

Erasmus+ Internship Experience Report

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Karadeniz Technical University, Trabzon, Turkey | April 1 – June 12, 2026

1. General Information

As part of the Erasmus+ Internship Programme, I completed a research traineeship at Karadeniz Technical University (KTU), located in Trabzon, Turkey. My stay lasted from April 1, 2026 to June 12, 2026 — a total of approximately 10 weeks.

I am enrolled as a 3rd semester student in the Masters of Information Technology programme at TH OWL (Technische Hochschule Ostwestfalen-Lippe), Lemgo, Germany. The internship was hosted by the Computer Engineering Department at KTU, under the direct supervision of Prof. Dr. Güzin ULUTA■, and was classified as a research internship focused on IoMT (Internet of Medical Things) Network Intrusion Detection.



Figure 1: With the Erasmus+ Exchange Programme team at Karadeniz Technical University

2. Preparation: Planning, Organisation and Application Process

The preparation process began several months before departure. I identified KTU as a suitable host institution because of its strong Computer Engineering department and the active IoMT security research conducted by Prof. Dr. Güzin ULUTA■, whose work aligned closely with my own research interests.

The application involved coordinating with the International Office at TH OWL, completing the Learning Agreement, and obtaining approval from both home and host institutions. The process was smooth and well-supported. Travel, visa documentation, and accommodation were arranged well in advance. I received an Erasmus+ grant of €2,739 for the full duration of the traineeship.

3. Accommodation

I stayed in the official Erasmus student dormitory provided by KTU. The accommodation was a shared room within a student housing facility located near the university campus, making it extremely convenient to commute to the research department daily.

The dormitory was well-maintained and offered a comfortable environment for both work and rest. Sharing the space with fellow international students created a warm social atmosphere from the very first day. I strongly recommend future Erasmus interns to apply for university dormitory housing early — it is the most affordable and convenient option in Trabzon.

4. Research Internship: Activities and Achievements

The primary focus of my internship was conducting a cybersecurity research project titled:

"IoT Network Intrusion Detection System using Dual-Channel GASF-GADF Image Fusion with MobileNetV2 and Grad-CAM Explainability"

This project was conducted on the CICIoMT2024 dataset and involved the following tasks:

- Data preprocessing and cleaning of multi-protocol IoT network traffic data
- Handling class imbalance using SMOTE (Synthetic Minority Oversampling Technique)
- Converting time-series network features into dual-channel GASF and GADF images
- Training MobileNetV2 protocol-wise: WiFi (96.27%), MQTT (99.72%), Bluetooth (89.52%)
- Implementing Grad-CAM explainability to visually highlight attack detection decisions
- Conducting cross-protocol zero-day generalization test — 100% correct classification
- Cross-dataset validation on BoT-IoT dataset using the same GASF-GADF pipeline
- Maintaining all code and scripts on GitHub for version control

The research produced results of publishable quality and is being prepared for submission to MDPI Sensors or IEEE Access. This project represents a novel contribution, as no prior work has combined GASF-GADF dual-channel imaging with MobileNetV2 specifically on the CICIoMT2024 dataset.



Figure 2: Presenting the completed research project to Prof. Dr. Güzin ULUTA■, Computer Engineering Dept., KTU

5. Finances: Cost of Living

The total Erasmus+ grant received was €2,739, equating to approximately €1,000 per month. This was sufficient to cover core living expenses, although daily costs in Trabzon were somewhat higher than expected.

- Accommodation: Subsidised university dormitory — affordable through Erasmus+ housing
- Food and groceries: Moderately expensive — comparable to German city prices
- Local transport: Very affordable — public buses and taxis readily available
- Leisure and tourism: Reasonably priced — most natural attractions free or low cost

Overall monthly expenditure was approximately €1,000. Future students should budget carefully for groceries, as supermarkets in Trabzon can be surprisingly costly.

6. Everyday Life and Leisure

Life in Trabzon was a wonderfully enriching experience. The city sits on the shores of the Black Sea surrounded by lush green mountains, creating a breathtaking natural landscape. The local people are notably polite, kind, and hospitable.

