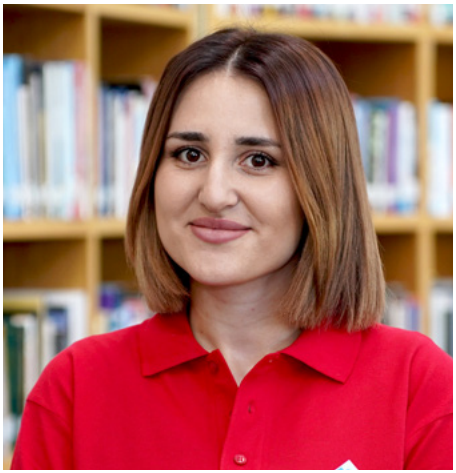
The project employs the use of research interviews with individuals who have experienced the themes covered both directly and indirectly. I have also included previously created sources and autoethnographic research based on my personal experience.

Keywords: *Syria, survive, life, resilience.*

BOOK

WHAT WE LEAVE BEHIND

MADINA SHOGUNBEKOVA



Following the collapse of the Soviet Union in 1991, the survival of ethnic minorities in post-Soviet Central Asia, particularly the Pamiri community in Tajikistan Gorno-Badakhshan Autonomous Oblast (GBAO), has been a subject of discussion and advocacy of international organizations such as United Nations and Amnesty International. Employing an autoethnographic approach straddling the line between fiction and non-fiction techniques in the written narrative, the creative project explores the profound impact of armed conflicts on Pamiri youth identity formation in GBAO.

Presented via a single central character – a young Pamiri female – the narratives structured into thematic chapters. The first and second chapters immerse readers in the 2012-armed conflict in Pamir, detailing the protagonist's direct encounter with violence at the age of 13, setting a potent tone for the book and emphasizing the immediate phycological impact and the formation of resilience. Chapter three shifts to the historical roots of these conflicts, tracing back to the aftermath of the Soviet Union's collapse in 1992, when tensions over Pamiri autonomy first emerged giving the notion of transgenerational trauma through post-memory. The final chapter brings the narrative to the recent 2022 conflict in GBAO that has been leading to forced displacement and loss of culture as a result of assimilation.

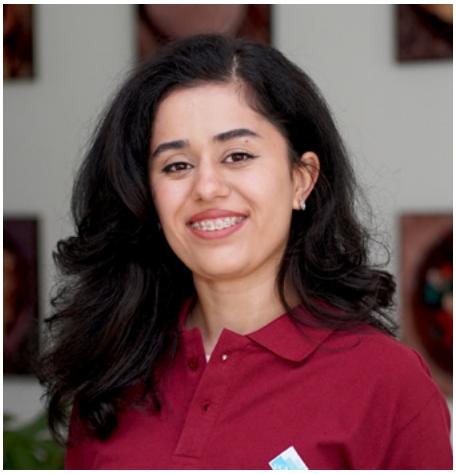
Through these narratives, the project sheds light on the enduring struggles and resilience of Pamiri female youth generations amidst conflict, preserving historical records and ensuring that the realities of armed conflicts in GBAO and their consequences are not forgotten.

Keywords: *Pamiri youth, trauma, identity, war, mental health, violence, post-traumatic stress disorder, GBAO.*

SILENCED VOICES: THE EXPERIENCES OF FEMALE PAMIRI MIGRANTS IN RUSSIA THROUGH ART

NILUFAR KARGASOVA

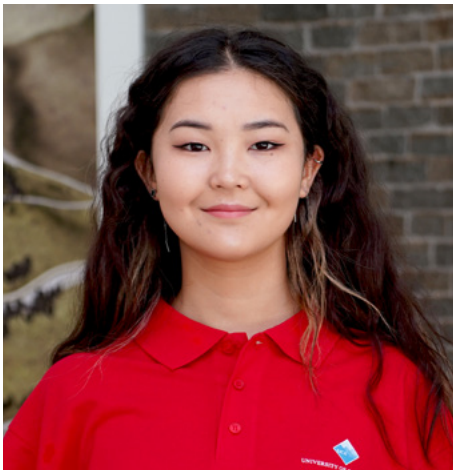
This is a creative work exploring the life experiences of Pamiri female migrants in Russia. Central Asian migrants, including those from the Pamiri community, face various forms of marginalization, such as discrimination, bureaucratic hurdles, extreme media bias, work exploitation, and social exclusion. It's crucial to raise awareness about the marginalization of this small ethnic group, especially considering the discrimination they already face in their home country of Tajikistan. This creates immense psychological pressure for Pamiri women in Russia, further intensified by the declining standard of living they experience. This installation of digital art and collages aims to bring awareness to these challenges. The research employed a qualitative methodology—semi-structured interviews—to capture the stories of two generations of women: one in her early twenties and the other in her forties. Additionally, other Pamiri migrants within the same age group were surveyed to identify the challenges they faced. The data from these interviews and surveys served as the foundation for the 2D, 3D, and audio works exhibited



Keywords: *Marginalization, Pamiri, Female, Migrants, Discrimination, Art, Social Problems.*

BREAKING STEREOTYPES: GENDER ROLES IN KYRGYZ FAIRYTALES

KYZZHIBEK ZHANIBEKOVA



The project presents an exegesis that combines traditional research and creative output, with the latter building on the former. The study is a deep dive into the role of oral folklore in shaping, reflecting, and perpetuating gender roles in Kyrgyz culture. It investigates fairytales' enduring significance and influence in preserving cultural identity and values, including historical narratives, traditions, values, and beliefs. The research delves into how gender roles in Kyrgyz culture have been shaped and molded in and through the practice of folklore. Through content analysis and narrative study methods, the research dissects five fairytales to highlight the historical, cultural, and social influences that have contributed to portraying men and women in Kyrgyz culture. The research method encompasses an analysis of Kyrgyz fairytales in which women play and incarnate the story's leading roles or key figures, underscoring the importance and relevance of this study.

The project leverages the themes uncovered in the studied folklore to produce an animated short film. This film is not just a creative output but a powerful tool to challenge traditional gender norms, aiming to create more gender-inclusive and balanced narratives of women. It strives to reflect women's realistic strengths and potential in Kyrgyz society, offering a new perspective. The project also seeks to bridge generational gaps by preserving and retelling the cultural heritage embedded in age-old legends and fairytales while questioning societal norms and values. By translating the analytical results into contemporary storytelling, the project explores the potential to shape the perspective of younger generations regarding gender roles. It contributes significantly to the discourse on gender dynamics in modern storytelling and folklore practices, inspiring change and progress.

Keywords: *Kyrgyz culture, gender roles, oral folklore, socio-cultural norms, gender dynamics, digital narrative, storytelling.*

DOCUMENTARY FILM

STORIES OF IDENTITY, DREAMS, AND CONNECTION WITH THE LAND

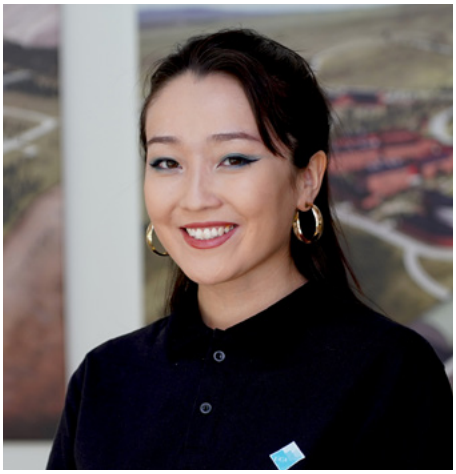
TAKHMINA ZHUMAKOVA

This creative project endeavors to explore the narratives of indigenous entrepreneurs in the Naryn region, focusing on their individual experiences, aspirations, and profound connections with the local environment. Through qualitative research methods, including interviews and storytelling sessions, the study seeks to elucidate the intricate relationship between these entrepreneurs and their surrounding landscape. The project aims to investigate how cultural heritage informs the entrepreneurial endeavors of individuals in the Naryn region, examining the ways in which traditions, values, and indigenous knowledge are integrated into their businesses. By delving into these aspects, the research seeks to uncover the essence of these entrepreneurs' identities and the significance of their connection to the land. Furthermore, the study intends to shed light on the broader implications of these personal narratives, exploring the intersections between individual aspirations, cultural heritage, and environmental stewardship. Through this exploration, the project seeks to contribute to a deeper understanding of the dynamics shaping indigenous entrepreneurship in the Naryn region and beyond. Ultimately, the findings of this research project aspire to provide insights that can inform policies, practices, and initiatives aimed at supporting indigenous entrepreneurship and promoting sustainable development in culturally diverse regions like Naryn.

Keywords: *Naryn region, tourism, indigeneity, entrepreneurship, Kyrgyz culture*

TALE OF FEMALE AQYNS: LIBERATING THE KYRGYZ LANGUAGE, FOSTERING CULTURAL RESILIENCE

ADINAI MUKAMBETOVA



Considering the long-lived and continuing legacy of the Soviet colonization, where ideological policies and the Russian language reigned as the lingua franca, the Kyrgyz language was systematically suppressed and relegated to an inferior status. Although Kyrgyzstan gained independence in 1991, the Russian language remains prominent even after 30 years. In urban areas, particularly the capital city of Bishkek, Russian is the primary language among young people. This colonial influence of the past persists, presenting still the Russian language as the language of the higher society and class. Those who lack proficiencies in Russian are often stigmatized and relegated to a lower social status.

This project takes the format of an exegesis, combining traditional research and creative output. The project employs qualitative methods of bottom-up content analysis and narrative analysis. As key cultural figures, Aqyns have played a pivotal role in transmitting Kyrgyz folklore and narratives across generations, contributing to the preservation and maintenance of the language. By delving into and analyzing the content, genre, and craft of Aqyns, the project aims to gain a deeper understanding of the 'culture' of the Kyrgyz language. The research is also conscious of and pays heed to the significance of the female gender in the phenomenon of cultural and language preservation. To this end, the project focuses on female Aqyns in its scope.

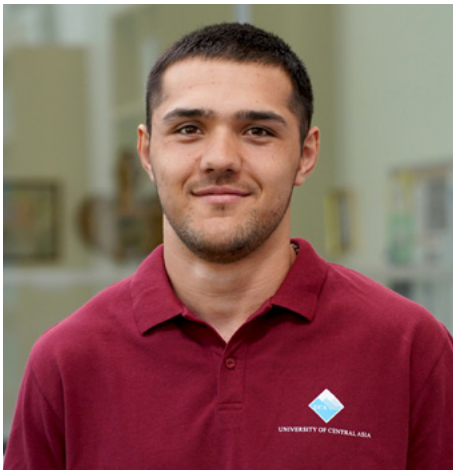
Informed by the traditional research part, the project also involves the production of comics. Drawing on the power of popular culture and its associated genres, these comics will serve as a dynamic and engaging platform for promoting traditional folklore and the national language among younger generations. This research-based visual narrative is hoped to foster cultural resilience in Kyrgyzstan's struggle for linguistic decolonization.

Keywords: *Aqyns, decolonization, revitalization, cultural resilience.*


Computer Sciences

DEVELOPMENT AND IMPLEMENTATION OF A MACHINE LEARNING-BASED SECURITY ALERT AND EVACUATION SYSTEM

AZAMAT SHIRINSHOEV



This research introduces the design and development of the Campus Emergency Alert System (CEAS), a package of safety measures, which has been provided especially for the University of Central Asia. The CEAS is designed to promote campus security through the integration of state-of-the-art technological aspects which offer live communication, emergency control, and user positioning. The system architecture uses an extensible, scalable framework that enables high availability and reliability of handle emergency scenarios effectively.

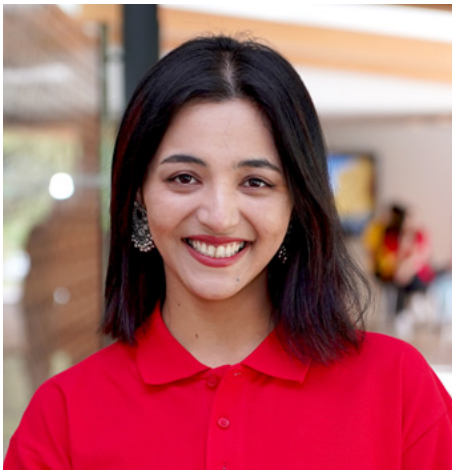
Some of the functionality requirements of the CEAS are instant communication, real-time emergency notifications, user status updates, and facial recognition, to mention a few. Non-functional requirements are concerned with system performance measures such as uptime, response time, and adherence to the international security standards. The dual-interface system divides user functionalities — receiving alerts and sending SOS notifications — and administrative capabilities, which cover user status monitoring and system-wide alerts management through a sophisticated dashboard developed using Python framework, Django.

