Exhaustive Technical Skillset for a Machine Learning Engineer:

**1. Foundational Mathematics & Statistics:**

* **Linear Algebra:** Eigenvalues, eigenvectors, matrix operations, dimensionality reduction
* **Probability Theory:** Random variables, distributions, conditional probability, Bayes' theorem
* **Calculus:** Differentiation, integration, optimization techniques
* **Statistics:** Hypothesis testing, regression analysis, statistical learning theory

**2. Programming Languages & Frameworks:**

* **Python:** Primary language for ML, libraries like NumPy, Pandas, Scikit-learn, TensorFlow, PyTorch
* **R (optional):** Popular for statistical analysis and data visualization
* **Familiarity with other languages:** C++, Java, Julia (beneficial for specific tasks)

**3. Machine Learning Algorithms & Techniques:**

* **Supervised Learning:** Linear Regression, Logistic Regression, Decision Trees, Support Vector Machines, Ensemble Methods (Random Forest, Gradient Boosting)
* **Unsupervised Learning:** Principal Component Analysis (PCA), K-means Clustering, Anomaly Detection
* **Deep Learning:** Neural Networks, Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), Transformers
* **Model Optimization & Evaluation:** Hyperparameter tuning, cross-validation, metrics like accuracy, precision, recall, F1 score

**4. Data Wrangling & Engineering:**

* **Data Cleaning & Preprocessing:** Handling missing values, outliers, scaling, feature engineering
* **Data Acquisition & Storage:** APIs, web scraping, databases (e.g., SQL)
* **Big Data Processing Tools:** Hadoop, Spark (basic understanding)

**5. Distributed Computing & Cloud Platforms:**

* **Familiarity with cloud platforms:** AWS, Azure, GCP, for GPU access, scaling, and deployment
* **Parallel & Distributed Processing Libraries:** TensorFlow Distributed, PyTorch Lightning

**6. Software Engineering & Version Control:**

* **Object-oriented programming principles**
* **Git and other version control systems**
* **Basic software development practices**

**7. Communication & Collaboration:**

* **Effectively communicate complex technical concepts to non-technical audiences**
* **Collaborate with data scientists, engineers, and other stakeholders**
* **Documentation and reporting skills**

**8. Additional Skills (optional but beneficial):**

* **Natural Language Processing (NLP)**
* **Computer Vision**
* **Reinforcement Learning**
* **Machine Learning Explainability (MLX)**

## Training & Learning Resources:

* **Online Courses:**
  + **Coursera:** "Google Cloud AI Platform Specialization," "Deep Learning Specialization"
  + **edX:** "MITx MicroMasters Program in Data Science and Analytics"
  + **Udacity:** "Nanodegree in Artificial Intelligence"
* **Books:**
  + "Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow" by Aurélien Géron
  + "Deep Learning" by Ian Goodfellow, Yoshua Bengio, and Aaron Courville
  + "Probabilistic Programming and Bayesian Methods for Hackers" by Camron C. Anderson
* **Websites & Blogs:**
  + Machine Learning subreddit: <https://www.reddit.com/r/MachineLearning/>
  + Kaggle: <https://www.kaggle.com/>
  + Google AI Blog: <https://blog.research.google/>
  + Lex Fridman Podcast: <https://lexfridman.com/podcast/>
* **Competitions & Hackathons:**
  + Kaggle competitions: <https://www.kaggle.com/competitions>
  + Hackerearth: <https://www.hackerearth.com/>
  + AI for Good Global Summit: <https://aiforgood.itu.int/>

**Remember:**

* The specific skills required may vary depending on your role and industry.
* Continuously learn and stay updated with the fast-paced field of ML.
* Build a strong portfolio of projects to showcase your skills.
* Network and connect with other ML professionals.

I hope this exhaustive list helps you on your journey to becoming a successful Machine Learning Engineer!