Dr. rer. nat. Nenad Balanesković, Blauenstraße 21, 60528 Frankfurt/M,

Tel: +49 (0)15221794546, E-Mail: balaneskovic@gmx.net

Curriculum Vitae

Über meine Person

Geburtsdatum: 14. 05. 1984
Geburtsort: Nis, Serbien
Familienstand: verheiratet

- kontaktfreudig
- didaktische und Verhandlungsfähigkeiten
- empathisch
- kooperativ

Links

LinkedIn	https://www.linkedin.com/in/dr-rer-nat-nenad-balaneskovic-840322223/
Xing	https://www.xing.com/profile/Nenad_Balaneskovic/web_profiles
Kaggle	https://www.kaggle.com/nenadbalaneskovic
LeetCode	https://leetcode.com/u/nenadBalaneskovic/

Meine Zielsetzung

- Teilnahme an diversifizierten Data-Science- und KI-Projekten
- Einsatz der im universitären und industriellen Zusammenhang erworbenen Softwareentwicklungstechniken (Python, MATLAB, C#, C++, JavaScript, RUST, Go)
- Erfahrungsgewinn in der Softwareentwicklung von Windows-Applikationen mit Python, R, MATLAB und Visual Studio Code
- Stetige Weiterbildung in Bereichen AI, Data mining, maschinelles Lernen und Algorithmenentwicklung

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Ausbildung   (siehe auch: ⌗ https://github.com/NenadBalaneskovic)

2016	**Promotion** an der TU Darmstadt (*magna cum laude*); Thesis: »*Random Unitary Operations and Quantum Darwinism*«. University Library of the TU Darmstadt (link): https://tuprints.ulb.tu-darmstadt.de/id/eprint/5148
2011 - 2016	Doktorstudium in Physik (PhD) an der TU Darmstadt. Forschungsbereich: **Quanteninformationstheorie und Quantencomputer**
2008 - 2011	**Master-Studies** in Physics (MSc.) an der TU Darmstadt; Thesis: »*Nonequilibrium and the Functional Renormalization Group*«.
2005 - 2008	**Bachelor-Studies** in Physics (BSc.) an der TU Darmstadt; Thesis: »*Nonequilibrium Initial Conditions for Plasma Instabilities*«.
2000 - 2005	Gymnasium an der Carl-Schurz-Schule in Frankfurt/M; Abschluss: **Abitur** (Universitätseingangsqualifikation)

Lehrerfahrung

2024: Soft2tec GmbH, Rüsselsheim	Mai-August, Betreuung der **Bachelor-Thesis** von Lennard Schimmer
2015 - 2016: TU Darmstadt	**Übungs- und Prüfungsleitung**, Vorlesung »*Classical Mechanics*«
2015: TU Darmstadt	**Übungs- und Prüfungsleitung**, Vorlesung »*Theoretical Quantum Optics*«
2014: TU Darmstadt	May-August, Betreuung der **Bachelor-Thesis** von Marc Mendler
2013: TU Darmstadt	Mai-August, Betreuung der **Bachelor-Thesis** von Felix Weber
2012 - 2013: TU Darmstadt	**Übungs- und Prüfungsleitung**, Vorlesung »*Classical Mechanics*«
2012: TU Darmstadt	**Übungs- und Prüfungsleitung**, Vorlesung »*Quantum Mechanics*«
2011 - 2012: TU Darmstadt	**Übungs- und Prüfungsleitung**, Vorlesung »*Electrodynamics*«
2011: TU Darmstadt	**Übungsleitung**, Vorlesung »*Introduction to Theoretical Physics*«
2010: TU Darmstadt	**Lehrpreis** der Gerhard Herzberg Gesellschaft
2010: TU Darmstadt	**Übungsleitung**, Vorlesung »*Quantum Mechanics*«
2009 - 2010: TU Darmstadt	**Übungsleitung**, Vorlesung »*Classical Mechanics*«
01. 10. 2008 - 30. 09. 2010: *TU Darmstadt*	**Business, Corporate and Organization Management** (M.Sc. Kurse)
01. 10. 2005 - 30. 09. 2010: *TU Darmstadt*	Praktikum im Bereich **Measurement Technology**[1]
2002 -	Private Nachhilfe-Stunden für Gymnasium-Schüler in Physik und Mathematik

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[1]Praktische physikalische Kurse in Messtechnik (Fachbereiche: Festkörperphysik, Polymerphysik, Kernphysik, Astronomie, Optik)

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Arbeitserfahrung

01. 01. 2022 - 31. 01. 2025	Angestellt bei **nexonar** (ehemals **soft2tec GmbH,** nun Tochter der **Atlas Copco Holding GmbH**) in **Rüsselsheim** als **Optical Engineer**

▶ *Aufgaben:*
• Datenanalyse und Datenverarbeitung im Rahmen verschiedener industrieller Datenwissenschaftsprojekte (Automobil-, Luftfahrt- und Medizinindustrie).
• Entwicklung und Test von KI- und ML-Algorithmen für Bewegungserfassung, Bildverarbeitung, Signalverarbeitung, Prozessautomatisierung, Qualitäts- und Zuverlässigkeitskontrolle von industriellen Prozessen und Data Mining sowie Design, Durchführung und Analyse von Experimenten mit Infrarotkameras und Sensoren.
• Entwurf von Methoden zur Datenanalyse, zum maschinellen Lernen und zur Datenverarbeitungunter Verwendung von Algorithmen (überwachtes, unüberwachtes und bestärkendes Lernen) zur Auswertung von Zeitreihen und Bildern.
• MLOps-gesteuerte CI/CD-Tests, Schulungen und Überwachung der eingesetzten Machine-Learning-Funktionen zum Zweck der zeitnahen algorithmischen Anpassung an sich ständig ändernde Dateneingaben und externe Geschäftsanforderungen (zeitoptimiertes Projektmanagement).

▶ *Erfolge:*
• 60-fache Steigerung der ML/KI-gesteuerten Produktion von Infrarotkameras seit 2017 bei einer Validierungsfehlerquote von 0 %.
• Technische Umsetzung und strategische Planung, Forschung und analytische Entwicklung von Datenanalyse- und statistischen Algorithmen sowie messtechnischen Methoden.
• Entwicklung neuer Mess- und Verifizierungsmethoden auf der Grundlage statistischer Inferenz für die robotergesteuerte Automatisierung der eingeführten Validierungsprozesse.
• Grafische Benutzeroberflächen für die tägliche Unterstützung interner messdatengestützter Steuerungs- und Qualitätsmanagementprozesse (6-Sigma-Prozesssteuerung und deren Gestaltung).
• Robuste und zuverlässige numerische (nicht-)lineare Optimierungsmethoden für aufgezeichnete Zeitreihenmessungen.
• Quantitative Bewertungsmethoden (Operations Research, graphentheoretische und Bayesianische neuronale Modelle, Optimierung stochastischer Prozesse usw.) zur Modellierung und Bewertung verschiedener Messaufbauszenarien und Hardware-Tests.

01. 03. 2017 - 31. 12. 2021	Angestellt bei **Soft2tec GmbH** in **Rüsselsheim** als **Technology Consultant**

▶ *Aufgaben:*
• Datenanalyse und Datenverarbeitung im Rahmen verschiedener industrieller Datenwissenschaftsprojekte (Automobil-, Luftfahrt- und Medizinindustrie).
• Verwaltung der Anforderungen der Stakeholder, Wartung, Entwicklung und Tests von Hardwarekalibrierungsverfahren und Validierungsalgorithmen im Labor.

▶ *Erfolge:*
• Einrichtung einer modernen, datenanalysebasierten Software- und Hardware-Infrastruktur für die Hardware-Produktion und Tests in der Laborabteilung.
• ML/KI-gesteuerte Algorithmen für die quaternionische Steuerung von Roboterbewegungen, effiziente Rauschunterdrückung in Bezug auf Zeitreihen und Bildanalyse von gesammelten Messdaten sowie Empfehlungssysteme im Bereich der medizinischen Therapien sowie der Luft- und Raumfahrt-, Automobil- und Fertigungsindustrie.

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01. 10. 2011 - 31. 03. 2016	**Forschungsangestellter** des Bundeslandes Hessen (**Institut für Angewandte Physik, Technische Universität Darmstadt**)

► *Aufgaben:*
• Verwaltung der Forschung und Einführung innovativer Quantencomputertechnologie.

► *Erfolge:*
• Konzeption von Quantenfestplatten zur effizienten Informationsspeicherung.
• Graphentheoretisches Design und Effizienzprüfungen von Paradigmen und Compilern für die quantenlogische Programmierung sowie Quantensicherheitsprotokollen.

Führungs- und Funktionalerfahrung

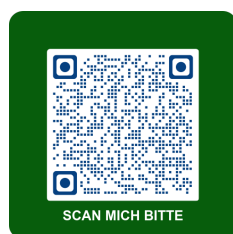| Institution	Zeitraum	# Teamgröße	Beschreibung
nexonar (Atlas Copco Holding)	01. 01. 2019 - 31. 01. 2025	4	Verwaltung der Wartung, Entwicklung und Tests von Hardwarekalibrierungsverfahren und Validierungsalgorithmen in der Laborabteilung
Institut für Angewandte Physik, Technische Universität Darmstadt	01. 12. 2011 - 31. 12. 2015	5	Verwaltung der Forschung und Einführung innovativer Technologien

Projekterfahrung Industrie

01. 08. 2024 - 31. 08. 2024 | nexonar quality control (Desoutter & Atlas Copco Group)
- Design des interaktiven Panels in PowerBI zur Anzeige
aktueller Produktionsdetails und -entwicklungen

01. 06. 2024 - 31. 07. 2024 | nexonar AI-management (Desoutter & Atlas Copco Group)
- Erstelle detaillierten AI-Management-Bericht für die vollständig automatisierte,
ISO-standardisierte Produktzertifizierungspipeline (Labor)

01. 01. 2024 - 31. 05. 2024 | nexonar software development (Desoutter & Atlas Copco Group)
- Design des neuen GUI-Dialogs für die nexonar Calibration Analyzer (nCA)
Software zur Unterstützung manueller Kameravalidierung

01. 01. 2024 - 31. 01. 2025 | nexonar quality control (Desoutter & Atlas Copco Group)
- Design der neuen Gauge Study-gesteuerten Prozeduren und Software-Funktionalitäten
für Qualitätskontrolltests produzierter Hardware-Batches.

01. 01. 2023 - 30. 06. 2024 | nexonar hardware development (Desoutter & Atlas Copco Group)
- Design der neuen Form von infra-rot Trackern (»Flower Tracker«).

01. 04. 2022 - 31. 01. 2025 | GUI development (Desoutter & Atlas Copco Group)
- Design der PyQt-GUI für die automatisierte Kamerakalibrierung.

01. 12. 2021 - 31. 03. 2022 | MQTT-projects (Nissan, BMW, Airbus)
- Automatisierung der Blendenanpassung über eine eigenständige PyQt-GUI
(auch unter Verwendung von JavaScript, MATLAB, C++ und Python).

01. 05. 2021 - 30. 06. 2024 | Cloud-based automation of camera validation (Atlas Copco Group)
- Google Apps Script Implementierung der Kameravalidierprozedur.

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01. 09. 2019 - 30. 09. 2019	Faurecia ArtIFIS Project - ML-gesteuerte Bewegungssteuerung des Roboteragenten (Bügeln und Dämpfen von Autositzpolstern): Roboterbewegungssteuerung unterstützt durch maschinelles Lernen und Quaternion-Rekonstruktion der Roboterbewegungsbahnen beim Bügeln und Dämpfen von Autositzpolstern in den Autofabriken von Faurecia.
01. 08. 2019 - 31. 12. 2021	FALCON collaboration - FEM-Modellierung der äußeren Belastung von Gehäusen von Infrarot-Trackern.
01. 05. 2019 - 30. 06. 2024	LIANDRI collaboration - Fehlerabschätzung von Entfernungsmessungen durch numerische Rekonstruktion der Kamerapixel-Funktion, die als Teil der Nexonar-Software zur präzisen Positionierung beweglicher Sensoren verwendet wird.
01. 05. 2019 - 31. 08. 2019	P&G Manufacturing GmbH (Schwalbach am Taunus) - ML- und KI-gestützte Reduzierung von Sensorrauschen aus aufgezeichneten Messungen der Zahnbürstenbewegungen.
01. 08. 2018 - 31. 10. 2019	Balanced R&R Gauge Study Project (soft2tec GmbH, Rüsselsheim) - Gauge R&R-Studie zur Optimierung der Robustheit von Abstandsmessungen im Rahmen von Messaufgaben und Qualitätskontrolle in der Produktion bei soft2tec GmbH, implementiert als JavaScript-Google-Makro für den intuitiven täglichen Gebrauch.
01. 05. 2018 - 31. 07. 2018	Linear Regression Optimization Project (soft2tec GmbH, Rüsselsheim) - Lineare Regressionsoptimierung der Robustheit von Entfernungsmessungen im Rahmen der Standard-Kamerakalibrierung.
01. 02. 2018 - 31. 05. 2018	Honda Ltd (Swindon) - Mathematische Modellierung der Leistung von Fabrikarbeitern und Entwicklung mathematischer und physikalischer Kriterien zur Bewertung der Bewegungs- und Leistungsprozesse an einem Motorblock-Fließband.
01. 05. 2017 - 31. 01. 2020	Sense Vojta Project at DRK-Kinderklinik (Siegen) - ML-gestützte Frequenzanalyse von Körperteilbewegungen und Entwicklung von Algorithmen für autonomes maschinelles Lernen aus aktuellen Messdaten von aufgezeichneten Therapiesitzungen für die Live-Unterstützung durch Therapeuten.
01. 03. 2017 - 31. 01. 2025	nexonar Calibration Automation (Desoutter & Atlas Copco Group) - Automatisierung des Kamerakalibrierungsprozesses: Google Apps Script und Python-Implementierung der Kameravalidierungsalgorithmen; Erstellung der PyQt-GUI zur Begleitung der vollautomatischen Kamerakalibrierung und -validierung; Konzeption, Planung und Management des Projekts zur Implementierung der vollautomatischen Kameraproduktionspipeline mit Feedbackschleife im Labor der soft2tec GmbH.

Projekterfahrung   Finanz

SCAN MICH BITTE

Dr. rer. nat. Nenad Balanesković, Blauenstraße 21, 60528 Frankfurt/M,

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Konferenzen

01. 08. 2021 - 31. 01. 2025	14 CCMA[2] Forschungskonferenzen geleitet (Rüsselsheim am Main)
19. Februar 2019, Berlin	**VDI-Conference** (Beitrag: Präsentation »*Sensor-based diagnostics according to the Vojta principle*«)
November 2016, Atlanta (USA)	**Atomic Physics 2016 Conference** (Einladung als Sprecher, Beiträge: Präsentation & Poster)
Januar 2016, Bad Honnef	**605th DPG-seminar** (Beitrag: Poster)
Oktober 2015, Bad Honnef	**600th DPG-seminar** (Beitrag: Poster)
Mai 2015, Bad Honnef	**586th DPG-seminar** (Beitrag: Poster)
Mai 2015, Pecs (Ungarn)	**3rd Work Meeting** (Beitrag: Präsentation, internationale Kollaboration)
März 2015, Heidelberg	**DPG-conference** (Beitrag: Poster)
März 2014, Berlin	**DPG-conference** (Beitrag: Poster)
Mai 2013, TU Darmstadt	**Zertifikat Hochschullehre** der HDA (Hochschuldidaktische Arbeitsstelle)
März 2013, Hannover	**DPG-conference** (Beitrag: Poster)
März 2012, Stuttgart	**DPG-conference** (Beitrag: Poster)
Mai 2012, Bad Honnef	**500th DPG-seminar** (Beitrag: Poster)

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[2]nexonar Forschungsabteilung "**C**amera **C**alibration & **M**easurement **A**ccuracy", siehe Seite 7.