The key technologies employed in the CEAS include Django REST Framework, GPS tracking which will be used for precise location services, and machine learning algorithms for facial recognition, cross platform app and Data analytics. The incorporation of these technologies ensures that the system is not only adequate for the current safety and communication needs during emergencies but also compliant with the highest levels of data integrity and user accessibility.

The implementation of CEAS aims to significantly improve the response times to campus emergencies, enhance the coordination of security efforts, and increase the overall safety of students, faculty, and staff. The thesis evaluates the system's performance and user feedback through a series of tests and surveys, confirming that CEAS meets the outlined requirements and effectively improves the campus safety infrastructure.

DETECTING FOREST FIRES USING MACHINE LEARNING TECHNIQUES AND CREATING AN ALERT SYSTEM

AZRA NISAR



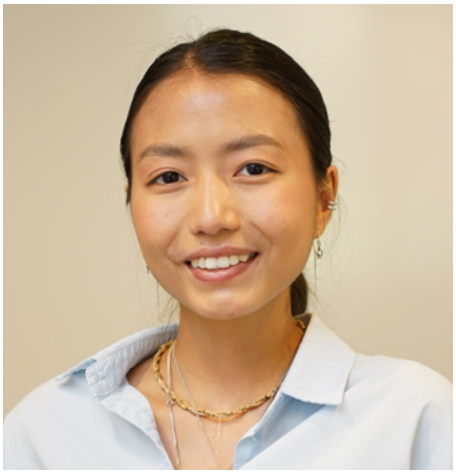
The increasing forest fires incidents are indeed a significant risk to the ecosystems since it has a major contribution to the global warming cycle. This project aims to dig deeper into the profound relationship between forest fires and global warming. Thus, exploring how rising temperatures add to the spread of forest fires while heat results in climate change consequently, creating a positive feedback loop. Human-induced fires, which spread twice as fast as natural fires and result in greater arboreal mortality, have exacerbated this issue, as evidenced by research from the University of Maryland highlighting a loss of three million more hectares of forest since 2001— an area equivalent to Belgium (Alkhatib, 2023). Furthermore, the environmental consequences of forest fires are indeed beyond deforestation; the smoke of the fires releases poisonous air pollutants including ozone, NO2, PM2.5, and hydrocarbons into the atmosphere which add to the air pollution and global warming significantly. This research seeks to offer a comprehensive analysis of forest fire patterns and the detection of their occurrences through advanced machine learning techniques. By predicting forest fires with dynamic mathematical models, the project aims to equip authorities and stakeholders with tools for better forest management and mitigation strategies. In addressing this critical issue, the project stands to benefit not just specific regions, but global communities, underscoring the universal impact of wildfires and the collective responsibility in combating them.

In 1972 Richard C. Rothermel introduced the fire spread rate model which is then known as the model to predict wildfire behavior globally (firelab, 2023). This respective model was built amid 1960s and 1970s at the Missoula Fire Sciences Laboratory. Known as the "Rothermel Model," it has been used as the basis of various digital fire behavior analysis systems, which are playing a vital part in improving fire management, training, and forecasting systems. The model came with a variety of applications in the initial stages of its development. Some of the major milestones included prediction of fire behavior on a small yet effective scale thus, simulating wildfires on a large scale eventually and planning for fuel treatments and burns control (firelab, 2023). Over the following decades, these proposed uses of the model, among others, have been recognized and practically integrated.

TRAFFIC-SIGN RECOGNITION SYSTEM FOR THE VISUALLY IMPAIRED PEDESTRIANS IN KYRGYZSTAN: SIFT/BRISK DETECTOR WITH TWO-KEYPOINT DESCRIPTOR ON ANDROID CAMERAX

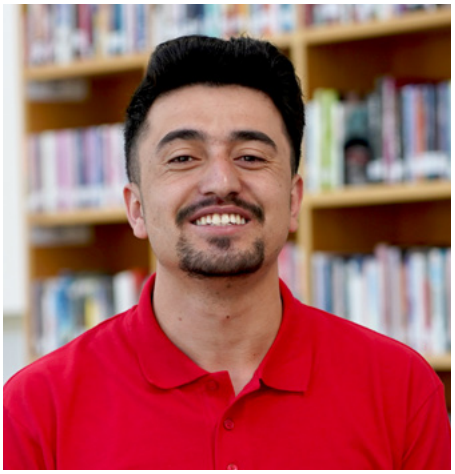
AYDANA KUBATOVA

In this study, the traffic sign recognition system for visually impaired pedestrians was developed. For this purpose, the SIFT algorithm for localization of keypoints and the BRISK algorithm for detection of sampling patterns on the picture and building two-keypoint binary descriptors are employed. The Java Android mobile application implements SIFT and BRISK algorithms to recognize traffic signs in real-time mode on Android CameraX. For speeding up the application, AdaBoost weak classifiers and multithreading approaches are employed. The experiments were conducted with crosswalk traffic sign at the campus of the University of Central Asia, Naryn City, Kyrgyzstan. The results of the experiment at a distance range between 1.5 to 3.5 meters using a Redmi 10A Android smartphone showed a true positive rate close to 100% and a true negative rate of 100%.



FEEDBACK SYSTEM FOR BUSINESSES BASED ON CUSTOMERS FACIAL RECOGNITION AND GESTURES

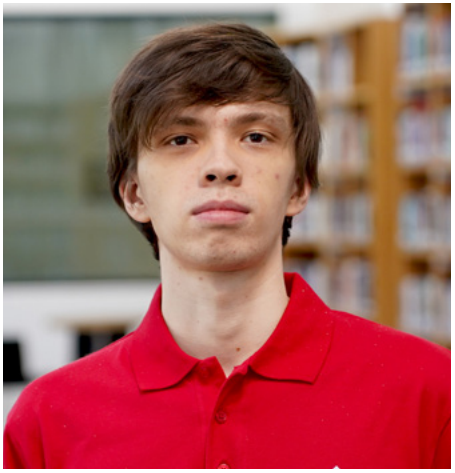
AQEEL AHMAD



In this world of digital automation and AI, the majority of businesses still use traditional methods for feedback collection and analysis. With this project, our purpose is to provide a new method for taking customer feedback in different small-scale businesses like retail stores, restaurants and hotels. This novel method utilises gesture and facial recognition technologies to take feedback in an organized and digitalized way. Moreover, it uses more accurate models that going to understand human gestures, emotions and faces with high precision and turn that information into useful insights for businesses. We have integrated these high-accuracy models in the form of a web application that will make the feedback process convenient and user-friendly for customers. Furthermore, it will improve businesses by taking business valuable and more productive insights. The website will not just make the feedback process simple but it will improve customer engagement and will provide an advanced way to businesses for analyzing their customer sentiments. The purpose of the work is to show the trial-and-error approach in the process, highlighting the implementation, and showing the test results and limitations of the project. Moreover, this work will serve as valuable content for future studies in the field of human gestures, face and emotion recognition.

POLYGLOT SPEAK: BREAKING LANGUAGE BARRIERS FOR THE LOCAL COMMUNITY USING NEURAL NETWORKS

ALEXANDR RUSSIN

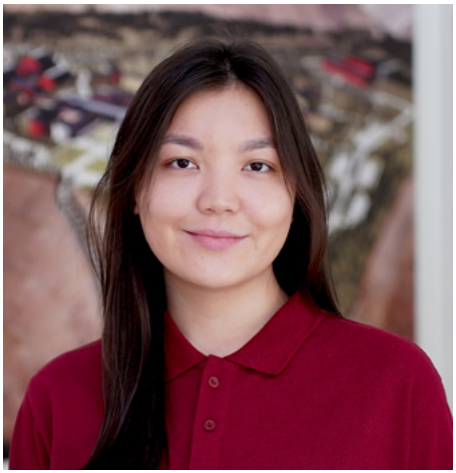


In today's digital world, language poses significant problems in education and intercultural communication, especially in the small mountain communities of Central Asia. To address the identified issue, I developed a project that can translate the video from English to Russian, adapting the speakers' unique voice and intonation. I will use neural network models in my system to recognize and translate speech and maintain tone and intonation. Whisper, XTTS, and other models will be used to process data, translate, and adapt voice with the highest efficiency. The idea of this project is to support mountain communities of Central Asia, such as Naryn, and give them access to Western education resources.

My system tends to adapt the speaker's translated voice on the original video, which is often lost during regular translation. The project is based on an iterative waterfall model that can systematically go through clearly defined phases. In a world where equal education comes first, "PolyGlot speaks" represents an innovative approach to overcoming educational and cultural differences. As a result of my project, I will produce twenty translated educational videos, which are expected to improve educational opportunities and significantly promote a richer intercultural exchange.

DEVELOPMENT AND IMPLEMENTATION OF A WEB APPLICATION FOR IMPROVING STUDENTS' ACADEMIC AND SOCIAL EXPERIENCES IN KYRGYZSTAN

ALINA ERKULOVA

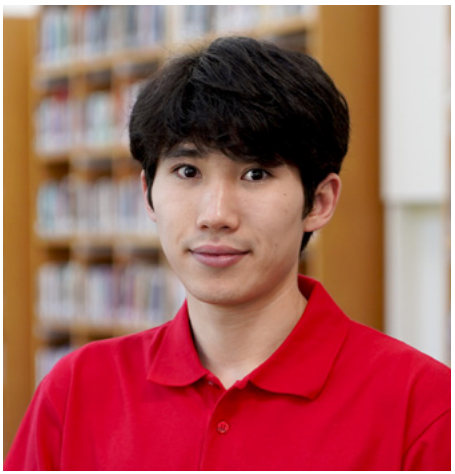


With rapid technological advancement, numerous tools were invented to improve billions of people's quality of life. Digital instruments have transformed individuals' way of managing various aspects of their personal and professional endeavors. Thus, platforms for communication, task management, job hunting, mentorship, as well as event and opportunities search play an essential role in facilitating seamless navigation of the modern world.

For students, it is crucial to stay up to date with current developments, build valuable connections with peers, manage their tasks, look for careers along with self-fulfillment opportunities, and do extracurricular activities. However, with the abundance of existing solutions for addressing their needs,young people may face some challenges, such as information overload, fragmented experience, and accessibility barriers. Student Space addresses these challenges and revolutionizes the educational, social, professional, and personal experience of students in Kyrgyzstan. The web application integrates various features such as planning tools, networking capabilities, academic assistance resources, exploration of job prospects, extracurricular activities, global opportunities, and mentorship. In order to develop the project, HyperText Markup Language (HTML), Cascading Style Sheets (CSS), JavaScript programming language, React library, MUI styled component, and Backend-as-a-Service (BaaS) Firebase are in use. In this thesis work, the web application implementation process and results will be presented, demonstrating Student Space's transformative potential to improve Kyrgyzstan's student experience.

EXPLORE KYRGYZ REPUBLIC: A WEB PORTAL WITH ULTIMATE GEOGRAPHIC INFORMATION SYSTEM FOR TOURISTS

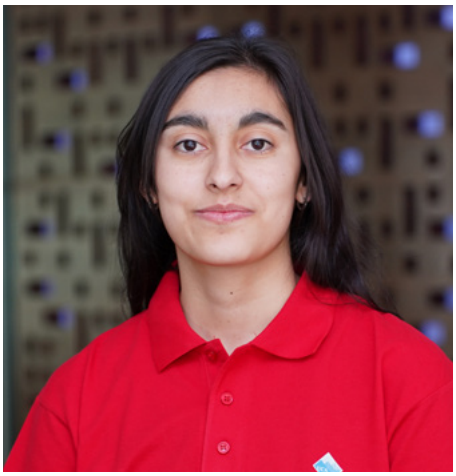
ARLEN ABDYRASHITOV



In an era of digital change, the tourist industry stands to profit significantly from advances in geospatial and machine learning technology. "Explore Kyrgyz Republic: The Ultimate GIS for Tourists" is a pioneering online application that aims to transform the tourist experience in the Kyrgyz Republic. This project uses cutting-edge geospatial data collecting and deep learning techniques to create a dynamic, interactive, and user-friendly platform that provides complete tourism information. Tourists have access to detailed, interactive maps that indicate sights, lodging, and transit alternatives and give real-time safety information and geographic feature identification. The application's deep learning capabilities allow the study of satellite data to provide personalized trip recommendations, improving the exploration experience by adjusting to individual interests and behaviors. Furthermore, the platform is intended to support several languages, broadening its appeal to a broad global audience. The program promotes local culture and customs, including user-generated material, giving users a sense of community, and belonging. The initiative intends to improve the travel experience and contribute to the long-term growth of the Kyrgyz Republic's tourist sector by utilizing technology to provide individualized, culturally rich, and safe travel experiences.

