Project ID: 24/CSE-AIML/1/101

Emotional Response Data Capturing on Ads using Deep Neural Networks

A PROJECT REPORT
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Submitted in partial fulfillment of the requirements for the degree of Bachelor of Technology in Computer Science and Engineering-Artificial Intelligence and Machine Learning

to

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May 25, 2024

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Declaration

We hereby declare that the work presented in this report entitled "Emotional Response Data Capturing on Ads using Deep Neural Networks", was carried out by us. We have not submitted the matter embodied in this report for the award of any other degree or diploma of any other University or Institute. We have given due credit to the original authors / sources for all the words, ideas, diagrams, graphics, computer programs, experiments, results, that are not my original contribution. We have used quotation marks to identify verbatim sentences and given credit to the original authors / sources.

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We would like to thank everyone who contributed to the completion of this project report. Their support, guidance and encouragement throughout this endeavor has been invaluable.

Firstly, We would like to express our sincere thanks to our project mentor, Dr. Avdhesh Gupta, for his unwavering support and valuable guidance. His expertise, insightful feedback, and constructive criticism helped shape the direction and scope of this report.

We would like to thank our college, Ajay Kumar Garg Engineering College, Ghaziabad for providing the necessary resources, equipment and infrastructure for this project. With their support, our research activities progressed smoothly. We also extend a warm thanks to all the faculty of Computer Science and Engineering Department who directly or indirectly encouraged us.

Finally, We would like to thank our parents and friends for all their moral support they gave us during the completion of this project.

Abstract

In the realm of advertising, understanding audience emotional responses is paramount for crafting compelling narratives that resonate deeply. This project presents a novel approach to dissecting audience reactions to advertisements by employing Convolutional Neural Networks (CNNs) to classify emotions in real-time video frames. This advanced technique promises to revolutionize the way advertisers gauge and respond to audience sentiments, offering a more precise and immediate understanding of viewer reactions.

Traditionally, advertising feedback has relied on methods such as surveys, focus groups, and direct feedback mechanisms like emails and phone calls. These conventional approaches, while valuable, have significant limitations. Surveys and focus groups, for instance, are retrospective and heavily depend on participants' ability to recall and articulate their feelings after viewing an advertisement. This reliance on memory can lead to biased or incomplete feedback, as individuals may forget key details or their responses may be influenced by the passage of time. Additionally, these methods are time-consuming and expensive, often requiring the coordination of multiple participants and substantial resources.

Direct communication channels like emails or phone calls offer a more personal touch but also present challenges. These methods can be intrusive, leading to low response rates, as individuals may be reluctant to engage in lengthy discussions or provide detailed feedback. Moreover, the qualitative nature of the data collected through these channels can make

Project ID: 24/CSE(AIML)/02

VISION VOYAGE: IMAGE CAPTION GENERATOR

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I would like to express my sincere gratitude and appreciation to all those who have contributed to the successful completion of my research on "VISION VOYAGE: IMAGE CAPTION GENERATOR."

I would like to express my sincere gratitude to my project supervisor for their invaluable guidance, constructive feedback, and continuous encouragement throughout this research on medicinal plant identification. Their expertise and insights were instrumental in shaping the direction and quality of this project. Additionally, I am indebted to my mentors for their mentorship and for sharing their extensive knowledge of medicinal plants, which significantly enriched my understanding of the subject.

Furthermore, I would like to acknowledge the support of my colleagues and friends, whose insightful discussions and suggestions were of great help. Special thanks to those who provided technical assistance and moral support.

Finally, I owe a great deal of gratitude to my family for their unwavering support and encouragement throughout the duration of this project. Their belief in my abilities has been a constant source of motivation. Thank you all for your contributions and support, without which this project would not have been possible.

