

Reasearch Demo Link -<https://youtu.be/42SIafdetLk>

Research Tittle

# Depression Detection from Social Media using Machine Learning Techniques

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Video link -<https://youtu.be/ckyMrSR9ORM>

The background of the slide features several large, overlapping, organic shapes in shades of purple, magenta, and blue. These shapes are positioned primarily on the right side and bottom, creating a modern, artistic feel. The text is placed on the left side, set against a solid dark purple background.

01

# Insight on Depression

Over the years, stress, anxiety, and modern-day fast-paced lifestyles have had immense psychological effects on people's minds worldwide. Depression can occur in people of all ages. It can be very risky and can lead to anxiety attacks, death after a heart attack, and problems like high blood pressure and diabetes.



# Approach

With the rise of technology, various approaches to machine learning techniques can detect emotions in human beings. Text-based emotion recognition, for example, sentiment analysis of tweets and posts on various social media platforms, can help in the detection of the mood and emotion of the individual

# Methodology

02

Machine learning algorithms like

- Naive Bayes,
- Support Vector Machines (SVM)
- Recurrent neural network (RNN)

can be used to detect depression earlier.

# Research Aim

The aim of this research is to use machine learning algorithm for early detection of depression from social media. By using Support Vector Machine (SVM) and Recurrent Neural Network (RNN) Naive Bayes (NB), with the goal of improving mental health care accessibility and reaching individuals who may not seek assistance due to social shame.



# Research Objectives

1.

To determine depressed individual from social media machine learning techniques such as Support Vector Machine and Recurrent Neural Network, Naive Bayes can be used to analyse sentiment, behavioural cues.

2.

To identify changes in posting frequency, engagement levels, emotion tone that may signal depressed symptoms.

3.

To evaluate and validate the effectiveness and accuracy of the developed algorithms through rigorous testing and validation



# Research Scope

1.

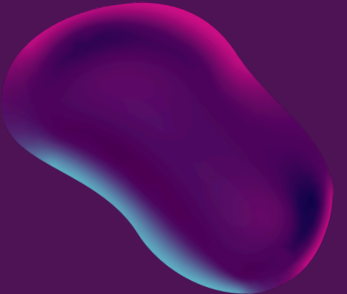
a) The objective of this study will be the creation and evaluation of machine learning models to identify depression using a dataset with two major groups: condition group and control group. In the course of this study, three major algorithms related to machine learning are focused on: Support Vector Machines, Recurrent Neural Networks, and Naive Bayes classifiers. That would be the dataset of tweets, metadata of users like a number of followers, friends, favorites, and statuses, and the number of retweets each tweet received. The demographic data, type of depression, and whether he or she has melancholia in case it is available will also be considered in this model.

2.

a) The study will evaluate textual and behavioural data from social media to detect and analyse depressive symptoms using natural language processing techniques. To make sure the models can accurately assess sentiment and emotional tone across various languages and populations, language usage will be a crucial factor to take into account.

3.

a) One limitation of this study is its dependence on publicly available datasets, which does not capture the entire range of socio-cultural nuances and variances in social media usage associated with depression. Furthermore, while the models aim to improve depression identification, their generalizability and usefulness in a variety of real-world contexts will be investigated, taking into account practical restrictions and ethical considerations.



# LITERATURE REVIEW

This literature review navigates the vast field of mental health detection using machine learning techniques particularly focused on social media. In the era where technology have effect on every part of our life, understanding the connection between mental health and social interaction is very important. This section starts a journey to explore the depression detection on social media with the help of machine learning methodologies. Social media sites such as Facebook, Instagram have become a space for users to express their emotions, including depression. These Sites has large amount of data providing both opportunities and challenges for detecting mental health issue. This literature review aims to analyse machine learning techniques to examine data for depression detection. By examining many machine learning models such as Support Vector Machine (SVM) and Recurrent Neural Network (RNN), Naive Bayes (NB) this review seeks to understand their efficiency and application in real world