SMART SOLAR TRACKER SYSTEM WITH IOT INTELLIGENT CONTROL OF END-DEVICES

GAINIKAMAL BATAYEVA



The increasing demand for more efficient alternative energy resources has prompted the development of innovative solutions, such as solar panels. One effective way to harvest and generate energy from alternative energy sources is to capture sunlight using solar panels. This project introduces a Smart Solar Tracking system, that integrates IoT (Internet of Things) intelligent control and a user-friendly Android OS-based mobile application. This study aims to develop a smart solar microgrid that will manage two power lines connected to critical and shiftable loads. The intelligent IoT (Internet of Things) control integration involves the utilization of Arduino Mega/Uno programmable boards, sensors, and photoresistors needed for effective solar intensity tracking. The main benefit of the proposed system is its affordability considering the utilization of wide-spread technology such as Arduino, solar panels, solar charge controller and necessary sensor equipment.

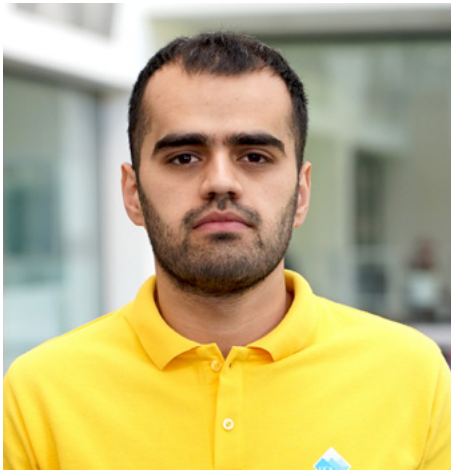
To enable remote monitoring, a supplementary Android OS-based mobile application has been developed. The user-friendly interface provides accessibility for all users regardless of their technical backgrounds.

Smart Solar Tracking System with Intelligent IoT control devices and supporting Android mobile application, offers effective solutions in harvesting solar energy, reducing energy costs, and promoting renewable energy sources at the university campus.

DEVELOPMENT AND IMPLEMENTATION OF A MOBILE APPLICATION FOR UCA AUCTION SYSTEM

GULAMAD AZIZOV

In response to the Material Management Department (MMD) at UCA's need to streamline the process of selling assets that are no longer in use and do not serve the UCA infrastructure, an innovative Android auction application was proposed. This paper demonstrates the key element of the project and its development process. While facilitating the products' selling procedure to employees, the software applies a user-friendly design and real-time bidding algorithm to guarantee transparency and fairness of each product in auction. The design rationale behind the application accentuates relief of interaction, security, and efficiency, integrating two different user levels such as admin and bidder. They consist of different features such as products listings, bid tracking and other secondary functionalities. The app was designed to tackle specific difficulties encountered by MMD, including the shortage of storage spaces due accumulation of surplus products. Future work will be focused on developing an identical app for the iOS operating system. This project is set to act as an additional business strategy for UCA and to meet the employees' needs.



AN AUTOMATIC POTATO DISEASE DETECTION TECHNIQUE BASED ON MACHINE LEARNING

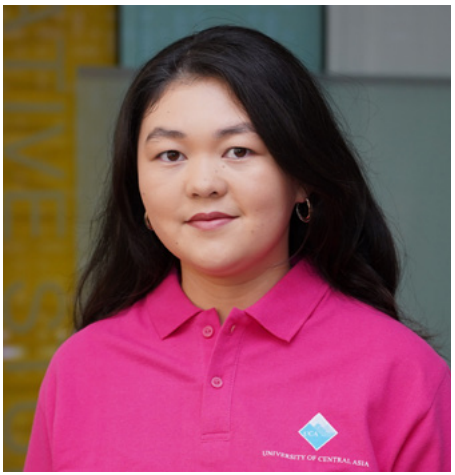
DIANA OROZEK KYZY

In response to the evolving agricultural landscape in Naryn, Kyrgyzstan, this project focuses on transforming potato cultivation through innovative technological solutions. Leveraging Machine Learning techniques, specifically Convolutional Neural Networks and Classification Algorithms, the project aims to revolutionize potato disease detection, yield prediction, and overall agricultural optimization. Notably, the incorporation of both binary and multiclass classification sets this project apart, providing distinct output for improved insights. Additionally, a user-friendly GUI software is in development to categorize tabular and image datasets, offering practical solutions to the challenges faced in agriculture. The ultimate objective is to enhance productivity, streamline agricultural methods, and ensure food security in Naryn.

DEVELOPMENT AND IMPLEMENTATION OF A SYMPTOM LOGGING AND ANALYSIS MOBILE APPLICATION FOR PERSONAL HEALTHCARE WITH API INTEGRATION

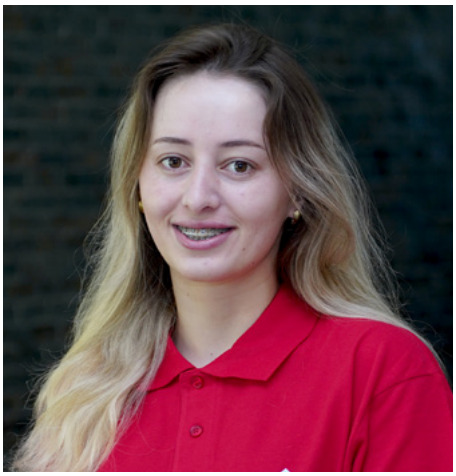
ZHAINAGUL ZHUMANAZAR KYZY

People in Kyrgyzstan, especially those in remote areas face serious issues when it comes to healthcare because of limited access and distant locations. The main goal of Android Mobile Application DeniSak app development is to solve that issue by empowering users to take control over their health and well-being. The primary objectives of the app are to focus on early predictions, healthy lifestyle and promoting awareness of the importance of self-care and healthcare. The Android Studio IDE's Java programming language was used for building the application. The app has features including daily symptoms tracker, fitness goal tracker, educational articles, convenient tools that help identify risk factors. This report detailly outlines the background, implementation, development, faced challenges and future development plans and recommendations.



DEVELOPMENT AND IMPLEMENTATION OF AN E-COMMERCE WEB PLATFORM FOR PAMIR, BADAKHSHAN, TAJIKISTAN

MARKHABO RAKHMATSHOEVA



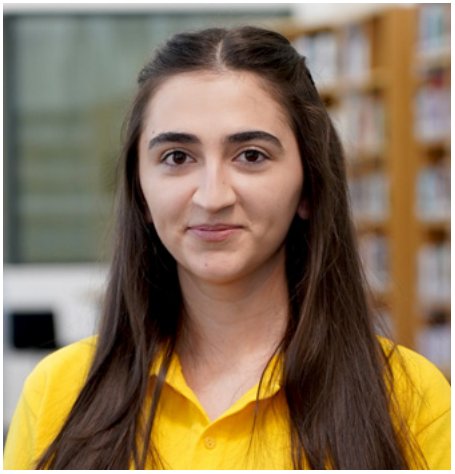
AliCart is a novel e-commerce platform designed to improve the shopping experience in the Badakhshan rural region in Tajikistan, especially for residents of remote areas like Pamir. This initiative aims to enhance the quality of life by making a diverse range of products easily accessible from home or work, reducing the need for lengthy trips to distant markets and enabling the locals to promote and sell their products. Badakhshan faces challenges like limited access to diverse and affordable products as well as to vendors for selling their local products. For instance, essential items and luxury goods are often not available and expensive, with only a few significant shopping centers located many hours away. AliCart offers a convenient and secure way for online shopping, providing a diverse range of products from daily necessities to specialized items. The platform also supports local artisans and farmers by allowing them to sell their products directly to consumers, thus helping them generate their livelihood.

Unlike existing e-commerce platforms that either overlook or inadequately serve the area, AliCart builds on the community's trust in my family-owned stores in Khorog. It has been working for decades and now digitalizing it would make it even easier for customers to access branded and local products from their comfort zone. To promote the platform, AliCart will include a 5% discount on all items and free delivery for orders over 1000 somoni within Khorog. Together with 24/7 customer support and a physical store within reach, we aim to offer our online services while maintaining trust with our physical presence. Besides, we intend to incorporate instructional material on our platform to help new users grasp the subtleties of online commerce, which will foster their understanding of digital environments and improve user experience.

By introducing AliCart, we not only hope to digitalize the shopping mode in Badakhshan but also improve the living standard of the local community. Additionally, we aim to empower local vendors by providing them with a reliable platform to sell their goods. This project is set to play a pivotal role in advancing digital commerce in one of Tajikistan's most isolated and remote regions.

DEVELOPMENT AND IMPLEMENTATION OF A MACHINE LEARNING -BASED IDENTITY VERIFICATION SYSTEM USING IRIS RECOGNITION

MEKHRAFRUZ GULAMADSHOEVA

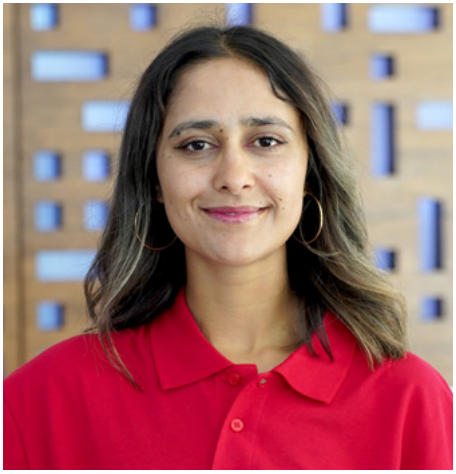


The need for more secure identity verification has spurred the creation of robust solutions like iris recognition systems. The development of machine learning (ML) algorithms for iris recognition systems as a means of identity verification is explored in this thesis. To emphasize the remarkable benefits of iris recognition for security and authentication, the study begins with a thorough analysis of current biometric identification methods. The central core of the research includes the study and endeavor of creating a machine learning (ML) framework that upgrades iris recognition performance in terms of accuracy and efficiency.

Innovative algorithms were created to improve the capacity of the system to precisely identify users based on their iris pattern. These algorithms are the combination convolutional neural networks (CNN), and cutting-edge machine learning algorithms features and techniques. The thesis targets the preprocessing procedures necessary for effective machine learning model training, the analysis of the SDK for iris recognition, and provides an in-depth analysis of the dataset that includes a variety of iris images. In addition, the web application was developed using tools such as Django and REST API. This research will introduce the step-by-step process of attempting to use Python programming language libraries, and different approaches to implement the iris recognition system. Moreover, the study investigates the difficulties and errors encountered, including variations in occlusions, lighting, necessary tools, and image quality, and offers solutions to address these issues for future scholars and contributors. The thesis ends with an overview of the application of this system in different aspects, such as finance, healthcare, and security, as well as recommendations for future investigations to strengthen the system's resilience.

PREDICTIVE MODELING OF HOUSE PRICES IN BISHKEK: A COMPREHENSIVE ANALYSIS

MUNIZA HASHIM



The project, "Predictive Modeling of House Prices in Bishkek: A Comprehensive Analysis," aims to analyze and predict real estate trends in Bishkek, Kyrgyzstan. Using a dataset of 10,000 observations and 30 engineered features, various machine learning models are trained and evaluated to find the most accurate predictive model. The project culminates in a web application that allows users to predict house prices based on specific parameters, providing insights and resources for educational purposes via GitHub.

