Artificial Intelligence for Ultrasound Image Analysis

Presenter: Lado Mindadze
Coauthor: Bakari Kadzanaia
E-mail: lado.mindadze522@ens.tsu.edu.ge

Faculty of Exact and Natural Sciences, Department of Computer Science, Ivane Javakhishvili Tbilisi State University, 3 Chavchavadze Ave., Tbilisi 0179, Georgia

Abstract

The project aims to develop an innovative artificial intelligence system that enhances the analysis of ultrasound images, particularly in organ identification, disease diagnosis, and severity assessment. The system assists physicians in making accurate and timely diagnoses, reduces the likelihood of errors, and accelerates the clinical decision-making process.

The key problem this project addresses is the lack of precision and efficiency in analyzing ultrasound images, which are often interpreted manually and heavily dependent on the physician's experience. Challenges include the presence of textual "noise," non-standard formats, and the need to filter out irrelevant data.

The solution is based on deep learning algorithms, specifically convolutional neural networks (CNNs), implemented using the TensorFlow and Keras frameworks. The image processing pipeline includes Region of Interest (ROI) extraction, textual detail filtering, and normalization. The data used currently comes from open sources (Kaggle), with plans to integrate real clinical datasets in the future.

The technological framework includes Google Colab, Docker, and other cloud-based tools that facilitate efficient model training and testing. The resulting system is designed to be intuitive, adaptable to the Georgian medical ecosystem, and practical for everyday clinical use.