Project Proposal: A Parallel Algorithm for Matrix Multiplication

1. Introduction:

Matrix multiplication is a fundamental operation in various scientific and engineering applications, with applications ranging from computer graphics to scientific simulations. This project aims to implement a parallel algorithm for matrix multiplication, as proposed in the paper titled "A Parallel Algorithm for Matrix Multiplication." This paper, sourced from the Parallel Computing Journal (Elsevier), provides insights into optimizing the matrix multiplication process through parallelization.

2. Objectives:

- Implement a parallel algorithm for matrix multiplication based on the methodologies presented in the selected paper.

- Explore and analyze the efficiency gains achieved through parallelization in comparison to traditional sequential matrix multiplication.

- Evaluate the performance of the implemented algorithm using benchmark datasets and metrics.

3. Methodology in Brief:

The selected paper proposes a parallel algorithm for matrix multiplication, and the implementation will involve adapting and coding the algorithm presented in the paper. The methodology includes:

- **Literature Review:** Conduct an in-depth literature review to understand the existing parallel algorithms for matrix multiplication, with a focus on the approach proposed in the selected paper.

- **Algorithm Understanding:** Gain a comprehensive understanding of the parallel algorithm outlined in the paper. Identify key steps and optimizations introduced for efficient matrix multiplication.

- **Code Implementation:** Translate the algorithm into code, utilizing a suitable parallel programming model such as OpenMP. Leverage existing parallel computing libraries and frameworks to enhance efficiency.

4. Data to Be Used:

The implementation will be tested and validated using standard matrix multiplication datasets. Datasets of varying sizes will be employed to assess the scalability of the parallel algorithm. Additionally, synthetic datasets may be generated to evaluate the algorithm's performance under different matrix dimensions and characteristics.

5. Expected Outcomes:

- Successful implementation of the parallel matrix multiplication algorithm.

- Comparative analysis demonstrating the performance benefits of the parallel algorithm over sequential approaches.

- Insights into the scalability and efficiency of the algorithm across different matrix sizes.

This project promises to enhance understanding and skills in parallel programming while addressing a classic problem with practical implications in various domains. The results will be disseminated through a comprehensive report, highlighting the implemented algorithm's strengths and potential areas for further improvement.