Internship Project

BITCOIN PRICE PREDICTION MODEL

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OUTLINE

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PROBLEM STATEMENT

Example:

Bitcoin uses Blockchain, a peer-to-peer technology, to operate with no central authority or banks; managing transactions and the issuing of bitcoins is carried out collectively by the network. Bitcoin is open-source; its design is public, nobody owns or controls Bitcoin, and everyone can take part. Due to its decentralized nature, predicting Bitcoin's price is complex, influenced by various factors such as market demand, regulatory news, and technological developments. Additionally, the volatility of Bitcoin's market, driven by investor sentiment and global events, makes accurate price forecasting a challenging task.

PROPOSED SOLUTION

The proposed system aims to address the challenge of predicting Bitcoin prices by leveraging data analytics and machine learning techniques to forecast market trends accurately. The solution will consist of the following components:

❖ **Data Collection:**

- Gather historical data on Bitcoin prices, including time, date, trading volume, and other relevant factors.
- Utilize real-time data sources, such as market news, social media sentiment, and global economic indicators, to enhance prediction accuracy.

❖ **Data Preprocessing:**

- Clean and preprocess the collected data to handle missing values, outliers, and inconsistencies.
- Feature engineering to extract relevant features from the data that might impact Bitcoin price movements.

❖ **Machine Learning Algorithm:**

- Implement machine learning algorithms, such as Linear Regression and Decision Tree Regressor models, to predict Bitcoin prices based on historical and real-time data.
- Incorporate additional factors like market sentiment, regulatory announcements, and technological developments to improve prediction accuracy.

PROPOSED SOLUTION

❖ **Deployment:**

- Develop a user-friendly interface or application that provides real-time predictions for Bitcoin prices, allowing users to make informed trading decisions.
- Deploy the solution on a scalable and reliable platform, considering factors like server infrastructure, response time, and user accessibility.

❖ **Evaluation:**

- Assess the model's performance using appropriate metrics such as Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE).
- Fine-tune the model based on feedback and continuous monitoring of prediction accuracy, ensuring it adapts to changing market conditions.

SYSTEM APPROACH

The "System Approach" section outlines the overall strategy and methodology for developing and implementing the bitcoin price prediction system. Here's a suggested structure for this section:

❖ System Requirements:

➢ Hardware Requirements:

- **Processor:** Multi-core CPU (Intel i5/i7 or equivalent) or GPU (NVIDIA for accelerated training).
- **Memory (RAM):** Minimum 8 GB, recommended 16 GB or higher for handling large datasets and running multiple pipelines.
- **Storage:** Minimum 50 GB free space for data storage and processing.
- **Network:** Stable internet connection for real-time data fetching and cloud deployment.

➢ Software Requirements:

- **Operating System:** Windows, macOS, or Linux.
- **Python Version**: Python 3.7 or higher.
- **Integrated Development Environment (IDE):** Jupyter Notebook, VS Code, or PyCharm.
- **Cloud Platform:** IBM Watson Studio for model training and deployment.

SYSTEM APPROACH

- **Library required to build the model:**
  - **Data Collection and Preprocessing:**
    - pandas: For data manipulation and analysis.
    - numpy: For numerical computations and handling arrays**.**
  - **Machine Learning and Model Development:**
    - scikit-learn: For implementing machine learning models, including Linear Regression and Decision Tree Regressor.
    - statsmodels: For statistical analysis and time series modeling.
  - **Data Visualization:**
    - matplotlib: For creating static plots and visualizing data.
  - **Deployment and Monitoring:**
    - ibm-watson-machine-learning: For deploying models on IBM Watson Studio.
  - **Evaluation:**
    - sklearn.metrics: For calculating performance metrics such as MAE and RMSE.