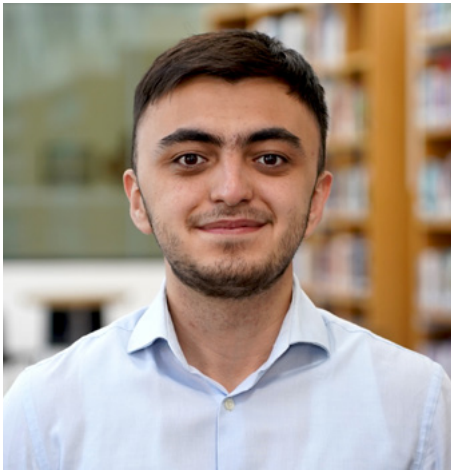
The methodology includes data acquisition, preprocessing, prediction, model evaluation, and integration into the application. Data preprocessing involved cleaning, transforming, and reducing noise. Eleven machine learning algorithms were used, including Decision Tree, Linear Regression, Random Forest, Gradient Boosting, LGBM, CatBoost, Support Vector Regressor, K-Neighbors, Neural Network (MLP Regressor), Bayesian Ridge, and Stochastic Gradient Regressor. Performance was measured using MAE, MSE, and RMSE. Random Forest, Gradient Boosting, LGBM, CatBoost, and Decision Tree Regressor showed the best results and were implemented in the web application.

The application allows users to input parameters such as price per square meter, house area, number of rooms, district, floor number, and construction date. This tool addresses the dynamic real estate market in Bishkek, helping stakeholders make informed decisions based on fair transactions and market trends. The project includes a literature review to highlight historical and current market conditions affecting property prices.

Keywords: *Keywords: Machine Learning Algorithms, Bishkek, Real Estate, House Prices, Dataset, User-Interface*

DEVELOPMENT AND IMPLEMENTATION OF A WEB APPLICATION FOR HOTEL HUB MANAGEMENT AND HOTEL BOOKING SYSTEM

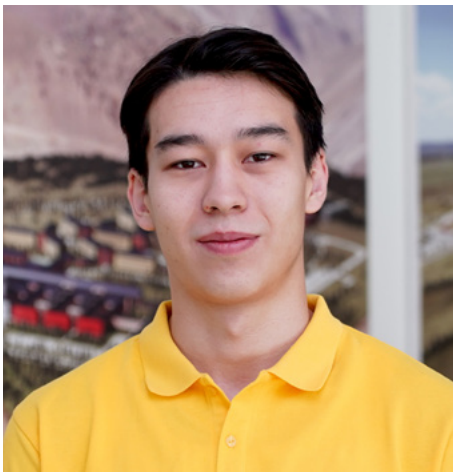
MUKHTARAM SULAIMONOV



The Digital transformation in the hospitality industry is designed to boost the performance of both the services for the organization and of the customers. “Hotel Management & Booking System” developed for Aska Hotel in Naryn is an advanced system which aims at radically improving the way hotel administration and bookings are done at the present time. The system combines a sophisticated administration toolbox for hotel managers at Aska and a simple and intuitive booking user interface for customers. With it, there are live updates for room availability, integrated maps for room availability, and a complete administrative panel that hotel managers use to administer and monitor bookings, manage finance, handle user accounts, and arrange cabins intelligently. Through adapting a combination of Agile and iterative methodology, the system takes into consideration user feedback. In this way, improvement and responsiveness are guaranteed, as well. The first tests of the system have shown higher effectiveness satisfaction of the users, suggesting that this new tool could significantly improve practices and concepts at Aska hotel.

DEVELOPMENT AND IMPLEMENTATION OF WEB AND MOBILE APPLICATION FOR UCA TRANSPORTATION SYSTEM

ULUGBEK KARIMOV



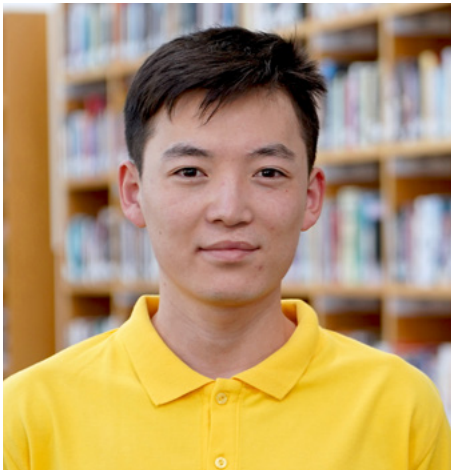
This report details the development of a software solution to automate vehicle management processes within the University of Central Asia. The software addresses the limitations of the current manual system, which is prone to human error, requires significant administrative effort, and lacks robust data analysis capabilities.

The proposed software offers a streamlined electronic platform for requesting, approving, and scheduling vehicle usage by faculty and staff. It integrates real-time vehicle tracking with scheduling functionalities, allowing for optimal resource allocation. Furthermore, the system automates departmental budget tracking for vehicle usage, enabling informed decision-making. Comprehensive data analytics and reporting features provide insights on vehicle usage patterns, fuel consumption, and maintenance schedules.

This university-specific software prioritizes user-friendliness and avoids the complexities often associated with Enterprise Resource Planning (ERP) systems.

DEVELOPMENT OF A STUDENT CAMPUS ASSISTANT MOBILE APPLICATION

ULUK URMATBEKOV



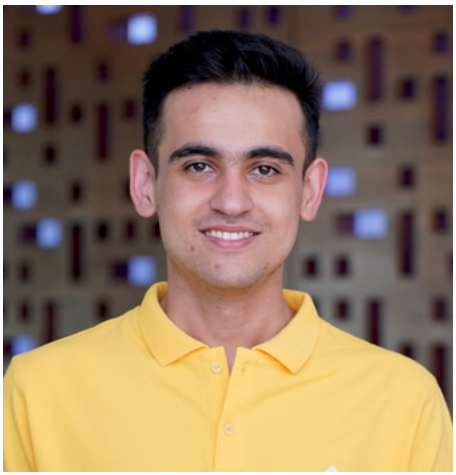
Nowadays, the evolution of the digital technology industry is making people's routines more comfortable. This is achieved mainly by developing different software that solves many challenges in various aspects of our lives. Thus, I developed software that eases students' lives and solves challenges in their campus life within the university environment. This study presents the development and implementation of the Campus

Assistant mobile application. The application integrates various features such as laundry booking, smart room, sports activity scheduling, canteen menu, and event announcements, all accessible through a user-friendly interface and on the base of Firebase, Android Studio, and IoT devices. In this paper, I will elaborate more on each feature and guide you through the process of achieving the final result.

DEVELOPMENT AND IMPLEMENTATION OF BACKEND FOR THE WEB PORTAL AND MOBILE APPLICATION WITH IDENTITY VERIFICATION FOR UCA CANTEEN SYSTEM

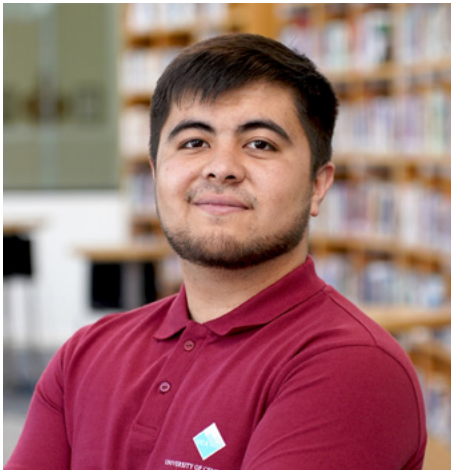
FARIDUNI NURIDDINZODA

This project aims to create an accelerated and quality canteen system. This system presents users with a web portal integrated with facial recognition, mobile application and Telegram bot. The web portal allows owners to perform the required functions for the canteen, monitor all activities in real time. This web portal is developed in Golang language because of fast API requests, which is currently leading in competition with other backend languages. The system also includes a mobile application and a telegram bot, which will be available to all campus representatives through which they can monitor the food menu and the quality of food through reading reviews on it. The mobile app will be written in Java and it will only be available to Android users. Fortunately for the rest of the users, a telegram bot written in Golang will be provided in which the same features will be available as on the mobile app except for leaving reviews. All in all, this project greatly simplifies the dining hall system and provides more options for the entire campus.



ARTIFICIAL INTELLIGENCE ASSISTANT: ENHANCING HUMAN-COMPUTER INTERACTION WITH ARTIFICIAL INTELLIGENCE

SHAHROM SIDDIQZODA



Evolutionary trends in human-computer interaction dictate the necessity of an intelligent AI assistant. The project is focused on AI Assistant development – a desktop application aimed at improving human-computer interaction based on intelligible conversation, text document processing for inquiry and gesture-control interaction. The project aims to make use of open- source AI models and private data sources. By combining them, Retrieval-Augmented Generation models become dynamic and adaptable. The chatbot, based on the Llama-2-7B-Chat model, gives excellent responses to queries, while the RAG model, powered by Google AI's Gemini Pro, turns out to generate relevant and pertinent answers on the basis of uploaded documents in different formats. In order to achieve the unification of the existing elements and ensure a convenient environment for the user, these components are combined in a desktop application with an easy-to-use interface. There are several areas for interaction in the application: a window for the chat, a field for the document, a section for system commands, and a switch for the activation of the control over gestures. The AI Assistant presented here proves the feasibility and efficiency of combining a number of AI technologies into a whole from the end-user perspective. This project opens doors for further exploration in personalized AI assistants, with potential applications in business, education, and personal productivity.

Earth & Environmental Sciences

THE WATER QUALITY ANALYSIS OF KARAKUL LAKE THROUGH GIS (GEOGRAPHIC INFORMATION SYSTEM) AND REMOTE SENSING

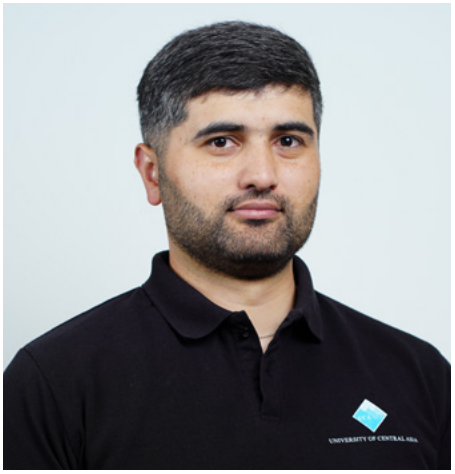
ALIMA SHOMAMADOVA

Water quality analysis is important to ensure water is safe for human consumption and helps maintain ecological balance in aquatic environments. Two mechanisms are generally used to do water quality analysis: in situ sampling and study through remote sensing. This study focuses on the water quality analysis of Karakul Lake situated in the Pamir mountains in Gorno-Badakhshan Autonomous Oblast (GBAO) Tajikistan. The analysis has been done using remote sensing to determine the concentration of different water elements that are optically active in the Karakul Lake. The parameters used in the study are DEM, NDWI, NDVI, NDTI, Turbidity, NDCI, Chlorophyll-a, Surface Temperature, Temporal temperature variation of different points in Lake, Cyanobacteria (Cya), CDOM, DOC, COLOR, and Total Nitrogen. This concentration of each parameter is compared to the universally accepted and recommended concentration in the water body to see how each parameter can impact the quality of water in the lake. The collected data from different sources such as Sentinel-2 were analyzed through specific algorithms to determine the concentration of each parameter using GIS. All the remote sensing data from 2018 to 2023, except DOC, showed that the optically active parameters indicated that the water in the study area was clean and healthy. Still, the results can be cross-checked using in situ measurement of the parameters. The study concluded that remote sensing can play a vital role in analyzing a water body without physically being to the place, and offers more flexibility and options to study the water body because it provides the user with the option to analyze the components for a longer period and over a larger area with minimum cost, while in situ study is limited in its approach for data collection in terms of temporal and spatial dynamics.

Keywords: *Remote Sensing, GIS, optically active elements, Sustainability, Temporal, Spatial, sediments, mean concentration, Eutrophication, Water Weeds, in situ data collection.*

FEASIBILITY OF SOLAR PUMPS FOR SUSTAINABLE IRRIGATION IN ISHKASHIM, GBAO, TAJIKISTAN

NEKRUZ NIYOZMAMADOV



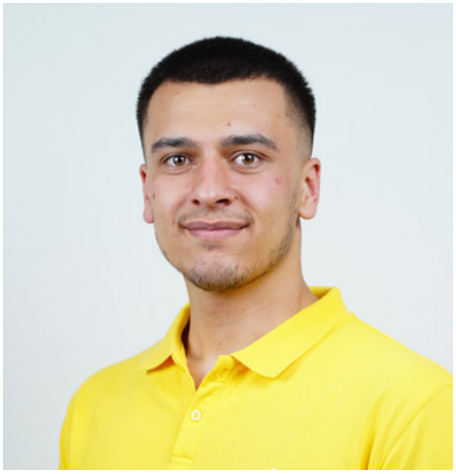
A long-term solution to the farming problems in Ishkashim, GBAO is to set up solar-powered irrigation systems. This is because Ishkashim is located in a remote and mountainous part of Tajikistan. Ishkashim could be a good place to use solar power because it gets a considerable amount of sunlight. Solar pumps could cut down on the use of non-renewable energy sources by a large amount. This would lower the carbon footprint and operating costs of diesel-powered systems. Switching to solar power is better for the environment because it cuts down on greenhouse gas emissions that come from using standard irrigation methods. Better water management through these methods also protects water resources, which is very important in this dry area. In terms of financial resources, the cost of solar power at first is balanced out by the lower costs of fuel and repairs over time. Also, local farmers might be able to get more financial help from the government and foreign groups that offer subsidies and grants. On a social level, solar irrigation could make it easier for farmers to get water, which would increase crop yields and stability. This would improve the community's food security and economic stability. There are some problems with putting in solar pumps in Ishkashim, like getting the parts and training the farmers, but the general benefits make it a good idea that could work. With careful planning and input from the community, solar-powered irrigation could completely change farming in Ishkashim, helping the area meet global sustainability goals and making people's lives better.

