Contents

[Abstract 3](#_Toc127282232)

[Intro 3](#_Toc127282233)

[Literature review 3](#_Toc127282234)

[Problem definition 3](#_Toc127282235)

[Possible solutions/Research methods 4](#_Toc127282236)

[Schedule for experiments / implementation 4](#_Toc127282237)

[Experiments and data analysis 4](#_Toc127282238)

[Discussion 5](#_Toc127282239)

[Conclusions 5](#_Toc127282240)

[References 5](#_Toc127282241)

# Abstract

This is the abstract text. You can write some sentences about the final product and why you decide to work on this project. You can briefly mention relevant info related to project.

What is the usage of inventory management system?

**Key Words:** Deep learning, Forecasting methods, Text dataset, (univariant / Multi-variant prediction algorithms ), ...

Our project aims to leverage Spark and machine learning innovations to help manage inventory by predicting future demand data based on historical inventory demand data. The end product is a predictive model that leverages various machine learning models including linear regression, random forest regression, and gradient boosted tree regression to provide accurate predictions.

The decision to pursue this project stemmed from the importance of effectively managing inventory in any business. The ability to predict future demand data with a high degree of accuracy can help businesses optimize inventory levels, reduce waste, and improve overall efficiency.

By using various machine learning models, the project aims to provide a more comprehensive and accurate approach to forecasting future demand data. Using Spark, the model can process large amounts of data quickly and efficiently, making it an ideal solution for businesses with large amounts of inventory data.

Overall, this project aims to provide building materials companies with a powerful tool to manage inventory and improve their overall efficiency. By leveraging the latest machine learning innovations, we believe this project can have a meaningful impact on multiple industries, such as food and cold storage, where inventory needs are stronger and more timely.

**Keywords**: Spark “Machine learning” “Inventory management” “Predictive model” “Demand forecasting” AI

# Introduction

This is an intro text. It is a longer version of the abstract where you can start telling your story to guide the reader through the proposal. You can add some examples to elaborate your motivation of doing this project.

What do you want to achieve at the end? Does it affect anyone, users/players?

In today's fast-paced business and fast-iterating world, effective inventory management is one of the keys to success. Think about why Wal-Mart is successful? Whether you are a small business or a large business, having the right amount of inventory on hand can make all the difference. Forecasting future demand data can be a challenging task, especially for businesses with extensive inventory data.

New technologies are changing fast: Leveraging the latest machine learning innovations and the power of Spark, we developed a predictive model that can help businesses manage inventory more effectively. Using a variety of machine learning models, including linear regression, random forest regression, and gradient boosted tree regression, our models provide accurate forecasts of future demand data based on historical inventory demand data.

The reason I thought: The motivation for developing this project stems from the importance of inventory management to businesses of all sizes. Inefficient inventory management can lead to lost sales, wasted resources and increased costs. By providing businesses with powerful tools to predict future demand data, we believe our programs can have a meaningful impact on their bottom line.

Picture this: a small retail business struggling to manage its inventory. Without accurate forecasting of future demand figures, they could end up with excess inventory that they cannot sell, or run out of stock when demand is high. This can lead to lost sales and, ultimately, lost revenue. With our predictive models, the business can make data-driven decisions to optimize its inventory levels and reduce waste.

The goal of this project is to help businesses of all sizes and industries manage their inventory more effectively. By leveraging the latest machine learning innovations and the power of Spark, we believe our projects can truly change the lives of entrepreneurs, their employees, and their customers.

# Literature review

The ultimate purpose of this is to give reader the better picture of what is going on around the problem you wanna solve. You will sumarize different articles, or provide some survery, and then highlight what is the interesting areas that worth investigation.

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Maecenas porttitor congue massa. Fusce posuere, magna sed pulvinar ultricies, purus lectus malesuada libero, sit amet commodo magna eros quis urna (Nguyen, How to write technically, 2019).

Nunc viverra imperdiet enim. Fusce est. Vivamus a tellus.

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Proin pharetra nonummy pede. Mauris et orci.

Aenean nec lorem. In porttitor. Donec laoreet nonummy augue.

Suspendisse dui purus, scelerisque at, vulputate vitae, pretium mattis, nunc. Mauris eget neque at sem venenatis eleifend. Ut nonummy.

Mr Tung (Nguyen, petaminds.com, 2015) also said “blah…”.

In the article " CUSTOMER DEMAND FORECASTING VIA SUPPORT VECTOR REGRESSION ANALYSIS"( <https://www.researchgate.net/publication/244387078_Customer_Demand_Forecasting_via_Support_Vector_Regression_Analysis>).

The authors discuss the use of Support Vector Regression (SVR) to predict customer demand in the retail industry. The authors emphasize the importance of accurate demand forecasting in the retail industry as it helps businesses optimize inventory levels and improve profitability.