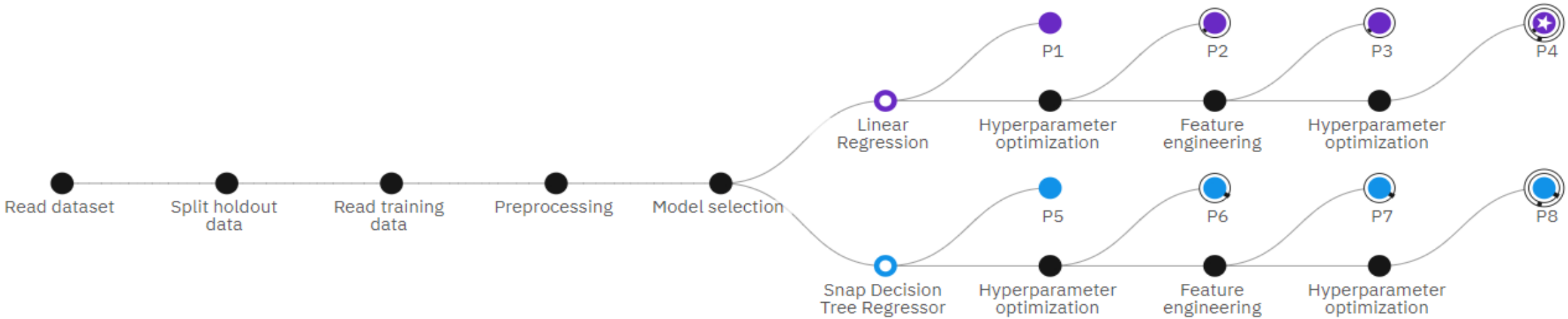
ALGORITHM & DEPLOYMENT

In the Algorithm section, describe the machine learning algorithm chosen for predicting bitcoin price. Here's an example structure for this section:

- **Algorithm Selection:**
  - The Bitcoin Price Prediction model employs both Linear Regression and Snap Decision Tree Regressor algorithms.
- **Data Input:**
  - The input features used by these algorithms include historical Bitcoin price data, trading volumes, and market sentiment indicators
- **Training Process:**
  - The algorithms are trained using historical Bitcoin price data. The dataset is split into training and validation sets to evaluate the model's performance.
- **Prediction Process:**
  - Once trained, the models predict future Bitcoin prices based on the input features. Real-time data inputs, such as current market trends and news, are integrated into the prediction process to update the forecasts continuously.