Keywords: *Solar-powered irrigation, Sustainable agriculture, Renewable energy, Environmental impact, Remote agriculture, Water resource management.*

INTEGRATION OF GIS AND RS FOR FLOOD VULNERABILITY MAPPING AND VISUALIZATION IN TOGUZBULOK RIVER VALLEY

JAVOHIR MIRMASTOV

This diploma thesis provides a comprehensive study on flood vulnerability mapping in Toguzbulok watershed, located at the Pamir Mountain's region of Tajikistan. Using spatial dataset, softwares, factors and tools such as the Geographic Information System and multi-criteria decision-making techniques, factors influence, slope, elevation, land use/land cover, and drainage density was constructed a flood vulnerability map and 3D model animatino of possible flooding the area. The flood vulnerability map identifies areas with different levels of flood vulnerability, from very low to very high. These outcomes give a basic understating of flood risk within the watershed. Additionally, this study also shows flood vulnerability mapping as an essential tool to provide information for potential flood occurrence analysis. This information is important to identify high-risk and vulnerable areas during the formulation of flood disaster considering aspects above. Moreover, integrated GIS and Remote Sensing technologies, techniques of spatial analysis, and Hydrological modeling offers a detailed understanding of the spatial distribution of flood occurrence and contributing factors. The connection of this study extends to flood management, considering flood readiness, primarily to flood management planning. Hence, providing a context for promoting flood management in line with GIS and RS information towards flood disaster preparedness assessing flood risk and informing policy emissions. Finally, this research provides knowledge to the wide context of flood risk and mapping susceptibility in mountain regions to human-based components and offering valuable data for further research cooperation.



Keywords: *Flood vulnerability mapping, Toguzbulok watershed, Pamir Mountain region, Tajikistan, Geographic Information System (GIS), Spatial dataset, Factors influencing flood vulnerability, 3D model animation.*

A STUDY ON INTEGRATING GIS, REMOTE SENSING AND MACHINE LEARNING TECHNIQUES FOR LANDSLIDE SUSCEPTIBILITY ANALYSIS IN SHOKHDARA BASIN, TAJIKISTAN

EDGAR MICHAEL NAGAYA WANGIRA

This study investigates landslide susceptibility in Tajikistan's Roshtqala district, focusing on the Shokhdara basin, a region prone to slope instability. Utilizing Geographic Information Systems (GIS), Remote Sensing (RS), and Machine Learning (ML), the study addresses the challenges of landslide inventory creation and integrates ML algorithms developed using the Python program language to statistically analyze the susceptibility of Shokhdara basin to landslides. In this study, a digitized landslides inventory for Roshtqala district was developed and utilized in creating a landslides distribution map for the region using ArcMap. Through statistical analysis of RS data using Linear Regression ML model, the study identifies key controlling factors such as curvature, elevation, slope, aspect, and rainfall, that significantly influence landslide susceptibility in Shokhdara basin. The findings in this study underscore the practical implications of accurate landslide susceptibility analysis for local communities and environmental management. Ultimately, this study contributes to the field by advancing our understanding of landslide susceptibility in the Shokhdara basin and laying the groundwork for future studies aimed at mitigating landslide risks in the region.

Keywords: *Landslide Susceptibility, Machine Learning, Remote Sensing (RS), Geographic Information Systems (GIS), Shokhdara basin.*

EXPLORING LITHIUM RESOURCES: GEOLOGICAL INSIGHTS INTO SPODUMENE-BEARING PEGMATITES IN NAMADGUT VILLAGE, TAJIKISTAN

ADISA DOROBEKOVA

This research investigates spodumene-bearing granitic pegmatites from the Namadgut area in Ishkashim, SW Pamir Mountains in Tajikistan. The pegmatites are mainly made from large spodumene crystals up to 40cm long and 5 cm wide, white mica flakes, quartz, and plagioclase. The pegmatites are intruded into the low-grade metamorphic rocks of dark carbonaceous slate and phyllite. Small garnet crystals are formed at the vicinity of the pegmatites in phyllite, indicating thermal metamorphism. The rock samples show granular textures with different crystal sizes under the microscope. Quartz crystals contain plenty of fluid inclusions under the microscope. The inclusions are very small (~5 μm) and contain fluid and air bubbles, indicating them as two-phase fluid inclusions. The existence of large number of fluid inclusions in quartz shows fluid role and fluid assisted cation transportation during pegmatite formation. Opaque minerals are of two generations, one generation is massive and larger opaque minerals and the other one is indicated by small round aggregates of opaque minerals. They may have been formed in different stages of fluid evolution and pegmatite rocks genesis. Representative samples from mineral separates (white mica, quartz, spodumene and plagioclase), along with whole rock samples were analyzed by the ICP-MS method for major oxides, trace and rare earth elements. All samples were analyzed for lithium (Li) content as well. Li content of spodumene is more than 10000 ppm (1 wt%) for all analyzed samples (exceeding the upper detection limit of the analytical method used). Spodumene Cs content varies from 9.04 to 30.10 ppm, while Ta contents are low as 0.2 to 1.1 ppm. Trace elements of white mica and quarts, compared with examples worldwide indicate Li-rich nature for the pegmatites. The whole rock Li contents for two samples analyzed are 9200 and more than 10000 ppm, making the spodumene-bearing pegmatites of the Namadgut area economically valuable.

Keywords: *Granitic pegmatites, Spodumene, Li mineralization, SW Pamirs, Ishkashim, Tajikistan*

A WEB-BASED APPROACH TO PALEOGEOGRAPHIC RECONSTRUCTIONS

NOZIGUL TIRANDOZOVA

A long-term solution to the farming problems in Ishkashim, GBAO is to set up solar-powered irrigation systems. This is because Ishkashim is located in a remote and mountainous part of Tajikistan. Ishkashim could be a good place to use solar power because it gets a considerable amount of sunlight. Solar pumps could cut down on the use of non-renewable energy sources by a large amount. This would lower the carbon footprint and operating costs of diesel-powered systems. Switching to solar power is better for the environment because it cuts down on greenhouse gas emissions that come from using standard irrigation methods. Better water management through these methods also protects water resources, which is very important in this dry area. In terms of financial resources, the cost of solar power at first is balanced out by the lower costs of fuel and repairs over time. Also, local farmers might be able to get more financial help from the government and foreign groups that offer subsidies and grants. On a social level, solar irrigation could make it easier for farmers to get water, which would increase crop yields and stability. This would improve the community's food security and economic stability. There are some problems with putting in solar pumps in Ishkashim, like getting the parts and training the farmers, but the general benefits make it a good idea that could work. With careful planning and input from the community, solar-powered irrigation could completely change farming in Ishkashim, helping the area meet global sustainability goals and making people's lives better.

Keywords: *Solar-powered irrigation, Sustainable agriculture, Renewable energy, Environmental impact, Remote agriculture, Water resource management.*

HYDRO CHEMICAL PROPERTIES OF HOT SPRING WATER IN THE ISHKASHIM AND SHUGHNAN DISTRICTS OF TAJIKISTAN: A COMPARATIVE STUDY INTEGRATING HYDRO CHEMICAL ANALYSES AND REMOTE SENSING

SHAMIMA ALINAZAROVA

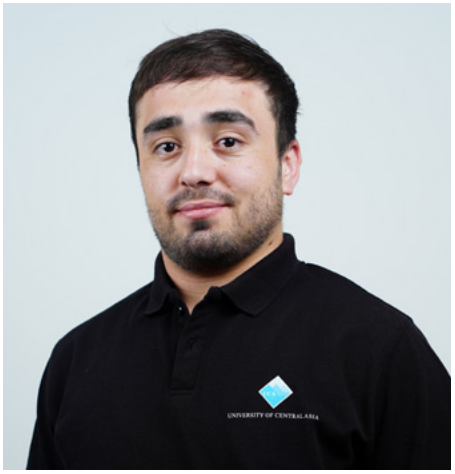
The present study investigates the seasonal variations of the hydro-chemical composition of hot springs, taking Tajikistan's Ishkashim and Shughnan districts as a case study, through utilizing hydro chemical approaches as well as remote sensing techniques. It seeks to provide a comprehensive analysis of the chemical composition and temperature and other physical parameters including pH, turbidity, salinity, and dissolved oxygen contents of thermal waters in various seasons. The findings of this study may be used to know the seasonal changes of these thermal waters which will help in the better usage of their therapeutic properties and will be of great benefit to the local community in the tourism and health care industries. It is also crucial to realize the distinctions for environmental monitoring and long-term sustainable management of geothermal resources in the region.

Keywords: *Hydro Chemical Properties, Hot Springs, Seasonal Variations, Remote Sensing, Geothermal Resources.*

HOW DOES CLIMATE CHANGE IMPACT CROP YIELD VARIABILTY RELATED TO AGRICULTURE ACROSS DIFFERENT AREAS OF SHUGNAN REGION?

ANUSHERVON JUMAKHONOV

This diploma thesis examines how altering weather patterns affect agricultural yields in Shugnan's diverse landscapes. Varying climate norms influence crop outputs differently across the territory. The research probes links between meteorological trends and harvest amounts to clarify climate change's implications for sustainable farming across the area. Both difficulties and potential benefits for regional agriculture in adjusting to the changing climate are investigated. The study seeks to enlighten responses to secure reliable food provision facing unpredictable conditions. Using field surveys, data analysis, and modelling, the study synthesizes climate data with historical crop yield data to discover trends and moments of variability. Additionally, spatial analysis is employed to determine climate change hotspots and assess the implications for crop agricultures in various zones within the Shugnan region. The results presented exhibit strong correlations between climate parameters including temperature, precipitation, extreme weather events, and changes in crop yield among different agro-ecological zones of Shugnan region. This correlation shows how susceptible the agricultural systems within the zones presented are to climate change-related disruptions. The study also examines the adaptation strategies used by farmers to reduce the impact of climate change on crop yield variability. The study evaluates the efficacy of these adaptive measures and provides an overview of potential means through which the resilience can be further increased with regard to the agricultural practices. Consequently, this study can serve as a useful addition to the current knowledge about adaptation to climate change in the agricultural sector. The findings may inform the policymakers, agricultural practitioners, and further researchers who decide to focus on the possibilities of sustainable development in the Shugnan region and beyond as a result. With this information at hand, the stakeholders can select the most appropriate areas for investment, intervention, and policy measures to develop climate-resilient agriculture adequately and secure the food supply in the communities.

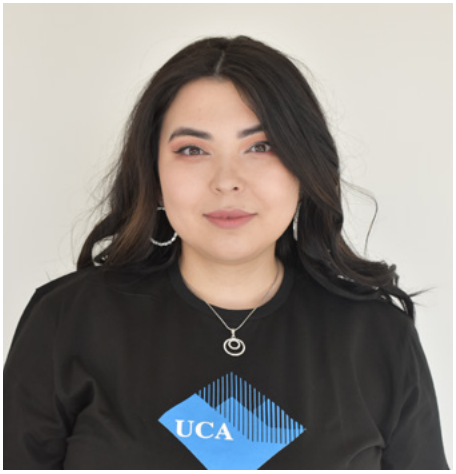


Keywords: *Climate variability, Agricultural Yields, Shugnan Region, Modelling, Data analyses.*

THE EVALUATION OF THE EFFECTIVENESS OF LANDSLIDE MITIGATION STRATEGIES IN KYRGYZSTAN

NADIRA KARATAEVA

This diploma thesis aims to evaluate the effectiveness of landslide mitigation strategies in Kyrgyzstan. The country is prone to landslides due to its mountainous terrain and frequent seismic activity. The study examines the various landslide mitigation strategies implemented in Kyrgyzstan, including structural measures such as landslide mass unloading, terracing, gabion instalment, and non-structural measures such as early warning systems, slope stabilization through nature-based solutions, mapping, and monitoring of landslide prone sites, and resettlement of residential houses located in the danger zone, notification of the population about the places and boundaries of the zones affected by landslides and training the population to identify signs of landslide activation. The research methodology involves a combination of qualitative and quantitative methods. The findings of the study provide insights into the effectiveness of different mitigation strategies and highlight the challenges and opportunities for improving landslide risk management in Kyrgyzstan. The conclusions and recommendations of the study could be useful for policymakers, practitioners, and researchers working on landslide risk reduction in Kyrgyzstan and other similar contexts.