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Research Conference	**Camera Calibration &**
CCMA	**Measurement Accuracy**
(Rüsselsheim am Main, Germany)	**(soft2tec GmbH - nexonar)**

SOFT2TEC	nex)))onar

27. 08. 2021		On distance dependence of sensor quality 1
03. 09. 2021		On distance dependence of sensor quality 2
10. 09. 2021		On distance dependence of sensor quality 3
24. 09. 2021		On distance dependence of sensor quality 4
01. 10. 2021		On distance dependence of sensor quality 5
08. 10. 2021		On distance dependence of sensor quality 6
08. 04. 2022		Bayesian Inference of Calibration Methods
14. 10. 2022		nexonar Calibration Analyzer (nCA)
16. 12. 2022		Euler Angle Dependence of pixel values
26. 05. 2023		An optimized infra-red tracker design – Flower Trackers
30. 06. 2023		Improved Prime Number Generation
17. 11. 2023		nexonar Calibration Analyzer (nCA) v2.0
07. 06. 2024		nexonar Calibration Analyzer (nCA) v3.0
27. 01. 2025		Bayesian Calibration Comparisons and Lens Analysis

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Stipendien

2005 - 2007	Stipendium der **Studienstiftung des deutschen Volkes** (Rückzahlung von Kosten für Bücher)
2002 - 2005	Stipendium der **Gemeinnützigen Hertie-Stiftung** für Gymnasiasten (Rückzahlung von Kosten für Bücher)

Sprachen

Deutsch	fließend
Englisch	fließend
Russisch	Grundkenntnisse
Serbisch	Muttersprachler

EDV-Kenntnisse (siehe auch die Liste der IT-Skills unten)

Programmiersprachen & Data Science Plattformen:

Bevorzugte Sprachen:
A - L: C#, Google Apps Script, JavaScript,
M - Z: Mathematica, MATLAB, MongoDB, Python, R, SQL

Fortgeschrittene Kenntnisse:
A - M: C++, Git, Github, GraphQL, KNIME, Maple, Maxima,
N - Z: Octave, Open Modelica, PyTorch, Sage,
Scilab, Scala, Tensor Flow, VS Code

Grundkenntnisse:
A: Alteryx, Angular, ApacheAirflow, ApacheKafka, Arduino, ASP.NET, AWS,
C: Cassandra, ChatGPT, Cobol, Confluence, Copilot, CSS,
D: Dagster, Dart (Flutter), DataBricks, DBeaver, dbt, Django, Docker, DuckDB,
E - F: Erlang, Flask, Fortran, F#,
G: Go, Google Analytics, Google Cloud, Google JAX, Grasshopper (GhPython),
H: Haskell, Hibernate/Spring, HTML,
J: Java, Jenkins, Jira,
K: Kangaroo, Kotlin, Kubernetes,
L: Ladybug, LookerStudio, Lua,
M: Minitab, MS Azure,
N: Neo4j, NodeJs,
O: OBS Studio,
P: Perl, PHP, PowerBI, Powershell,
R: RaspberryPi, React, Redis, Rhino, Ruby, RUST,
S: SageMaker (AWS), SAS, Shotcut, Snowflake, SPSS, Stata,
T - U: Tableau, Terraform, Unity
V: VBA, VertexAI, Vue.js

Benutzersysteme:

Linux (Ubuntu, OpenSUSE), Windows (Vista, 7, 8, 10, 11)

Allgemeine Anwendungn:

A - L: Euler, Gimp, Gnuplot, ImageJ, Inkscape, LaTeX, LaTexDraw, LyX,
M - Z: MS-Office[3], Open Office, Origin, Visual Studio, WinFIG

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[3]Word, PowerPoint, Excel

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Artikel

Eur. Phys. J. **D 69**, 232 (2015)	Nenad Balanesković »*Random unitary evolution model of quantum Darwinism with pure decoherence*«
Eur. Phys. J. **D 70**, 177 (2016)	Nenad Balanesković, Marc Mendler »*Dissipation, dephasing and quantum Darwinism in qubit systems with random unitary interactions*«

Publikationen

ISBN 978-3-659-83733-3 Scolar's Press	Nenad Balanesković, »*Random Unitary Operations and Quantum Darwinism - Environment as an efficient quantum memory*«

Hobbies

Schach, Fitness, Literatur *Retro & Game Programming*	Lieblingsauthoren: E. A. **Poe**, A. C. **Doyle**, H. G. **Wells**, U. **Eco**

Verschiedenes

Fortgeschrittene Kenntnisse:

A-H:
Algorithmic Complexity, Automata Theory, (Agentic) Artificial Intelligence, Blockchain, Clean Code, Continuous Integration / Continuous Delivery, Computer Vision, CRISP-DM, Cryptography, Data Engineering, Data Mining, Deep Learning, Design Patterns, Dynamic Programming, Feature Engineering, Functional Programming, GenAI, Graph Theory, H2O.ai.

I-P:
KNIME, Knowledge Graphs, LangChain, Large Language Models, Machine Learning, Meta Programming, MLflow, ML DevOps, Natural Language Processing, Nummerical Simulations, Project Management, Process Management, Prompt Engineering.

Q-Z:
Quantum Algorithm Development, Quantum Security Protocols, Scientific Modeling, SCRUM, Secure Coding, SixSigma, Statistics, TinyML, TypeScript, UML (PlantUML), wxGlade, wxpython.

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Überblick der IT-Skills

Kenntnisniveau und Erfahrung

●○○○○ Elementarkenntnisse
●●○○○ Elementarkenntnisse und grundlegende Projekterfahrung
●●●○○ Fortgeschrittene Projekterfahrung
●●●●○ Tiefe Kenntnisse
●●●●● Expertenkenntnisse

Eintrag	Niveau	Details	Erfahrung [Jahre]	Optional : Beschreibung der Erfahrung
Languages:				
MATLAB / Simulink Wolfram Mathematica	●●●●○	auch verwendet: Octave, Sage, Maxima	19	[21]-[18], [16]-[2]
Python, R	●●●●○	Python-Packages: OpenCV, Qt5, SymPy Keras, TensorFlow Control, NumPy Pandas, nltk, PyPI SpaCy, PyTorch, pytest	18	[19], [16]-[1]
(Visual) C++, C#/.NET	●●●○○	regulärer Einsatz	17	[21]-[19], [17], [13], [11]
VBA, GAS, SPSS, SAS	●●●○○	regulärer Einsatz	12	[21]-[11], [7]-[6]
Java 8, Shell-Scripting, D	●●○○○	see Description	9	[21]-[19], [11]
Perl, Scala, Dart/Flutter	●●○○○	see Description	8	[11]
Go, PHP, HTML, CSS, Rust, Ruby	●●○○○	see Description	7	[19], [11]
Data bases:				
MySQL, Postgresql	●●●○○	regulärer Einsatz	8	[19]-[18], [16]-[11]
MongoDB (PyMongo)	●●●○○	regulärer Einsatz	8	[18], [16]-[11]
ApacheHadoop, PySpark	●●○○○	see Description	7	[11]
Operating systems:				
Windows (8, 10, 11)	●●●○○	regulärer Einsatz	20	[18]-[1]
Linux	●●●○○	see Description	17	[21]-[19], [11, 8]
Tools:				
Office: MS, Libre, Open	●●●○○	regulärer Einsatz	19	[21]-[1]
MS Visual Studio (Code)	●●●○○	regulärer Einsatz	15	[21]-[1]
Anaconda	●●●○○	regulärer Einsatz	12	[19], [16]-[1]
Eclipse, NetBeans	●●○○○	see Description	9	[21]-[19]
PowerShell, ImageJ	●●●○○	see Description	7	[18], [15]-[9]
Miscellaneous:				
SCRUM, Kanban	●●●○○	regulärer Einsatz	10	[19]-[18], [12]-[1]
GitHub, GitLab	●●●○○	see Description	10	[13]-[9], [6]-[2]
Gimp, Inkscape, WinFIG	●●●○○	regulärer Einsatz	16	[19]-[9]
LyX, LaTeX, Atom	●●●●○	regulärer Einsatz	21	[21]-[18], [16]-[1]
Gnuplot, Origin	●●●●○	regulärer Einsatz	21	[21]-[9]
UML, Design Patterns	●●●○○	see Description	8	[18], [16], [13]-[11]
LibreCAD, FreeCAD	●●○○○	see Description	6	[11], [9]
Ethereum, Arduino, RaspberryPi, LabView, F#	●○○○○	see Description	5	[11]

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Kenntnisniveau und Erfahrung

●○○○○ Elementarkenntnisse
●●○○○ Elementarkenntnisse und grundlegende Projekterfahrung
●●●○○ Fortgeschrittene Projekterfahrung
●●●●○ Tiefe Kenntnisse
●●●●● Expertenkenntnisse

Eintrag	Niveau	Details	Erfahrung [Jahre]	Optional : Beschreibung der Erfahrung
wxPython Tkinter	●●●○○	see Description	8	[11]-[6]
TypeScript JavaScript	●●●○○	see Description	9	[11]-[6]
WordPress	●●○○○	see Description	5	[11]-[6]
PlantUML	●●●○○	regular usage	6	[11]-[2]
Github Copilot	●●○○○	see Description	6	[11]-[2]
AutoCAD	●●○○○	see Description	5	[11], [9]
Frameworks:				
Hibernate Spring Grasshopper Ladybug Rhino *Lunchbox* **Kangaroo** *Galapagos*	●●○○○	see Description, mit Python-Packages: **GhPython**	5	[11]-[2]
Django wxGlade Flask	●●○○○	mit Python-Packages: Plotly, Tkinter, Dash alpha_vantage backtesting, yfinance Scrapy, Scipy seaborn, nmap pynput, mlxtend poetry, black flake8, bs4 bootstrap roboticstoolbox AutoGluon with R-Packages: Shiny, ggplot	5	[11]-[6]
Kubernetes, Docker	●●○○○	see Description	5	[11]-[6]
MLflow, TinyML KNIME, gRPC	●●●○○	regulärer Einsatz	6	[11]-[2]
MicroPython CircuitPython	●●○○○	with Python-Packages: machine	5	[11]-[4]
Business Analysis Tools:				
PowerBI Tableau	●●●○○	regulärer Einsatz	6	[11]-[1]

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Kenntnisniveau und Erfahrung

●○○○○ Elementarkenntnisse
●●○○○ Elementarkenntnisse und grundlegende Projekterfahrung
●●●○○ Fortgeschrittene Projekterfahrung
●●●●○ Tiefe Kenntnisse
●●●●● Expertenkenntnisse

Eintrag	Niveau	Details	Erfahrung [Jahre]	Optional : Beschreibung der Erfahrung
AI and Data Science platforms and Utilities:				
Data Bricks	●●○○○	see Description, mit Python-Packages: PySpark	5	[11]-[2]
OpenAI	●●○○○	mit ChatGPT	5	[11]-[6]
MS Copilot (Security)	●●○○○	see Description	5	[11]-[6]
H2O.ai	●●○○○	regulärer Einsatz	5	[11]-[2]
redis, Hugging Face	●●○○○	mit aioredis	5	[11]-[2]
MS SQL Server	●●●○○	see Description	5	[11]-[2]
Google Cloud, MS Azure AWS, Amazon SageMaker	●●○○○	see Description	6	[11], [8]
Jenkins (CI/CD), Redmine	●●●○○	see Description	8	[18], [16]-[2]
Jira, Confluence Dagster	●●○○○	see Description	3	[11], [2]
Cassandra, Neo4j DBeaver, dbt, Alteryx Snowflake, DuckDB	●●○○○	see Description	4	[11], [8], [4]-[2]
LookerStudio, Minitab React, Angular, Stata	●●○○○	see Description	4	[11], [8], [4]-[2]
Terraform, VertexAI Vue.js, Google JAX	●●○○○	see Description	4	[11], [8], [4]-[2]
Haskell, Cobol Fortran, Google Analytics	●●○○○	see Description	4	[11], [8], [4]-[2]
NodeJs, ApacheKafka ApacheAirflow	●●○○○	see Description	4	[11], [8], [4]-[2]
OBS Studio, Shotcut	●●●○○	see Description	7	[18], [16]-[2]
Open Modelica	●●●●○	see Description	18	[21]-[19]
Lua, Unity, Kotlin, Erlang	●●○○○	Privatprojekte	3	-
LangChain	●●●○○	Privatprojekte	3	Externe AI / ML Projekte
GraphQL, Cypher	●●●○○	see Description	4	[11], [8], [4]-[2]

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●●●●● Expertenkenntnisse

Python / R package	Niveau	Erfahrung [Jahre]	Details
OpenCV, cv2	●●●●○	8	Package for machine vision analysis.
Qt5, Tkinter	●●●○○	9	Packages for generating graphical user interfaces (GUIs).
SymPy, ScikitLearn	●●●●○	17	Packages for (symbolic) calculations.
Keras, TensorFlow	●●●○○	7	Frameworks for machine learning analysis of large data sets.
Control / PyCaret	●●○○○	6	Package for system control analysis / AutoML.
NumPy	●●●●○	17	Package for numeric calculations.
Pandas Dask Polars & Arrows	●●●●○	17	Packages for manipulation of data sets (tables).
nltk, SpaCy	●●●○○	7	Packages for natural language processing.
roboticstoolbox	●●○○○	5	Python's toolbox for control of robotic agents.
PyTorch	●●●○○	7	Framework for machine learning analysis of large data sets.
pytest	●●●○○	8	Package for debugging and testing of python code.
Plotly, Dash	●●○○○	6	Packages for interactive plot generation.
alpha_vantage backtesting yfinance	●●○○○	5	Packages for analysing and testing finance data.
Scrapy bs4	●●●○○	7	Packages for web scraping (BeautifulSoup).
poetry black flake8	●●●○○	7	Packages for code linting.
seaborn matplotlib Shiny ggplot	●●●●○	17	Packages for plotting data sets.
bootstrap,Scipy	●●●○○	8	Packages for statistical data analysis and optimization.
mlxtend	●●●○○	6	ML-library of useful tools for regular data science tasks.
pynput, nmap	●●●○○	5	Libraies for controling and monitoring input devices and ports.
machine	●●○○○	5	MicroPython package for micro-controllers.
GhPython	●●○○○	5	Package for Python scripting with Rhino's Grasshoper plug-in.
Ladybug	●●○○○	5	Grasshopper's Python plug-in for weather forecast modeling.
Kangaroo	●●○○○	5	Rhino-Grasshopper's live physics plug-in for form finding.
Lunchbox	●●○○○	5	Rhino-Grasshopper's ML solver plug-in.
Galapagos	●●○○○	5	Rhino-Grasshopper's evolutionary solver plug-in.
AutoGluon	●●○○○	5	Library for automated evaluation of ML models.
protobuf	●●○○○	3	Library for generating python code from protocol buffer files.
asyncio, aiohttp aioredis	●●○○○	4	Libraries for utilizing asynchronous I/O bound code execution.
qiskit	●●○○○	4	Library for utilizing pythonic quantum computing algorithms.
Pygame	●●○○○	4	Graphics and audio library for writing Pythonic games.
Pyomo, linopy gamspy	●●●○○	3	Pythonic modeling of (linear) optimization models.