RESULT

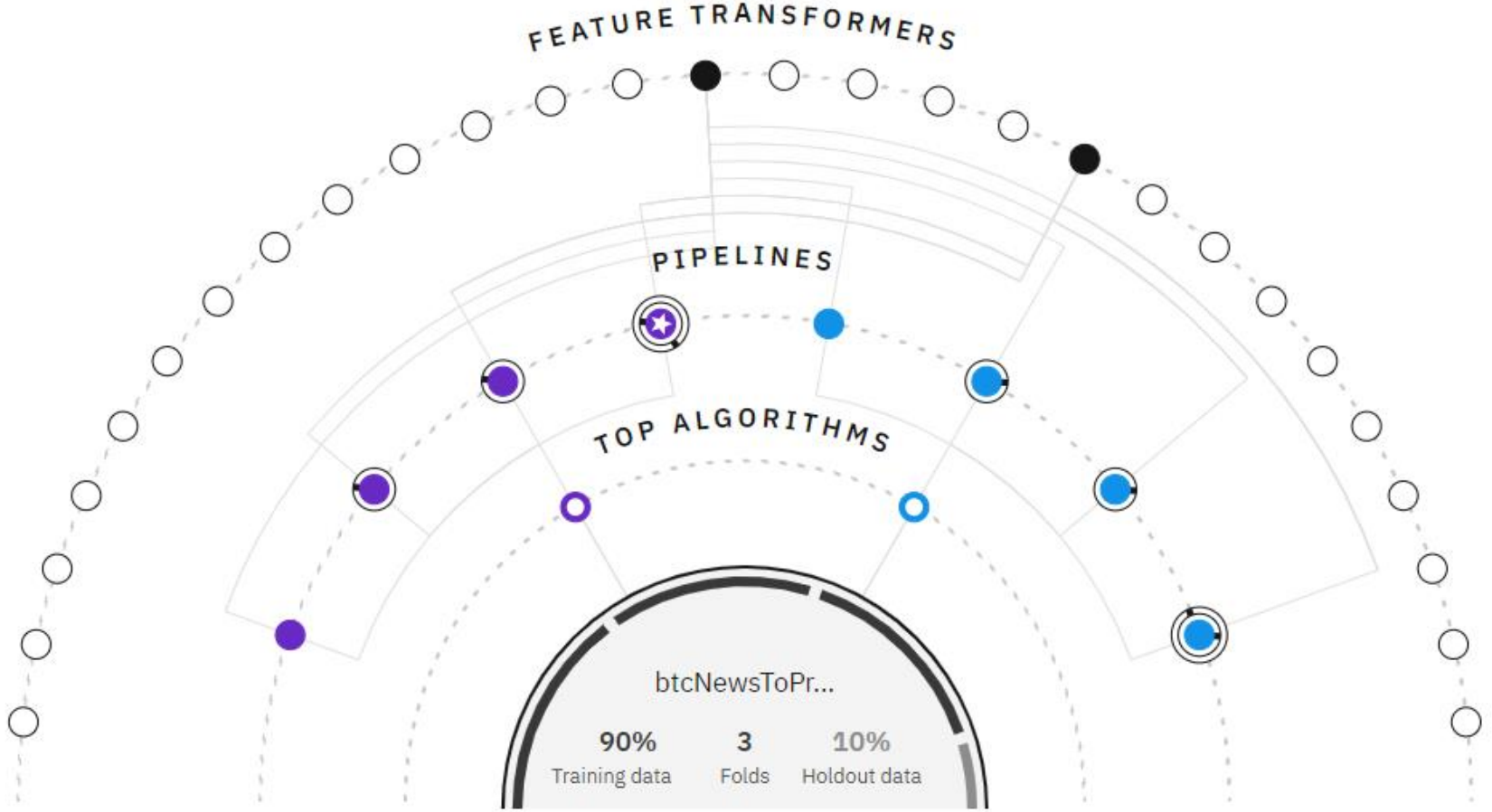
Progress map
Prediction column: price



RESULT

Relationship map

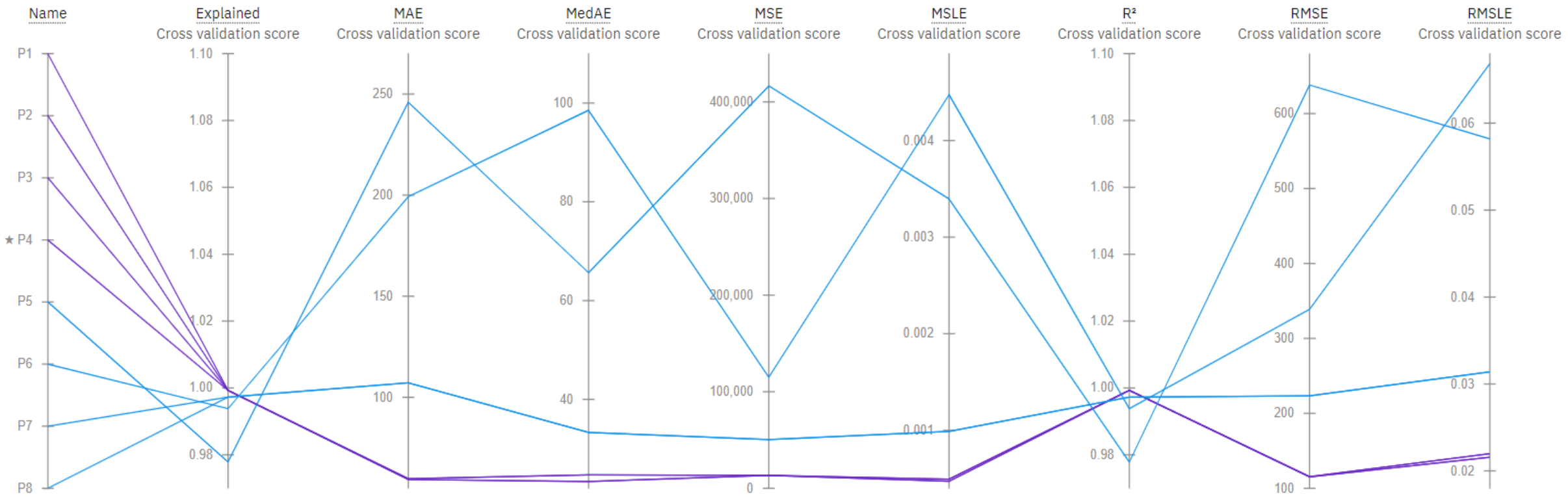
Prediction column: price



RESULT

Metric chart

Prediction column: price



RESULT

Pipeline details

Pipeline 4

Rank	RMSE (Optimized)	Algorithm	Enhancements
1	107.117 (Holdout)	Linear Regression	TFE HPO-1 +2

Save as

Model viewer

Model information

Feature summary

Evaluation

Model evaluation

Feature name	Transformation	Feature importance
low	None	83.95%
high	None	14.73%
open	None	1.11%
NewFeature_10	pca(ALL)[118]	0.01%
NewTextFeature_117	word2vec(top_5)[117]	0.01%
NewTextFeature_64	word2vec(top_3)[64]	0.01%
NewTextFeature_43	word2vec(top_2)[43]	0.01%
NewTextFeature_167	word2vec(top_8)[167]	0.01%

RESULT

Model evaluation measure

Measures	Holdout score	Cross validation score
Root mean squared error	107.117	115.299
R squared	0.999	0.999
Explained variance	0.999	0.999
Mean squared error	11473.967	13311.205
Mean squared log error	0.001	0.000
Mean absolute error	58.460	59.383
Median absolute error	28.900	23.386

CONCLUSION

- Predicting Bitcoin prices remains a complex challenge due to the cryptocurrency market's inherent volatility and the multitude of factors influencing price movements. This study aimed to develop a robust prediction model by combining **Linear Regression** and **Snap Decision Tree Regressor** pipelines. While the model has demonstrated potential in capturing certain price trends, it is evident that accurately forecasting Bitcoin prices requires a multifaceted approach.
- The model’s performance is influenced by various factors, including data quality, feature engineering, and the selection of appropriate machine learning algorithms. While the chosen methodologies have provided valuable insights, further research is necessary to enhance predictive accuracy. Incorporating additional relevant features, such as sentiment analysis, social media data, and macroeconomic indicators, could potentially improve the model’s performance.