# Research Domain

The examination of literature within the research domain sheds light on the depression detection using machine learning techniques specifically on social media sites such as Facebook and Instagram. Although existing research has made significant advances in understanding the application of machine learning for mental health diagnostics, there remains a gap in understanding the efficiency of different algorithms such as support vector machine and recurrent neural network in the real world

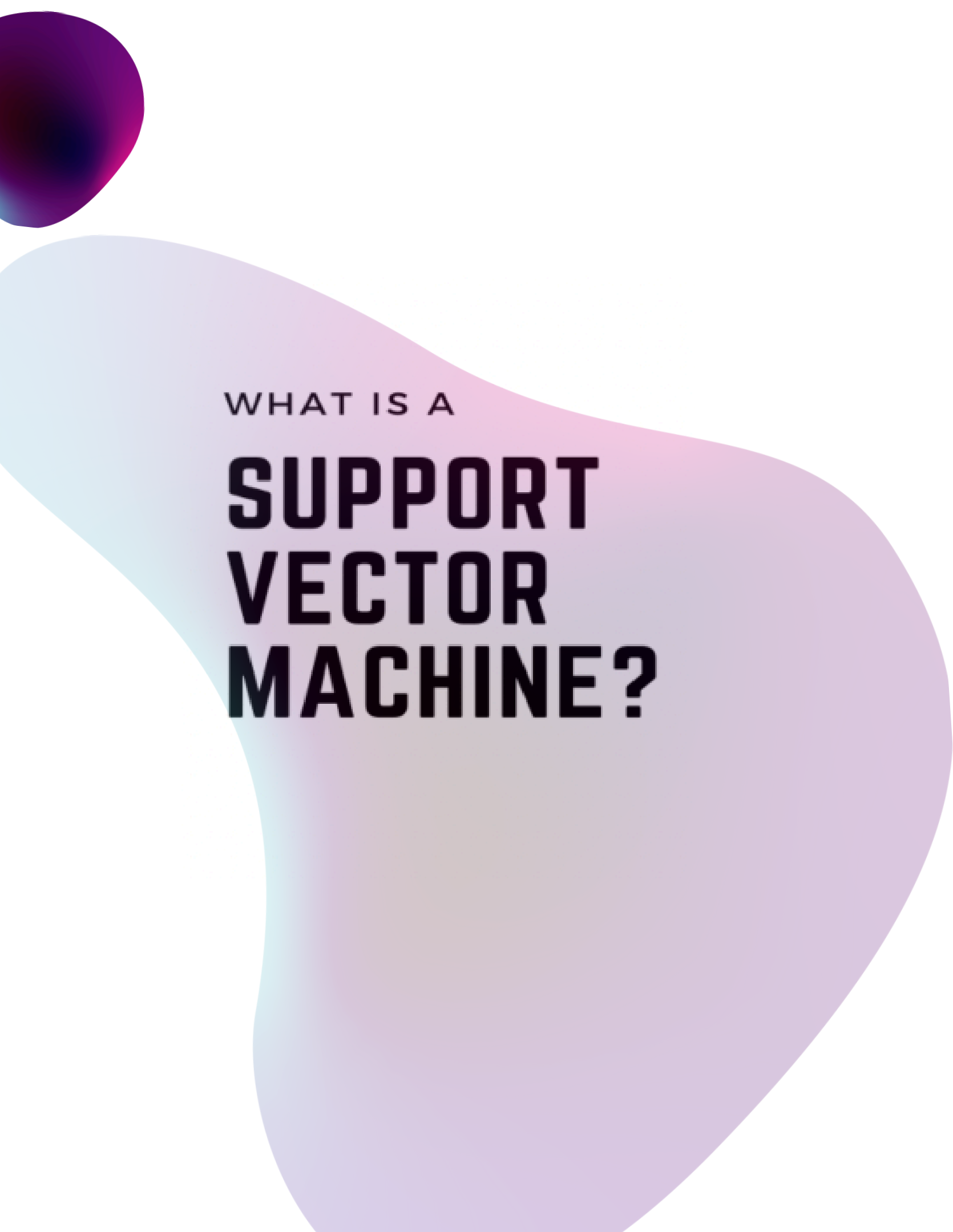
## Machine learning

Machine learning (ML) is transforming the field of mental health research by enabling the analysis of vast amounts of data to identify patterns and make predictions. In the context of detecting depression, ML algorithms like Recurrent Neural Networks (RNNs), Support Vector Machines (SVMs), and Naive Bayes classifiers are particularly valuable. These techniques can analyze text data from social media platforms to detect emotional tones and linguistic patterns that indicate depressive symptoms.

