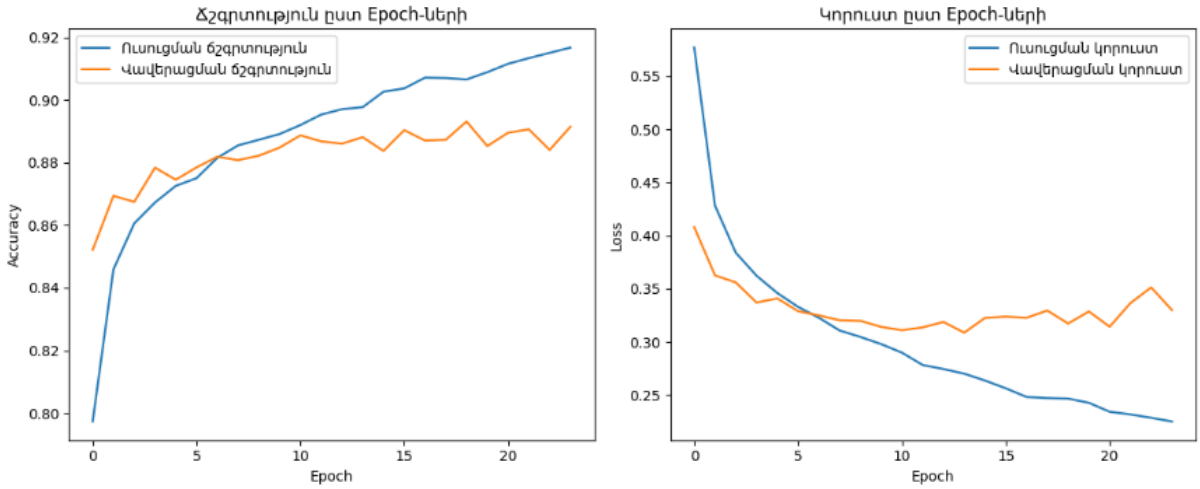
**I attempted to compare the performance of a neural network and a random forest classifier by solving the same classification task using these two well-known approaches.**
The first method uses a neural network, and the second relies on a random forest algorithm.

I initially tried using a neural network with **5 layers**, but it quickly **overfitted after just 10 epochs**. Therefore, I reduced the network to **3 layers**, which provided more stable performance.

By analyzing the **loss curve of the 3-layer neural network**, I noticed that after the **10th epoch**, the results **stopped improving** and even began to degrade, indicating overfitting.
As a result, I chose to **limit training to 10 epochs** to avoid overfitting and maintain generalization




**After that, I adjusted the number of estimators in the Random Forest so that the training time would approximately match that of the neural network. This allowed for a fairer comparison of accuracy.**
In this setup, the neural network performed **slightly better** than the Random Forest.

To further investigate, I reduced the number of estimators by about **three times**, aiming to minimize the possibility of overfitting.
Even with this adjustment, the neural network still achieved **slightly higher accuracy**,

indicating its ability to generalize better under these conditions.

**Conclusion:**

Random Forest is a highly effective and robust classification algorithm, known for its stability, resistance to overfitting, and ease of interpretation.

However, in this experiment, it slightly underperformed compared to the neural network, which was able to achieve marginally higher accuracy.

This suggests that, while Random Forest remains a strong and reliable baseline, neural networks may offer a performance advantage in more complex classification tasks such as those involving image data like Fashion-MNIST.