- It is essential to acknowledge that Bitcoin prices are driven by a complex interplay of factors, including market sentiment, regulatory changes, technological advancements, and economic conditions. As such, no single model can guarantee accurate predictions with absolute certainty. The model presented in this study should be considered as a tool for analysis and potential support in decision-making rather than a definitive predictor of future price movements.
- Continuous monitoring, evaluation, and refinement of the model are crucial to adapt to the evolving cryptocurrency market landscape. By combining the model’s insights with expert analysis and risk management strategies, investors and traders can make more informed decisions.

FUTURE SCOPE

The Bitcoin price prediction model presented in this study serves as a foundation for further research and development. Several avenues for future exploration can be identified:

- **Incorporation of Alternative Data:** Expanding the feature set to include alternative data sources, such as social media sentiment, news analytics, and economic indicators, can potentially improve prediction accuracy.
- **Advanced Machine Learning Techniques:** Experimenting with more sophisticated machine learning algorithms, including deep learning models like Long Short-Term Memory (LSTM) and Recurrent Neural Networks (RNN), could capture complex patterns in Bitcoin price data.
- **Ensemble Modeling:** Combining multiple models, such as the proposed Linear Regression and Snap Decision Tree Regressor pipelines, through ensemble techniques can potentially enhance predictive performance.
- **Dynamic Model Updates:** Implementing mechanisms to regularly retrain and update the model with new data can help adapt to changing market conditions and improve prediction accuracy over time.
- **Risk Assessment:** Developing tools to quantify prediction uncertainty and assess potential risks associated with different price scenarios can provide valuable insights for investors and traders.
- **Explainable AI:** Enhancing the model's interpretability through explainable AI techniques can help understand the factors driving price predictions and build trust in the model's outcomes.

