1. What are you trying to do? Articulate your objectives using no jargon.

We aim to develop and compare two different methods (ARIMA and LSTM) for predicting short-term temperature changes. Our goal is to create accurate forecasts of temperature for the next few days or weeks based on historical weather data.

1. How is it done today? What are the limits of current practice?

Currently, weather forecasting relies on complex numerical models and statistical techniques. However, these methods can sometimes struggle with short-term local predictions. Traditional time series models like ARIMA are widely used but may miss complex patterns. More advanced machine learning techniques like LSTM are gaining popularity but their effectiveness compared to traditional methods is still being evaluated.

1. What's new in your approach? Why will it be successful?

Our approach combines and compares a traditional statistical method (ARIMA) with a modern deep learning technique (LSTM). By directly comparing these methods on the same dataset, we can evaluate their strengths and weaknesses for short-term temperature forecasting. This comparison could lead to insights on when to use each method or how to combine them for better predictions.

1. Who cares?

This research is valuable for meteorologists, climate scientists, and organizations that rely on accurate short-term weather forecasts, such as agriculture, energy, transportation, and event planning industries. Improved short-term temperature forecasts can lead to better decision-making in these sectors.

1. If you're successful, what difference and impact will it make?

Success in this project could lead to more accurate short-term temperature forecasts. This could have significant impacts on various sectors, from helping farmers make better crop management decisions to improving energy demand predictions for utility companies. It could also contribute to our understanding of which forecasting methods are most effective for different types of weather prediction tasks.

1. What are the risks and payoffs?

Risks include the possibility that neither method significantly outperforms current forecasting techniques, or that the results may not generalize well to different geographic locations or time scales. The payoff is potentially more accurate and reliable short-term temperature forecasts, which could have wide-ranging benefits across multiple industries and improve our overall ability to predict and prepare for weather conditions.

1. How much will it cost?

The primary costs will be computational resources for data processing and model training, as well as the time invested by the research team. We plan to use freely available weather data and open-source software tools, which will help keep costs down. A more detailed budget can be developed as the project scope is finalized.

1. How long will it take?

We estimate the project will take approximately 4-6 months. This includes time for data collection and preprocessing, model development and training, comparative analysis, and documentation of results.

1. What are the midterm and final "exams" to check for success?

Midterm evaluations will include:

* Successful data collection and preprocessing
* Implementation of both ARIMA and LSTM models
* Initial results from each model on a test dataset

The final evaluation will be based on:

* Comprehensive comparison of ARIMA and LSTM performance on multiple metrics (e.g., Mean Absolute Error, Root Mean Square Error)
* Analysis of each model's strengths and weaknesses for different forecasting scenarios
* A clear conclusion on which method (or combination of methods) performs best for short-term temperature forecasting
* Documentation of the entire process and results in a format suitable for academic publication or practical application