

Progress Report — Forecasting Bitcoin Mining Difficulty and Revenue

Course: DSCI 510 — Fall 2025

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Project Scope Update

The overall project scope has remained consistent: to build a Bitcoin mining profitability forecasting tool using data from public APIs and historical sources. We initially planned to integrate three data sources—CoinMetrics, Blockchain.com, and CoinGecko—to analyze network difficulty, BTC price, and generate revenue estimates. No major changes have been made to the goals or direction of the project so far.

Data Sources

We have successfully integrated two external data APIs:

- **Blockchain.com Query API:** Used to retrieve current blockchain metrics such as mining difficulty and block height.
- **CoinGecko API:** Used to fetch the current Bitcoin spot price in USD via the `/simple/price` endpoint.

Additionally, we are using a historical dataset (`btc.csv`) downloaded from **CoinMetrics.io**, which contains Bitcoin blockchain statistics from 2009 until October 20, 2025. This dataset is stored locally under the `data/` folder and serves as the main input for forecasting models.

Issues / Difficulties

1. Forecasting with `main.py`:

We attempted to build a forecasting and revenue simulation script using Prophet. However, we faced multiple issues:

- The CSV file (`btc.csv`) from CoinMetrics lacked essential columns like `DiffLast`, which are necessary for difficulty prediction.
- Some preprocessing errors and mismatched column names caused the script to fail during execution.
- Although we replaced the CSV with an older, working version, the Prophet model still needs fine-tuning to produce reliable outputs.

2. Git/GitHub Synchronization:

There have been difficulties pushing local code changes to GitHub. This includes authentication problems and possibly Git configuration issues on the development machine.