

1. Problem Definition & Feasibility Analysis

Problem Definition

The primary objective of the project is to develop a predictive model using Long Short-Term Memory (LSTM) neural networks that forecasts future Bitcoin prices based on historical price data. The goal is to accurately predict the price movements of Bitcoin to aid in investment decisions and risk management.

Feasibility Analysis

Financial Feasibility

1. Initial Costs:

- **Data Acquisition:** While historical Bitcoin price data is generally available for free or at a low cost, acquiring high-quality, granular data may involve expenses.
- **Computational Resources:** Investment in GPUs or cloud computing services to handle the training of LSTM models, which can be significant depending on the complexity and scale of the model.
- **Development Team:** Costs associated with hiring data scientists, machine learning engineers, and possibly financial analysts.

2. Operational Costs:

- **Model Maintenance and Updates:** Regular updates and maintenance to adapt to new market conditions and data, which might incur recurring costs.
- **Cloud Services Fees:** Ongoing costs for cloud computing services if not managed in-house.

3. Return on Investment (ROI):

- **Increased Accuracy in Predictions:** Can potentially lead to higher profits from trading, improved risk management, and better strategic decisions.
- **Market Edge:** Competitive advantage in trading strategies if the model outperforms other market predictions.

Technical Feasibility

1. Data Handling and Processing:

- **Data Quality and Integrity:** Ensuring the data is clean, accurate, and free from biases is crucial for reliable outputs.
- **Storage and Security:** Managing large datasets with secure and efficient storage solutions.

2. Model Development:

- **LSTM Network Suitability:** LSTM's are proven in handling time-series data, but require careful tuning and optimization to capture the complex patterns in Bitcoin

prices.

- **Hyperparameter Tuning:** Extensive testing and validation to find the optimal settings for the model.

3. Infrastructure and Tools:

- **Computational Infrastructure:** Requires robust infrastructure to support intensive computations.
- **Software and Tools:** Availability of advanced machine learning frameworks and libraries (e.g., TensorFlow, PyTorch) to build and deploy LSTM models.

Social Feasibility

1. Market Impact:

- **Ethical Considerations:** Concerns about the potential for model-based manipulations or exacerbating market volatility.
- **Transparency and Trust:** Balancing model secrecy for competitive edge while maintaining transparency to foster trust among users and regulators.

2. Regulatory Compliance:

- **Adherence to Financial Regulations:** Ensuring the model and its usage comply with local and international financial regulations, including data privacy laws.

3. Stakeholder Acceptance:

- **Investor Confidence:** Building confidence among stakeholders through demonstrable accuracy and reliability of predictions.
- **Collaboration with Financial Analysts:** Integrating insights from financial experts with technical predictions to enhance model reliability and acceptance.