Abstract

Image caption generation involves automatically describing images with syntactically and semantically accurate sentences. This process necessitates recognizing important objects, their attributes, and their relationships within an image. Our proposed model utilizes Convolutional Neural Networks (CNN) and Long Short-Term Memory (LSTM) networks to achieve this. The CNN extracts intricate visual features from input images, while the LSTM generates contextually coherent captions. Leveraging pre-trained models for object detection, our system seamlessly integrates object recognition with caption generation. Extensively trained on large-scale image-caption datasets, our model learns to associate visual elements with textual descriptions, facilitating the generation of accurate and meaningful captions. This research significantly advances the realms of computer vision and natural language processing.

The study delves into the training procedures, evaluation metrics, and potential applications of image caption generators, emphasizing their utility in assisting visually impaired individuals, enhancing content management systems, and improving human-computer interaction. Through a comprehensive analysis of existing literature and experimental results, the research underscores the effectiveness of current models while also identifying areas for future improvement. The implications of this technology are vast, offering significant advancements in automated image understanding and description, which can be applied across various domains such as healthcare.

Project ID: 104/CSE(AIML)/4

COGNICARE: THE VIRTUAL MENTAL HEALTH PREDICTOR

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We would like to express our heartfelt gratitude to everyone who contributed to the completion of our final year B.Tech group project. First and foremost, we extend our sincere thanks to our project guide Mr. Samender Singh Sir (Assistant professor), for his invaluable guidance, unwavering support, and expertise throughout the project journey. His mentorship played a pivotal role in shaping our understanding and refining our project.

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Special thanks to our classmates and friends for their encouragement, moral support, and willingness to lend a helping hand whenever needed. Their encouragement kept us motivated during challenging times. Last but not least, we extend our gratitude to all the resources, libraries, and institutions that provided us with the necessary materials and facilities for the successful completion of our project.

Thank you all for being part of this rewarding journey and for contributing to the completion of our project goals.

Abstract

Mental health disorders are a significant global health concern, affecting millions of individuals worldwide. Early detection and intervention play crucial roles in improving outcomes for individuals suffering from mental health issues. This project aims to develop a machine learning-based system for predicting mental health disorders using various physiological and behavioral data.

The proposed system utilizes machine learning algorithms to analyze data and to predict the likelihood of mental health disorders such as depression, anxiety, and stress. The project focuses on feature selection, data pre-processing, and model optimization to enhance the accuracy and reliability of predictions. The project's methodology involves collecting a diverse dataset and utilizing NLP to predict the mental well-being of people.

The system's performance is evaluated using cross-validation techniques and compared with existing approaches to assess its effectiveness in predicting mental health disorders. The project also explores the ethical implications and privacy concerns associated with deploying such a system in real-world settings. Overall, the project aims to contribute to the development of an effective and scalable solution for early detection and intervention of mental health disorders using machine learning techniques.

Project ID: 24/CSE(AI&ML)/1/06

Doctor's Handwriting Recognition

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Acknowledgements

We take this opportunity to express our sincere gratitude and respect to Ajay Kumar Garg Engineering College, Ghaziabad for providing us a platform to pursue our studies and carry out our final year project.

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We consider it a privilege and honor to express our sincere gratitude to our guide Dr. Jaishree Jain, Associate Professor, Department of Computer Science and Engineering, for the valuable guidance throughout the tenure of this review.

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Abstract

Handwriting is the way to convey an idea or information through written means.But over the years, due to fewer doctors per population ratio, doctors have become well-known for their illegible cursive handwriting and have become well accepted. The legibility issue of handwritten medical documents, particularly those created by physicians, has long been a significant problem in healthcare. This study presents Doctor's Handwriting Recognition, an innovative solution to tackle the problem of illegible doctor's handwriting in medical records. Our ideation surpasses its function as a recognition system, serving as evidence of technology's ability to unite tradition and innovation in healthcare documentation. Digitizing medical records is essential for improving patient care, optimizing operations, and safeguarding data. The recognition system uses a Region-based deep Region-based Convolution Neural network (R-CRNN) that is enhanced with the Connectionist Temporal Categorical (CTC) loss function. This allows the system to adapt to the unique handwriting of individual doctors. Doctor's Handwriting Recognition has the potential to revolutionize healthcare professionals' interactions with handwritten medical information. It offers increased efficiency, enhanced patient safety, and decreased medical errors. Adopting this technological advancement improves healthcare documentation and enhances the accessibility of medical records, ultimately benefiting patient well-being.