# Proposed Solutions

In order to detect depression, Researchers have been looking for approaches to effectively identify depression. The techniques of machine learning are being investigated for identification approaches effective in identifying depression. Besides, the paper discusses several methods used to detect emotion and mood in people. Machine learning examines how facial expressions, images, chatbots portraying emotions, and texting on social network platforms could effectively identify emotions and, thus, depression. Some of the ML techniques that recognize emotion from text are the Support Vector Machines (SVM), Recurrent Neural Networks (RNN), and Naive Bayes (NB). Machine learning algorithms can detect emotion from text, and to detect emotion from tweets, sentiment analysis can be performed using NLP techniques (Joshi & Kanoongo, 2022).





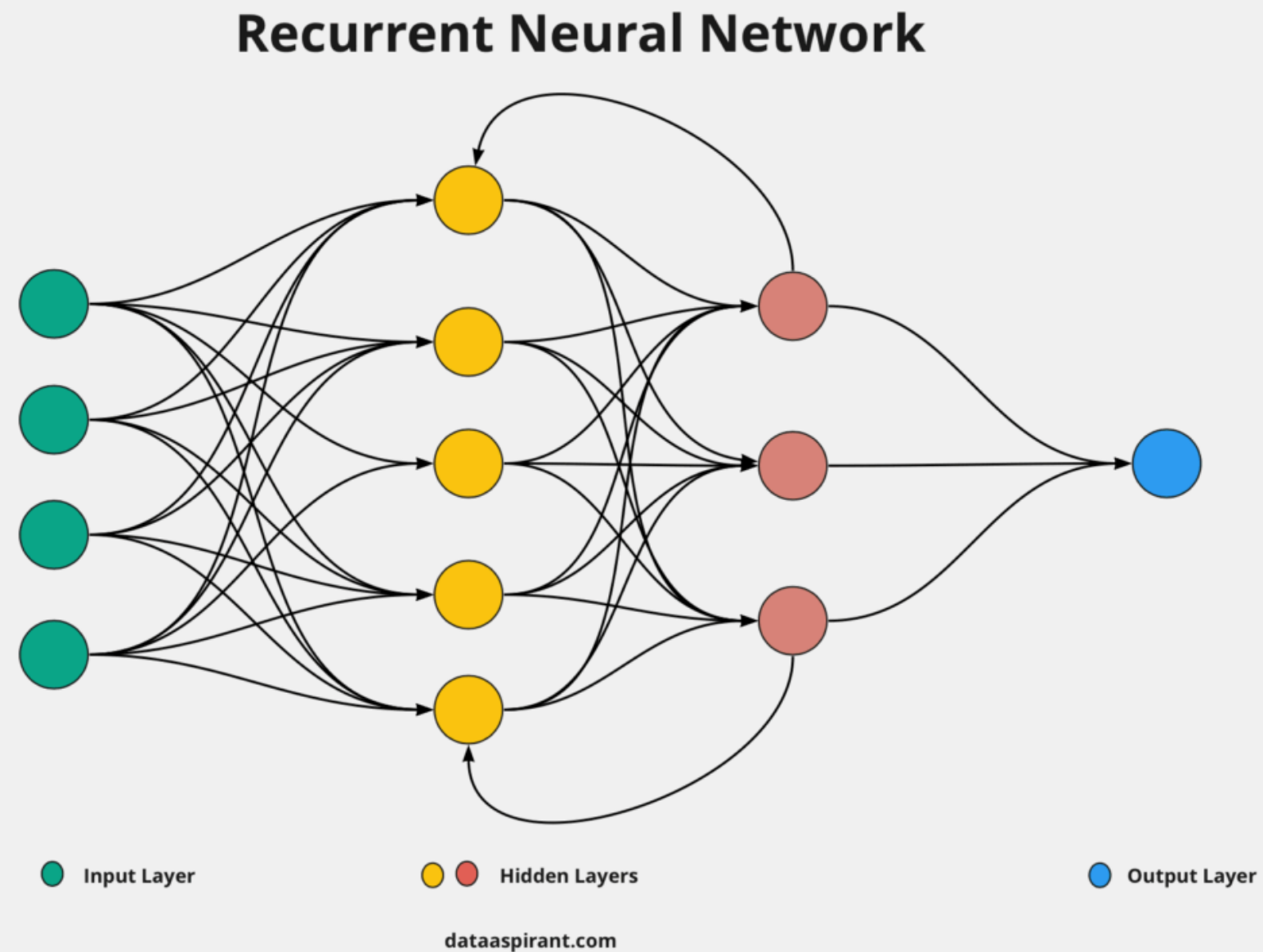
WHAT IS A

# **SUPPORT VECTOR MACHINE?**

# Support Vector Machine

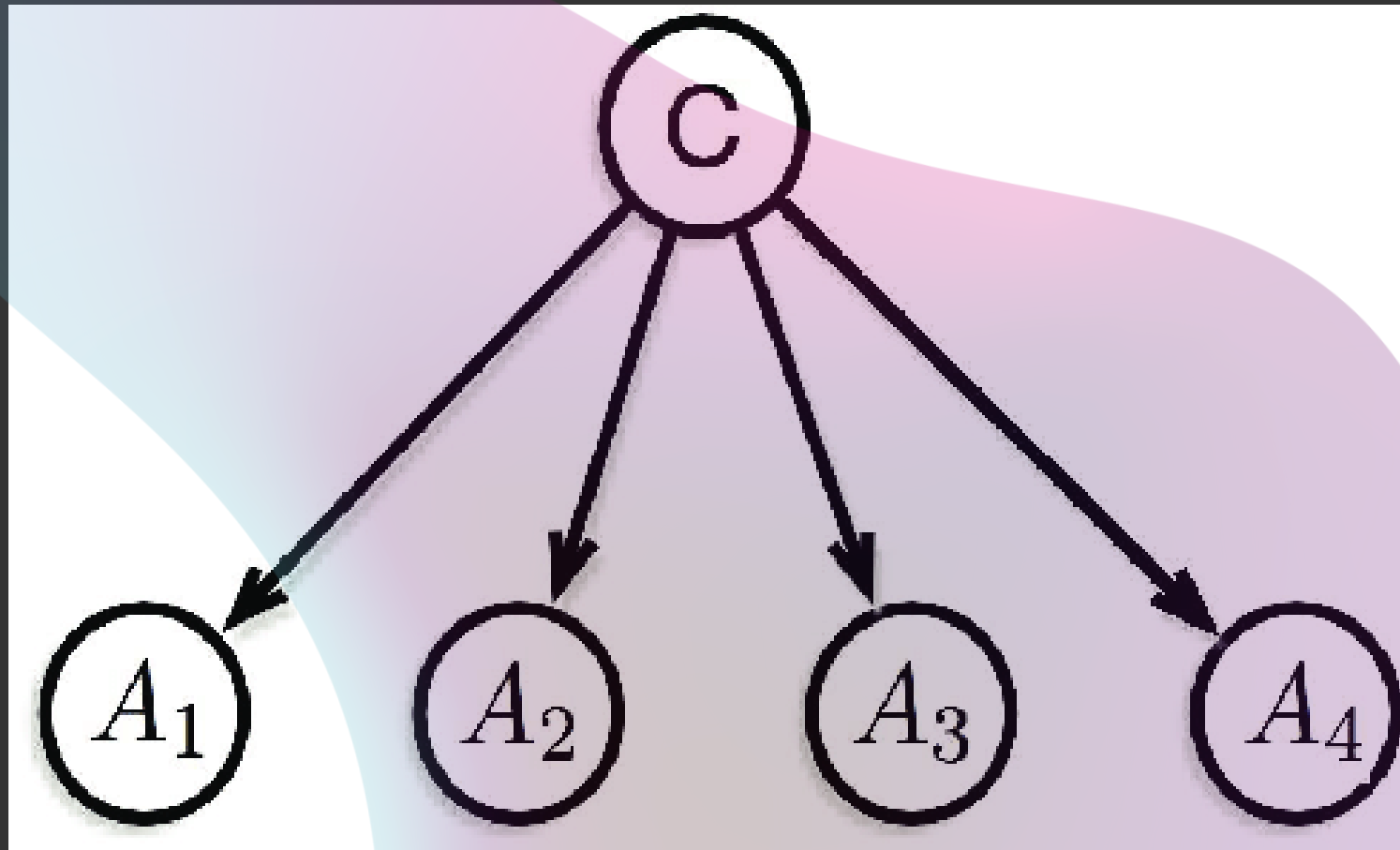
SVM is a supervised learning algorithm that assists in analyzing and recognizing the patterns within data as a classification and regression prediction tool . It converts nominal data to numerical automatically for classification. The algorithm of SVM allows the selection of the lines or known as a separator in a manner that accurately mimics the underlying function in the target space.

