

# Divorce Case Prediction using Machine Learning

Ankush Chougule<sup>1</sup>, Renuka Shinde<sup>2</sup>, Sankalp Nagpure<sup>3</sup>, Sachin Kadam<sup>4</sup>

Students, Department of Computer Engineering<sup>1,2,3,4</sup>

Sinhgad Institute of Technology, Lonavala, Maharashtra, India

**Abstract:** *The number of divorce cases has seen a significant increase worldwide in recent years. In India, for instance, the divorce rate has risen from 1 in 1000 to 13 in 1000 over the last few decades, which is a major concern for marriage counselors and therapists. Consequently, there is a need for an effective technique to predict divorce cases that can assist therapists in identifying the severity of a situation. This paper presents a study on divorce case prediction using various machine learning algorithms such as Perceptron classifier, Decision Tree classifier, Random Forest classifier, Naive Bayes classifier, K-Nearest Neighbor classifier, and Support Vector Machine classifier. The authors have employed the Gottman method as a criteria for making predictions. After training, these algorithms predict whether a divorce will occur or not, which can help the therapist analyze the level of tension between a couple and counsel them accordingly. The authors achieved the highest accuracy of 98.5% with the Perceptron model.*

**Keywords:** Divorce prediction, Machine learning, Classification algorithms, Random forest, Logistic regression, Decision tree, Support vector machine, Neural network

## I. INTRODUCTION

It's certainly true that divorce is a complex and concerning issue that affects families all over the world. The Gottman method of relationship therapy is one approach that can be used to help couples address the underlying issues that may lead to divorce. By focusing on factors such as love maps, sharing admiration and fondness, and managing conflict, the Gottman method aims to help couples build stronger and more resilient relationships.

It's also interesting to consider the potential of combining this approach with machine learning algorithms to predict divorce cases. Machine learning algorithms have been used in a variety of fields to identify patterns and make predictions based on large sets of data. In the context of predicting divorce, these algorithms could potentially analyze factors such as communication patterns, emotional expressions, and other behavioral markers to identify couples who may be at risk of divorce.

Of course, it's important to approach this topic with caution and sensitivity, as predicting divorce can be a sensitive and emotionally charged issue. Additionally, it's important to remember that there is no foolproof way to predict divorce, as every couple and relationship is unique. However, by combining the insights of relationship theory with the power of machine learning, we may be able to develop more effective tools and strategies for supporting couples and strengthening relationships.

## II. LITERATURE SURVEY

M Irfan , W Uriawan , O T Kurahman in their paper[1] titled "Comparison of Naïve Bayes and K-Nearest Neighbor Methods to Predict Divorce Issues" In this paper discusses the increasing divorce rate in Cimahi, with an average of 800 cases per month. To predict the occurrence of divorce, data mining techniques such as Naive Bayes and K-Nearest Neighbor algorithms are used. The article compares the two algorithms to determine the most accurate and efficient method for predicting divorce. The comparison shows that the Naive Bayes algorithm has a higher accuracy rate of 72.5% compared to the K-Nearest Neighbor algorithm's accuracy rate of 57.5%.[1]

Ellie Lisitsain certified Gottman therapist, relationship expert, and the Content Director at The Gottman Institute in their paper [2] titled "An Introduction To The Gottman Method Of Relationship Therapy" The paper on The Gottman Relationship Blog shares an article from GoodTherapy.org, which summarizes the Gottman Institute's research and approach to couples therapy. GoodTherapy.org is an organization dedicated to helping people find ethical therapists.

The article provides links to previous blog postings, making it easy for readers to navigate specific topics discussed in prior writings. The article is a valuable resource for couples seeking guidance on how to improve their relationships.[2]