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Professionelle Erfahrung

Contents

1 Project 21:

08 2024 - 09 2024   Customer: **nexonar GmbH (Rüsselsheim)**
     Different research projects for Desoutter & AtlasCopco
»**Design of an interactive panel in PowerBI for displaying
latest production details and developments**«

Soft2tec's LAB(oratory) division needs an interactive panel in PowerBI for displaying latest camera production details and developments associated with different research topics. It should

1. access appropriate updated Excel-sheets and display latest information regarding s2t storage of needed materials, hardware as well as software components;

2. diplay changes in the number of produced and / or used calibrated infra-red cameras and track the latest trends regarding upcoming camera orders;

3. present latest software releases, research results and link them to appropriate documentation sources.

The aim of this project is to establish an ISO-conform PowerBI-interface for aiding users in tracking and visually latest production details and developments within the laboratory division of soft2tec GmbH, as well as in performing quality management procedures for testing produced batches of hardware components (backed by appropriate software functionalities) that should reduce the overall dropout of used materials.

Tasks:

- Write an article containing a thorough description of the PowerBI-interface for displaying quality control information regarding camera production tasks and test procedure for nexonar's hardware components.

- Visualization of all results with Excel, Python, PowerBI (or Tableau).

- Bug fixing, process documentation.

Technologies:

- Excel;

- Python;

- Google Apps Script, PowerBI, Tableau;

- Motion Visualizer, 3DAWin, GML, FlyCapture;

- LaTeX;

- Scrum, Github/Git.

2 Project 20:

06 2024 - 09 2024   Customer: **nexonar GmbH (Rüsselsheim)**
Different research projects for Desoutter & AtlasCopco
**»Write a detailed AI-management report for a fully automated
ISO-standardized product certification pipeline (laboratory)«**

Using ML- and AI-methods in combination with novel, as well as standard algorithms of statistical inference, mathematical physics and (non-)linear optimization, has proven itself a crucial component of numerous tasks associated with automating diverse industrial processes. In this report we intend to design a roadmap to the fully automated certification of infra-red cameras, calibrated and validated within the LAB(oratory)-division of s2t GmbH.

The aim of this project is to establish an ISO-conform roadmap to accomplishing a fully automated product certification pipeline within the upcoming 4 years. The roadmap should delve into technological details and potential milestones of this large undertaking.

Tasks:

- Write an article containing a thorough description of Gauge Study-driven quality control test procedure for nexonar's hardware components.

- Perform an ML-driven comparison analysis of different statistical, ML- and AI-algorithms aided by Python and R.

- Explore (compare) modern DBMS and ML/AI technologies and write a report recommending appropriate software solutions for nexonar projects.

- Visualization of all results with Python, Rhino-Grasshoper, PowerBI (or Tableau) and MATLAB.

- Bug fixing, process documentation, see also related tasks [11, 8, 4, 3].

Technologies:

- MATLAB, R, SAS, SPSS, Stata, Minitab, MLflow, Minitab, TinyML;

- Python, Hugging Face, DataBricks (PySpark);

- Ruby, Perl, C++, Rust, C#, Fortran, Cobol, Scala, Haskell;

- Arduino, RaspberryPi;

- Rhino-Grasshopper, Ladybug, Kangaroo, FreeCAD;

- Google Apps Script, Angular, JavaScript (NodeJs, Vue.js, React), PowerBI, Tableau;

- GCP (Google Analytics, LookerStudio), AWS (SageMaker), MS Azure;

- Terraform, ApacheKafka, ApacheAirflow, Hadoop;

- Vertex AI, OpenAI, H2O.ai, Google JAX, KNIME, Alteryx;

- Cassandra, Neo4j, MongoDB, MySQL, DBeaver, dbt, Redis, Snowflake, DuckDB, GraphQL;

- Kubernetes, Docker;

- Jira, Confluence, Dagster;

- Jenkins, Redmine, Motion Visualizer, 3DAWin, GML, FlyCapture;

- LaTeX, LaTeXDraw;

- Scrum, Github/Git.

Taking nexonar's operational and data infrastructure into account, the following software solutions may be recommended:

- MATLAB, R (standard software already used at nexonar), MLflow (for organizing ML-workflows, alternative to Dagster);

- TinyML (for transmitting ML code to microcontrollers, in conjunction with Arduino or RaspberryPi);

- Python (standard software already used at nexonar, including TensorFlow, Keras, PyTorch, OpenCV, numpy, pandas, matplotlib, etc.), Hugging Face (offers a vast collection of pre-trained ML-models), DataBricks (in conjunction with PySpark or Scala), Scala (or Haskell, due to their explicit functional programming paradigm);

- C++ (standard software already used at nexonar, a valuable alternative: Rust), C# (standard software already used at nexonar);

- Rhino (in comjunction with Grasshopper, Ladybug, Kangaroo) - offers a wide collection of methods for scientific modeling, ML-algorithm development and hardware design;

- Standard software already used at nexonar: Google Apps Script and JavaScript (recommendation: should be used in conjunction with NodeJs, Vue.js, React, Angular);

- Standard software already used at nexonar: PowerBI, recommendation: with respect to nexonar we should prefer Tableau;

- Standard software solution used at nexonar: GCP (Google Analytics, LookerStudio), however AWS (SageMaker, Bracket) and MS Azure should also be used more frequently, especially in the course of ML-benchmark comparisons;

- ApacheAirflow (a reliable workflow management platform for data engineering pipelines), future possible implementations may also involve Apache Hadoop (distributed storage) and Apache Kafka (distributed stream processing platform);

- Vertex AI, Google JAX (already integrated into Google-ecosystem), KNIME (No-Code-ML platform), OpenAI (preferably ChatGPT);

- Neo4j (Graph DB, especially useful when modeling ML- and AI-knowledge graphs), MongoDB (standard NoSQL solution, alternative: a key-value NoSQL DB Redis), MS MySQL (standard relational DB solution with DBeaver), DuckDB, GraphQL;

- Kubernetes (for an open-source containerized workflow-orchestration and automated ML-software deployment), in conjunction with Docker;

- Jira, Confluence (could be used as an alternative to Jenkins and Redmine);

- Standard software already used at nexonar: Motion Visualizer, 3DAWin, GML (all three software solutions should be replaced by the functionality of the native **nexonar Calibration Analyzer** (**nCA**) software in the forseeable future), Jenkins, Redmine, FlyCapture, Spinnaker, ImageJ;

- Standard software already used at nexonar: MS Office, LaTeX, LaTeXDraw;

- Standard software (development methodology) already used at nexonar: Scrum, Github/Gitlab/Git.

3 Project 19:

01 2024 - 01 2025   Customer: **nexonar GmbH (Rüsselsheim)**
Different research projects for Desoutter & AtlasCopco
**»Design of new Gauge Study-driven procedures and software functionalities
for quality control tests of produced hardware batches«**

Nexonar's infra-red (IR) trackers and cameras are used in numerous customer applications. In order to guarantee high relighability of these hardware components optimal quality control Gauge Study-driven test procedures need to be designed and implemented as Python-GUI functionalities.

The aim of this project is to establish ISO-conform quality management procedures for testing produced batches of hardware components backed by appropriate software functionalities that should reduce the overall dropout of used materials.

Tasks:

- Write an article containing a thorough description of Gauge Study-driven quality control test procedure for nexonar's hardware components.

- Perform an ML-driven optimization analysis of statistical quality tests of product batches aided by Python and R.

- Visualization of all results with Python, Rhino-Grasshoper, PowerBI (or Tableau) and MATLAB.

- Bug fixing, process documentation.

Technologies:

- MATLAB, R, SAS, SPSS, Stata, Minitab, MLflow, Minitab, TinyML;

- Python, Hugging Face, DataBricks (PySpark);

- Rhino-Grasshopper, Ladybug, Kangaroo;

- Google Apps Script, Angular, JavaScript (NodeJs, Vue.js, React), PowerBI, Tableau;

- GCP (Google Analytics, LookerStudio), AWS (SageMaker), MS Azure;

- Terraform, ApacheKafka, ApacheAirflow, Hadoop;

- Vertex AI, OpenAI, H2O.ai, Google JAX, KNIME, Alteryx;

- Cassandra, Neo4j, MongoDB, MySQL, DBeaver, dbt, Redis, Snowflake;

- Kubernetes, Docker;

- Motion Visualizer, 3DAWin, GML, FlyCapture;

- LaTeX, LyX;

- Scrum, Github/Git.

4 Project 18:

01 2024 - 05 2024   Customer: **nexonar GmbH (Rüsselsheim)**
Different research projects for Desoutter & AtlasCopco
**»Design of new Dialog of nexonar Calibration Analyzer (nCA)
supporting manual camera validation«**

The Pythonic nexonar Calibration Analyzer (nCA) GUI needs a new button which would allow users to generate validation reports (pdfs) from position measurement data recorded with calibrated infra-red FLIR-cameras. This button should provide users with a dialog that

1. allows pre-selection of camera parameters (such as "sensor type" [IR / NIR]) and lens parameters (such as "focal length in mm" [8 / 12.5 / 16 /25]);

2. enables upload of recorded distance measurement files (csv data) for translation (T) and rotation (R) tests thereby checking whether # of T-files equals # of R-files;

3. performs validation of T- and R-data files (csv) for each camera separately; displays numerical and graphical results in the corresponding display-area of the GUI;

4. stores validation results as pdf report for each camera separately;

5. offers possibilities for correcting displayed values manually by the user (for instance when rounding a result to two digits instead of a four-digit precision or changing the status color of a particular result);

6. aborts the entire procedure, if necessary.

The aim of this project is to establish ISO-conform quality management procedures for manual camera validation within a new dialog of nCA version 3.0.

Tasks:

- Write an article containing a thorough description of manual camera validation test procedures for nexonar's hardware components.

- Perform an ML-driven optimization analysis of statistical quality tests of product batches aided by Python and R.

- Visualization of all results with Python, Rhino-Grasshoper, PowerBI (or Tableau) and MATLAB.

- Bug fixing, process documentation.

Technologies:

- MATLAB, R, MLflow, H2O.ai, TinyML;

- Python, Rhino-Grasshopper, Ladybug, Kangaroo;

- Google Apps Script, JavaScript, PowerBI, Tableau;

- Motion Visualizer, 3DAWin, GML, FlyCapture;

- LaTeX, KNIME;

- Scrum, Github/Git.

5 Project 17:

01 2023 - 06 2024   Customer: **nexonar GmbH (Rüsselsheim)**
Different research projects for Desoutter & AtlasCopco
»Design of a new infra-red Tracker Form«

Nexonar's infra-red (IR) trackers are used in numerous customer applications. In order to operate these IR-trackers rely on optimal geometrical placement of IR-diodes along their three rigid body axes.

The aim of this project is to design a new form of IR-trackers whose diode placement along its three rigid body axes guarantees robustness of distance measurements with respect to small tracker tilts.

Tasks:

- Write an article containing a thorough mathematical and physical study of desired (optimal) IR-tracker forms.

- Perform an optimization analysis of diode placements along the three rigid body axes of desired IR-tracker design candidates aided by Python, Rhino-Grasshopper and R.

- Visualization of all results with Python and MATLAB.

- Bug fixing, process documentation.

Technologies:

- MATLAB, R;

- Python, Rhino-Grasshopper, Ladybug, Kangaroo;

- Google Apps Script, PowerBI, Tableau;

- Motion Visualizer, 3DAWin, GML, FlyCapture;

- LaTeX, KNIME;

- Scrum, Github/Git.

6   Project 16:

Soft2tec's infra-red (IR) cameras are used in numerous customer applications. In order to operate they use license files generated via nexonar's Camera License Tool from an xml-file containing a list of estimated intrinsic camera parameters. These estimates of intrinsic camera parameters (such as its focal length or its principal axis) are generated by OpenCV calibration algorithms running over a set of chessboard images collected by a robotic agent with respect to a specific IR-camera.

The aim of this project is to design a PythonQt5-GUI which should perform a cumulative error-reprojection analysis of an entire set of collected chessboard images associated with a particular IR-camera and extract from them a subset of »appropriate« chessboard images that would lead to optimal estimates of intrinsic camera parameters prior to the final stage of the OpenCV-calibration.

Tasks:

- Write a PythonQt5 script which should provide a GUI-driven characterization of chessboard images based on cumulative OpenCV-error reprojection prior to their final calibration.

- Perform histogram analysis of chessboard images by means of error reprojections with Python, ImageJ and R in order to acquire experimental estimates of a subset of collected chessboard images that may be ignored when performing OpenCV calibrations.

- Visualization of all results with Python and MATLAB.

- Bug fixing, process documentation.

Technologies:

- MATLAB, Wolfram Mathematica, R;

- Python (Keras, TensorFlow, OpenCV, Qt5, MLflow);

- Google Apps Script, JavaScript;

- Motion Visualizer, 3DAWin, GML, FlyCapture;

- LaTeX, PowerBI, Tableau, KNIME;

- ImageJ, wxpython, Tkinter;

- Scrum.

7 Project 15:

Soft2tec's infra-red (IR) cameras are used in numerous customer applications. Therefore, an automated adjustment of appropriate lens aperture values would accelerate and enhance the procedure of camera calibration and validation considerably. Therefore, it is, as a first step, necessary to obtain reliable theoretical predictions of confidence intervals for aperture adjustments of lenses characterized by different focal lengths (GAS, MATLAB, R).

In addition, as a further research step, it appears important to acquire experimental estimates of reliable confidence intervals for aperture adjustments associated with different types of lenses (Python, ImageJ, R) .

Finally, one should also compare all findings of the afore mentioned two research steps and thus cross-validate them mutually (MATLAB, Wolfram Mathematica).

Tasks:

- Write a GAS script which should provide reliable theoretical confidence intervals for aperture adjustments associated with lenses characterized by different focal lengths.

- Perform histogram analysis of pixel-brightness on GML-generated bmp files with Python, ImageJ and R in order to acquire experimental estimates of reliable confidence intervals for aperture adjustments associated with lenses characterized by different focal lengths.

- Visualization of all results with Python and MATLAB.

- Bug fixing, process documentation.

Technologies:

- MATLAB, Wolfram Mathematica, R;

- Python (Keras, TensorFlow, OpenCV, MLflow);

- Google Apps Script, JavaScript, LookerStudio;

- Motion Visualizer, 3DAWin, GML, FlyCapture;

- LaTeX;

- ImageJ;

- Scrum.

8 Project 14:

05 2021 - 06 2024   Customer: **soft2tec GmbH (Rüsselsheim)**
    »Cloud-based Automation of Camera Validation«

Soft2tec's infra-red (IR) cameras are used in numerous customer applications. Therefore, a stable GAS routine should be designed that would parse csv files of camera-tracker distance measurements captured by Motion Visualizer (MV) and calculate static as well as dynamic projections of error interval width with respect to each individual camera (as specified by its corresponding serial number, SN). This would allow one to classify and validate a camera without being forced to perform manual translation measurements via 3DAWin.

In addition, the functionality of the GAS routine should also be deployed to Google Cloud.

Finally, one should also perform data analysis on xml-files (generated by the GML-software) containing camera parameters and their tolerance intervals and infer whether it is possible to correlate different parameter ranges with specific classification types of the camera validation procedure. If successful, this analysis could even eliminate the necessity of an explicit camera validation by replacing it with an implicit validation approach, in accordance with ISO/IEC 17025.

Tasks:

- Write and deploy a GAS script to Google Cloud that should automatize the camera validation procedure and compute dynamic error tolerances of camera tracker distance measurements based on their static counterparts.

- Perform data mining analysis on GML-generated xml files containing parameters of calibrated cameras and study the possible correlations between calculated tolerance ranges of camera parameters and specific classification types of the camera validation procedure.