# Recurrent Neural Network



Recurrent Neural Networks (RNNs) are a type of artificial neural network capable of dealing with sequence data by remembering the past input in internal states. Compared with feedforward networks, RNNs contain loops in which information can be retained, so they are especially suitable for time-series data tasks, speech recognition, and natural language processing.

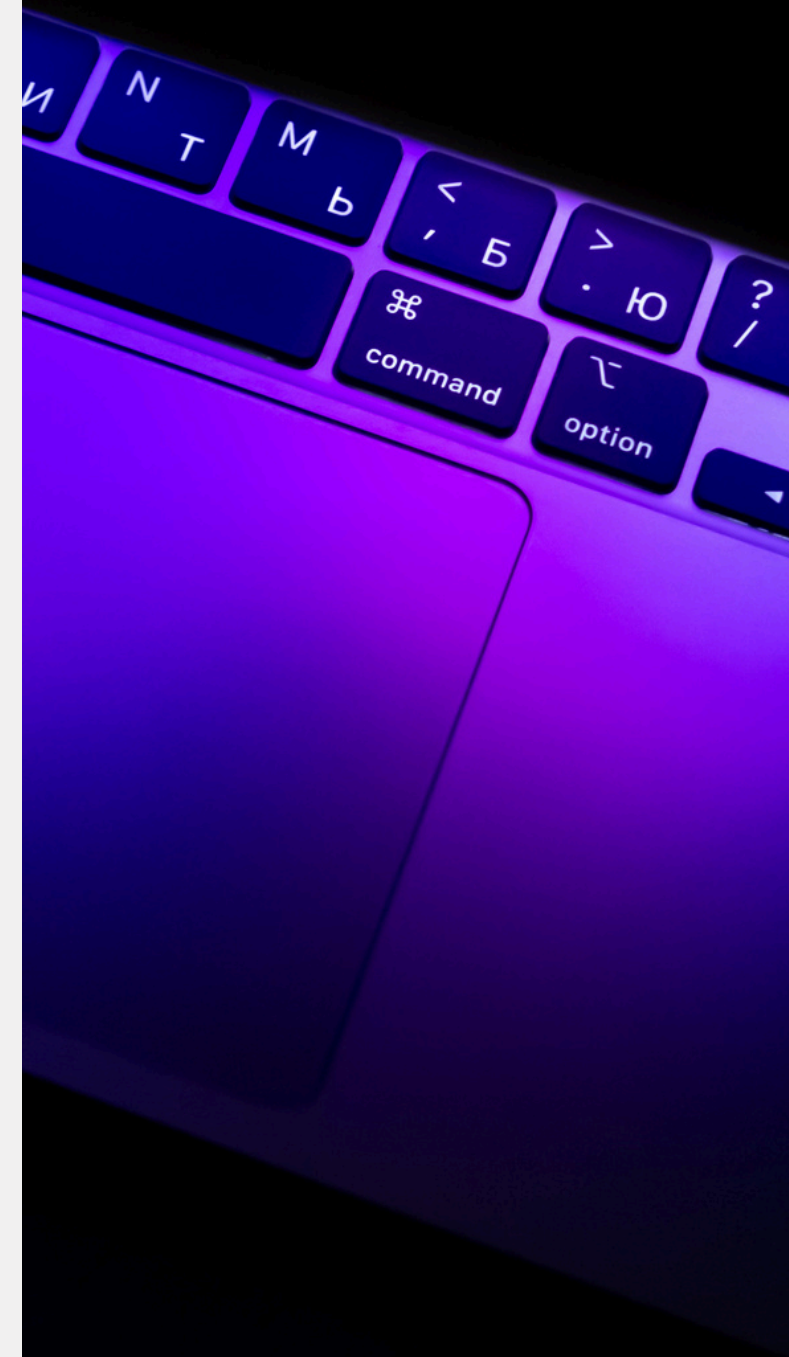
# Naive Bayes



Naive Bayes is simple in approach and noisy in effectiveness in most cases of text classification tasks. Though simple to use, Naive Bayes is one of the classifiers that works well enough, especially in a vast amount of data; it is efficient sufficient with noisy and high-dimensional data as obtained through social media content. The basic structure of the Naive Bayes approach is shown in figure

# RESEARCH METHODOLOGY

The methodology for detecting depression from social media using machine learning involves a systematic approach encompassing data collection, preprocessing, feature extraction, model training, and evaluation. This study leverages advanced machine learning techniques, including Recurrent Neural Networks (RNNs), Support Vector Machines (SVMs), and Naive Bayes classifiers, to analyze textual data from social media platforms and identify patterns indicative of depression.





