

EAA Seminar

## Deep Learning – Applications in Market Risk and Economic Capital Modelling: Deep dive and practical exercises

11/12 November 2019 | Prague, Czech Republic



Organised by the EAA – European Actuarial Academy GmbH.

### Introduction

Deep learning techniques represent a certain part of wider machine learning methods and have become increasingly popular for a variety of real-life applications solving complex high-dimensional problems.

So far, typical applications for deep learning architectures such as deep neural networks and recurrent neural networks include speech and pattern recognition, language processing, audio recognition or machine translation. In all these applications, deep learning techniques were able to yield break-through results due to their highly flexible and innovative architectures and their approach of training models towards a set of given data.

Hence, given the variety and complexity of problems in the insurance industry combined with the typically large amounts of available data, practitioners have started applying these techniques in the insurance industry.

This seminar will exclusively focus on applying deep learning techniques for market risk modelling and the wider economic capital modelling space as well as asset allocation and

actuarial business planning which represent areas of great importance for insurance companies where deep learning techniques have typically not been widely used before. Main goal of the seminar is to present relevant tools and techniques from deep learning and bring them together with applications in market risk, economic capital modelling, asset allocation and actuarial business planning. Examples are proxy modelling, projecting cash flows and economic balance sheet items (incl. the Solvency II ratio) in the future and prediction of economic time series.

The seminar will be highly practical; all major applications presented in the seminar will be followed by hands-on sessions where the participants will be able to implement the techniques under supervision and apply them to data sets.

Additionally, EAA offers the webinar „Deep Learning – Applications in Market Risk and Economic Capital Modelling: Overview on current state-of-the-art techniques” on 25 September 2019 | 10:00 - 12:00 CEST. The speakers describe the difference between the webinar and the seminar as follows:

*The webinar provides an overview on current state-of-the-art techniques and illustrates them based on two case studies, while the seminar offers a deep dive into these techniques providing more and additional technical and theoretical background and allows the participants to apply DL techniques themselves under the guidance of the speakers.*

Participants of the webinar who also take part in the seminar in Prague will get a discount of € 50.00 on the seminar fee.

## **Participants**

The practical sessions will make use of Keras, Tensorflow and R. Guidelines on how to install these tools on your own laptop will be provided several weeks prior to the beginning of the seminar. Technical support regarding the installation will be provided during the seminar, if necessary

No special prior knowledge is required.

## **Purpose and Nature**

The main purpose of the seminar is for the participants to learn which applications deep learning techniques offer in the context of market risk, economic capital modelling, asset allocation and actuarial business planning. Therefore, we will provide an introduction into the wider deep learning framework and then focus on key techniques, tools and ingredients which are particularly useful for the context of market risk and economic capital modelling as well as asset allocation and actuarial business planning. Participants will also learn about the requirements for the successful application of these techniques and their boundaries. The seminar will be highly practical; all major applications presented in the seminar will be followed by hands-on sessions where the participants will be able to implement the techniques under supervision and apply them to data sets.

## Language

The language of the seminar will be English.

## Lecturers

Dr. Mario Hoerig, Partner, Oliver Wyman Actuarial

Mario Hoerig is a Partner with Oliver Wyman, co-leading the actuarial services offering in the German speaking markets. Mario focuses on quantitative modelling under Solvency II (economic scenario generators for risk-neutral and real-world purposes, ALM studies, risk factor modelling for Solvency II, risk aggregation, economic capital and capital management) and advises some of the largest insurance companies in Europe on these topics.

Dr. Daniel Hohmann, Senior Manager, Oliver Wyman Actuarial

Daniel Hohmann is a Senior Manager with Oliver Wyman. He has a strong quantitative background and has been advising his clients on a variety of market risk and economic capital topics such as proxy modelling, risk-neutral and real-world scenario generation and time series analysis for market data.

## NN

Further speakers from the industry will present and share their experience with deep learning techniques within market risk and economic capital applications

## Preliminary Programme

### Monday, 11 November 2019

8.45 - 09.00	Registration
09.00 - 09.15	Introduction & welcome (EAA)
09.15 - 10.45	Deep Learning: Overview on features, mechanics and wider applications – Why are deep learning techniques successful (and popular)?
10.45 - 11.00	Coffee Break
11.00 - 12.30	Neural networks: Classifications, architectures and ingredients
12.30 - 13.30	Lunch
13.30 - 15.00	Application session 1: Using neural networks for Solvency II proxy modelling
15.00 - 15.15	Coffee Break
15.15 - 17.00	Application session 2: Using neural networks for the projection (and prediction) of cash flows and the Solvency II ratio
approx. 18.30 Dinner	

### Tuesday, 12 November 2019

09.00 - 10.45	Theory session: Recurrent neural networks and applications
10.45 - 11.00	Coffee Break
11.00 - 12.30	Hints and tricks designing and implementing neural networks

12.30 - 13.30	Lunch
13.30 - 15.10	Application session 3: Using neural networks for the prediction of economical time series
15.10 - 15.15	Concluding remarks, closing of seminar (EAA)

## Fees & Registration

Please register for the seminar as soon as possible because of the expected demand. If there are more persons interested in this seminar than places available we will give priority to the registrations received first. Please send your registration as soon as possible by using our online registration form at [www.actuarial-academy.com](http://www.actuarial-academy.com).

Your registration is binding. Cancellation is only possible up to 4 weeks before the first day of seminar. If you cancel later, the full seminar fee is due. You may appoint someone to take your place, but must notify us in advance. EAA has the right to cancel the event if the minimum number of participants is not reached.

Please always give your invoice number when you effect payment. All bank charges are to be borne by the participant. We will send you an invoice, please allow a few days for handling.

Your early-bird registration fee is € 840.00 plus 21 % VAT until 11 September 2019. After this date the fee will be € 990.00 plus 21 % VAT.

Participants of the webinar who register for the seminar in Prague, will get a discount of € 50.00 for this seminar. Please send an email to [contact@actuarial-academy.com](mailto:contact@actuarial-academy.com) after your online registration for the seminar if you participated in the webinar, too.

## Venue & Accommodation

The seminar will take place in Prague, Czech Republic:

Angelo by Vienna House Prague

Radlická 1g

150 00 Praha 5

Phone: +420296882707

<https://www.viennahouse.com/en/angelo-prague/the-hotel/overview.html>

We have arranged special prices for accommodation. The special rate is 115 € per night in a classic single room including breakfast and VAT. It is valid for bookings by 25 October 2019 out of our allotment "EAA Seminar". Our allotment includes a limited number of rooms. Kindly book your accommodation directly with the hotel using this [booking form](#) and note the hotel's cancellation policy.

## CPD

For this seminar, the following CPD points are available under the CPD scheme of the relevant national actuarial association:

Austria:	11 points
Belgium:	11 points
Bulgaria:	12 points
Czech Republic:	2-3 points (individual accreditation)
Estonia:	11.5 hours
Finland:	7.75 points
Germany:	12 hours
Hungary:	12 hours
Ireland:	11.5 hours
Italy:	approx. 4 credits (GdLA individual accreditation)
Latvia:	12 hours
Netherlands:	approx. 11 PE-points (individual accreditation)
Portugal:	11.5 hours
Russia:	40 points
Slovakia:	8 CPD points
Slovenia:	50 points
Spain:	CAC 12 points, IAE 11 hours
Switzerland:	15 points

No responsibility is taken for the accuracy of this information.