- Visualization of all results with Python and MATLAB.

- Bug fixing, process documentation.

Technologies:

- MATLAB, Wolfram Mathematica, R, C#;

- Python (Keras, TensorFlow, OpenCV, MLflow);

- Excel, Google Apps Script, JavaScript, PowerBI;

- Motion Visualizer, 3DAWin, GML;

- LaTeX, GitLab, GitHub, KNIME;

- Google Cloud, LookerStudio, Google Analytics, VS Code;

- Scrum, Power-Shell, Kubernetes, Docker.

9 Project 13:

»**FEM-Modeling of External Stress on Tracker Housings**«

Soft2tec's infra-red (IR) trackers are used in numerous customer applications and often have to endure high external forces. Therefore, a thorough FEM-analysis of stress-distribution throughout the entire tracker-housing should lead to valuable insights into robustness of materials currently used in the framework of the tracker manufacturing process.

In addition, the results of an FEM-analysis should be compared with standard predictions of stress distribution within tracker-housings obtained by utilizing a static rigid rod model.

This should also allow to assess whether a full-fledged FEM-modeling should be considered as a necessary analytical approach compared to a simpler (and cheaper) static rigid rod modeling with respect to future robustness tests performed on tracker-housings.

Tasks:

- Perform an FEM-analysis of soft2tec-tracker housings and their robustness when subjected to varying external forces.

- Compare the FEM-results with robustness predictions obtained from a standard static model of tracker-housings composed of rigid rods.

- Visualization of all results with Python and Rhino-Grasshopper.

- Bug fixing, process documentation.

Technologies:

- MATLAB, Wolfram Mathematica, R;

- Python, Keras, TensorFlow, MLflow;

- Excel, Google Apps Script;

- Motion Visualizer, 3DAWin;

- LaTeX, KNIME;

- FreeCAD, LibreCAD, Rhino-Grasshopper;

- Scrum, Power-Shell.

10 Project 12:

When providing customer-related service it is of highest importance for soft2tec GmbH to supply each customer with infra-red cameras and trackers suitable for their specific projects. Therefore, an interactive GUI, which should provide reliable estimates of camera-tracker distances and their accuracy with respect to different camera parameters as inquiry inputs, would considerably improve the just-in-time support and interaction between soft2tec and its collaborators. Additionally, a thorough algorithmic design of data acquisition, preparation and pattern extraction methods should lead to new experimental setups and Gauge studies, especially with respect to dynamic measurements of camera-tracker distances.

Tasks:

- Design a MATLAB-module within a MATLAB-GUI that should provide maximum estimates of distance errors along the camera's z-axis measured by IR-cameras (rectangular sensor) and NIR-cameras (square sensor) with respect to lenses of different focal length (8 mm, 12.5 mm and 16 mm) and shutter times (0.5 ms, 1 ms, 1.5 ms and 2 ms) for different z-distances between an infra-red camera and an M-size tracker.

- Analyze the z-dependence of tracker's diode-pixels dected by an infra-red camera with respect different pixel-resolutions of camera sensors and lenses of different focal lengths, as well as by taking into account several increasing values of shutter time.

- Design algorithms for data acquisition with respect to enlarged camera's parameter spaces both within static and dynamic measurements of tracker-camera distances along the camera's z-axis.

- Bug fixing, process documentation.

Technologies:

- MATLAB, Wolfram Mathematica, R;

- Python, Keras, TensorFlow, MLflow;

- Motion Visualizer, 3DAWin;

- LaTeX, KNIME;

- Scrum, Power-Shell.

11 Project 11:

03 2017 - 01 2025   Customer: **soft2tec GmbH (Rüsselsheim)**
»Automation of the camera calibration process (phase 1)«

In order to standardize the camera and tracker calibration processes their main procedural steps need to be fully automated. This will in turn increase the output of calibrated cameras and trackers and ensure the reliability of their distance measurements and movement tracking capabilities. The main goal remains an automatized, robot-driven system capable of calibrating infra-red (IR) cameras and trackers, as well as validating their performance by means of standardized statistical inference methods. This project relies partially on results and experience obtained within related research projects, such as [18], [14], [13], [12], [10] - [8], [6] and [4] - [2] introduces new research topics outlined within the task list below.

Tasks:

- Design an appropriate camera calibration procedure and conceptualize its robot-driven implementation;

- Analyze the the ideal placement of electrical components within the robot's control cabinet from the point of view of temperature distribution and ventilation - Python (Qt5, Control, LabView, Simulink);

- Maintain regularly the robot's frontend web page (Go, HTML, PHP, Flutter/Dart);

- Parse robot's log files for specific error message types via Python's Natural Language Processing Toolkit (nltk) in order to improve the error response of the robot's frontend from the standpoint of its clarity.

- Store all images of the calibration chess board into a data lake (PySpark, Hadoop, Java, Scala) and maintain a reference data base of all files (xml, licenses, etc) generated during camera and tracker calibration procedures (MySQL, MongoDB, DuckDB);

- Optimize GML's image processing algorithms - Python (OpenCV, Keras, TensorFlow, MLflow);

- Implement MATLAB-routines for statistical inference and time-series analysis that should aid an automatized validation of calibrated cameras and test them with Wolfram Mathematica and C# (MATLAB, Wolfram Mathematica, R, C#, Excel VBA, SPSS, Google Apps Script, SAS);

- Test the Arduino-code implementing robot's movement trajectories (C++) and time-optimize robot's trajectories by setting up the corresponding movement recipes within the robot's frontend (web page);

- Compare the performance of C++ mathematical libraries with their corresponding Rust implementations (Rust);

- Bug fixing, process documentation (FreeCAD, Rhino, LaTeX).

Technologies:

- MATLAB, Wolfram Mathematica, R, SAS, SPSS, Stata, Minitab, MLflow, TinyML;

- Python (Qt5, Control, OpenCV), Keras, TensorFlow, Hugging Face, DataBricks (PySpark);

- C++, C#, Java, Scala, Haskell, Fortran, Cobol, Rust, JavaScript (NodeJs, Vue.js, React, Angular);

- KNIME, Alteryx, Jira, Confluence, Dagster;

- Excel, Google Apps Script, VBA, SPSS;

- PowerBI, Google Analytics, Looker Studio, Tableau;

- GCP, AWS (SageMaker), MS Azure;

- DataBricks (PySpark), Hadoop, Kubernetes, Docker;

- LabView, Arduino, RaspberryPi;

- Terraform, ApacheKafka, ApacheAirflow;

- Vertex AI, OpenAI, H2O.ai, Google JAX;

- Cassandra, Neo4j, MongoDB, MySQL, DBeaver, dbt, Redis, Snowflake, DuckDB, GraphQL, Cypher;

- Rhino-Grasshopper, Ladybug, Kangaroo, FreeCAD;

- Jenkins, Redmine, Motion Visualizer, 3DAWin, FlyCapture, Spinnaker, ImageJ;

- Go, HTML, PHP, Flutter/Dart, Ruby, Perl;

- LaTeX, LaTeXDraw, LyX, Scrum, Power-Shell, GitHub, GitLab, Git.

Conclusions:

Taking nexonar's operational and data infrastructure into account, the following software solutions have been selected (colored **green**) as a basis for the final implementation of a fully automated ML/AI-driven hardware production pipeline (consult also the AI-report in [2], **orange** colored entries are still being considered):

- **MATLAB**, **R** (standard software already used at nexonar), **MLflow** (for organizing ML-workflows, alternative to **Dagster**);

- **TinyML** (for transmitting ML code to microcontrollers, in conjunction with **Arduino** or **RaspberryPi**);

- **Python** (standard software already used at nexonar, including TensorFlow, Keras, PyTorch, OpenCV, numpy, pandas, matplotlib, etc.), **Hugging Face** (offers a vast collection of pre-trained ML-models), **DataBricks** (in conjunction with **PySpark** or **Scala**), **Scala** (or **Haskell**, due to their explicit functional programming paradigm);

- **C++** (standard software already used at nexonar, a valuable alternative: **Rust**), **C#** (standard software already used at nexonar);

- **Rhino** (in comjunction with **Grasshopper**, **Ladybug**, **Kangaroo**) - offers a wide collection of methods for scientific modeling, ML-algorithm development and hardware design;

- Standard software already used at nexonar: **Google Apps Script** and **JavaScript** (recommendation: should be used in conjunction with **NodeJs**, **Vue.js**, **React**, **Angular**);

- Standard software already used at nexonar: **PowerBI**, recommendation: with respect to nexonar we should prefer **Tableau**;

- Standard software solution used at nexonar: **GCP** (**Google Analytics**, **LookerStudio**), however **AWS** (in conjunction with **SageMaker**, **Bracket**) and **MS Azure** should also be used more frequently, especially in the course of ML-benchmark comparisons;

- **ApacheAirflow** (a reliable workflow management platform for data engineering pipelines), future possible implementations may also involve **Apache Hadoop** (distributed storage) and **Apache Kafka** (distributed stream processing platform);

- **Vertex AI**, **Google JAX** (already integrated into Google-ecosystem), **KNIME** (No-Code-ML platform), **OpenAI** (preferably **ChatGPT**);

- **Neo4j** (Graph DB, especially useful when modeling ML- and AI-knowledge graphs), **MongoDB** (standard NoSQL solution, alternative: a key-value NoSQL DB **Redis**), **MS MySQL** (standard relational DB solution with **DBeaver**), **GraphQL**, **DuckDB**;

- **Kubernetes** (for an open-source containerized workflow-orchestration and automated ML-software deployment), in conjunction with **Docker**;

- **Jira**, **Confluence** (could be used as an alternative to Jenkins and Redmine);

- Standard software already used at nexonar: **Motion Visualizer**, **3DAWin**, **GML** (all three software solutions should be replaced by the functionality of the native **nexonar Calibration Analyzer** (**nCA**) software in the forseeable future), **Jenkins, Redmine**, **ImageJ**, **FlyCapture**, **Spinnaker**;

- Standard software already used at nexonar: **MS Office**, **LaTeX**, **LaTeXDraw**;

- Standard software (development methodology) already used at nexonar: **Scrum**, **Github/Gitlab/Git**.

12   Project 10:

»Quaternion-analysis of movement patterns for a steaming robot with MATLAB«

In the first instance of this project one aims to characterize relation between the robot's position measurements and the Euler-angle data, which then need to be transformed into the Quaternion picture by means of MATLAB.

Such quaternionic representation of angle-measurement data (robot's orientation) is then fed into robot's software to ensure robot's proper movements during the process of automatized steaming of car seats.

Tasks:

- Design a MATLAB-executable capable of transforming angular movement coordinates into their quaternionic representation a steaming robot-software is capable to understand;

- Bug fixing, process documentation.

Technologies:

- MATLAB, Wolfram Mathematica;

- Python, Keras, TensorFlow;

- Excel, Google Apps Script, VBA, SPSS;

- MySQL, MongoDB;

- Motion Visualizer, 3DAWin;

- LaTeX, Scrum, Power-Shell.

13 Project 9:

In the first instance of this project one aims to characterize the robustness of distance-errors obtained in the course of camera calibration-related distance measurements between a specific camera and the standard infra-red (IR) calibration-tracker M13.

This task should be accomplished by means of the Gauge R&R Study. The data evaluation algorithms are intended to be implemented as Google Apps Script and MATLAB's OOP-modules that should, in the long run, be part of the overall automatization-process of the standard camera calibration procedure established in the course of numerous (more than 200) calibration experiments (performed within the time-window between 15. 03. 2017 and 30. 04. 2018). These modules should then be translated (ported) into the C# code.

Finally, by looking at the error-robustness of different cameras (with different serial numbers), one could even obtain a tolerance range within which future error-values of camera-tracker distances could be anticipated, thereby enhancing the decision-making process of the (future) automatized camera-calibration procedure(s). This would allow us in the future to offer customer-adapted camera calibration solutions and thus perform a Gauge R&R Study for each customer separately.

Tasks:

- Design a full-fledged GoogleAppsScript macro capable of performing a Gauge R&R study over gathered measurements recorded with soft2tec's Motion Visualizer software;

- Bug fixing, process documentation.

Technologies:

- MATLAB, Wolfram Mathematica;

- C#, C++;

- Python, Keras, TensorFlow, Qt5;

- Excel, Google Apps Script, VBA, Google Analytics, Looker Studio;

- MySQL, MongoDB, SAS, SPSS;

- Motion Visualizer, 3DAWin;

- LaTeX, Power-Shell.

14   Project 8:

05 2018 - 07 2018   Customer: **soft2tec GmbH (Rüsselsheim)**
»Linear Regression Optimization of the Robustness
of Distance Measurements in the Course of the Standard Camera Calibration Procedure«

In the first instance of this project one aims to characterize the robustness of distance-errors obtained in the course of camera calibration-related distance measurements between a specific camera and the standard infra-red (IR) calibration-tracker M13.

This task should be accomplished by means of the machine-learning driven linear (or even non-linear) regression (if necessary). The data evaluation algorithms are intended to be implemented as a MATLAB-module that should, in the long run, be part of the overall automatization-process of the standard camera calibration procedure established in the course of numerous (more than 200) calibration experiments (performed within the time-window between 15. 03. 2017 and 30. 04. 2018).

As a further feature one could also test the distance-error robustness with respect to tracker-codings other than M13, or even with respect to multiple tracker-codings operating simultaneously. This would allow us to extract those coding-combinations (groups) of trackers that operate, from the point of view of the camera calibration, in a mutually compatible manner.

Finally, by looking at the error-robustness of different cameras (with different serial numbers), one could even obtain a tolerance range within which future error-values of camera-tracker distances could be anticipated, thereby enhancing the decision-making process of the (future) automatized camera-calibration procedure(s).

Tasks:

- Analytical and mathematical modeling and description of the robustness of distance measurements generated by the standard soft2tec-calibration procedure by means of standard machine learning techniques;

- Bug fixing, process documentation.

Technologies:

- MATLAB, Wolfram Mathematica;

- C#, C++, R;

- Python, Keras, TensorFlow, Qt5;

- Excel, Octave, MySQL, MongoDB, SAS, SPSS;

- Motion Visualizer, 3DAWin;

- LaTeX, Power-Shell.

15   Project 7:

03 2018 - 05 2018   Customer: **Honda Engineering Europe Ltd (Swindon)**
»Design of mathematical and physical criteria for the evaluation of movement and performance processes at a motor block assembly line«

In order to describe temporal performance (efficiency) of workers when bolting together motor blocks at an assembly line in a mathematically and physically correct manner, that would in turn facilitate a design of a proper feedback software system, *Personal Perfomance Index* (**PPI**) has been introduced and thoroughly tested based on real data measurements performed and gathered in a Honda-plant in Swindon.

Tasks:

- Design of mathematically and physically motivated criteria (quantities) for measuring temporal efficiency of workers at a motor block assembly line;

- Bug fixing, process documentation.

Technologies:

- Analytical modeling (especially functional and fractional calculus);

- MATLAB, Python, Visual C++, Wolfram Mathematica, Rust;

- Excel, MySQL, MongoDB, SPSS;

- LaTeX, Power-Shell.

16 Project 6:

09 2017 - 03 2020   Customer: **ISI Bau- und Gebäudedienstleistungen GmbH**
(Frankfurt am Main)
»Extension of the Matlab's data analysis GUI with functionalities
for pattern recognition of construction grid movements«

A MATLAB-GUI structure should be designed which would distinguish construction grid undergoing dynamic changes from its state of rest. This could be achieved by exposing a construction grid to diverse contolled external influences (such as shaking, hits, deliberate movements, etc.) and recording its acceleration and angular velocity by means of Internal Measurement Units (IMUs).