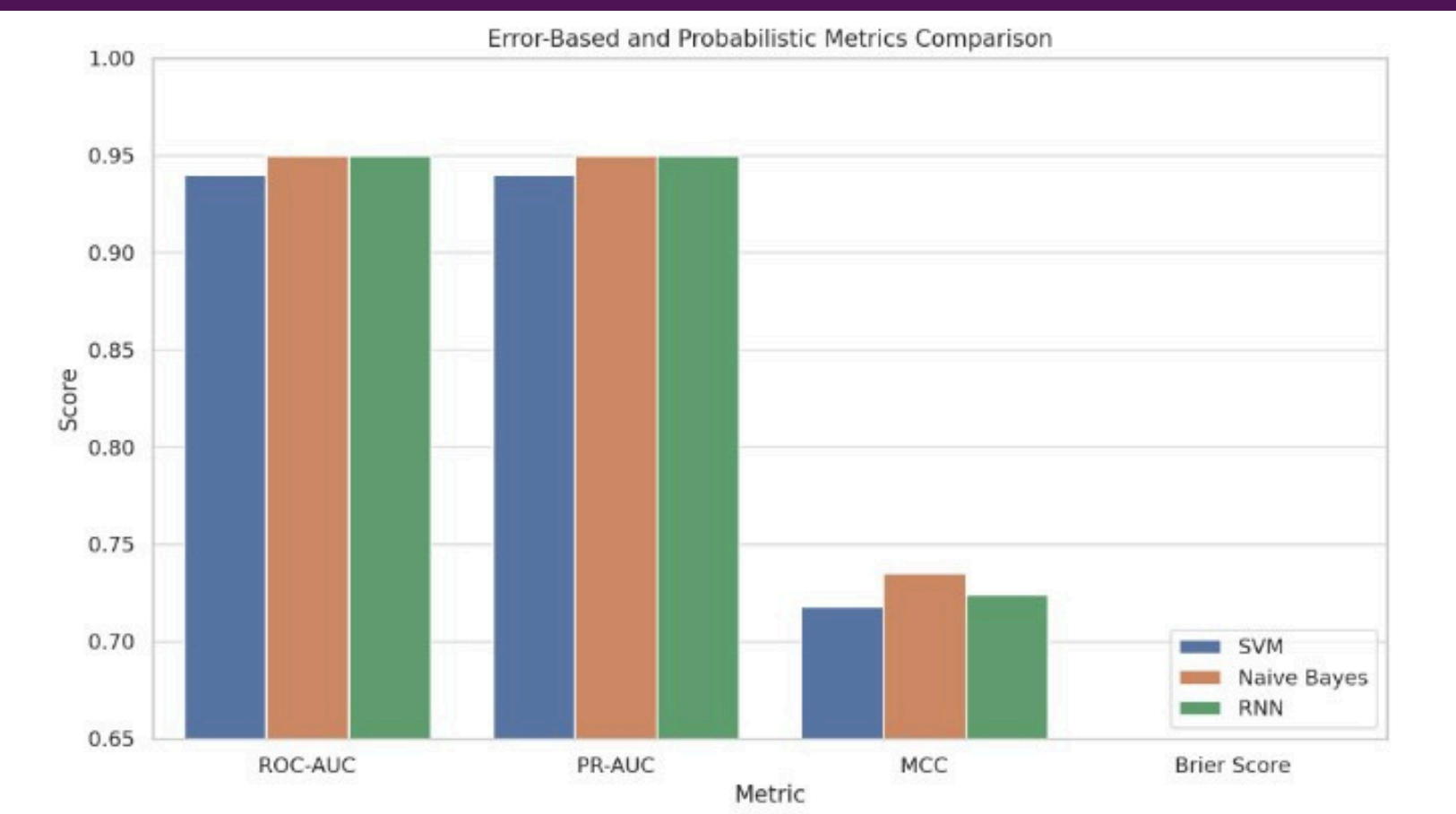