One of the greatest highlights was the close friendships formed with fellow international students. Our group of four friends quickly became inseparable — exploring the city together, visiting historical sites, cooking meals, and supporting one another. These friendships made Trabzon feel like a true home away from home.

During weekends and free evenings, we explored Trabzon's most famous attractions:

- Sümela Monastery — a stunning ancient monastery carved into the Pontic Mountain cliffs

- Black Sea coastline — long walks along the seafront with beautiful sunsets
- Local bazaars and markets — authentic Turkish food, tea culture, and traditional cuisine
- KTU campus surroundings — a beautiful green campus ideal for evening relaxation



Figure 3: Inside the historic Sümela Monastery — one of the most remarkable sites in the region

The international Erasmus student community at KTU was vibrant and welcoming. Students from across Europe and Asia quickly formed a close-knit group, organising weekend trips and activities together that made the experience socially rich and unforgettable.



Figure 4: With friends at the stunning Black Sea coastline — memorable moments together

The Black Sea sunsets in Trabzon were among the most breathtaking natural experiences of the entire trip — a quiet moment by the sea after a productive day of research, watching the sun dip below the horizon, was something truly special and unforgettable.

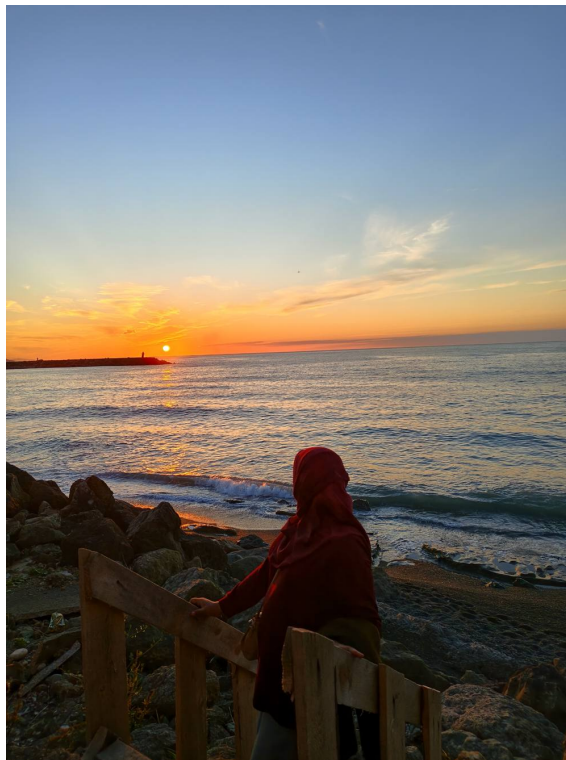


Figure 5: A beautiful Black Sea sunset — one of Trabzon's most stunning natural moments

7. Insider Tips for Future Students

- Apply for university dormitory as early as possible — most convenient and affordable
- Learn basic Turkish phrases — many locals outside university do not speak English
- Use Google Translate camera feature — invaluable for menus, signs, and labels
- Do not miss Sümela Monastery — one of the most remarkable historical sites in the region
- Connect with international Erasmus students early — they become your support network
- Budget approximately €1,000 per month — grocery costs are higher than expected
- Explore the Black Sea coast and mountains on weekends — the natural beauty is extraordinary

8. Conclusion

My Erasmus+ internship at KTU was an exceptionally positive and transformative experience — both professionally and personally. I successfully completed a full IoMT cybersecurity research project under the expert supervision of Prof. Dr. Güzin ULUTA■. The results are of publishable quality and will be submitted to an international journal.

Professionally, the internship strengthened my technical skills in deep learning, data preprocessing, explainable AI, and research methodology. Working independently on a complex project significantly enhanced my analytical and problem-solving abilities.

On a personal level, living in Trabzon introduced me to a rich culture, extraordinary natural environment, and genuinely warm people. The friendships formed with fellow international students — especially our close group of four — were among the greatest highlights. We explored the city, shared meals, visited historical sites, and created memories that will last a lifetime.

I would wholeheartedly recommend this Erasmus+ internship to future TH OWL students interested in cybersecurity, AI, or computer engineering research. The combination of high-quality academic supervision, a welcoming international environment, and the unique beauty of Trabzon makes it an outstanding choice.