Training Course on Sentiment Analysis and Opinion Mining (Advanced)

Professional Development Training Course Outline

Category	Data Science	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

This intensive training course provides a comprehensive exploration into **fine-grained sentiment analysis** and **aspect-based opinion mining**, equipping participants with advanced techniques to extract nuanced insights from unstructured text data. As digital interactions proliferate, understanding the subtle emotional undercurrents and specific product/service attributes driving public perception has become paramount. This program moves beyond basic positive/negative classification, delving into cutting-edge methodologies and practical applications for **enhanced customer understanding**, **brand reputation management**, and **data-driven strategic decision-making**.

Training Course on Sentiment Analysis & Opinion Mining (Advanced) is designed for professionals seeking to master the complexities of modern sentiment analysis, leveraging **Natural Language Processing (NLP)**, **Machine Learning (ML)**, and **Deep Learning (DL)**. Participants will gain hands-on experience with **real-world datasets** and **industry-standard tools**, developing the expertise to implement sophisticated sentiment models, identify **emotional triggers**, and uncover **actionable insights** for competitive advantage. This course is essential for anyone aiming to transform raw textual data into a powerful asset for business growth and innovation in today's **AI-driven landscape**.

Programme Curriculum

Training Course on Sentiment Analysis & Opinion Mining (Advanced)

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Course Duration

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Course Objectives

1. Master Fine-Grained Sentiment Classification across diverse text modalities.
2. Implement Aspect-Based Sentiment Extraction for granular opinion insights.
3. Apply Deep Learning Architectures (e.g., Transformers, LSTMs) for advanced sentiment modeling.
4. Develop expertise in Emotion Detection and Affective Computing beyond polarity.
5. Utilize Contextual Embeddings (e.g., BERT, GPT) for nuanced text understanding.
6. Perform Cross-Lingual Sentiment Analysis to analyze global feedback.
7. Conduct Sentiment Lexicon Expansion and domain-specific adaptation.
8. Identify Sarcasm and Irony Detection techniques in textual data.
9. Integrate Real-time Sentiment Monitoring for proactive insights.
10. Evaluate and optimize Sentiment Model Performance using advanced metrics.
11. Explore Ethical Considerations and Bias Mitigation in sentiment AI.
12. Apply sentiment analysis to Social Media Listening and brand health.
13. Leverage Explainable AI (XAI) for interpreting sentiment predictions.

Organizational Benefits

- Gain a deeper, more granular understanding of customer preferences, pain points, and overall satisfaction across products, services, and brand interactions.
- Swiftly identify and mitigate negative sentiment trends or potential PR crises by monitoring real-time discussions and customer feedback.
- Inform product roadmaps and feature prioritization by analyzing specific aspects customers love or dislike, leading to user-centric innovations.
- Tailor marketing messages and sales pitches based on audience sentiment, leading to higher engagement and conversion rates.
- Benchmark brand sentiment against competitors, identify market gaps, and uncover opportunities for differentiation and strategic advantage.
- Equip leadership with actionable insights derived from vast amounts of unstructured text data, enabling more informed and agile business decisions.
- Automate the categorization of customer support queries, prioritize urgent issues, and improve response times based on sentiment and emotion.
- Identify potential compliance issues or fraudulent activities through sentiment analysis of internal communications or public forums.

- By addressing customer concerns effectively and delivering on expectations identified through sentiment analysis, organizations can foster stronger relationships and drive repeat business.

Target Audience

1. Data Scientists & Analysts
2. Machine Learning Engineers
3. Product Managers
4. Marketing & Brand Managers
5. Customer Experience (CX) Professionals
6. Business Intelligence (BI) Analysts
7. Researchers & Academics
8. Software Developers

Course Outline

Module 1: Foundations of Advanced Sentiment Analysis

- Beyond Polarity: Understanding Fine-Grained, Emotion, and Aspect-Based Sentiment.
- The Role of NLP, ML, and Deep Learning in Modern Sentiment Analysis.
- Challenges in Sentiment Analysis: Ambiguity, Context, Sarcasm, and Negation.
- Data Preprocessing for Advanced Sentiment Tasks: Tokenization, Embeddings, Dependency Parsing.
- Ethical Considerations: Bias in data, privacy, and responsible AI deployment.
- **Case Study:** Analyzing Twitter feeds for public sentiment on a new product launch, identifying subtle negative emotions beyond simple "negative" classification.