REFERENCES

- Github : https://github.com/Ayushnema704/Bitcoin_Price_Predictor.git

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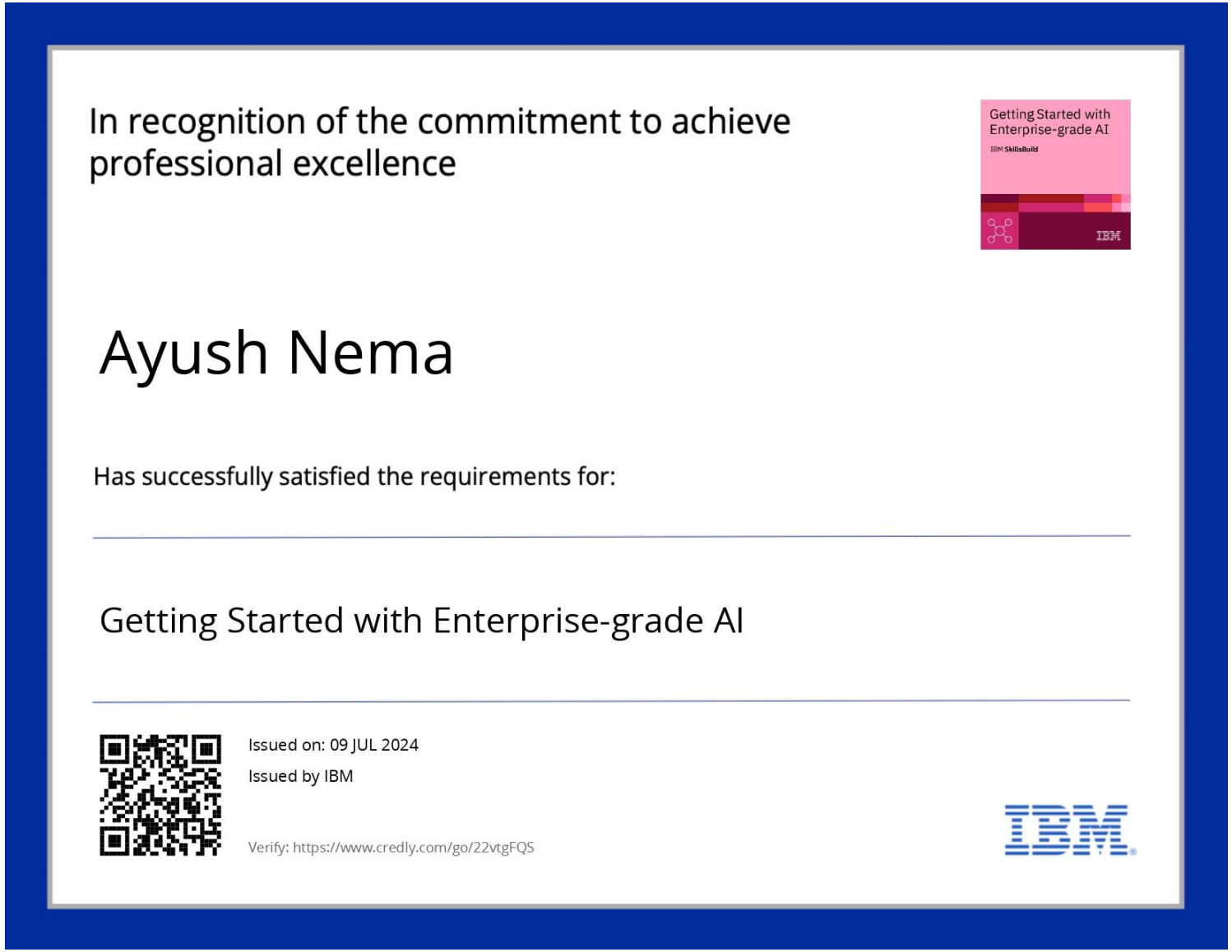
COURSE CERTIFICATE 1



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