Such signals could then be exposed to MATLAB-modules for frequency and time domain analysis already present within the MATLAB-GUI designed in the course of the SenseVojta project in order to enable reliable recognition and prediction of construction grid movements. This type of MATLAB-functionality would then provide essential data analytical services as part of a larger software warning system designed for capturing unexpected (often weather-induced) movements of construction grids.

Tasks:

- Design an appropriate MATLAB-GUI functionality for pattern recognition and prediction of construction grid movements;

- Bug fixing, process documentation.

Technologies:

- MATLAB, Python, Visual C++, Wolfram Mathematica;

- Excel, MySQL, MongoDB;

- LaTeX.

17 Project 5:

09 2017 - 10 2017   Customer: **Carl-Zeiss SMT GmbH (Roßdorf)**
»Error mitigation in the Auto Global Alignment (AGA) Module«

Extension and repair of the already existing Auto Global Alignment (AGA) module written in C++. The AGA module should correctly recognize edges of all types of masks made from MoSi (molybdenum-silicon) and EUV-materials and yield the correct number of detected mask edges (2, 4 or 6).

Tasks:

- Visual Studio C++ programming of modules responsible for the recognition of edges and structures within mask profiles produced from diverse materials;

- Bug fixing.

Technologies:

- Visual Studio;

- Visual C++, Excel.

18 Project 4:

Through the therapeutic use of reex locomotion, attributed to Dr. Vaclav Vojta, elementary movement patterns of patients with damaged central nervous system and musculoskeletal system can be restored (at least regarding some body areas), i.e. these movement patterns may become accessible to the patient. Reex movements are activated with the help of the SenseVojta (SV) therapy: during a therapy session, the therapist exerts targeted pressure on certain areas of the patient's body.

A patient usually lies on his stomach, back or side. Pressure stimuli of therapists lead to the activation of spontaneous (unconsciously used) movements of muscles, especially within the spine region, however spontaneous movements of patient's arms, legs, hands and feet - regardless of his/her age - may also occur. Through the use of SV reex locomotion, performing elementary components of human locomotion, such as

1. the balance of patient's body during movements (postural control);

2. maintenance of patient's upright body posture (opposed to the direction of the gravitational force) and

3. targeted gripping and walking movements of the limbs (phasic mobility) become feasible again.

The SenseVojta (SV) project aims at aiding therapists with a software infrastructure that could reliably characterize six possible activity levels1 (0-5) of a particular patient. For details regarding the SV therapy, which we do not intend to address here, please refer to the web site https://www.vojta.com/en/ (subsection The Vojta principle).

More specically, we will implement a MATLAB-GUI for combining machine learning techniques with standard frequency analysis of measured signals that could offer reliable predictions of patient's activity levels during a regular SV therapy session. This MATLAB-GUI should:

- provide a data analysis structure that would quantitatively aid therapists during therapy sessions in their aim to recognize movement patterns of patients;

- execute different scripts (such as spectrogram or psdWelch) suited for time (series) and frequency analysis of measured signals such that many measurement sessions could be compared with each other;

- allow new MATLAB-scripts to be flexibly added and removed from the execution sequence, if necessary;

- allow machine learning supported comparisons of velocity, acceleration and angular velocity measurements in time and frequency domain extracted from signals recorded by means of infra-red (IR) sensors with respect to different body parts of a patient - breast, arms, legs, abdomen, etc.;

- provide a concise csv report of generated statistical results.

Tasks:

- MATLAB GUI programming for frequency and time analysis of movement signals measured by sensors;

- Design of machine learning algorithms;

- Bugfixing, documentation.

Technologies:

- MATLAB, Octave, Java;

- Excel, MySQL, MongoDB, SAS, SPSS;

- Redmine, Jenkins. Motion Visualizer, 3DAWin;

- Scrum, LaTeX, Power-Shell.

19   Project 3:

Design of modern concepts of quantum mechanical algorithms and their and application in quantum computers. In the course of this research project mathematical and physical criteria for the most efficient data storage of data have been proposed and utilized within the design of an appropriate layered quantum hard disk structure.

Tasks:

- OOP of numerical simulations (quantum networks, stochastic differential equations, graph theory) with C++, C# and MATLAB;

- Code-testing with Wolfram Mathematica, Python, R and MATLAB;

- Process documentation with LaTeX;

- Development of a GUI for numerical simulations with MATLAB, C# and Visual C++;

- Design, update and maintenance of the Institute's webpage with HTML und PHP.

Technologies:

- Visual Studio;

- C++, MATLAB, R, Python, Wolfram Mathematica, Open Modelica;

- HTML, PHP, Java, MySQL;

- Linux/Windows, LaTeX, SPSS, SAS, Shell-Scripting;

- C#, WPF;

- Scrum.

20   Project 2:

11 2009 - 02 2011   Customer: **Institut für Theoretische Kernphysik, TU Darmstadt,**
research group of Prof. Dr. Jürgen Berges
»Functional Renormalization and Non-Equilibrium
in the Early Evolution of the Universe« –
research, education and application development

Theoretical description of the inflationary phase in the course of the early evolution of the Universe by means of the functional renormalization group (FRG).

Tasks:

- OOP of numerical simulations (functional renormalization group, partial differential equations) with C++ and MATLAB;

- Code-testing with Wolfram Mathematica and MATLAB;

- Process documentation with LaTeX;

- Development of a GUI for numerical simulations with MATLAB.

Technologies:

- Visual C++;

- Wolfram Mathematica, MATLAB, Open Modelica;

- Linux/Windows, LaTeX, SPSS, SAS, Shell-Scripting.

21 Project 1:

Theoretical description of the universe immediately after its formation („big bang") along with physical conditions that used to dominate its early evolution by means of modern mathematical and physical concepts of quantum field theory (QFT).

Tasks:

- OOP of numerical simulations (functional renormalization group, partial differential equations) with C++ and C;

- Code-testing with Wolfram Mathematica and MATLAB;

- Process documentation with LaTeX;

- Extension and redesign of an existing C++ console application for numerical simulations.

Technologies:

- Visual C++, Objective C, Open Modelica;

- Wolfram Mathematica, MATLAB;

- Linux/Windows, LaTeX, SPSS, SAS, Shell-Scripting.

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Training-Zertifikate

LinkedIn-Learning courses
05. 09. 2025 - 10. 09. 2025
(Beitrag: Test & Übungen)

»*1) Eine kollaborative Teamkultur mit KI aufbauen*«

»*2) Die Wirksamkeit des Coachings mit generativer KI verbessern*«

»*3) Verantwortungsvolle KI für Manager:innen*«

»*4) Fachzertifikat: KI für die Leitungsebene*«

»*5) Künstliche Intelligenz (KI) – Grundlagen*«

»*6) Ihre Arbeit optimieren mit Microsoft Copilot*«

»*7) Was ist generative KI?*«

»*8) Ethik im Zeitalter generativer KI*«

»*9) Generative KI: Die Entwicklung einer durchdachten Online-Suche*«

»*10) Microsoft 365 Copilot kennenlernen*«

»*11) Grundlagen der Nachhaltigkeit: Kernkonzepte*«

»*12) Nachhaltigkeit als Innovationschance: Von der Linearzur Kreislaufwirtschaft*«

»*13) Cloud Computing-Strategie: Nachhaltigkeit*«

»*14) Künstliche Intelligenz und Nachhaltigkeit – eine Einführung*«

»*15) Microsoft Cloud für Nachhaltigkeit: ESG und die Zukunft der Wirtschaft*«

»*16) Grüne Kompetenzen für eine umweltfreundlichere Wirtschaft*«

»*17) Fachzertifikat: KI für Manager:innen*«

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LinkedIn-Learning courses 20. 08. 2025 - 05. 09. 2025 (Beitrag: Test & Übungen)	»18) Microsoft Azure KI Grundwissen: Workloads und Machine Learning auf Azure« »19) Microsoft Cybersicherheit Grundwissen: Konzepte, Lösungen und KI-Schutz« »20) Business-Analyse – Grundlagen« »21) Einführung ins Projektmanagement« »22) Einführung in grundlegende Fähigkeiten für Ihre Karriere in der Datenanalyse« »23) Projektmanagement: Initiierung und Setup« »24) Datenanalyse lernen Teil 1: Grundlagen« »25) Datenanalyse lernen Teil 2: Kernkompetenzen erweitern und anwenden« »26) Projektmanagement: Planung und Strukturierung« »27) Data Science lernen: Die Grundlagen verstehen« »28) Data Science lernen: Storytelling mit Daten« »29) Datenverwaltung mit Microsoft 365« »30) Projektverwaltung mit Microsoft 365« »31) Projektmanagement: Kosten und Nutzen« »32) Zusammenarbeiten in Microsoft 365« »33) Projektmanagement: Kommunikation« »34) Optimierung der Arbeit mit Microsoft 365« »35) Berufsbild: Projektmanagement« »36) Projektmanagement: Team, Führung, Zusammenarbeit« »37) Projektmanagement: Qualität« »38) Projektmanagement: Risiko und Unsicherheit« »39) Projektmanagement: Projektabschluss« »40) Cybersecurity Awareness: Cybersecurity-Terminologie« »41) Microsoft Copilot für Security« »42) Cybersecurity-Bedrohungen im Überblick« »43) Fachzertifikat: Microsoft Azure KI Grundwissen« »44) Cybersecurity Grundlagen: Grundlegende Konzepte« »45) Generative KI für Führungskräfte« »46) KI-Fähigkeiten in Ihrer Organisation aufbauen als Führungskraft« »47) Künstliche Intelligenz – Grundwissen für Führungskräfte« »48) KI-Innovation: So halten Sie Ihr Team auf dem neuesten Stand« »49) Generative KI in die Unternehmensstrategie integrieren« »50) Verantwortungsvolle KI in Organisationen leiten« »51) KI-gestütztes Management: Effizienter führen« »52) Der Managerleitfaden für Karrieregespräche im Zeitalter der KI« »53) Mit generativer KI kritisch(er) denken«
Kaggle-Kurse (online) (contribution: tests & exercises) 18. 06. 2025 - 28. 06. 2025	»1) Python (24. 05. 2025)« »2) Intro to Machine Learning (31. 05. 2025)« »3) Pandas (03. 06. 2025)« »4) Intermediate Machine Learning (11. 06. 2025)« »5) Intro to Deep Learning (13. 06. 2025)« »6) Feature Engineering (14. 06. 2025)« »7) Data Cleaning (15. 06. 2025)« »8) Data Visualizations (24. 05. 2025)« »9) Intro to Programming Techniques (20. 06. 2025)« »10) Time Series (22. 06. 2025)« »11) Computer Vision (23. 06. 2025)« »12) Geospatial Analysis (24. 06. 2025)« »13) Intro to SQL (25. 06. 2025)« »14) Intro to Game AI and Reinforcement Learning (26. 06. 2025)« »15) Advanced SQL (27. 06. 2025)« »16) Machine Learning Explainability (28. 06. 2025)« »17) Intro to AI Ethics (28. 06. 2025)«

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AC-conference (online courses)
(contribution: tests & exercises)
05. 01. 2025 - 28. 01. 2025
(»Month of Learning«)
- continuation on next page

I) Advanced Python Sessions:

»1) Python Data Structures: Linked Lists«

»2) Complete Guide to Python Fundamentals for MLOps«

»3) Python Object-Oriented Programming«

»4) Python Standard Library - Fundamentals & Essential Training«

»5) Building a Recommendation System with Python Machine Learning and AI«

II) Miscellaneous:

»1) Quick Start Guide to Scala & Coding Exercises«

»2) Code-Challenges für C++«

»3) Programming Foundations: Discrete Mathematics«

»4) Introducing Functional Programming in C++«

»5) Geld am Aktienmarkt anlegen«

»6) Grasshopper: Architectural Prototyping«

»7) Mathematik-Grundlagen für die Programmierung«

»8) Programming Foundations: Memory, Pointers, and Garbage Collection«

»9) Microservices – Grundlagen«

»10) Microsoft Azure: Grundlagen für die Softwareentwicklung«

»11) Microsoft Azure Stack Grundkurs«

»12) Microsoft 365 Identity and Services: Zugriff und Authentifizierung verwalten«

»13) Programming Foundations: Numerical Mathematics and Calculations«

»14) Persönliche Finanzplanung: Grundwissen und Entscheidungshilfen«

»15) Power BI Data Visualization and Dashboard Tips, Tricks, & Techniques«

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| AC-conference (online courses) (contribution: tests & exercises) 05. 01. 2025 - 28. 01. 2025 (»Month of Learning«) - continuation on next page | **III) Sessions on Advanced AI:** |

III) Sessions on Advanced AI:
»1) *Data Labeling for Machine Learning*«
»2) *Datamining mit Databricks/Spark und Automated Machine Learning in der Cloud*«
»3) *Building and Deploying Deep Learning Applications with TensorFlow*«
»4) *Machine Learning Foundations: Probability*«
»5) *Machine Learning Grundlagen*«
»6) *Applied Machine Learning: Algorithms*«
»7) *Machine Learning Foundations: Calculus*«
»8) *Applied Machine Learning: Feature Engineering*«
»9) *Machine Learning Foundations: Linear Algebra*«
»10) *Machine Learning with ML.NET*«
»11) *Machine Learning with Logistic Regression in Excel, R, and Power BI*«
»12) *Predictive Analytics Essential Training: Data Mining*«
»13) *Probability Foundations for Data Science*«
»14) *Programming Foundations: Test-Driven Development*«
»15) *Protecting Data for Analysis and Machine Learning*«
»16) *Building Recommender Systems with Machine Learning and AI*«
»17) *Executive Guide to Predictive Modeling Strategy at Scale*«
»18) *Audit and Due Diligence Foundations*«

IV) Sessions on Data Mining:
»1) *Automation with Python and PowerShell for IT and Cybersecurity*«
»2) *Data Mining Grundlagen: Einführung in die Datenvorbereitung mit Data Cleansing, Data Transformation und Feature Engineering*«
»3) *Data Science Foundations: Data Mining in R*«
»4) *The Data Science of Economics, Banking, and Finance*«
»5) *Data Visualization for Data Analysis and Analytics*«
»6) *Data Visualization in R with ggplot2*«
»7) *Learning Graph Neural Networks*«
»8) *Complete Guide to R: Wrangling, Visualizing, and Modeling Data*«
»9) *Interactive Dashboards with Plotly and Dash*«

V) Advanced Python Sessions:
»1) *Learning ArcGIS Python Scripting*«
»2) *Learning Python*«
»3) *Natural Language Generation with Python*«
»4) *Building NLP Pipelines with spaCy*«
»5) *pandas Essential Training*«
»6) *Advanced Hands-On Python: Working with Excel and Spreadsheet Data*«
»7) *Using Python for Automation and Testing*«
»8) *Complete Guide to Python for Data Engineering: From Beginner to Advanced*«
»9) *Python for Data Science and Machine Learning Essential Training 1 & 2*«
»10) *Skill Up with Python: Hands-On Data Science and Machine Learning Projects*«
»11) *Python for Data Visualization*«
»12) *Python für die Datenanalyse: Grundlagen & Machine Learning*«
»13) *Python: Datenanalyse mit Pandas*«
»14) *Python Essential Libraries*«
»15) *Python in Excel: Working with pandas DataFrames*«
»16) *Advanced Python in Excel for Finance: A Hands-On Approach*«
»17) *Python Data Structures: Sets and Frozen Sets*«
»18) *Generative KI in Python*«
»19) *Python Basics and Advanced Features*«
»20) *Python in Excel: Getting Started with Data Analysis*«