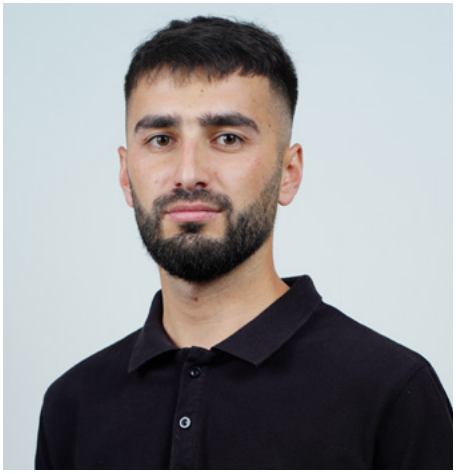
Keywords: *Landslides, mitigation strategies, risk management, mountainous environments, Tien Shan.*


GE
Global Economics

THE IMPACT OF MIGRATION AND REMITTANCES ON AGRICULTURAL PRODUCTIVITY IN TAJIKISTAN

AKHMED NAZARBEKOV

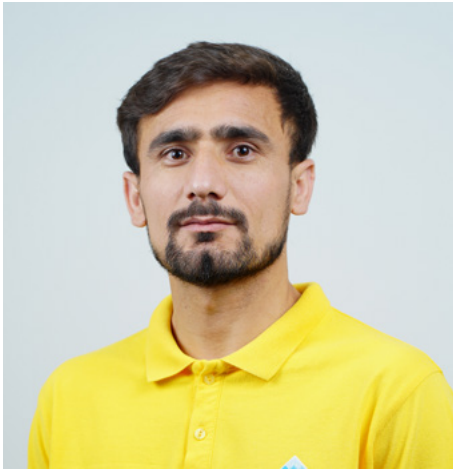
How do migration and remittances affect agricultural productivity? Employing Ordinary Least Squares (OLS) regression with clustered standard errors on quantitative data from a cross-sectional survey of 835 households in Khatlon, Tajikistan conducted by the International Food Policy Research Institute (IFPRI) in 2023, the analysis examines the impact of migration and remittances on crop diversification and total crop value. The results indicate that while migration itself negatively affects agricultural productivity due to labor shortages, remittances partially compensate for these losses when invested in agricultural inputs such as improved seeds, fertilizers, and pesticides. Furthermore, the findings highlight the importance of land area and plot type in determining crop diversification and total crop value. The research contributes to the understanding of the migration-remittances-agriculture nexus in Tajikistan, supporting the New Economics of Labor Migration (NELM), Agricultural Household Model, and Behavioral Economics theories. Despite limitations related to endogeneity and missing data, the study provides valuable insights for rural households to effectively invest remittances and optimize agricultural practices. Future research should address these limitations by employing longitudinal data, expanding the research scope, and considering the role of gender in remittance investment decisions.



THE IMPACT OF THE GENERALIZED SYSTEM OF PREFERENCES PLUS (GSP+) ON PAKISTAN'S EXPORTS TO THE EU: AN ARIMA MODEL APPROACH

ALI KHAN

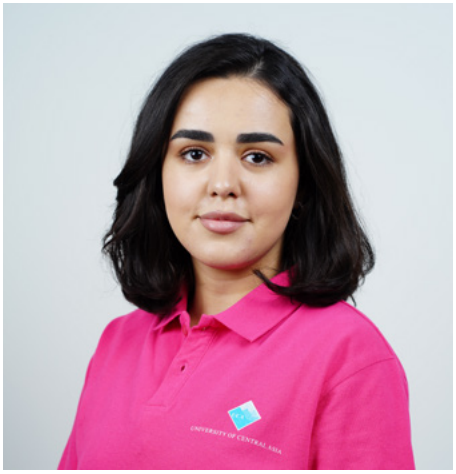
This paper aims to find the impact of Generalized System of Preferences Plus (GSP+) Scheme on the exports of Pakistan to European Union (EU). The study uses ARIMA model on a monthly time series data from January 2000 to December 2023 on Pakistan's Exports to European Union. This study analyses the export trends of Pakistan to EU from 2000 to 2023, trying to find the potential structural break in seasonally adjusted growth rate around the year 2014 to validify the potential impact of the intervention (GSP+ status). Moreover, this study uses historical seasonally adjusted growth rate to make prediction for the period after 2014 till 2023, Pakistan's inclusion in GSP+, to compare it with the actual seasonally adjusted growth rate available. This study empirically evaluates the hypothesis that Pakistan's export performance to EU member countries has been positively influenced after acquiring GSP+ status in January 1,2014. However, the finding of this study show no effect of GSP+ on Pakistan's Export to EU. This study finds that preferential trade agreements like GSP+ alone are not sufficient in determining the trade relation between countries.



THE IMPACT OF HEALTH ON ECONOMIC GROWTH IN CENTRAL ASIA: A GROWTH ACCOUNTING APPROACH

AMINA AEMBEKOVA

This paper looks at how the health component of human capital affects economic performance in all Central Asian countries: Kazakhstan, the Kyrgyz Republic, Tajikistan, Uzbekistan, and Turkmenistan. Specifically, it analyzes the impact of life expectancy on overall output and output per worker, which characterizes labor productivity. The time frame includes the period from 2000 to 2021. It was additionally divided into two decades: 2000-2010 and 2011-2021. The methodology is based on a simple growth accounting framework that seeks to analyse the effect that life expectancy, physical capital, and total factor productivity have had on GDP growth. The findings show that better health condition, as indicated by the increase in life expectancy, has a significant impact on the productivity of worker. Nonetheless, its contribution to total output growth remains relatively small. In contrast, capital investment plays a crucial role in enhancing labor productivity and fostering economic growth, especially in capital intensive countries such as Kazakhstan and Uzbekistan. This study emphasizes the importance of Total Factor Productivity as a key driver of economic growth and shows that investments in new machinery and technology, along with improvements in policies, are essential for boosting productivity gains.

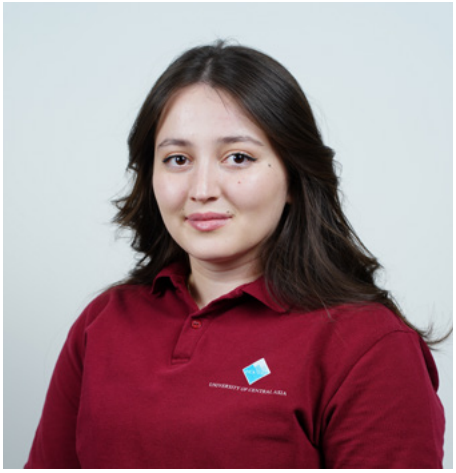


A COMPREHENSIVE ANALYSIS OF TAJIKISTAN'S ECONOMIC TRANSFORMATION VIA TRADE DYNAMICS:

A CASE OF TAJIKISTAN'S POTENTIAL INCLUSION IN THE EURASIAN ECONOMIC UNION

DILNOZA MOYONOVA

This paper investigates the ex-ante effect on Tajikistan's economy upon its prospective membership in the Eurasian Economic Union (EAEU). Through employing a Computable General Equilibrium Model and its GTAP 10 database, this study finds that EAEU integration might have a positive effect on Tajikistan's GDP, production output, its welfare and trade creation in the long run yet the EAEU integration presents drawbacks in output production and export potential for several economic sectors, including electricity and metals, due to high competition in the common market of EAEU. This paper is the first one to study the ex-ante effects of Tajikistan integration with the EAEU; thus, it fills the gap as well as contributes to the literature on CGE GTAP modelling. In addition, this study provides policymakers in Tajikistan with an understanding of the prospective benefits and drawbacks of the country's accession to the EAEU.



CHINA'S INVESTMENT IN ROAD DEVELOPMENT IN CENTRAL ASIA

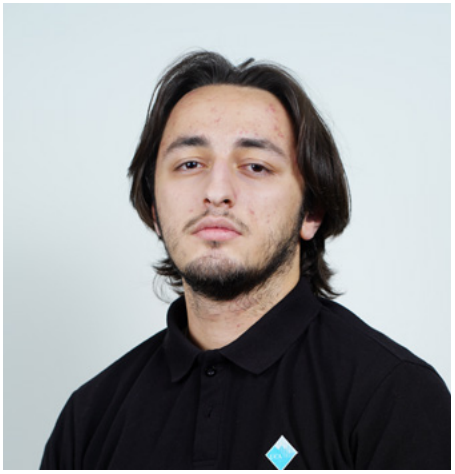
FAIYOZ ALIMAMADOV

What are the effects of China's investment in road development in Central Asia? By analyzing the inflow of Chinese capital into infrastructure, the study highlights how these investments have facilitated enhanced trade routes and economic integration among Central Asian countries, potentially elevating their strategic positions in global markets. More importantly, this research also addresses significant challenges accompanying these investments, such as concerns regarding debt sustainability, environmental impacts, and the social implications for local populations. The study concludes that the future of China's road development initiatives in Central Asia will be critically dependent on the region's ability to manage these investments prudently, ensuring that they contribute to long-term regional stability and prosperity without compromising the sovereignty and environmental integrity.

ECONOMIC IMPACT OF SANCTIONS ON RUSSIA IN CENTRAL ASIA

FARHOD SHERZAMONOV

This paper examines the economic consequences of international sanctions imposed on Russia, focusing on the ripple effects across Central Asian economies. It delves into the multifaceted economic relationship between Russia and Central Asian countries, highlighting how sanctions influence trade, energy partnerships, labor migrations and remittances. The research employs a dynamic ordinary least squares model to analyze various economic indicators from 2000 to 2021, assessing broader impact on the GDP Growth per capita of Central Asian nations. Key finding suggest that sanctions not only affect the Russian economy but also extended their impact to Central Asia, challenging these countries to adapt economically and strategically under new geopolitical pressures. This study contributes to a nuanced understanding of the interdependencies within Eurasian economic landscapes and the complex dynamics of sanctions in international relations.



ECONOMIC IMPACT OF REMITTANCE FLOWS IN FORMER SOVIET REPUBLICS

GAVHAR GURMINJOVA

This research aims at analysing the economic impact of remittance flows in five highly dependent on international money transfer post-Soviet countries: Tajikistan, Moldova, Armenia, Georgia, and Ukraine. This study focuses on the effect of remittance flows on GDP per capita growth, investment, and consumption from 2003 to 2021. Three extended neoclassical models are employed (Barro, 1996). The results demonstrate complex dynamics: while remittances positively affect GDP per capita growth, the variable is not statistically significant. In contrast, remittances have a statistically significant effect on investment, suggesting that households tend to prioritize consumption rather than long-term investment. Nevertheless, remittances have a positive and statistically significant effect on consumption. This tendency can be attributed to the fact that receiving households become more reluctant as they have a stable inflow of money from abroad. In order to optimize the positive effects of remittances, policymakers should focus on improving financial literacy and creation of a supportive environment for investment and entrepreneurship. The objective of this multimodal approach is to promote sustainable and inclusive economic development in the former Soviet states.

