



JAIN
DEEMED-TO-BE UNIVERSITY

SCHOOL OF
COMPUTER
SCIENCE AND IT

**School of Computer Science and Information
Technology**

**Department of Computer Science and Information
Technology**

**Semester: VI
Specialisation: ARTIFICIAL INTELLIGENCE**

Subject: Predictive Analytics & Data Visualization

Activity 1

Subject Teacher: Dr. Boopathi Raja

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REPORT

1. Introduction to Predictive Modeling

Overview: This course provides a foundational understanding of predictive modeling techniques. Participants gain a deep understanding of how to analyse data patterns, make accurate predictions, and build models using advanced statistical and machine learning algorithms.

Key Skills Gained:

- **Understanding Predictive Models:** Develop a solid grasp of predictive modeling concepts, including linear regression, logistic regression, decision trees, and ensemble methods such as random forests and gradient boosting.
- **Data Preprocessing:** Acquire advanced skills in data cleaning, handling missing values, feature engineering, and preparing data for predictive analysis to ensure accurate model outputs.
- **Model Evaluation:** Gain proficiency in evaluating model performance using metrics like mean squared error, root mean squared error, F1 score, and receiver operating characteristic (ROC) curves. Learn to use cross-validation techniques for robust evaluation.
- **Practical Implementation:** Hands-on experience in implementing predictive models using popular libraries such as Python's Scikit-learn, TensorFlow, and R programming language.
- **Real-World Applications:** Learn through case studies that demonstrate predictive modeling applications in various domains such as finance, healthcare, marketing, and supply chain management. Develop the ability to frame and solve real-world business problems using predictive analytics.
- **Deployment of Models:** Understand how to deploy predictive models in production environments and monitor their performance over time.

2. Data Visualization with Plotly Express

Overview: This course emphasizes the art and science of creating meaningful and interactive visualizations using Plotly Express, a powerful Python-based data visualization library. The course enables

learners to convey complex data stories through compelling visual representations.

Key Skills Gained:

- **Introduction to Plotly Express:** Master the basic and advanced functionalities of Plotly Express, including creating line plots, scatter plots, bar charts, pie charts, histograms, and box plots.
- **Customizing Visualizations:** Enhance visualizations with detailed customization options, including adjusting color schemes, sizes, themes, labels, tooltips, and annotations to make visuals more insightful and aesthetically appealing.
- **Interactive Dashboards:** Design and implement interactive dashboards that enable users to dynamically interact with data visualizations by filtering, zooming, and hovering over data points.
- **Advanced Charting Techniques:** Learn advanced chart types such as choropleth maps, 3D plots, and network diagrams to visualize geographical and multidimensional data.
- **Data Insights:** Use visualization techniques to uncover trends, correlations, outliers, and patterns in large datasets effectively.
- **Integration and Presentation:** Integrate Plotly Express visualizations seamlessly into Jupyter Notebooks, web applications, and reports to create end-to-end data analytics workflows.
- **Best Practices in Visualization:** Learn to follow best practices for data visualization, including the ethical representation of data and avoiding misleading visualizations.

3. Data Visualization with OpenAI API: Generating Code with Generative AI

Overview: This course explores cutting-edge techniques for leveraging OpenAI's API to automate the generation of Python code for creating data visualizations. By combining the power of generative AI and data visualization tools, learners streamline the visualization process and boost productivity.

Key Skills Gained:

- **OpenAI API Utilization:** Develop proficiency in utilizing OpenAI's API to generate efficient Python code for various data visualization tasks, including chart creation, data preprocessing, and annotation.

- **Automation of Visualizations:** Learn to automate the creation of charts, graphs, and dashboards with minimal manual intervention, saving significant time in the data analysis process.
- **Custom Generative Models:** Understand how to craft precise prompts for the OpenAI API to customize generated visualizations based on specific dataset attributes, including creating tailored charts for unique business needs.
- **Hybrid Workflows:** Combine human creativity and AI-generated outputs to design innovative and effective visualizations that balance automation with manual refinement.
- **Error Handling and Refinement:** Acquire skills to debug and refine AI-generated code, ensuring visualizations meet high standards of accuracy and clarity. Learn to iteratively improve results by modifying prompts and fine-tuning code.
- **Enhanced Productivity:** Master the use of generative AI to accelerate coding tasks, allowing more focus on interpreting insights rather than manually coding visualization logic.
- **Case Studies and Applications:** Explore real-world examples of using OpenAI's API to generate visualizations for fields like finance, healthcare, education, and marketing. Understand how generative AI is transforming data analytics workflows.

Conclusion

These Coursera certification courses collectively provide a robust foundation for individuals aiming to excel in the domains of data science, artificial intelligence, and data visualization. The structured learning pathways not only equip learners with advanced technical skills but also nurture a holistic understanding of how to apply these skills effectively in real-world scenarios.

By mastering predictive modeling techniques, learners gain the ability to analyze complex datasets and derive actionable insights, which is critical for decision-making in industries ranging from healthcare to marketing. The hands-on experience in model implementation, evaluation, and deployment ensures readiness for tackling dynamic challenges in predictive analytics. Moreover, the inclusion of case studies enables participants to translate theoretical knowledge into practical problem-solving strategies, preparing them for leadership roles in data-driven domains.

The Plotly Express course emphasizes the art of storytelling through data visualization, which is vital in an era where the ability to convey insights

visually can determine the success of a project or business strategy. Interactive dashboards and customized visualizations empower professionals to engage stakeholders effectively, fostering better decision-making and communication. This skill set is particularly valuable for analysts, data scientists, and professionals aiming to bridge the gap between technical teams and business units.

The course on data visualization using OpenAI API represents the forefront of technological innovation. By harnessing generative AI to automate coding tasks, participants save time and resources while maintaining high-quality outputs. This capability is transformative, enabling learners to focus on interpreting results and generating creative solutions rather than being bogged down by manual coding. The exposure to AI-powered workflows prepares individuals to stay ahead in the rapidly evolving tech landscape, making them indispensable in forward-thinking organizations.

Furthermore, these courses foster critical soft skills such as problem-solving, adaptability, and collaboration. The emphasis on ethical data practices ensures that learners can navigate complex moral dilemmas associated with data usage, enhancing their reputation as responsible professionals.

In conclusion, these Coursera certifications are more than just technical training programs; they are gateways to professional growth and innovation. Graduates are not only equipped to handle today's data challenges but are also empowered to anticipate and adapt to future trends. Whether aiming for roles in data science, AI, or business analytics, the skills and knowledge gained from these courses position individuals as thought leaders and innovators in their respective fields. With the growing demand for data-driven decision-making across industries, these certifications provide a significant competitive edge, opening doors to impactful and fulfilling career opportunities.



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Jan 13, 2025

Pranshu Bhardwaj

has successfully completed

Introduction to Predictive Modeling

an online non-credit course authorized by University of Minnesota and offered through Coursera

De Liu
Professor
Information & Decision Sciences

COURSE
CERTIFICATE



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Jan 10, 2025

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Data Visualization with Plotly Express

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Snehan Kekre
Instructor
Machine Learning and Data Science

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Pranshu Bhardwaj

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Data Visualization with OpenAI API: Generate code with GenAI

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A handwritten signature in black ink, appearing to read "Ahmad", followed by a horizontal line.

Ahmad Varasteh
Data Mining and Machine Learning Instructor

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