Slide 1:  
Hello, I’m Pablo Tejeda, and today I’ll be introducing you to Artificial Intelligence and Machine Learning. We’ll cover the basics of AI, explore different types of machine learning models, and look at how these technologies are applied in the real world. I’ll also demonstrate a simple C++ example of linear regression to show how machine learning can be used to make predictions. Let’s dive in!  
  
Slide 2:  
Artificial Intelligence, or AI, refers to creating machines that can perform tasks requiring human-like intelligence, like problem-solving or decision-making. Machine Learning, a subset of AI, focuses on teaching machines to learn from data and improve over time without explicit programming. Simply put, AI is about creating intelligent systems, and Machine Learning is about helping systems learn from data.

Slide 3:  
Machine Learning is often categorized into three main types: supervised, unsupervised, and reinforcement learning. In supervised learning, we train the model using labeled data, where the system learns to predict an output based on input-output pairs. This is commonly used for tasks like image recognition or spam detection. Unsupervised learning deals with unlabeled data, where the model finds patterns or clusters on its own without specific guidance. It’s useful in areas like customer segmentation or anomaly detection. Finally, reinforcement learning is based on a reward-punishment system. The model learns to make decisions by performing actions in an environment and receiving feedback. This type is often used in robotics and gaming. Each type of machine learning has its own unique applications and strengths, helping us solve a variety of complex problems.

Slide 4:   
AI and Machine Learning are transforming many fields. In healthcare, they support disease diagnosis, drug discovery, and personalized patient care. In e-commerce and marketing, machine learning powers product recommendations and targeted advertising, enhancing customer experience and engagement. For autonomous vehicles, AI enables self-driving technologies by processing real-time data for safe navigation. In finance and banking, it’s widely used for fraud detection and automated trading, helping ensure security and efficiency. Finally, in natural language processing, AI is behind chatbots and voice assistants, making interactions more intuitive and accessible. These applications show just how versatile and impactful AI technologies have become.

Slide 5:  
As AI continues to grow, it brings with it several ethical concerns and challenges. One key concern is privacy. AI systems often rely on large amounts of personal data, raising questions about how this data is collected, stored, and used. Bias and fairness are also significant issues. AI models can unintentionally reflect biases present in the data they’re trained on, leading to unfair treatment in areas like hiring or law enforcement. Another challenge is transparency. Many AI algorithms are complex, making it difficult to explain how they reach their decisions—often called the 'black box' problem. In addition, we need to consider job displacement. Automation through AI has the potential to replace certain jobs, which could impact employment in various sectors. Finally, there’s the question of responsibility. As AI makes more autonomous decisions, we need clear guidelines on accountability if something goes wrong. Addressing these ethical and practical challenges is crucial for responsible AI development and use.

Slide 6:  
Artificial Intelligence is evolving rapidly, shaping the future in both exciting and challenging ways. AI will likely integrate more deeply into our daily lives, revolutionizing industries like healthcare with advancements such as personalized medicine and tailored treatments. The emphasis will increasingly shift towards ethical AI development, ensuring fairness, transparency, and accountability to address biases and prevent misuse. The future of AI isn’t about replacing humans but amplifying human potential through collaboration. AI tools will empower us to solve problems that were once considered unsolvable. On the technical side, overcoming challenges like improving AI’s energy efficiency and creating systems that are easier to understand will be essential. Quantum computing may also unlock entirely new possibilities, enabling AI to process data at unprecedented speeds. To shape this future positively, we must invest in education, research, and policies that promote ethical and innovative AI development. The journey ahead is full of possibilities, and it’s up to us to guide this transformative technology responsibly.

Slide 7:  
Let me demonstrate a basic implementation of linear regression using C++ code. Linear regression is a fundamental machine learning algorithm that finds the best-fit line through a set of data points. It works by minimizing the error between the predicted values and the actual data. In this demonstration, the code begins with a dataset of input values representing hours of study and corresponding test scores. We use gradient descent to adjust the slope and intercept of the line iteratively, aiming to reduce the mean squared error. The Visual Studio code window shows the implementation, which includes functions to calculate the error, update parameters using gradient descent, and output the final model. After running the program, we can see how the model predicts a test score based on a given number of study hours. Let’s switch to the code and walk through how it works before running it to see the output in action.:

Visual Studio:  
Show Visual Studio Code:  
This is our simple linear regression implementation in C++ using Visual Studio.  
At the top of the program, I’ve defined the dataset. The x vector contains the input values, representing hours of study, while the y vector contains the output values, representing test scores.  
The gradientDescent function is the core of this program. It updates the slope and intercept of the line by iterating over the dataset, minimizing the error with each step.  
We calculate the error using the meanSquaredError function, which helps ensure the model is improving as it trains.  
In the main function, we initialize the model parameters, train the model over 1000 iterations, and finally make a prediction for a test case of 6 hours of study.  
  
Run the Code in Visual Studio:  
Now let’s run the program to see how it works.  
As the program runs, you’ll notice the error output at regular intervals, showing the progress of the training process.  
Once training is complete, the program outputs the final model in the form of y = m \* x + b.  
It then makes a prediction for 6 hours of study, providing us with a test score based on the trained model.  
  
Show Code Output:  
The console shows the error decreasing during training, demonstrating how the model converges to the best-fit line.  
Here’s the final model, with the calculated slope and intercept, and the prediction for 6 hours of study displayed as the final output.

Slide 8:  
To summarize, this demonstration showcased how linear regression works in practice using a simple C++ program. We started with a dataset representing hours of study and test scores, then trained a linear model using gradient descent. Over time, the error decreased, allowing the model to improve its accuracy. The final output was a model that could predict a test score based on new input data, like predicting the score for 6 hours of study. This demonstration underscores how machine learning takes raw data, applies mathematical optimization, and produces actionable insights, a concept central to AI applications across industries.

Slide 9:  
To conclude, artificial intelligence and machine learning are driving innovation across diverse fields, from healthcare and autonomous vehicles to finance and natural language processing. Throughout this presentation, we explored the types of machine learning, real-world applications, ethical considerations, and the exciting future ahead. The linear regression demonstration further emphasized how AI turns raw data into predictions through mathematical optimization. Key takeaways include recognizing the transformative potential of AI, the ethical responsibilities it entails, and the importance of continual learning as the field evolves.

Slide 10:  
Thank you for taking the time to watch my presentation on Artificial Intelligence and Machine Learning. I hope you found it informative and engaging. If you have any questions or would like to discuss them further, please feel free to reach out to me. I appreciate your attention and participation, and I look forward to any feedback or discussions you may have.