Project ID: 24/CSE(AIML)/10

Customer Churn Analysis

A PROJECT REPORT
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We also extend my thanks to all the faculty of Computer Science and Engineering who directly or indirectly encouraged me.
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Abstract

In the telecom industry, massive amounts of data are being generated due to the increasing population. Business analysts assert that the expense of acquiring new customers surpasses that of retaining existing ones.

The growing population issue has contributed to customer churning. This has raised concern for businesses as they need to compete passionately to retain customers as customers play a vital role in the revenue of a company. If the rate of acquiring new customers fails to match the needs of enterprise development, the collapse of the enterprise is sure, thus early detection of churning aids in taking protective measures for a company to reduce the losses. The main purpose of this study is to advise ideal machine learning algorithms for predicting early customer churn.

The paper discusses capabilities, methodology, results, and applications. The system uses a Decision Tree Classifier, Random Forest Classifier, and Principal Component Analysis(PCA) which can be used for both classification and regression tasks. This allows the system to study the patterns of customer churn and various factors affecting the trends and patterns.

Customer Churn Pattern analysis has the potential to radically change telecommunication industries' interactions with customers. It has the features to provide better visual patterns on the trends of churning. Feature selection techniques like information gain and correlation analysis among variables are utilized to identify crucial features. These qualities have aided in several domains like businesses, banking, and insurance

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Chapter 1

Introduction

1.1 Introduction to Customer Churn

A loyal customer base is crucial to the growth of any business. They can help businesses become more competitive in their core markets, lower the cost of publicity and negotiating, and use the herd mentality to draw in more new clients. Many businesses focus solely on acquiring new consumers while ignoring how to retain existing clients.

Research indicates that businesses will benefit more from their current customers the longer they stay in touch with them. The market for current clients is not only less expensive, but they are also more inclined to experiment with new goods. According to research, your current customers spend 31% more than new leads and are 50% more inclined to check out a new product. In a company setting, the net present value of customers will rise by 25% to 95% for every 5% increase in customer retention rate.

Thus, one of the most important functions of customer attrition is that it will help the business financially. The telecom industry is not the only one experiencing churn issues. Numerous issues with client attrition also affect the gambling and tourist industries. When it comes to video games, players who find a game too challenging are likely to churn, or quit, while those who find a game too simple will likely become bored 2 and even-

tually stop playing it. Let's examine the cause of client attrition and the necessity of its analysis:

1. Tougher Telecom Environment: Due to a small number of well-rounded market players' dominance, the market is saturated, and fierce price wars result.
2. Smarter and more exacting clients: Comparison shoppers become less devoted and raise their expectations for better services at lower prices.

Realizing the prediction of high-value customer turnover based on current research and combining it with the customer attribute characteristics of the telecom industry is the primary challenge to be addressed in this article. To meet the previously described difficulty, businesses must precisely predict the behavior of their clients.

There are two approaches to managing client turnover:

(1) Reactive : Reactive client management in the telecom industry involves responding to customer issues, complaints, and requests as they arise. It includes robust customer support centers, technical support for troubleshooting service and billing issues, efficient complaint handling, quick service restoration during outages, and feedback collection for improvement. Clear escalation procedures and detailed record-keeping ensure effective issue resolution. Continuous training for customer service representatives is essential. While reactive management addresses immediate needs, it is often complemented by proactive strategies to enhance overall customer satisfaction and loyalty.

(2) Proactive : Reactive client management in the telecom industry involves responding to customer issues, complaints, and requests as they arise. It includes robust customer support centers, technical support for

troubleshooting service and billing issues, efficient complaint handling, quick service restoration during outages, and feedback collection for improvement. Clear escalation procedures and detailed record-keeping ensure effective issue resolution. Continuous training for customer service representatives is essential. While reactive management addresses immediate needs, it is often complemented by proactive strategies to enhance overall customer satisfaction and loyalty.

