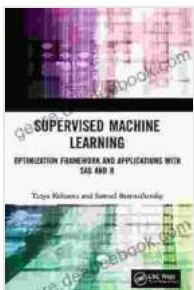


# Supervised Machine Learning: Optimization Framework And Applications With SAS And R

Optimization is the process of finding the best possible solution to a problem, given a set of constraints. Optimization problems arise in a wide variety of applications, including finance, manufacturing, logistics, and transportation.

SAS and R are two popular statistical software packages that can be used to solve optimization problems. SAS is a powerful and versatile software package that provides a wide range of features for data analysis, visualization, and reporting. R is an open-source software package that is specifically designed for statistical computing.

In this article, we will discuss the basics of optimization, and we will show how to use SAS and R to solve optimization problems.



## Supervised Machine Learning: Optimization Framework and Applications with SAS and R by Tanya Kolosova

★★★★☆ 4.6 out of 5

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## Basics of Optimization

Optimization problems can be classified into two main types:

- **Linear optimization** problems involve finding the minimum or maximum of a linear function, subject to a set of linear constraints.
- **Nonlinear optimization** problems involve finding the minimum or maximum of a nonlinear function, subject to a set of nonlinear constraints.

Linear optimization problems can be solved using a variety of algorithms, including the simplex algorithm and the interior point method. Nonlinear optimization problems can be solved using a variety of algorithms, including the gradient descent algorithm and the Newton method.

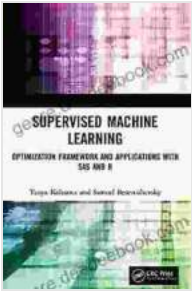
## Optimization with SAS

SAS provides a number of features for optimization, including:

- The PROC OPTMODEL procedure can be used to solve linear and nonlinear optimization problems.
- The PROC OPTNET procedure can be used to solve network optimization problems.
- The PROC OPTMILP procedure can be used to solve mixed-integer linear programming problems.

In the following example, we will use the PROC OPTMODEL procedure to solve a simple linear optimization problem. The problem is to find the maximum profit for a company that produces two products, A and B. The company has a limited amount of time and money available, and each product has a different profit margin.

```
proc optmodel; /* Define the decision variables. */ var x1 >= 0;
```



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