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AC-conference (online courses) (contribution: tests & exercises) 05. 01. 2025 - 28. 01. 2025 (»Month of Learning«)	**VI) Sessions on Business Analysis, Leadership & Requirement Elicitation:**

VI) Sessions on Business Analysis, Leadership & Requirement Elicitation:
»1) Developing Your Leadership Philosophy«
»2) Leadership Stories: 5-Minute Lessons in Leading People«
»3) Aus Misserfolgen lernen«
»4) Inspirational Leadership Skills: Practical Motivational Leadership«
»5) Requirements Elicitation for Business Analysts: Interviews«
»6) Requirements Elicitation for Business Analysis: Stakeholder Conversations«
»7) Mastering Self-Motivation«
»8) SQL Hands-On Practice: Solve Business Problems«
»9) Strategic Agility«
»10) Strategic Planning Foundations«
»11) Managing Stress«
»12) Veränderungen im Beruf erfolgreich bewältigen«
»13) Zeitmanagement – Grundlagen«

VII) Sessions on Relational Data Bases:
»1) SQL Queries Made Easy«
»2) Advanced PostgreSQL«
»3) Advanced NoSQL for Data Science«
»4) Data Analysis with PostgreSQL«
»5) Hands-On Introduction: Data Engineering«
»6) Complete Guide to Data Lakes and Lakehouses«
»7) ETL in Python and SQL«
»8) Intermediate SQL for Data Scientists«
»9) PostgreSQL: Advanced Queries«
»10) PostgreSQL Essential Training«
»11) Problem-Solving Strategies for Data Engineers«
»12) Relational Databases Essential Training«
»13) Complete Guide to SQL for Data Engineering: from Beginner to Advanced«
»14) Intermediate SQL: Data Reporting and Analysis«

VIII) Sessions on Project Management:
»1) Agile Software Development: Code Quality«
»2) Agile Software Development: Refactoring«
»3) Agile Requirements Foundations«
»4) Grundlagen der Programmierung: Agile Softwareentwicklung«
»5) Agile Software Development: Clean Coding Practices«
»6) Grundlagen der Programmierung: Clean Code und SOLID«
»7) Data-Driven Project Management: Project Metrics That Matter«
»8) Project Management Foundations: Communication«
»9) Project Management Foundations: Risk«
»10) Project Management Foundations: Schedules«
»11) Scripting for Testers«
»12) Programming Foundations: Secure Coding«

IX) Sessions on Advanced AI:
»1) Advanced NLP with Python for Machine Learning«
»2) Advanced Graph Neural Networks«
»3) Advanced Python & OOP«
»4) Introduction to Artificial Intelligence«
»5) AI-Powered Time Series Forecasting with Python«
»6) Programming Foundations: Algorithms«
»7) Artificial Intelligence Foundations: Machine Learning«
»8) Cloud Architecture: Core Concepts«

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AC-conference (online courses) (contribution: tests & exercises) 05. 01. 2025 - 28. 01. 2025 (»Month of Learning«) - continuation on next page	**X) Sessions on Modern Software & Hardware Trends, part 2:**
	»1) Learning Vue.js«
	»2) Learning ASP.NET«
	»3) Learning REST APIs«
	»4) Learning JAX«
	»5) Learning Minitab«
	»6) Quality Analytics Using Minitab«
	»7) Linux-Server 1: Installation und erste Server-Konfiguration«
	»8) Linux-Server 2: Erweiterte Konfiguration, Speicherverwaltung, Optimierung«
	»9) Linux Performance Tuning«
	»10) Power BI: Integrating AI and Machine Learning«
	»11) React (Native) Grundkurs«
	»12) Building RESTful Web APIs with Django«
	»13) SAP Business One: Production and Logistics«
	»14) Electronics Foundations: Semiconductor Devices«
	»15) Learning SnowflakeDB«
	»16) Learning Terraform«
	»17) Introduction to Transformer Models for NLP«
	»18) Advanced AI: Transformers for Computer Vision«
	»19) Visual Studio: Source Control with Git and GitHub«
	»20) Vue.js Grundkurs & Essential Training«
	»21) Full Stack Web Development with Flask«
	XI) Sessions on Business Analysis, Leadership & Requirement Elicitation:
	»1) Atlas Copco Group Circular Economy Training«
	»2) Code of Conduct Compliance Signing 2025«
	»3) Balanced Scorecard and Key Performance Indicators«
	»4) Berufliche Ziele setzen und erreichen«
	»5) Business Analysis Foundations: Strategy Analysis«
	»6) Business Analysis Foundations: Competencies«
	»7) Business Analysis Foundations«
	»8) Business Benefits Realization Foundations«
	»9) Business Englisch: Erfolgreiche E-Mails verfassen«
	»10) Business Math«
	»11) Business Englisch: Online-Meetings meistern«
	»12) Business Englisch: Präsentationen meistern«
	»13) RPA, AI, and Cognitive Tech for Leaders«
	»14) Improving Your Conflict Competence«
	»15) Excel: Implementing Balanced Scorecards with KPIs«
	»16) Excel: Economic Analysis and Data Analytics«
	»17) Excel PivotTables: Mastering PivotTables and PivotCharts - Real-World Case Studies«
	»18) Financial Basics Everyone Should Know«
	»19) Running a Profitable Business: Understanding Financial Ratios«
	»20) Führungsfallen vermeiden«
	»21) Generative AI for Business Leaders«
	»22) Human Resources: Protecting Confidentiality«
	»23) Ihre Ideen durchsetzen«
	»24) Digital Technologies Case Studies: AI, IOT, Robotics, Blockchain«
	»25) Karriereplanung: Den eigenen Standort bestimmen & Karriere-Tipps«
	»26) Künstliche Intelligenz (KI): Geschichte, Techniken, Einsatzgebiete«
	»27) Kundenservice – Grundlagen«

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AC-conference (online courses) (contribution: tests & exercises) 05. 01. 2025 - 28. 01. 2025 (»Month of Learning«) - continuation on next page	**XII) Ethereum Sessions:**

XII) Ethereum Sessions:

»1) Building an Ethereum Blockchain App: 1 Introduction to Blockchain«
»2) Building an Ethereum Blockchain App: 2 Introduction to Ethereum«
»3) Building an Ethereum Blockchain App: 3 Ethereum Development«
»4) Building an Ethereum Blockchain App: 4 Ethereum Development Tools«
»5) Building an Ethereum Blockchain App: 5 Your Ethereum Wallet«
»6) Building an Ethereum Blockchain App: 6 Building Your First Ethereum App«
»7) Building an Ethereum Blockchain App: 7 Smart Contracts«
»8) Building an Ethereum Blockchain App: 8 Supply Chain Smart Contract dApp«
»9) Building an Ethereum Blockchain App: 9 Testing Ethereum Apps«
»10) Building an Ethereum Blockchain App: 10 Deployment and Maintenance«
»11) Building an Ethereum Blockchain App: 11 Integrating Non-Blockchain Apps«

XIII) Modern Software Architecture Sessions:

»1) Einführung in die Softwarearchitektur 1: Grundlagen und Begriffe«
»2) Einführung in die Softwarearchitektur 2: Architekturmuster«
»3) Einführung in die Softwarearchitektur 3: Architekturbewertung«
»4) Einführung in die Softwarearchitektur 4: Architekturdokumentation«
»5) Einführung in die Softwarearchitektur 5: Qualitätsmerkmale und -anforderungen«
»6) Refactoring: Bestehende Architekturen restrukturieren«

XIV) Sessions on Statistics:

»1) Statistik-Grundlagen 1: Grundbegriffe und deskriptive Statistik«
»2) Statistik-Grundlagen 2: Mehrere Variablen und Wahrscheinlichkeiten«
»3) Statistik-Grundlagen 3: Zufallsvariablen und Wahrscheinlichkeitsverteilungen«
»4) Statistics Foundations 1: The Basics«
»5) Statistics Foundations 2: Probability«
»6) Statistics Foundations 3: Using Data Sets«
»7) Statistics Foundations 4: Advanced Topics«
»8) Deskriptive Statistik mit R - Teil 1: Grundlagen und explorative Analysen«
»9) Deskriptive Statistik mit R - Teil 2: Korrelationen und Prognosen«
»10) Induktive Statistik mit R - Teil 1: Angewandte Wahrscheinlichkeitsverteilungen«
»11) Induktive Statistik mit R - Teil 2: Intervallschätzungen und statistische Tests«
»12) Machine Learning Foundations: Statistics«
»13) SPSS Statistics Essential Training«
»14) Learning Cryptography and Network Security«

XV) Sessions on Modern Software & Hardware Trends, part 1:

»1) Tableau 10 Grundkurs & Advanced Tableau Desktop«
»2) Data Engineering Pipeline Management with Apache Airflow«
»3) Introduction to Alteryx & Alteryx for Healthcare«
»4) Complete Guide to Apache Kafka for Beginners«
»5) Azure Data Explorer Grundkurs«
»6) Azure for DevOps: Designing a Strategy«
»7) DBeaver Essential Training«
»8) Data Engineering with dbt for SQL«
»9) Introduction to Django«
»10) Learning Docker: Continuous Delivery & Essential Training«
»11) Flutter Essential Training: Build for Multiple Platforms«
»12) Data Pipeline Automation with GitHub Actions Using R and Python«
»13) Learning Git and GitHub & Building GitHub Bots «
»14) GitHub Actions for CI/CD«
»15) Knowledge Graphs for Generative AI Use Cases«
»16) Kubernetes lernen«

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AC-conference (online courses) (contribution: tests & exercises) 05. 01. 2025 - 28. 01. 2025 (»Month of Learning«) - continuation on next page	**XVI) Arduino & Raspberry Pi Sessions:**

XVI) Arduino & Raspberry Pi Sessions:
»1) Arduino Grundkurs: Projects«
»2) Raspberry Pi Grundkurs: Hausautomation mit dem Raspberry Pi«
»3) Wetterstation mit Raspberry Pi und Arduino«

XVII) Sessions on Modern Programming:
»1) GraphQL Grundkurs«
»2) Kotlin Grundkurs«
»3) F# Grundkurs«
»4) Learning AutoLISP & Visual LISP«
»5) Angular Grundkurs: CLI, Projektsetup, Module, Komponenten, Bindungen, Dependency Injection, Direktiven, Pipes«
»6) Swift Grundkurs«

XVIII) Excel & Python Sessions:
»1) Excel VBA Grundkurs & für Profis«
»2) Excel VBA für Profis: Klassen (Konzepte & Workshop)«
»3) Excel VBA: Eigene Funktionen programmieren«
»4) Excel VBA: Dialoge programmieren«
»5) Excel VBA-Lösungen & VBA-Tipps«
»6) Excel VBA: Ein erstes Projekt (mit KI-Unterstützung)«
»7) Excel: Macros in Depth«
»8) Python in Excel: Data Outputs in Custom Data Visualizations and Algorithms«
»9) The Data Science of Economics, Banking, and Finance«
»10) Hands-On PostgreSQL Project: Spatial Data Science«

XIX) Sessions on Six Sigma:
»1) (Lean) Six Sigma Foundations«
»2) Lean Six Sigma: Analyze, Improve, and Control Tools«
»3) Lean Six Sigma: Define and Measure Tools«
»4) Six Sigma: Green Belt«
»5) Six Sigma: Black Belt«
»6) How to Manage Lean Six Sigma Projects: Part I & Part II«

XX) Sessions on Cryptography & Cybersecurity:
»1) Conversations on Cryptography & Ethical Hacking«
»2) Symmetric Cryptography Essential Training: Part I & Part II«
»3) Learning Cryptography and Network Security«

XXI) Sessions on Ruby & Perl:
»1) Hands-On Introduction: Ruby on Rails: Part I & Part II«
»2) Ruby on Rails 6 Essential Training«
»3) Ruby: Testing with RSpec«
»4) Ruby on Rails 6: Controllers and Views«
»5) Hotwire: Reactive Ruby on Rails Applications«
»6) Perl 5 Grundkurs: Parts I, II & III«
»7) Perl: CGI-Programmierung«

XXII) DevOps Sessions on Mathematica, MATLAB & COBOL:
»1) Mathematica und Wolfram Language Grundkurs«
»2) Mathematica 14 Essential Training«
»3) Learning MATLAB: Part I & II«
»4) MATLAB Essential Training: Part I & II«
»5) Accelerated MATLAB «
»6) COBOL Grundkurs: Part I & II«

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AC-conference (online courses) (contribution: tests & exercises) 05. 01. 2025 - 28. 01. 2025 (»Month of Learning«) - continuation on next page	**XXIII) PHP Sessions:** *»1) PHP Grundkurs: Sprachgrundlagen & Praktische Programmierung«* *»2) PHP: Objektorientierte Programmierung (OOP)«* *»3) Datenbankentwicklung mit PHP«* **XXIV) Sessions on Web Techniques:** *»1) Webtechniken lernen: HTML, CSS & Responsive CSS-Layouts«* *»2) JavaScript Essential Training«* *»3) Flask Essential Training«* *»4) Skill Up with Python: Hands-On Web Development Projects«* *»5) Coding Exercises: CSS Logical Properties«* *»6) Making Sense of the CSS Box Model«* *»7) Crafting Meaningful HTML«* *»8) Controlling CSS with JavaScript«* *»9) Learning HTML Canvas«* *»10) HTML and CSS: Creating Navigation Bars«* *»11) CSS and JavaScript Library Integration«* **XXV) Corporate Finance Sessions:** *»1) Emerging Financial Risk Management«* *»2) Business Analysis Foundations: Strategy Analysis«* *»3) Financial Analysis: Making Business Projections«* *»4) Corporate Finance: Environmental, Social, and Governance«* *»5) Accounting Foundations: Statement of Cash Flows«* *»6) Financial Accounting Foundations«* **XXVI) Sessions on Software Engineering & DevOps:** *»1) Go for Python Developers, Recipes & Practical Projects«* *»2) DevOps – Grundlagen«* *»3) Google Apps Script for JavaScript Developers«* *»4) Google Analytics 4 - Grundkurs und für Fortgeschrittene«* *»5) Google Universal Analytics Grundkurs: Planen, Implementieren, Verwalten, Bericht, Erkenntnis, Handlung«* *»6) PowerShell: Scripting for Advanced Automation«* *»7) Learning PowerShell Core«* *»8) PowerShell 7 Essential Training«* *»9) PowerShell for SQL Server Administration«* *»10) Learning Linux Shell Scripting«* *»11) Unix Essential Training«* *»12) Learning Bash-Shell Scripting«* *»13) Practical GitHub Actions, Project Management and Collaboration«* *»14) Learning Jenkins - Grundkurs & Essential Training«* *»15) Kubernetes - Grundlagen für Entwickler«* *»16) Docker lernen«* *»17) Introduction to MongoDB«* *»18) Learning Assembly Language«* **XXVII) DevOps Sessions:** *»1) DevOps Foundations: Infrastructure as Code«* *»2) Fundamentals of Data Transformation for Data Engineering«* *»3) Data-Informed Strategic Thinking for Senior Analysts and Data Scientists«* *»4) Python for Data Science Tips, Tricks, and Techniques - Essential Training«* *»5) Docker for Developers, Data Scientists & Data Engineers:Projects «* *»6) Kubernetes Grundkurs«* *»7) DevOps Foundations: Continuous Delivery/Continuous Integration«* *»8) Data Science Foundations: Data Assessment for Predictive Modeling«* *»9) Python for Engineers and Scientists«*

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AC-conference (online courses) (contribution: tests & exercises) 05. 01. 2025 - 28. 01. 2025 (»Month of Learning«) - continuation on next page	**XXVIII) Java Sessions:**