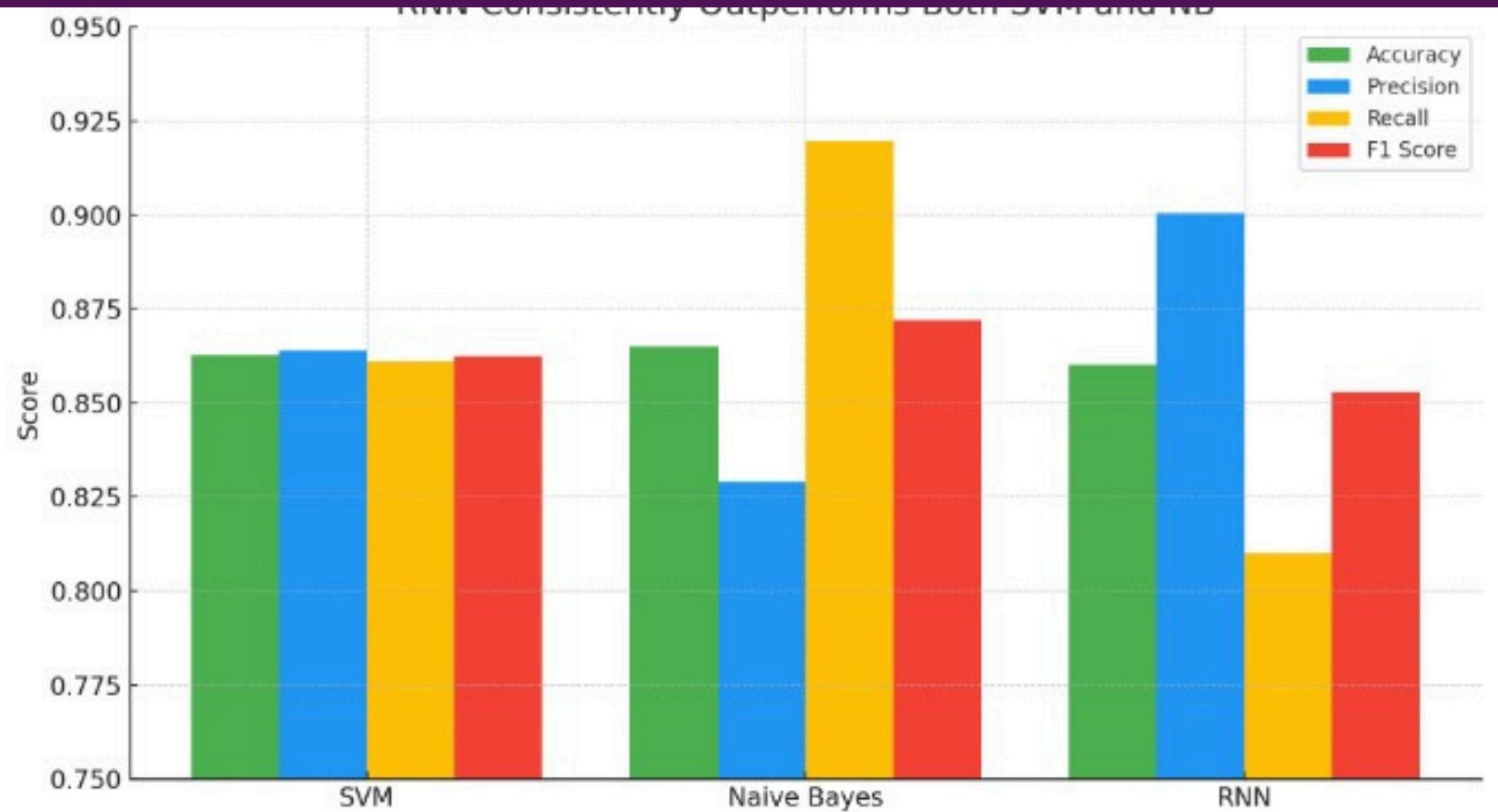
# Research Workflow