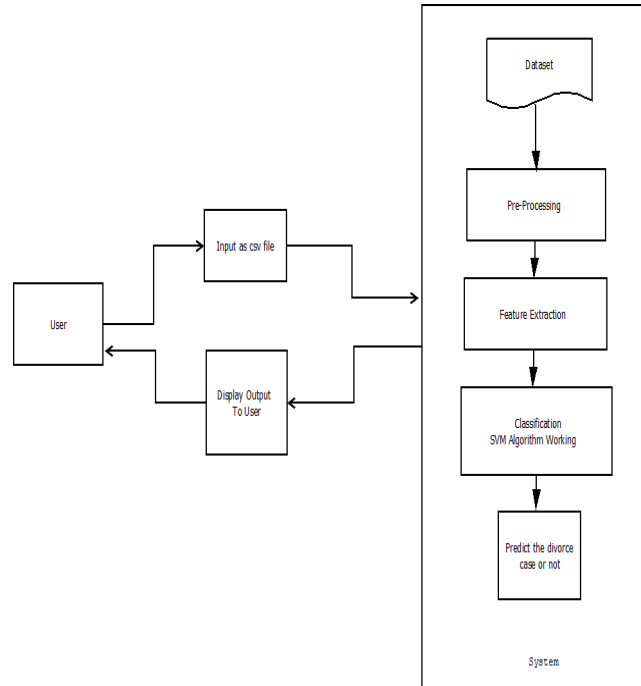


Figure 1: (Courtesy) Divorce Case Prediction [1]

Mustafa Kemal Yöntem , Tahsin Ilhan in their paper [3] Titled “Divorce Prediction Using Correlation Based Feature Selection and Artificial Neural Networks” The study investigates the success of DPS using Multilayer Perceptron Neural Network and C4.5 Decision tree algorithms. The most significant features affecting divorce are identified using correlation-based feature selection method. The study shows that DPS can predict divorce with high accuracy rates using Artificial Neural Networks. The results confirm the divorce predictors in the Gottman couples therapy in Turkish sampling.[3]

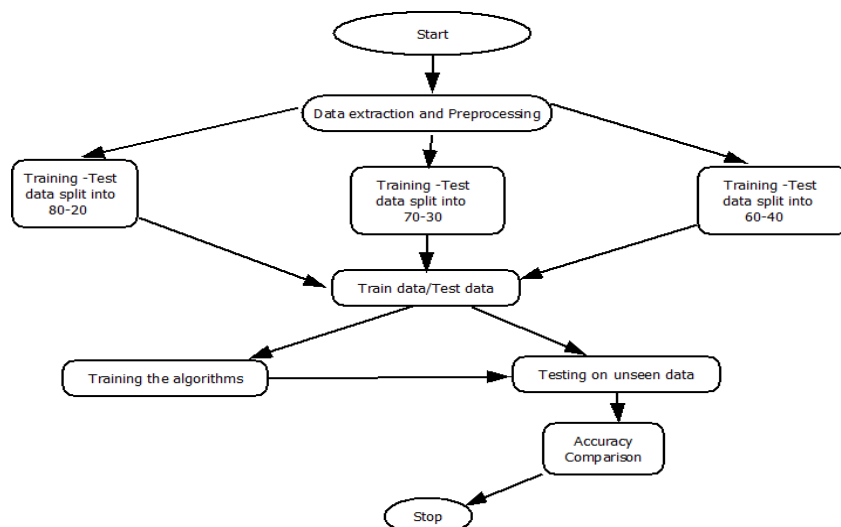


Figure 2: (Courtesy) Divorce Case Prediction Using ML [2]

Somya Goel; Sanjana Roshan; Rishabh Tyagi; Sakshi Agarwal in their paper [4] This research paper focuses on using Machine Learning to predict the probability of winning or losing a marriage and divorce case in Hindu, Muslim, and Christian religions. The study aims to compare the performance of various Supervised Machine Learning algorithms and determine the most effective algorithm for this domain of law. Based on the trained data set of previously fought

court cases, the probability of winning or losing a case is determined through legitimate processes. The proposed tool can assist users in determining the probability of the outcome of their case.

### 2.1 Comparison Between Literature Survey

Features	[1]	[2]	[3]	[4]
Purpose	Guidance for Improve relationship	Determine more accurate and efficient method	Significant feature selection method	Predict the probability of winning or losing a marriage and divorce case
Algorithm	Gottman Method Of Relationship Therapy	Naïve Bayes K-Nearest Neighbor	Multilayer Perceptron Neural Network C4.5 Decision tree algorithms	Supervised Machine Learning algorithms
Focus on	Study of relationship therapy	Accuracy	High accuracy rate	Assist users in determining the probability

### III. PROPOSED SYSTEM

The algorithms are compared based on their performance on a particular dataset, and the study uses the Perceptron, Naive Bayes, Logistic Regression, K-nearest Neighbors, and Support Vector Machine classifiers. The dataset used is downloaded from the UCI Machine Learning Repository and provides all necessary information for predicting divorce cases.

### IV. CONCLUSION

It is certainly interesting to explore the potential of machine learning models in predicting divorce cases and ultimately helping to save marriages. The high accuracy rate of the Perceptron model in our study is promising and suggests that machine learning models can be effective in predicting divorce cases.

### V. ACKNOWLEDGMENT

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