

DeepInvest is a 30-month project funded by PA 2014-2020. It consists of 3 experienced and committed partners located in Greece (CERTH, University of Macedonia, EFFECT SA. Fintech Software Solutions).

Summary

The **DeepInvest** project will apply **innovative machine learning techniques** for the realization of **optimal decision support** for portfolio management by structuring real portfolios, evaluating the performance of investment products and optimizing the investment decisions concerning the structure of the portfolio.

During the project, research and development will be conducted leading to:

a) **new machine learning models** for efficient, **faster and ultimately more profitable forecast of stock prices,** based on novel deep learning techniques and research efforts by members of the consortium, and

b) **automated portfolio management software**, aimed at both retail and institutional investors; the software will be able to produce investment recommendations in an efficient and fast manner, always taking into account the **investor profile and risk tolerance**.

This kind of automated management will require minor human intervention, offering **personalized**, **effective investment recommendations at a smaller cost**. It is important to note that this kind of automated management will offer the opportunity to the investment advisor to explain the goals and the specific characteristics of the each one of the proposed model portfolios.

Goals

The main goal of the **DeepInvest** project is to develop **innovative methods for efficient stock price forecasting**, **based on new methodologies in the field of neural networks**, aiming to the formation of **suitable model portfolios for each level of investment risk**. For this reason, the following **prediction optimized techniques** will be explored and implemented:

1) **Neural networks based on LSTM** (long short-term memory) units for predicting the returns of many securities per unit of time, without the need of training each of them separately.



Deep**Invest**

2) **Investigation of "sequence-to-sequence" techniques**, where two LSTM neural networks will be implemented, with one "handling" the encoding phase and the other the decoding phase.

3) **Investigation of an asymmetric loss function** for the usage of "more" information of the time series that is to be predicted, incorporating both the sign and the size of the deviation of the predicted return from the real one.

4) Investigation of the recently proposed "attention" technique during the training of the neural **networks**, so that they use more information from the time series used as input, with different focus weights on different samples of it.

5) Implementation of optimization techniques using the expected portfolio returns of model portfolios (according to relevant risk levels), in order to determine the quantity ("weights") of the purchase of each security.

https://deepinvest.gr/



CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS







European Regional Development Fund





Co-financed by Greece and the European Union