Module 2: Fine-Grained Sentiment Classification

- Multi-class and Ordinal Classification for sentiment scores (e.g., 5-point scale).
- Supervised Learning Models: SVMs, Logistic Regression, Random Forests for fine-grained tasks.
- Feature Engineering for Fine-Grained Sentiment: N-grams, TF-IDF, Linguistic Features.
- Evaluation Metrics for Multi-Class Classification: Precision, Recall, F1-Score, Confusion Matrix.
- Handling Imbalanced Datasets in Fine-Grained Sentiment.
- **Case Study:** Classifying movie reviews on a scale from "strongly negative" to "strongly positive" to better understand audience reception and influence.

Module 3: Introduction to Aspect-Based Sentiment Analysis (ABSA)

- Defining Aspects and Opinion Terms: Entity-level vs. Aspect-level sentiment.
- Key Challenges in ABSA: Aspect Extraction, Opinion Term Extraction, Aspect-Sentiment Pair Identification.
- Rule-Based vs. Machine Learning Approaches for ABSA.
- Dependency Parsing and Syntactic Analysis for Aspect-Opinion Relations.
- Evaluation Metrics for ABSA: Accuracy of aspect detection and sentiment assignment.
- **Case Study:** Deconstructing restaurant reviews to identify sentiment towards specific aspects like "food quality," "service," and "ambiance."

Module 4: Deep Learning for Sentiment Analysis (Part 1: Recurrent Neural Networks)

- Introduction to Neural Networks and Deep Learning Fundamentals.

- Recurrent Neural Networks (RNNs) and their application in sequential data.
- Long Short-Term Memory (LSTM) and Gated Recurrent Units (GRU) for capturing long-range dependencies.
- Bidirectional LSTMs for contextual understanding.
- Building and Training Sentiment Models with LSTMs in Keras/TensorFlow.
- **Case Study:** Using LSTMs to analyze customer support chat logs for evolving sentiment during a conversation.

Module 5: Deep Learning for Sentiment Analysis (Part 2: Convolutional Neural Networks)

- Convolutional Neural Networks (CNNs) for text classification.
- Filter sizes, pooling layers, and feature maps in text CNNs.
- Applications of CNNs for short text sentiment analysis.
- Combining CNNs and RNNs for robust sentiment models.
- Hyperparameter tuning for deep learning sentiment models.
- **Case Study:** Applying CNNs to analyze short-form social media comments (e.g., tweets) for rapid sentiment identification.

Module 6: Transformer Models and Contextual Embeddings

- The Attention Mechanism and its role in modern NLP.
- Introduction to Transformer Architecture (Encoder-Decoder).
- Pre-trained Language Models: BERT, RoBERTa, XLNet, GPT for sentiment tasks.
- Fine-tuning Transformer models for specific sentiment datasets.
- Zero-shot and Few-shot learning with large language models for sentiment.
- **Case Study:** Leveraging a fine-tuned BERT model to analyze complex legal documents for specific sentiment towards clauses or entities.

Module 7: Advanced Aspect Extraction Techniques

- Supervised Aspect Extraction: CRF, Bi-LSTM-CRF models.
- Unsupervised Aspect Extraction: Topic Modeling (LDA, NMF) for aspect discovery.
- Joint Aspect and Sentiment Modeling.
- Graph Neural Networks for aspect-relation extraction.
- Handling Implicit Aspects and Co-reference Resolution.
- **Case Study:** Automatically identifying key features and their associated sentiments from a large corpus of product reviews for an electronics company.

Module 8: Opinion Lexicon Expansion and Domain Adaptation

- Building domain-specific sentiment lexicons.
- Semi-supervised and Bootstrapping methods for lexicon expansion.
- Transfer Learning for sentiment analysis across domains.
- Active Learning strategies for efficient data labeling.
- Addressing data scarcity in niche domains.
- **Case Study:** Adapting a general sentiment model to accurately analyze medical patient feedback, requiring a specialized lexicon.

Module 9: Emotion Detection and Affective Computing

- Distinguishing Sentiment Polarity from Specific Emotions (e.g., joy, anger, sadness, fear).
- Emotion Lexicons and Rule-Based Emotion Detection.
- Machine Learning and Deep Learning for Emotion Classification.