THE IMPACT OF INTERNATIONAL TRADE ON POVERTY REDUCTION IN CENTRAL ASIA: EVIDENCE FROM PANEL DATA IN CENTRAL ASIA

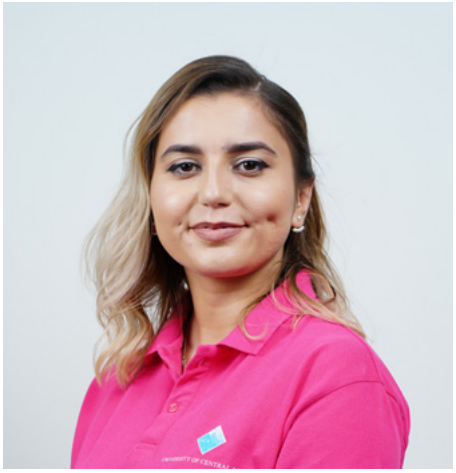
LOLA BAKHTDAVLATOVA

How does international trade impact poverty reduction in Central Asia, and what factors influence this relationship? To address this question, a fixed effects model and panel data from 1996 to 2021 are employed. The analysis reveals that trade openness has a positive, albeit indirect, effect on poverty alleviation, with the relationship being influenced by various country-specific factors such as GDP per capita, foreign direct investment, domestic credit to the private sector, political stability, and personal remittances. The results highlight the importance of complementary policies, including investment in infrastructure, education, and social safety nets, in harnessing the benefits of trade for poverty reduction. The findings also emphasize the need for regional cooperation and integration initiatives to promote inclusive economic growth. Despite some limitations, the thesis contributes to the understanding of the trade-poverty nexus in the understudied context of Central Asia, providing valuable insights for policymakers. The research underscores the significance of designing trade and development strategies tailored to the unique challenges and opportunities faced by each country in the region, taking into account the complex interplay of economic, political, and social factors that shape the impact of trade on poverty reduction.

HEALTH INSURANCE AND HEALTH OUTCOMES: A CROSS-COUNTRY ANALYSIS IN CENTRAL ASIA

MARVORI DAVLATNAZAROVA

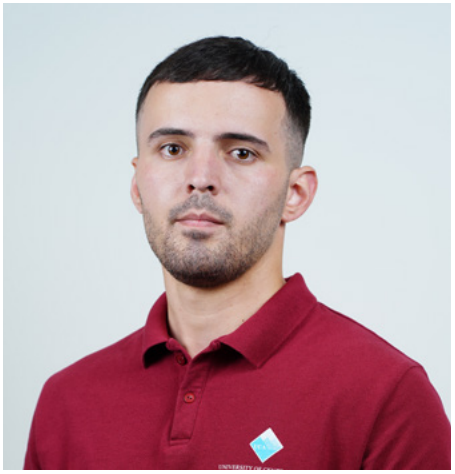
Inadequate health insurance coverage and high out-of-pocket expenditure pose significant challenges to achieving optimal health outcomes in Central Asia. This thesis explores the relationship between health insurance coverage, out-of-pocket expenditure, and health outcomes in Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan from 2000-2020. The research aims to demonstrate the effects of variations in health insurance coverage and socioeconomic factors on life expectancy using a fixed effects regression model. The study utilizes comprehensive data from international databases such as The World Bank and The World Health Organization. The results reveal a significant negative correlation between increased out-of-pocket expenses and reduced life expectancy, confirming the adverse effect of inadequate health insurance on health outcomes. In contrast, increased government health expenditure positively correlates with improved life expectancy, emphasizing the essential role of state resource investments in healthcare. Furthermore, the study evaluates the influence of socio-economic factors, such as GDP per capita, urbanization, and education level, providing a holistic view of the impact of economic development on public health. The research contributes to existing literature by focusing on a rarely studied region and offers practical policy implications for improving health outcomes and health insurance systems in Central Asia. The findings highlight the importance of strengthening health insurance coverage and considering socioeconomic determinants in developing effective healthcare policies in the region.



DETERMINANTS AND OBSTACLES FOR BUSINESS GROWTH IN DEVELOPING ECONOMIES: THE CASE STUDY OF TAJIKISTAN

MAMADRIZO MAHMUDOV

This paper investigates the determinants and obstacles to business growth in Tajikistan, focusing on how these factors have influenced small and medium-sized enterprises (SMEs) from 2002 to 2019. Utilizing data from World Bank surveys, this study employs regression analysis to determine the impeding impact of various business environment factors on the growth of businesses. The research identifies significant barriers such as access to finance, electricity supply, transportation, and regulatory issues including corruption and political instability, which variably affect business growth depending on the economic and political context of different periods. The findings reveal that while some obstacles have a consistent impact, others show fluctuating significance, reflecting the dynamic nature of the business environment in a transitional economy. This study contributes to the understanding of the complex relationship between economic reforms and business growth in Tajikistan, offering insights that are vital for policymakers and business leaders aiming to foster a favourable environment for economic development and investment attraction.



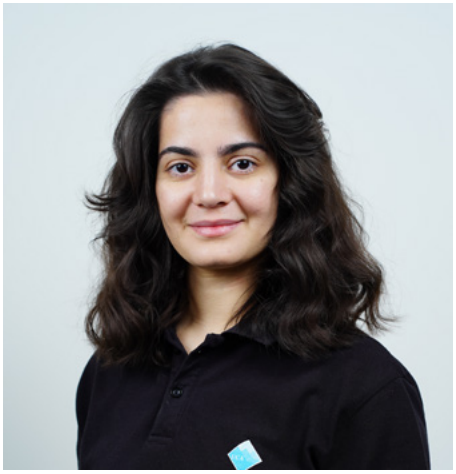
CLIMATE CHANGE IMPACT ON AGRICULTURAL PRODUCTIVITY, ESPECIALLY CEREAL CROP, IN CENTRAL ASIA

MIZHGONA KHOLDORBEKOVA

Climate change poses a significant threat to crop productivity in the five Central Asian countries of Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan. To investigate this issue, a country-level fixed effect panel model is employed, analyzing data from 1992 to 2020. The model examines the relationship between seasonal temperature and precipitation variables and cereal yields, while accounting for agricultural inputs such as fertilizer use, irrigation, and labor. The results indicate that higher spring temperatures have a positive effect on cereal yields, while higher spring precipitation has a negative effect, suggesting that moderate warming and drier conditions during the growing season may benefit crop growth in the region. However, the lack of significant results for weather variables in other seasons highlights the need for further research using more granular and spatially explicit data to better capture the complex relationships between climate change and agricultural productivity. The findings contribute to the understanding of the potential impacts of climate change on cereal crops in Central Asia and underscore the importance of developing adaptation strategies that consider the region's specific agro-ecological and socio-economic contexts. Future research should aim to incorporate additional factors, explore alternative model specifications, and conduct more rigorous diagnostic tests to enhance the robustness and interpretability of the results, ultimately enabling policymakers and stakeholders to develop effective strategies for mitigating climate change risks and ensuring the long-term sustainability of cereal production in Central Asia.

EFFICIENCY ANALYSIS: AGRICULTURAL PRODUCTIVITY IN KHATLON PROVINCE, TAJIKISTAN

MOHRUKH TALABKHUJA

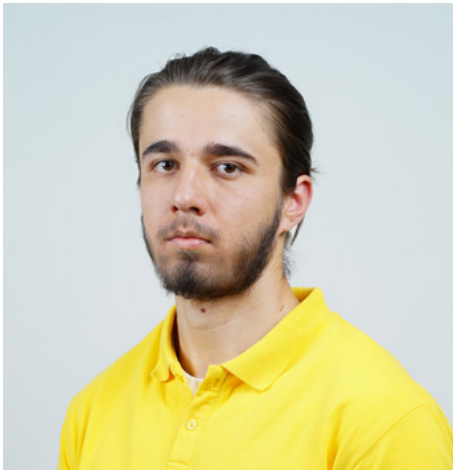


Agricultural productivity and efficiency in Tajikistan, face significant challenges, with farmers struggling to increase production. This study applies Stochastic Frontier Analysis (SFA) to examine these issues, focusing on quantifying technical inefficiency, identifying its determinants, and comparing productivity across plot types. Using data from a 2023 survey conducted by the International Food Policy Research Institute (IFPRI), the research analyzes a sample of 499 potato farmers, 356 tomato farmers, and 237 wheat farmers in 12 districts of Khatlon Province. The findings reveal that diversified irrigation sources, larger farm sizes, and output-based training and extension services positively influence productivity. However, soil salinity and unsustainable land management practices contribute to inefficiency, with the average technical efficiency estimated at only 5%, indicating substantial room for improvement. Dehkan farms are found to be the most productive compared to household and presidential plots. The study highlights the urgent need for policy interventions targeting irrigation infrastructure, sustainable land management, access to resources, and farmer education to enhance agricultural productivity, efficiency, and food security in the region. By addressing these issues, farmers in Khatlon Province can unlock their full potential and contribute to the overall development of the agricultural sector in Tajikistan. The research provides insights for policymakers and practitioners, emphasizing the importance of understanding and addressing the factors shaping agricultural performance in the country.

THE IMPACT OF DIGITAL TRANSFORMATION ON SMES IN TAJIKISTAN DURING THE COVID-19 PANDEMIC

NURMUHAMMAD BUTABEKOV

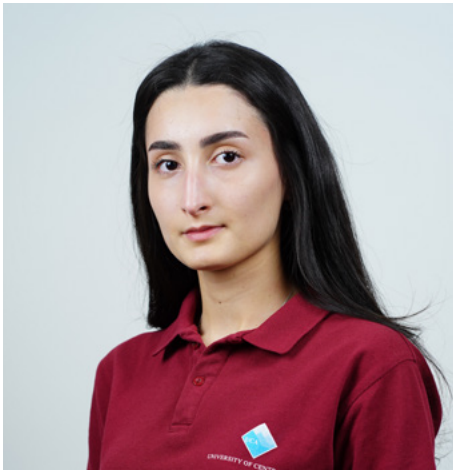
Is the COVID-19 crisis helping companies in Tajikistan to facilitate their transition into digital business? Tajikistan's SMEs were struck hard by the pandemic. Consumer demand dropped, supply networks fell apart, and health and safety conditions constrained business activities. Using quantitative surveys and qualitative interviews the study shows how some Tajik companies managed to adopt more digitalized business practices as they emerged from the COVID crisis. The adoption and impact of digital technology varied across sectors, with some like retail and education more readily embracing online platforms and e-commerce systems. The study also compares this process of transformation in Tajikistan with what has been observed in the rest of the world; it emphasizes the importance of digital literacy and a robust internet infrastructure for ensuring business continuity, particularly in rural areas of Tajikistan where digital infrastructure is underdeveloped, suggesting targeted investments.



ROLE OF BANKING SECTOR DEVELOPMENT IN AGRICULTURAL GROWTH IN CENTRAL ASIAN COUNTRIES

SAMIRA ODINABEKOVA

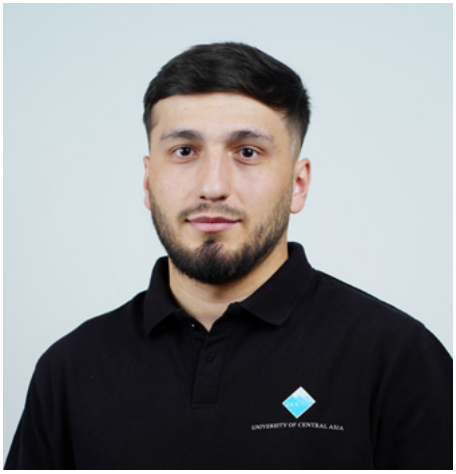
This study analysed the relationship between banking sector development and agriculture value added to GDP in Central Asian countries. The paper used Panel Dynamic Ordinary Least Squares with a fixed effect to look at these relationships for the period from 1996 to 2022. The result from the regression analysis revealed that there is low influence of domestic credit to the private sector by banks on agricultural value added to GDP, which supports the initial hypothesis. This study incorporated some explanatory variables such as labour participation in agriculture, land use, trade openness, and some others, to look at these factors' effects on the variable of interest. A descriptive analysis of some potential independent variables made the analysis more in-depth. Thus, this paper addresses the gap in the existing literature through its approach and specific scope.