XXVIII) Java Sessions:
»1) Java Grundkurs 1: Sprachkonzepte und Programmiergrundlagen«
»2) Java Grundkurs 2: OOP, Fehlerbehandlung, Stream-API«
»3) Java für Fortgeschrittene«
»4) Java: Datenbankprogrammierung«
»5) Spring Boot Grundkurs«
XXIX) Sessions on Data Science Platforms:
»1) MLOps Tools: MLflow and Hugging Face«
»2) Learning BigQuery«
»3) Advanced BigQuery«
»4) Redis + AI: Building a Vector Database with Redis«
»5) Advanced Redis«
»6) Redis Essential Training«
»7) Graph Databases: Neo4j for Complex Data Relationships«
»8) Introduction to Neo4j«
»9) Advanced MongoDB: Efficient and Secure Data Management«
XXX) Qunatitative Finance Sessions:
»1) Forecasting Using Financial Statements«
»2) Financial Modeling Foundations«
»3) Financial Accounting Part 1«
»4) Financial Accounting Part 2«
XXXI) Data Engineering Software Sessions:
»1) Rust for Data Engineering«
»2) AutoCAD Grundkurs«
XXXII) AI Auditing Sessions:
»1) Introduction to Auditing AI Systems«
»2) Algorithmic Auditing and Continuous Monitoring«
»3) Applied AI Auditing in Python«
XXXIII) Sessions on Interactions between Programming Languages:
»1) Using Rust with Python«
»2) Learning Julia«
»3) Learning Vertex AI: MLOps with Google Cloud«
»4) Rust: From Fundamentals to Advanced Concepts with AI-Assisted Development«
»5) LaTeX Grundkurs«
»6) Low Code/No-Code Data Literacy with KNIME: From Basic to Advanced«
»7) ChatGPT and Python«
»8) Tableau Speed and Performance«
»9) Apache Kafka Essential Training: Getting Started & Building Scalable Applications«
»10) Cassandra Data Modeling Essential Training«
»11) Data Science on Google Cloud Platform: Predictive Analytics, Building Data Pipelines - Essential Training for Developers«
»12) Introduction to Stata 15 & Advanced and Specialized Statistics with Stata«
»13) Data Modeling in MongoDB«
»14) Hands-On Introduction: Scala, Essential Training for Data Science«
XXXIV) HTML Sessions:
»1) HTML5 Grundkurs«
»2) HTML Essential Training«
»3) HTML for Programmers«
»4) HTML: Strukturierte Daten«
XXXV) CSS Sessions:
»1) CSS for Programmers«
»2) CSS Essential Training«
»3) CSS3-Selektoren für Profis«
»4) HTML & CSS: Creating Forms«
»5) HTML, CSS, and Generative AI: Speed Up Your Process«

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AC-conference (online courses) (contribution: tests & exercises) 05. 01. 2025 - 28. 01. 2025 (»Month of Learning«) - continuation on next page	**XXXVI) C # Sessions:** »1) *Learning C#*« »2) *Object-Oriented Programming with C#*« »3) *C# Essential Training 1: Types and Control Flow*« »4) *C# and .NET Essential Training*« »5) *C# Essential Training 2: Generics, Collections, and LINQ*« »6) *Advanced C#: Language Features*« »7) *C#: Advanced Practices*« »8) *C# Algorithms, Delegates, Events, and Lambdas*« »9) *Advanced C#: Functional Programming Patterns*« »10) *C#: Design Patterns Part 1*« »11) *C#: Design Patterns Part 2*« »12) *Debugging in C#*« »13) *C# Refactoring Tips and Tricks*«
AC-conference (online courses) (contribution: tests & exercises) 31. 12. 2024	**A) C++ Sessions:** »1) *C++: Smart Pointer*« »2) *C++ Grundkurs 1: Sprachgrundlagen, OOP, Speicherverwaltung, Vererbung*« »3) *C++ Grundkurs 2: Templates, Funktionale Programmierung, Fehlerbehandlung*« »4) *C Grundkurs*« »5) *Master C Language Pointers*« **B) Advanced Python Concepts Sessions:** »1) *Introduction to Artificial Intelligence*« »2) *Python Data Modeling and Model Evaluation Metrics*« »3) *Data Cleaning in Python Essential Training*« »4) *Python Prototyping on the Edge*« »5) *Machine Learning with Python: Logistic Regression*« **C) Useful Software Engineering Platforms Sessions:** »1) *Google Looker Studio (Google Data Studio) Grundkurs*« »2) *Data Analytics with Google Cloud BigQuery and Looker Studio*« »3) *Learning Apache Airflow*« »4) *Apache Airflow Essential Training*« »5) *JavaScript: In HTML 5 arbeiten*«
AC-conference (online course) (contribution: tests & exercises) 30. 12. 2024	**A) Applied Machine Learning Sessions:** »1) *Applied Machine Learning: Ensemble Learning*« »2) *Deep Learning with Python and Keras: Sentiment Analysis*« »3) *Full-Stack Deep Learning with Python*« »4) *AI Workshop: Build a Neural Network with PyTorch Lightning*« »5) *Self-Supervised Machine Learning*« »6) *Supervised Learning Essential Training*« **B) Data Engineering and Network Security Sessions:** »1) *Hands-On Advanced Python: Data Engineering Basics*« »2) *Python for Data Analysis: Solve Real-World Challenges*« »3) *Python Theory for Network Engineers*« »4) *Data Science Foundations: Python Scientific Stack*« »5) *Advanced Python: Classes and Functions*« »6) *Python for Security*« **C) Alternative Programming Languages Sessions:** »1) *CPython Grundkurs*« »2) *Node.js lernen*« »3) *Fortran Grundkurs*«

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AC-conference (online course) (contribution: tests & exercises) 29. 12. 2024	**A) Advanced SQL and Finance Session:** *»1) Solving Interpolation Challenges«* *»2) High Performance Relational Divisions«* *»3) Logical Query Processing, Part 1«* *»4) Logical Query Processing, Part 2«* *»5) Window Functions«* *»6) Top Five Things to Know in Advanced SQL«* *»7) Advanced SQL for Data Scientists«* *»8) Query Tuning and Performance Optimization«* *»9) Advanced SQL for Application Development«* *»10) Advanced SQL for Data Science: Time Series«* *»11) SQL for Finance: Income Statement Project«* *»12) Using Data in Financial Analysis«* **B) Advanced JavaScript:** *»1) JavaScript: Debugging«* *»2) Code-Challenges für JavaScript«* *»3) JavaScript für Fortgeschrittene«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 28. 12. 2024	**A) Deep Learning Sessions:** *»1) Deep Learning: Getting Started«* *»2) Deep Learning Foundations: Natural Language Processing with TensorFlow«* *»3) Neural Networks and Convolutional Neural Networks Essential Training«* **B) JavaScript Sessions:** *»1) JavaScript Grundkurs 1: Grundlagen und Syntax«* *»2) JavaScript Grundkurs 2: Programmiertechniken und Frameworks«* *»3) JavaScript: Unit-Testing«* *»4) Learning TypeScript«* *»5) TypeScript: Object-Oriented Programming«* *»6) Blockchain Programming in JavaScript«*
AC-conference (online course) (contribution: tests & exercises) 24. 12. 2024 - 27. 12. 2024	*»1) Apache Spark Essential Training: Big Data Engineering«* *»2) Learning Regular Expressions«* *»3) RAG and Fine-Tuning Explained«* *»4) Training Neural Networks in Python«* *»5) Deep Learning: Model Optimization and Tuning«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 23. 12. 2024	*»1) Cloud Hadoop: Scaling Apache Spark«* *»2) Advanced Python: Object-Oriented Programming«* *»3) Introduction to Spark SQL and DataFrames«* *»4) nexonar Training Days«* *»5) Google Cloud Foundations«*
AC-conference (online course) (contribution: tests & exercises) 22. 12. 2024	*»1) Build GANs and Diffusion Models with TensorFlow and PyTorch«* *»2) Recurrent Neural Networks«* *»3) Big Data Analytics with Hadoop and Apache Spark«* *»4) Hadoop for Data Science Tips, Tricks, & Techniques«* *»5) Apache PySpark by Example«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 21. 12. 2024	*»1) Generative AI: Working with Large Language Models«* *»2) Generative AI: Introduction to Large Language Models«* *»3) Introduction to Large Language Models«* *»4) Applied AI: Getting Started with Hugging Face Transformers«* *»5) Applied AI: Building NLP Apps with Hugging Face Transformers«*

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AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 16. 12. 2024 - 20. 12. 2024	»1) DevOps with AWS« »2) Amazon Web Services: Data Services« »3) OpenAI API for Python Developers« »4) ChatGPT Grundkurs« »5) Python Practice: Real-World Coding Challenges« »6) Learning Amazon SageMaker« »7) Python: Working with REST and Web Data« »8) Prompt Engineering – Grundlagen« »9) Python: Pen Testing AWS«
AC-conference (online courses) (contribution: tests & exercises) 08. 12. 2024	»1) Python Data Structures: Stacks, Deques, and Queues« »2) SQL Server Machine Learning Services: Python« »3) Advanced Python Projects: Build AI Applications«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 05. 12. 2024 - 06. 12. 2024	»1) Testing Python Data Science Code« »2) Data Science using SQL, Tableau, Python, and Spark« »3) From pandas to Polars« »4) gRPC in Python« »5) Asynchronous Python: Boost Performance and Efficiency«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 04. 12. 2024	»1) Using Large Datasets with pandas« »2) Synthetic Data: Advanced Concepts and Applications« »3) Data Science Grundlagen: Knowledge Graphen« »4) Learning Python Generators« »5) Using SQL with Python«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 03. 12. 2024	»1) Ethical Hacking: SQL Injection«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 26. 11. 2024	»1) Continuous Delivery mit AWS, Azure und Google Cloud«
AC-conference (online course) (contribution: tests & exercises) 24. 11. 2024	»1) Google Cloud Platform for Machine Learning - Essential Training«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 22. 11. 2024	»1) SQL Tips and Tricks for Data Science«
AC-conference (online course) (contribution: tests & exercises) 02. 11. 2024 - 04. 11. 2024	»1) Learning MySQL Development« »2) MySQL for Data Analysis« »3) MySQL for Data Engineering« »4) SQL for Exploratory Data Analysis Essential Training«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 28. 10. 2024	»1) Computer Vision for Data Scientists«

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AC-conference (online courses) (contribution: tests & exercises) 08. 09. 2024 - 29. 09. 2024	»1) Arbeitsvertragsrecht in Deutschland« »2) AI Show: Being Responsible with Generative AI« »3) Generative AI vs. Traditional AI«
AC-conference (online courses) (contribution: tests & exercises) 01. 09. 2024 - 03. 09. 2024	»1) OpenCV for Python Developers« »2) Introduction to Deep Learning with OpenCV« »3) Building Computer Vision Applications with Python«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 09. 08. 2024 - 25. 08. 2024	»1) Introduction to IT Automation« »2) Fundamentals of Dynamic Programming« »3) AI Algorithms for Gaming«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 02. 08. 2024	»1) Learning H20.ai« »2) Learning TinyML: A Hands-On Course«
AC-conference (online course) (contribution: tests & exercises) 23. 07. 2024 - 30. 07. 2024	»1) TensorFlow: Working with NLP« »2) Reading Corporate Financial Statements«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 19. 07. 2024 - 21. 07. 2024	»1) Introduction to Cassandra« »2) Mistakes to Avoid in Machine Learning« »3) Machine Learning with Scikit-Learn« »4) TensorFlow 2: Working with Neural Networks« »5) TensorFlow 2.0: Working with Images«
AC-conference (online course) (contribution: tests & exercises) 06. 07. 2024 - 18. 07. 2024	»1) Introduction to NoSQL« »2) Python Practice: Collections«
AC-conference (online course) (contribution: tests & exercises) 28. 06. 2024 - 29. 06. 2024	»1) Corporate Financial Statement Analysis« »2) Business Collaboration in the Modern Workplace«
AC-conference (online course) (contribution: tests & exercises) 23. 06. 2024 - 26. 06. 2024	»1) Requirements Elicitation and Analysis« »2) Learning Cloud Computing: Serverless Computing« »3) Cloud Computing lernen: Öffentliche (Public) Cloud-Plattformen« »4) Amazon Web Services (AWS): Basiswissen für Administratoren« »5) Microsoft Azure: Basiswissen für Entwickler«
AC-conference (online course) (contribution: tests & exercises) 29. 05. 2024 - 13. 06. 2024	»1) Learning Data Science: Manage Your Team« »2) Learning Data Science: Ask Great Questions« »3) Learning Data Science: Tell Stories With Data« »4) Learning Data Science: Using Agile Methodology« »5) Learning Data Science: Understanding the Basics«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 20. 05. 2024	»1) Why Digital Security at Atlas Copco Group?« »2) How to protect yourself from cyberattacks« »3) Processing personal data« »4) Cyberattack methods and risks«

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AC-conference (online course) (contribution: tests & exercises) 01. 05. 2024 - 15. 05. 2024	*»1) WordPress: Programmierung mit der REST API«* *»2) SAP Business One Essential Training«* *»3) Kubernetes: Your First Project«*
AC-conference (online course) (contribution: tests & exercises) 22. 04. 2024 - 26. 04. 2024	*»1) MLOps Essentials: Model Development and Integration«* *»2) Machine Learning & AI Foundations: Linear Regression«* *»3) MLOps Essentials: Model Deployment and Monitoring«* *»4) MLOps Essentials: Monitoring Model Drift and Bias«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 18. 04. 2024	*»1) Machine Learning and AI Foundations: Clustering and Association«* *»2) Introduction to MicroPython and Physical Computing«* *»3) Learning CircuitPython with Circuit Playground Express«* *»4) Learning Threat Modeling for Security Professionals«*
AC-conference (online course) (contribution: tests & exercises) 14. 04. 2024	*»1) Machine Learning and AI Foundations: Classification Modeling«* *»2) Machine Learning and AI Foundations: Value Estimations«* *»3) Machine Learning and AI Foundations: Recommendations«* *»4) Grasshopper: Generative Design for Architecture«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 12. 04. 2024 - 13. 04. 2024	*»1) Machine Learning and AI Foundations: Decision Trees (KNIME)«* *»2) Predictive Analytics Essential Training: Estimating and Ensuring ROI«* *»3) Machine Learning with Python: Decision Trees«* *»4) WordPress 5 für Entwickler: Plugins«* *»5) Machine Learning and AI Foundations: Advanced Decision Trees (KNIME)«*
AC-conference (online course) (contribution: tests & exercises) 10. 04. 2024	*»1) WordPress lernen«* *»2) WordPress für Entwickler: Auf der Kommandozeile (CLI) arbeiten«* *»3) Machine Learning and AI Foundations: Causal Inference and Modeling«*
AC-conference (online course) (contribution: tests & exercises) 07. 04. 2024 - 09. 04. 2024	*»1) Machine Learning and AI Foundations: Producing Explainable AI (XAI) and Interpretable Machine Learning Solutions«* *»2) Machine Learning and AI Foundations: Prediction, Causation, and Statistical Inference«* *»3) Advanced Predictive Modeling: Mastering Ensembles and Metamodeling«*
AC-conference (online course) (contribution: tests & exercises) 03. 04. 2024 - 05. 04. 2024	*»1) Behavioral Finance Foundations«* *»2) Finance Essentials for Small Business«* *»3) Introduction to Machine Learning with KNIME«*
AC-conference (online course) (contribution: tests & exercises) 30. 03. 2024	*»1) Learning Kubernetes«* *»2) Kubernetes: Cloud Native Ecosystem«* *»3) Kubernetes: Essential Tools«* *»4) Predictive Analytics Essential Training for Executives«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 29. 03. 2024	*»1) Introduction to Responsible AI Algorithm Design«* *»2) Debiasing AI Using Amazon SageMaker«* *»3) Cloud Quantum Computing Essentials«* *»4) Power BI Data Methods (2019)«*
AC-conference (online course) (contribution: tests & exercises) 25. 03. 2024 - 28. 03. 2024	*»1) Understanding Capital Markets«* *»2) AutoML: Build Production-Ready Models Quickly!«* *»3) Executive Guide to AutoML«*
AC-conference (online course) (contribution: tests & exercises) 24. 03. 2024	*»1) AI in Business Essential Training«* *»2) Artificial Intelligence and Business Strategy: Case Studies«* *»3) Safeguarding AI«*