When a customer requests to cancel, the business presents them with alluring alternatives to ensure their continued patronage. Anticipating customer attrition, tactics are provided to customers before any real churn occurs. Due to the rising prevalence of consumer churn prediction as a research topic, telecom providers have used tactics to categorize prospective churn customers according to their past behavior and records, and then provide them with offers of services to persuade them to stay.
The important features are selected using feature selection techniques such as information gain and correlation attribute ranking filters. We used several machine learning techniques for churn and non-churn classification on two large datasets of the telecom sector. We observed that the Random Forest algorithm produced better accuracy as compared to other machine learning algorithms.

1.2 Identification of the Problem

The problem this research paper addresses is customer churn in the telecommunications industry. Customer churn, also known as customer attrition, refers to the loss of customers who discontinue their service with a provider. This phenomenon poses a significant challenge for telecom companies, with several key aspects contributing to its importance:

Financial Impact : Losing customers translates to lost revenue. Acquiring new customers is often more expensive than retaining existing ones.

Competitive Landscape : The growing population intensifies competition in the telecom industry, making customer retention even more crucial.

Customer Lifetime Value : Loyal customers contribute significantly to a company's long-term profitability through recurring revenue. Losing them erodes this value.

The high cost of customer acquisition and the valuable revenue stream from loyal customers highlight the need for early detection of churn. By identifying customers at risk of leaving, telecom companies can implement targeted retention strategies to address their concerns and prevent churn.

Here's the specific gap this research aims to fill:

Limitations of Traditional Methods: Traditional methods of churn prediction, such as basic customer segmentation or simple statistical models, may not capture the complex factors influencing customer churn behavior in today's dynamic market.

This research explores the potential of Machine Learning (ML) algorithms

for more accurate churn prediction. ML can analyze vast amounts of customer data and identify intricate patterns that influence churn, leading to more effective retention strategies.

1.3 The Criticality of Addressing Customer Churn in Telecom

Customer churn, the loss of subscribers, is a major concern for telecom companies. It goes beyond short-term inconvenience, impacting a company's bottom line and competitive edge.

High churn rates translate to lost revenue. Studies show acquiring new customers can be up to 50% more expensive than retaining existing ones. Loyal customers, on the other hand, contribute significantly through recurring revenue. Losing them erodes a company's financial health.

In a fiercely competitive market, retaining customers is crucial. By addressing their needs and preventing churn, telecom companies differentiate themselves. Loyal customers not only stay satisfied but are 50% more likely to try new offerings and spend 31% more on average compared to new customers. Conversely, high churn can damage a company's reputation and deter potential customers.

However, churn, when managed effectively, can be a springboard for improvement. Machine Learning can analyze vast amounts of customer data, predicting churn with greater accuracy. This "predictive power" allows companies to proactively address customer concerns before they churn. By strategically allocating resources based on churn predictions, telecom companies can maximize the return on their retention efforts. Even a mere 5% boost in retention rates can increase net present value by 25% to 95%, showcasing the financial power of loyal customers.

Project ID: 24/CSE-AIML/1/11

Your Success Hauling

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Acknowledgements

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We also wish to express our sincere thanks to the Institutions for accepting our piece of work. In addition, we are grateful to the Faculty of CSE, Ajay Kumar Garg Engineering College.
Thanks for all your encouragement!