This paper presents a comprehensive literature review on retail demand forecasting, discussing various methods such as time series analysis, regression analysis, and machine learning techniques. The authors point out that while traditional methods such as time series analysis are widely used, they may not be able to effectively capture complex relationships among variables. This has led to increased interest in machine learning techniques such as SVR. Reference papers highlight the importance of accurate demand forecasting in the retail industry and the potential benefits of using machine learning techniques. It also makes a valuable contribution to the existing demand forecasting literature, especially in the context of machine learning techniques. The reference article The use of machine learning in demand forecasting provides valuable insights, but there are still some areas that deserve further research. For example, the authors focus primarily on one machine learning technique, and it would be interesting to compare the effectiveness of other techniques such as random forests or neural networks. Furthermore, this paper focuses primarily on the retail industry, and it would be interesting to explore the applicability of machine learning to other industries where demand forecasting is critical, such as manufacturing or infrastructure materials.

A potential advantage of our proposed solution utilizing Spark and various machine learning models such as linear regression, random forest regression, and gradient boosted tree regression is its ability to efficiently process large amounts of data. While traditional methods such as time series analysis can struggle with large datasets, our solution can process and analyze large amounts of data quickly and accurately. Our solution leverages multiple machine learning models that can help capture complex relationships between variables that traditional methods may miss. For example, gradient boosted tree regression models can handle nonlinear relationships and interactions between variables, which may be particularly relevant in the context of demand forecasting. The solution proposed by our engineering has potential advantages over traditional methods, especially in handling large datasets and capturing complex relationships between variables. By leveraging the latest machine learning innovations and the power of Spark, we believe our solution can have a meaningful impact on inventory management across industries.

# Problem definition

Based on the previous review, we can see that the function abc is quite interesting but is not fully utilised. My questions is “ How can I ….”

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Maecenas porttitor congue massa. Fusce posuere, magna sed pulvinar ultricies, purus lectus malesuada libero, sit amet commodo magna eros quis urna.

Nunc viverra imperdiet enim. Fusce est. Vivamus a tellus.

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Proin pharetra nonummy pede. Mauris et orci.

Aenean nec lorem. In porttitor. Donec laoreet nonummy augue.

Suspendisse dui purus, scelerisque at, vulputate vitae, pretium mattis, nunc. Mauris eget neque at sem venenatis eleifend. Ut nonummy.

# Possible solutions/Research methods

I can use Unity, Android Studio, … The pros and cons of the tools are….. I decide to work on this because of the following reasons.

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Maecenas porttitor congue massa. Fusce posuere, magna sed pulvinar ultricies, purus lectus malesuada libero, sit amet commodo magna eros quis urna.

Nunc viverra imperdiet enim. Fusce est. Vivamus a tellus.

## Schedule for experiments / implementation

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Maecenas porttitor congue massa. Fusce posuere, magna sed pulvinar ultricies, purus lectus malesuada libero, sit amet commodo magna eros quis urna.

Nunc viverra imperdiet enim. Fusce est. Vivamus a tellus.

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Proin pharetra nonummy pede. Mauris et orci.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| W1 | Create UI of the first scene | Features | Challenges/Actions | Time |
|  |  | Button |  | 1 hour |
|  |  | Music |  |  |
|  |  | Don’t know the programming language |  | 2 days |
|  |  | Read a book for 2 days |  |  |
| W2 | …. |  |  |  |

# Experiments and data analysis

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Maecenas porttitor congue massa. Fusce posuere, magna sed pulvinar ultricies, purus lectus malesuada libero, sit amet commodo magna eros quis urna.

Nunc viverra imperdiet enim. Fusce est. Vivamus a tellus.

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Proin pharetra nonummy pede. Mauris et orci.

# Discussion

# Conclusions

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Maecenas porttitor congue massa. Fusce posuere, magna sed pulvinar ultricies, purus lectus malesuada libero, sit amet commodo magna eros quis urna.

Nunc viverra imperdiet enim. Fusce est. Vivamus a tellus.

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Proin pharetra nonummy pede. Mauris et orci.

# References

"Customer Demand Forecasting via Support Vector Regression Analysis" (<https://www.researchgate.net/publication/244387078_Customer_Demand_Forecasting_via_Support_Vector_Regression_Analysis>)

PySpark: Apache Spark's Python API for distributed data processing and computing.

It provides a wide range of algorithms and tools, including machine learning and data processing. (https://spark-reference-doc-cn.readthedocs.io/zh\_CN/latest/programming-guide/quick-start.html)

Linear Regression: A widely used machine learning algorithm for building linear models and predicting continuous variables. (https://aws.amazon.com/cn/what-is/linear-regression/)

Random Forest Regression: An ensemble learning algorithm that combines multiple decision trees to improve prediction accuracy. (https://help.aliyun.com/document\_detail/439734.html)

Gradient Boosted Tree Regression (https://zh.wikipedia.org/wiki/%E6%A2%AF%E5%BA%A6%E6%8F%90%E5%8D%87%E6%8A%80%E6%9C%AF)