THE OPERATIONAL WORKFLOW OF DEPRESSION DETECTION FROM SOCIAL MEDIA INCLUDES FOUR STAGES: LITERATURE REVIEW, DATA COLLECTION, ALGORITHM MODELING, EVALUATION, AND ANALYSIS OF RESULTS.

- Phase1: Literature review
- Phase 2: Data collection
- Phase 3: Algorithm Model
- Phase 4: Evaluation and Result Analysis

# Performance Measurement

This part tests machine learning models in preserving their efficiency to detect depression from social media data. To evaluate the performance of the model in classifying depression signals, accuracy, precision, recall, f1 score and cross validation are used for the robustness of the depressive signals To fully evaluate the performance of each model in detecting depression from social media posts, we use five error-classification methods. These are more than accurate and give a multi-dimensional evaluation of model performance, error rate, and probability correctness:



- Accuracy
- Precision
- Recall (Sensitivity)
- F1 Score
- Cross validation
- Confusion Matrix and Error Rates
- Precision–Recall Analysis (PR-AUC)
- Receiver Operating Characteristic (ROC-AUC)
- Matthews Correlation Coefficient (MCC)

# RESEARCH DESIGN AND IMPLEMENTATION

This chapter elaborates on the testing phase, where some performance metrics—accuracy, precision, recall, F1 score, have been run over training and test sets. There will be a detailed and adequate description of techniques used for the implementation and tools for performance evaluation of acquired models, including Support Vector Machine (SVM), Recurrent Neural Networks (RNN), and Naive Bayes (NB). It will allow for a complete comparison of the models of early detection of depression through a structured approach to effectiveness analysis. The background will then be laid for practical applications and further research

## Test Method

Mainly, there are a couple of key stages where structured approach to the testing of the models' performance are applied:

- Data Splitting
- Model Training
- Measurement metrics
- Performance Comparison

# Research Contribution

The following improvements to the field of mental health care and machine learning are anticipated as a result of this research:

1.

A better understanding of how social media interaction contribute to emotional states of individual particularly depression.

2.

The creation of highly effective machine learning model for depression detection using support vector machine and recurrent neural network which can be implemented to analyze social media data

3.

A comprehensive set of guidelines for integrating machine learning depression detection system with social media, ensuring ethical use, privacy protection.

These contributions have significant effect of early detection of depression and provide robust tools for mental health professional and have potential to enhance mental health care.





Thank you for Watching



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[github.com/AlRafi1337](https://github.com/AlRafi1337)