Abstract

The dynamic character of modern professions is posing new problems for the established paradigms of career counseling in the rapidly changing field of career development. This study conducts a thorough investigation into the revolutionary possibilities of incorporating machine learning (ML) algorithms into the domain of career counseling websites. These platforms, which are meant to help people navigate the complex web of career options, are sometimes by their inability to offer personalized guidance that takes into account each person's particular combination of abilities, goals, and market demands. Our study recognizes the critical need for creative solutions to solve the drawbacks of traditional counseling techniques and places itself at the nexus of technology and professional development. By utilizing data analytics, the integration of ML algorithms seeks to transform the way that career counseling is provided. Through the utilization of extensive datasets that include career paths, market trends, and personal preferences, the applied machine learning models aim to identify patterns that surpass human perception. The study technique entails a careful selection of machine learning algorithms that are strategically deployed to capture the many aspects of career decision-making. Simultaneously, focus is made on making sure that the interface is easy to use so that technology may be seamlessly integrated into the individual's study of career paths. The development process is guided by ethical concerns, which are essential in reducing prejudices and maintaining the values of inclusion and justice.

Project ID: 24/CSE(AI&ML)/14

PREDICTIVE MODELING IN FINANCIAL MARKETS

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Abstract

This research project seeks to address the critical challenge of understanding and quantifying the influence of social media sentiment, particularly from Twitter, and other external factors on stock price movements. With an ever-increasing volume of information available on digital platforms, traders and investors require a comprehensive analysis of these external factors to make informed decisions in financial markets.
The study integrates historical stock price data with sentiment analysis of Twitter data to evaluate the correlation and causality between social media sentiment and stock price fluctuations. By employing advanced statistical models, we aim to provide traders and investors with actionable insights, allowing them to better anticipate market movements.

The primary objectives of this research include:

1. Quantifying the collective sentiment expressed on Twitter with respect to specific stocks or market indices.
2. Investigating the temporal relationship between social media sentiment and stock price movements, including lagged effects and market response times.
3. Identifying the most influential external factors, apart from social media sentiment, that impact stock prices.
4. Developing a predictive model that leverages historical data to forecast future stock price movements based on social media sentiment and external factors.
5. By accomplishing these objectives, this research endeavors to contribute to the development of data-driven decision-making tools for traders and investors, fostering a more informed and adaptive approach to stock market participation. Ultimately, understanding the dynamics between social media sentiment and stock price movements is of paramount importance in contemporary financial markets, where information dissemination is rapid, and sentiment can shape market behavior.

Project ID: 24/CSE(AI&ML)/1/15

Neural Network: Fine-Grained Emotion Classification in Textual Data

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Acknowledgements

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FOOD FORECASTING AND ANALYSIS

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We hereby declare that the work presented in this report entitled "FOOD FORECASTING AND ANALYSIS", was carried out by us. We have not submitted the matter embodied in this report for the award of any other degree or diploma from any other University or Institute. I have given due credit to the original authors/sources for all the words, ideas, diagrams, graphics, computer programs, experiments, and results, that are not my original contribution. I have used quotation marks to identify verbatim sentences and given credit to the original authors/sources.

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Abstract

In the competitive landscape of the restaurant industry, accurate demand forecasting is crucial for optimizing inventory management, enhancing customer satisfaction, and minimizing operational costs. This project presents a Tableau dashboard designed to forecast demand for a chain of restaurants, integrating machine learning techniques to provide actionable insights. The dashboard employs models such as Random Forest, Gradient Boosting, and K-Nearest Neighbors (KNN) to predict demand based on historical sales data, customer conditions, and special events.

Key performance metrics, including Mean Absolute Error (MAE), Root Mean Squared Logarithmic Error (RMSLE), and R^2 Score, are used to evaluate the models' accuracy and reliability. Among the models, Gradient Boosting demonstrated the highest accuracy with an MAE of 64.72 and an R^2 Score of 0.88, making it the most effective model for this application. The dashboard offers an intuitive interface, allowing users to visualize forecasted demand, analyze trends, and make data-driven decisions to enhance operational efficiency and customer satisfaction.

This tool is an invaluable asset for restaurant managers, providing them with the foresight needed to adjust staffing levels, manage inventory, and prepare for fluctuations in demand, ultimately driving better business outcomes.