START-UP CULTURE AND INNOVATION IN TAJIKISTAN: IMPACT OF START-UPS ON ECONOMIC GROWTH AND THE PREVAILING CHALLENGES AND OPPORTUNITIES THEY FACE

SHAHZOD NIYOZMAMADOV

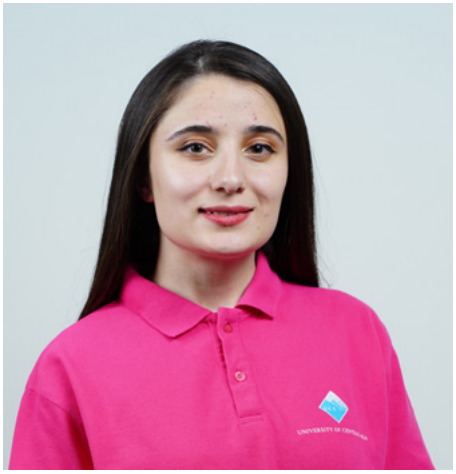
With a growing youth population interested in technology and innovation, Tajikistan is witnessing the exciting birth of a startup culture. This research dives into this new phenomenon, exploring its potential to fuel economic growth. However, the journey won't be smooth sailing. The study examines the complex challenges and opportunities that lie within Tajikistan's unique entrepreneurial landscape. Relying on interviews with stakeholders of the startup ecosystem, the qualitative analysis demonstrates the role of innovations, foreign investments, and socio-economic changes introduced by startups. The study presents the key challenges experienced by entrepreneurs, which include a lack of financing, cultural challenges, workforce turnover, process challenges, limited market insights and complex bureaucratic structures. Moreover, it discusses the options for growth integration, such as regulatory modifications, tax incentives, venture capital, business incubators, and public-private partnerships that can aid in developing a thriving startup culture. The findings underscore the importance of capitalizing on the opportunities present in the startup landscape and minimizing the obstacles faced by these businesses, thereby enhancing economic development in Tajikistan.



FOREIGN AID AND ECONOMIC GROWTH IN CENTRAL ASIA

SOHIBEGIM MAMADNAZAROVA

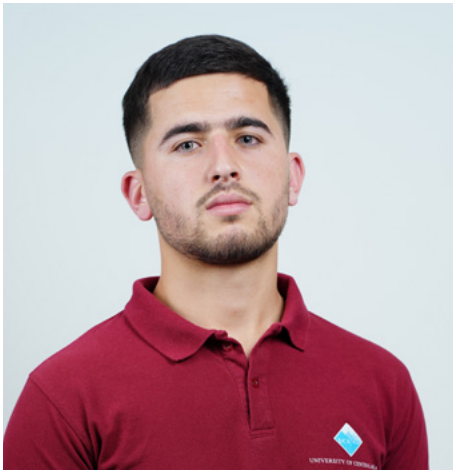
This research aims to assess how foreign aid, specifically in the form of official development assistance (ODA), influences economic growth in Central Asia. The study used panel data on the ODA and economic growth estimates of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan for the period of 2000–2020. According to the study results, a 1% increase in ODA caused GDP growth to rise by 2.15%-point. Furthermore, the study investigates whether aid effectiveness is dependent on institutional quality. The findings indicate that a 1%-point increase in ODA enhances GDP growth by 3.35% for every unit increase in rule of institutional quality. Thus, it suggests that aid effectiveness depends on institutional quality.



TRADE RELATIONS BETWEEN CHINA AND THE WORLD: AN ANALYSIS OF ECONOMIC TIES AND INVESTMENT PROJECTS UNDER THE BELT AND ROAD INITIATIVE

TABREZ SAFARMAMADOV

This paper examines the economic effects of the Belt and Road Initiative on trade dynamics and GDP growth in over 123 countries from 2000 to 2021. The paper applied fixed effects regression models and Granger causality tests with the panel data. The fixed effects models indicate that immediate impacts on trade balances are evident, yet GDP responses are inconsistent. The further findings from the Granger causality tests demonstrate intricate temporal connections, suggesting that whereas BRI investments may predict variations in import levels, their ability to forecast GDP growth and exports is less consistent. The research shows that BRI investments significantly boost imports from China into this country, which is an example of the initiative's support for the reinforcement of the export economy in China. It has very slight influence on the impact of GDP growth and exports among the participant countries; this may possibly indicate that benefits from BRI are not equally distributed. Results provided by the thesis are very important for understanding how large international projects like BRI can influence national economic indicators of a particular country in both the short and long run.



THE IMPACT OF INTELLECTUAL PROPERTY RIGHTS (IPRS) IN THE GLOBAL AGRICULTURAL INPUT MARKET

TAKHMINA IMOMKULOVA

This study extends Campi's (2017) work by investigating the impact of Intellectual Property Rights (IPRs) on agricultural productivity across 49 high-income, middle-income, and low-income countries from 2011 to 2020. The role of the rule of law as a moderating factor in the relationship between IPRs and agricultural productivity is also examined. Using a fixed effects model and data from FAO, World Bank, Campi and Nuvolari (2021), the analysis reveals that stronger IPRs have a positive and statistically significant effect on agricultural productivity in high-income and middle-income countries. The interaction term between IPRs and the rule of law is also positive and significant in these income groups, suggesting that a strong legal framework and effective enforcement of IPRs are crucial for realizing the benefits of agricultural innovation. However, in low-income countries, the effect of IPRs on productivity is insignificant, possibly due to the high costs of patented technologies and the lack of a strong legal infrastructure. The findings underscore the importance of tailoring IPR policies to the specific economic and institutional contexts of countries and highlight the need for flexible frameworks and public-private partnerships to ensure access to critical agricultural technologies in low- and middle-income nations.

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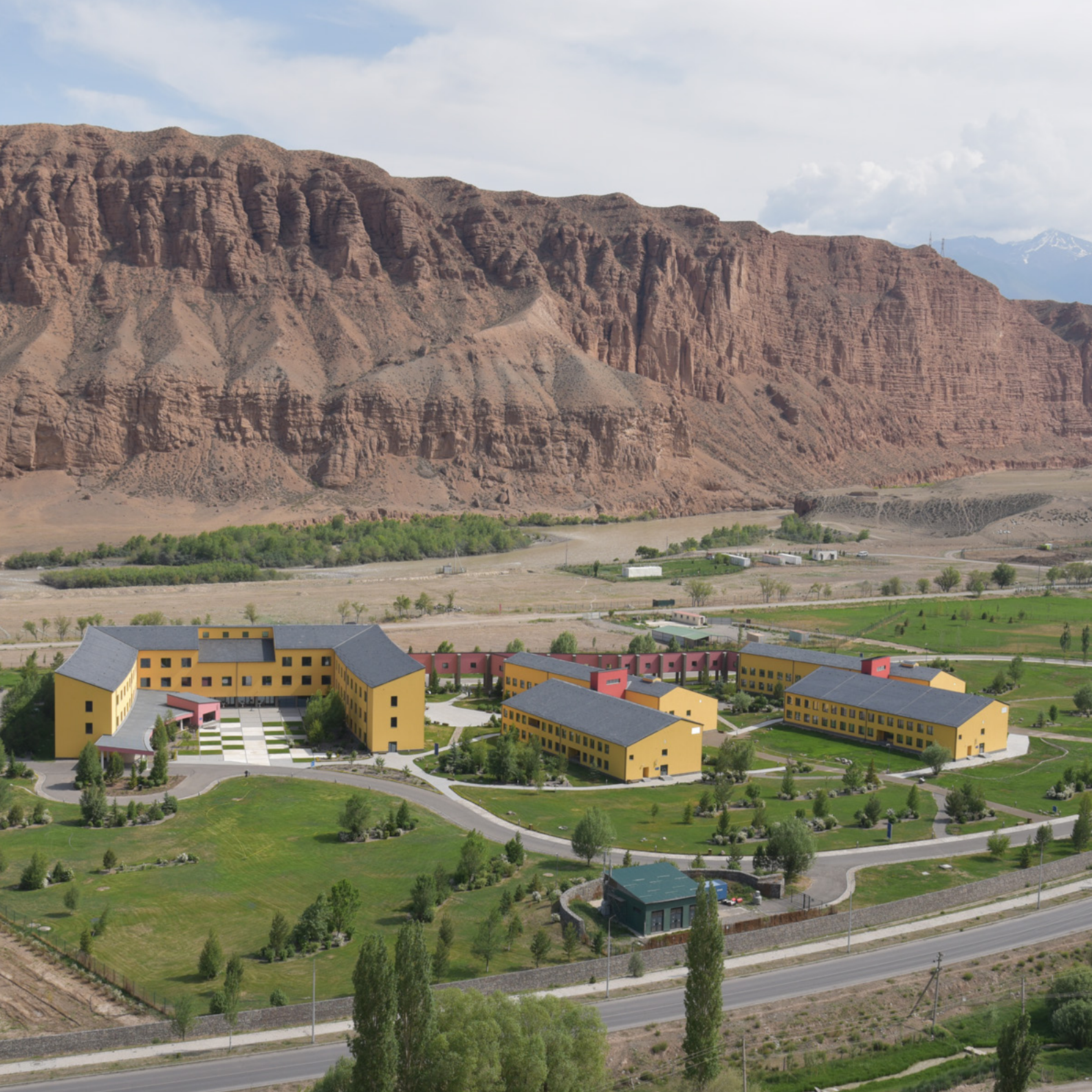

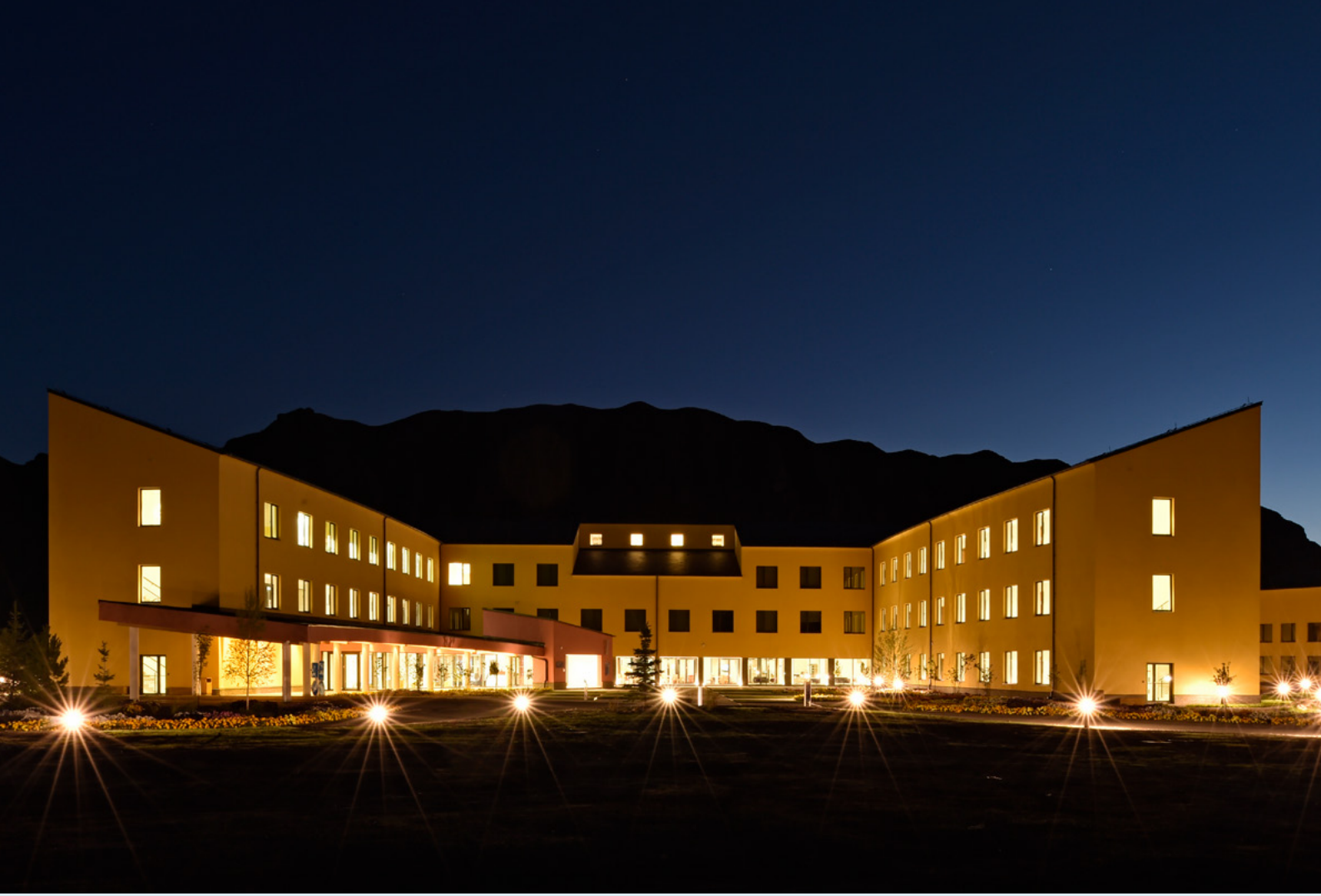

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