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AC-conference (online course) (contribution: tests & exercises) 22. 03. 2024 - 23. 03. 2024	»1) Artificial Intelligence for Business Leaders« »2) Introducing AI to Your Organization« »3) Learning XAI: Explainable Artificial Intelligence« »4) Artificial Intelligence and Business Strategy«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 20. 03. 2024 - 21. 03. 2024	»1) Learning RhinoCAM« »2) Grasshopper and Rhino: Python Scripting« »3) IoT Foundations: Fundamentals«
AC-conference (online course) (contribution: exercises) 17. 03. 2024 - 18. 03. 2024	»1) Finance Foundations« »2) Learning Algorithmic Design with Grasshopper« »3) Introduction to Digital Twins« »4) Grasshopper Essential Training (2017)«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 15. 03. 2024 - 16. 03. 2024	»1) Introduction to Quantum Computing« »2) Learning Grasshopper« »3) Grasshopper Essential Training«
AC-conference (online course) (contribution: exercises) 07. 03. 2024 - 09. 03. 2024	»1) Quantum Computing Fundamentals« »2) Introduction to Amazon Braket: Quantum Computing on AWS«
AC-conference (online course) (contribution: exercises) 04. 03. 2024 - 05. 03. 2024	»1) Introducing Rhino 6 (2018)« »2) Rhino 6 Essential Training (2018)« »3) Introduction to Quantum Cryptography«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 03. 03. 2024	»1) Learning LabVIEW«
AC-conference (online course) (contribution: exercises) 01. 03. 2024 - 02. 03. 2024	»1) Test Automation with Python: 6 Elements and Selectors« »2) Python GUI Development with Tkinter« »3) Test Automation with Python: 9 Designing Your Test Suite«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 26. 02. 2024	»1) Django Essential Training«
AC-conference (online course) (contribution: exercises) 24. 02. 2024 - 25. 02. 2024	»1) Building RESTful APIs with Flask« »2) Ethereum: Building Blockchain Decentralized Apps (DApps)«
AC-conference, Rüsselsheim am Main (contribution: exercises) 22. 02. 2024	»1) Introduction to F#« »2) Blockchain: Learning Solidity« »3) Corporate Finance Foundations«
AC-conference (online course) (contribution: exercises) 21. 02. 2024	»1) Flask Essential Training«
AC-conference (online course) (contribution: tests & exercises) 20. 02. 2024	»1) Python for Data Science Essential Training Part 1« »2) Python for Data Science Essential Training Part 2«

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AC-conference (online course) (contribution: exercises) 19. 02. 2024	*»1) Practical Python for Algorithmic Trading«* *»2) Dart Clean Code: Writing High-Efficiency, Maintainable Dart Programs«*
AC-conference, Rüsselsheim am Main (contribution: exercises) 18. 02. 2024	*»1) Finance Foundations: Corporate Governance«* *»2) Managerial Finance Foundations«* *»3) Introduction to Dart«*
AC-conference (online course) (contribution: exercises) 17. 02. 2024	*»1) Algorithmic Trading and Stocks Essential Training«* *»2) Using Tableau to Discover Powerful Business Insights«*
AC-conference (online course) (contribution: exercises) 16. 02. 2024	*»1) Python: Working with Predictive Analytics«* *»2) Financial Forecasting with Analytics Essential Training«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 12. 02. 2024- 15. 02. 2024	*»1) Data Science Foundations: Data Mining in Python«* *»2) Foundations of Treasury Management«* *»3) Getting Started with Python for Finance«* *»4) Algorithmic Trading and Finance Models with Python, R, and Stata«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 08. 02. 2024	*»1) PyTorch Essential Training: Deep Learning«* *»2) Transfer Learning for Images Using PyTorch: Essential Training«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 06. 02. 2024	*»1) Deploying Scalable Machine Learning for Data Science«* *»2) Hands-On PyTorch Machine Learning«* *»3) Natural Language Processing with PyTorch«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 05. 02. 2024	*»1) Applied Machine Learning: Foundations«* *»2) Applied Machine Learning: Feature Engineering«* *»3) DevOps for Data Scientists«*
AC-conference (online course) (contribution: exercises) 03. 02. 2024	*»1) Applied Machine Learning: Algorithms«* *»2) Produktiv arbeiten – Schritt für Schritt zur individuellen Lösung«* *»3) Applied Machine Learning: Algorithms«*
AC-conference (online course) (contribution: tests & exercises) 02. 02. 2024	*»1) Blockchain and Smart Contracts Security«* *»2) Introduction to NFTs: Non-fungible Tokens«* *»3) Cryptocurrency Foundations«*
AC-conference, Rüsselsheim am Main (contribution: exercises) 31. 01. 2024	*»1) Python for Health Sciences and Healthcare«* *»2) Blockchain: Beyond the Basics«*
AC-conference, Rüsselsheim am Main	30. 01. 2024*: »1) Python Statistics Essential Training«* (contribution: exercises)
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 29. 01. 2024	*»1) Designing RESTful APIs«* *»2) How Blockchains Will Change Business«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 26. 01. 2024	*»1) R und RStudio Grundkurs«* *»2) Blockchain Basics«*

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AC-conference (online course) (contribution: tests & exercises) 25. 01. 2024	*»1) TensorFlow Grundkurs 2: Machine-Learning-Projekte mit Python«*
AC-conference (online course)	23. 01. 2024: *»Django: Forms«* (contribution: exercise)
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 22. 01. 2024	*»1) Building a Personal Portfolio with Django«* *»2) Test-Driven Development in Django«* *»3) TensorFlow Grundkurs 1: Neuronale Netzwerke, Komponenten, Tensoren«*
AC-conference (online course) (contribution: exercises) 21. 01. 2024	*»1) Django Grundkurs«* *»2) Flask Grundkurs«*
AC-conference (online course)	18. 01. 2024: *»Kryptografie und Steganografie mit Python«* (contribution: exercise)
AC-conference (online course)	16. 01. 2024: *»Learning Django«* (contribution: exercise)
AC-conference (online course) (contribution: exercises) 14. 01. 2024	*»1) Case Study: Visualize Complex Microservice Data Using Python«* *»2) SQL Queries Made Easy«* *»3) Introduction to Scala«*
AC-conference (online course)	13. 01. 2024: *»Learning SQL Programming«* (contribution: exercise)
AC-conference (online course) (contribution: tests & exercises) 12. 01. 2024	*»1) Finance Foundations: Business Valuation«* *»2) Python Projects: Create an Interactive Quiz Application«*
AC-conference, Rüsselsheim am Main (contribution: exercises) 11. 01. 2024	*»1) Finance Foundations: Risk Management«* *»2) Create an Open-Source Project in Python«* *»3) Build Three Real-World Python Applications«*
AC-conference, Rüsselsheim am Main (contribution: exercises) 10. 01. 2024	*»1) Data Ethics: Watching Out for Data Misuse«* *»2) Machine Learning with Python: Foundations«* *»3) Machine Learning with Python: k-Means Clustering«* *»4) Machine Learning with Python: Association Rules«* *»5) Investment Evaluation«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 08. 01. 2024	*»1) Choose the Right Tool for Your Data: Python, R, or SQL«* *»2) Advanced Business Development: Communication and Negotiation«* *»3) Developing Ethical Hacking Tools with Python«* *»4) Managing Your Personal Investments«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 07. 01. 2024	*»1) Web Scraping with Python«* *»2) Managing Your Personal Finances«* *»3) Finance Strategies for Business Leaders«* *»4) Foundations of Decentralized Finance (DeFi)«*
AC-conference (online course) (contribution: tests & exercises) 06. 01. 2024	*»1) Corporate Finance: Robust Financial Modeling«* *»2) Corporate Finance: Profitability in a Financial Downturn«* *»3) Economics for Everyone: Understanding a Recession«*

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AC-conference (online course)	06. 01. 2024: »*Using Python with Excel*« (contribution: exercise)
AC-conference (online course) (contribution: tests & exercises) 29. 12. 2023	»*1) Python Parallel and Concurrent Programming Part 2*« »*2) Python Functions for Data Science*« »*3) Nail Your Python Interview*« »*4) Python Data Analysis*« »*5) Using Python for Automation*«
AC-conference (online course) (contribution: exercises) 28. 12. 2023	»*1) NLP with Python for Machine Learning: Essential Training*« »*2) Building Tools with Python*«
AC-conference (online course) (contribution: exercises) 27. 12. 2023	»*1) NumPy Essential Training 1: Foundations of NumPy*« »*2) NumPy Essential Training 2: MatPlotlib and Linear Algebra Capabilities*«
AC-conference (online course)	26. 12. 2023: »*Advanced NLP with Python for ML*« (contribution: exercise)
AC-conference (online course)	24. 12. 2023: »*Python for Data Visualization*« (contribution: exercise)
AC-conference (online course) (contribution: tests & exercises) 23. 12. 2023	»*1) Python Parallel and Concurrent Programming Part 1*« »*2) More Python Tips, Tricks, and Techniques for Data Science*«
AC-conference, Rüsselsheim am Main (contribution: exercises) 22. 12. 2023	»*1) Coding Exercises: pandas*« »*2) Data Visualization in Python with Dash*« »*3) Data Visualizations with Plotly*« »*4) Python Data Science Mistakes to Avoid*« »*5) Rapid Application Development with Python*«
AC-conference, Rüsselsheim am Main	21. 12. 2023: »*Text Analytics and Predictions with Python*« (contribution: test)
AC-conference, Rüsselsheim am Main	20. 12. 2023: »*Faster Python Code*« (contribution: test & exercise)
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 19. 12. 2023	»*1) pandas Essential Training*« »*2) Python Data Structures and Algorithms*«
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 18. 12. 2023	»*1) Secure Coding in Python*« »*2) Test Automation with Python: Python for Testers*« »*3) Python for Algorithmic Thinking: Problem-Solving Skills*« »*4) Algorithmic Thinking with Python: Developing Problem-Solving Skills*« »*5) Data Ingestion with Python*«
AC-conference (online course) (contribution: tests & exercises) 17. 12. 2023	»*1) Advanced Python: Working with Databases*« »*2) Python Data Structures: Sets and Frozen Sets*« »*3) Python Data Structures: Power of Linked Lists for Technical Interviews*« »*4) Faster pandas*« »*5) Advanced Pandas*« »*6) Python for Data Science Tips, Tricks, & Techniques*«
AC-conference (online course) 16. 12. 2023	»*Advanced Python: Practical Database Examples*« (contribution: exercise)

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AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 15. 12. 2023	*»1) Effective Serialization with Python«* *»2) Developing Secure Software«* *»3) Multithreading mit Python«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 14. 12. 2023	*»1) Python: Programming Efficiently«* *»2) Python: Working with Files«*
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 11. 12. 2023	*»1) Python Data Structures: Trees«* *»2) Unit-Testing and Test Driven development in Python«* *»3) Processing Text with Python: Essential Training«*
AC-conference (online course) (contribution: tests & exercises) 10. 12. 2023	*»1) Python: Recursion«* *»2) Functional Programming with Python«*
AC-conference (online course) (contribution: tests & exercises) 09. 12. 2023	*»1) Programming Concepts for Python«* *»2) Unit Testing in Python«*
AC-conference, Rüsselsheim am Main (contribution: exercises) 07. 12. 2023	*»1) Python: Statistische Auswertungen«* *»2) Python für Systemadministratoren Grundkurs«*
AC-conference, Rüsselsheim am Main (contribution: exercises) 06. 12. 2023	*»1) 8 Things You Must Know in Python«* *»2) Python: Geometrische Berechnungen«*
AC-conference, Rüsselsheim am Main (contribution: tests) 04. 12. 2023	*»1) Python Data Structures: Dictionaries«* *»2) Python: Decorators«*
AC-conference (online course) (contribution: tests & exercises) 03. 12. 2023	*»1) Learning Selenium«* *»2) Level Up: Advanced Python«* *»3) Advanced Python: Working with Data«* *»4) GitHub Copilot First Look«* *»5) Learning AI with GitHub Copilot«*
AC-conference (online course)	02.12.2023: *»Python Object-Oriented Programming«* (contribution: test)
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 01. 12. 2023	*Essentials of MLOps with Azure:* *»1) Databricks MLflow and MLflow Tracking«* *»2) Spark MLflow Projects on Databricks«* *»3) Spark MLflow Models and Model Registry«*
AC-conference, Rüsselsheim am Main	30.11.2023: *»Reinforcement Learning Foundations«* (contribution: test)
AC-conference, Rüsselsheim am Main	29.11.2023: *»Managing Python Projects«* (contribution: exercise)
AC-conference, Rüsselsheim am Main (contribution: tests & exercises) 27. 11. 2023	*»1) Apache Spark Deep Learning: Essential Training«* *»2) Test Automation Foundations«* *»3) Test Automation with Python: 1 Introduction to Automated Testing«*

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AC-conference (online course) (contribution: tests) 26. 11. 2023	*»1) Python: Design Patterns«* *»2) Python: Advanced Design Patterns«* *»3) Advanced Design Patterns: Design Principles«*
AC-conference (online course) (contribution: exercises) 25. 11. 2023	*»1) Python Projects«* *»2) Python: Unit-Testing«* *»3) Python: Type Annotations«*
AC-conference, Rüsselsheim am Main (contribution: exrcises) 24. 11. 2023	*»1) Learning Hadoop«* *»2) Software Design: Modeling with UML«* *»3) Software Design: Developing Effective Requirements«*
AC-conference, Rüsselsheim am Main	21. 11. 2023: *»Programming Founations: Design Patterns«* (contribution: exercise)
AC-conference, Rüsselsheim am Main (contribution: tests) 20. 11. 2023	»1) Spark for ML and AI« »2) Fuzzy Logic«
AC-conference, Rüsselsheim am Main	16. 11. 2023: *»MongoDB essentials and Python«* (contribution: test)
AC-conference, Rüsselsheim am Main	30. 10. - 02. 11. 2023: *»SAS Programming Essentials 2«* (contribution: test)
AC-conference, Rüsselsheim am Main	09. 09. 2023: *»Github for Data Scientists«* (contribution: test)
AC-conference, Rüsselsheim am Main	31. 08. 2023: *»SAS Programming Essentials«* (contribution: test)
AC-conference, Rüsselsheim am Main	01. 06. 2023: *»SAP Business One Basics & SAP Production Planning«* (contribution: test)
AC-conference, Rüsselsheim am Main	30. 05. 2023: *»Develop your leadership philosophy«* (contribution: test)
AC-conference, Rüsselsheim am Main	07. 03. 2023: *»Power BI: Dashboards for Beginners«* (contribution: test)
AC-conference, Rüsselsheim am Main	07. 01. 2023: *»Strategic thinking and action for managers«* (contribution: test)
AC-conference, Rüsselsheim am Main	24. 11. 2022: *»Talent Framework Atlas Copco Course«* (contribution: test)