<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<title>Predicting Exercise Quality Using Machine Learning</title>

<style>

body {

font-family: Arial, sans-serif;

line-height: 1.6;

margin: 20px;

background-color: #f4f4f4;

}

h1, h2 {

color: #333;

}

code {

background-color: #ddd;

padding: 2px 5px;

border-radius: 4px;

}

pre {

background: #eee;

padding: 10px;

border-radius: 5px;

overflow-x: auto;

}

a {

color: #1a0dab;

text-decoration: none;

}

a:hover {

text-decoration: underline;

}

</style>

</head>

<body>

<h1>Predicting Exercise Quality Using Machine Learning</h1>

<p><strong>Description:</strong></p>

<p>This project aims to predict the quality of exercise movements using data from accelerometers placed on the belt, forearm, arm, and dumbbell of six participants. The participants performed barbell lifts correctly and incorrectly in five different ways.</p>

<h2>📂 Project Structure</h2>

<ul>

<li><code>pml-training.csv</code> - Training dataset</li>

<li><code>pml-testing.csv</code> - Testing dataset</li>

<li><code>analysis.Rmd</code> - R Markdown file containing data analysis</li>

<li><code>analysis.html</code> - Compiled HTML report of the analysis</li>

<li><code>README.md</code> - Project documentation</li>

</ul>

<h2>🔍 Methodology</h2>

<p>The main steps in this project include:</p>

<ol>

<li>Data cleaning and exploration.</li>

<li>Feature selection to identify important variables.</li>

<li>Choosing a machine learning model (Random Forest was selected for its robustness in classification tasks).</li>

<li>Training the model using cross-validation techniques.</li>

<li>Evaluating model performance and making predictions on the test dataset.</li>

</ol>

<h2>📊 Results</h2>

<p>The model demonstrated high accuracy in predicting exercise quality. Cross-validation was employed to estimate out-of-sample error, ensuring the model's generalizability.</p>

<h2>💻 How to Run the Project</h2>

<pre><code># Install necessary packages

install.packages(c("caret", "randomForest", "ggplot2"))

# Run the analysis script

source("analysis.R")

</code></pre>

<h2>📜 License</h2>

<p>This project utilizes datasets from the <a href="http://groupware.les.inf.puc-rio.br/har" target="\_blank">Puc-Rio Groupware</a>. If you use this project, please provide appropriate references.</p>

<h2>📢 Contributions</h2>

<p>Contributions are welcome! If you'd like to improve this project, feel free to fork the repository, make your changes, and submit a pull request. You can also open an issue to discuss any improvements or bugs.</p>

<h2>🔗 Data Sources</h2>

<ul>

<li><a href="https://d396qusza40orc.cloudfront.net/predmachlearn/pml-training.csv" target="\_blank">Training dataset</a></li>

<li><a href="https://d396qusza40orc.cloudfront.net/predmachlearn/pml-testing.csv" target="\_blank">Testing dataset</a></li>

</ul>

</body>

</html>