- Multi-modal Emotion Recognition (text, facial expressions, tone of voice - theoretical overview).
- Applications in Customer Service and Mental Health.
- **Case Study:** Analyzing call center transcripts to detect customer frustration levels and automatically escalate high-priority emotional responses.

Module 10: Sarcasm, Irony, and Implicit Sentiment Detection

- Challenges in identifying non-literal language.
- Linguistic features and contextual cues for sarcasm detection.
- Machine Learning approaches for irony and sarcasm.
- Deep Learning models for nuanced sentiment interpretation.
- Handling negation and intensifiers in sentiment analysis.
- **Case Study:** Developing a model to correctly interpret sarcastic remarks in online product reviews to avoid misclassifying negative feedback as positive.

Module 11: Real-time Sentiment Monitoring and Visualization

- Architectures for real-time sentiment analysis pipelines (e.g., Kafka, Spark Streaming).
- Streaming data processing for continuous sentiment insights.
- Developing interactive dashboards for sentiment visualization (e.g., Tableau, Power BI, custom tools).
- Alerting mechanisms for significant sentiment shifts or anomalies.
- Integrating sentiment analysis with business intelligence tools.
- **Case Study:** Setting up a real-time social media monitoring system to track brand sentiment during a major marketing campaign or crisis.

Module 12: Advanced Evaluation and Model Deployment

- Beyond Accuracy: F-score, ROC-AUC, PR-Curves for imbalanced datasets.
- Cross-validation and robust testing strategies.
- Model Interpretability: SHAP, LIME for understanding sentiment predictions.
- Deployment strategies: APIs, containerization (Docker), cloud platforms (AWS, Azure, GCP).
- Monitoring model performance in production and retraining strategies.
- **Case Study:** Deploying a fine-grained sentiment model for customer feedback on a cloud platform, ensuring scalability and continuous monitoring.

Module 13: Sentiment Analysis for Specific Applications

- Product Review Analysis: Extracting insights for product improvement.
- Social Media Listening: Brand health, public opinion, trend analysis.
- Customer Service Analytics: Improving agent performance and customer satisfaction.
- Financial Market Sentiment: Predicting stock trends (introductory).
- Political Sentiment Analysis: Understanding public opinion on policies or candidates.
- **Case Study:** Analyzing large volumes of online product reviews to identify common customer complaints and praises, informing the next product iteration.

Module 14: Ethical AI, Bias, and Fairness in Sentiment Analysis

- Sources of bias in sentiment datasets and models.
- Detecting and mitigating bias in sentiment predictions.
- Fairness metrics and their application to sentiment models.
- Privacy concerns related to analyzing personal opinions.

- Responsible AI principles for sentiment analysis implementation.
- **Case Study:** Examining a sentiment model for potential gender or racial bias in its predictions and implementing strategies to improve fairness.

Module 15: Future Trends and Advanced Research in Sentiment Analysis

- Multimodal Sentiment Analysis: Combining text, image, and audio cues.
- Generative AI for Sentiment-aware text generation.
- Explainable AI (XAI) in advanced sentiment models.
- Few-shot and Zero-shot learning advancements.
- The convergence of Sentiment Analysis with Knowledge Graphs and Semantic Web.
- **Case Study:** Exploring a research paper on multimodal sentiment analysis for understanding user engagement with video content.

Training Methodology

This course adopts a highly interactive and hands-on training methodology, designed to ensure practical skill acquisition and deep conceptual understanding.

- **Lectures & Discussions:** Engaging theoretical sessions covering core concepts, algorithms, and advanced architectures.
- **Live Coding Demonstrations:** Step-by-step implementation of GANs using Python with popular deep learning frameworks (TensorFlow 2.x and Keras, or PyTorch).
- **Hands-on Labs & Exercises:** Practical coding sessions where participants build, train, and experiment with various GAN models on real datasets.
- **Case Study Analysis:** In-depth examination of real-world GAN applications across diverse industries, highlighting success stories and challenges.
- **Project-Based Learning:** A significant portion of the course will be dedicated to a capstone project, allowing participants to apply learned concepts to a practical problem.
- **Interactive Q&A:** Continuous opportunities for questions and discussions to clarify doubts and foster a collaborative learning environment.
- **Upcoming Scheduled Sessions**

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Physical	$12,000

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