Project ID: 24/CSE(AIML)/107

VIRTUAL ASSISTANT

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We hereby declare that the work presented in this report entitled "VIRTUAL ASSISTANT", was carried out by us. We have not submitted the matter embodied in this report for the award of any other degree or diploma of any other University or Institute. I have given due credit to the original authors/sources for all the words, ideas, diagrams, graphics, computer programs, experiments, and results, that are not my original contribution. I have used quotation marks to identify verbatim sentences and given credit to the original authors/sources.

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We sincerely thank everyone who contributed to the success of this group project. First, we deeply appreciate our project supervisor, **Dr. Ashish Dixit**, for their invaluable guidance, support, and feedback throughout the project. Their expertise and mentorship was crucial in directing us and ensuring the quality of our work.

We are also grateful to Dr.Jaishree Jain for their insightful input, which enhanced our understanding of the subject and provided the necessary foundation for this project.

Additionally, we acknowledge the efforts of our fellow group members. Their dedication, teamwork, and collaboration were essential in achieving our project goals. Each member's unique strengths and contributions played a vital role in our success.

Finally, we thank our friends and family for their unwavering support and encouragement during this project. This project would not have been possible without the collective efforts of everyone mentioned above. Thank you for your invaluable contributions to our success.

[Devendra Kumar,
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ABSTRACT

This report provides a comprehensive overview of a virtual desktop assistant designed to enhance productivity and streamline user experiences in both personal and professional settings. The assistant, named Jarvis, leverages voice recognition technology to perform tasks such as web searches, weather forecasts, and managing reminders. Jarvis integrates advanced features like real-time speech recognition, contextual navigation, and multilingual support, making it adaptable to various user needs and preferences. Key functionalities include launching websites, playing music, setting alarms, and automating interactions with platforms like YouTube and Google. The assistant also features a robust database architecture ensuring efficient data management and security measures, including encryption and access controls. Jarvis is built using tools such as Anaconda and Visual Studio, with speech recognition facilitated by APIs and libraries like pyttsx3. It offers a personalized user experience by learning from interactions and adapting its responses over time. Future developments aim to integrate Jarvis with mobile platforms and enhance its capabilities to serve as a comprehensive server assistant. The maintenance procedures outlined ensure optimal performance and security, with regular updates, performance monitoring, and user training. Jarvis aims to save users time and provide a seamless, intelligent assistant experience, potentially replacing traditional server administration roles.

Keywords : Virtual Assistant, Productivity, Voice Recognition, Automation, Machine Learning, User Experience, Database Management, Security, Mobile Integration.

Project ID: 24/CSE-AIML/1/103

iPark: Intelligent Parking

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DECLARATION

We hereby declare that the work presented in this report entitled "iPark: Intelligent Parking", was carried out by us. We have not submitted the matter embodied in this report for the award of any other degree or diploma from any other University or Institute. I have given due credit to the original authors/sources for all the words, ideas, diagrams, graphics, computer programs, experiments, and results, that are not my original contribution. I have used quotation marks to identify verbatim sentences and given credit to the original authors/sources.

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I would like to express my deepest gratitude to all those who have supported me throughout the development of this project.

Firstly, I would like to thank my project guide, Mr Samender Singh, for his invaluable guidance, patience, and encouragement. His insights and suggestions have been crucial to the success of this project. I extend my heartfelt thanks to Dr Avdhesh Gupta, our professor in charge, for providing the necessary resources and support. His expertise and feedback have been instrumental in shaping the direction and quality of this work.

My sincere appreciation goes to my friends and family for their unwavering support and encouragement throughout this journey. Their understanding and patience have been a constant source of motivation. Additionally, I would like to acknowledge the online communities and forums dedicated to machine learning and game development. The shared knowledge and collaborative spirit of these communities have been immensely helpful.

Lastly, I am grateful to God for providing me with the strength and perseverance to complete this project.

Thank you all for your continuous support and encouragement.

Abstract

The constant growth in the Artificial Intelligence and Machine Learning field is changing our daily lives in countless ways. The action of driving is one of the examples, and the redundant task of parking is a waste of our useful time. This project describes how RL agents in the Unity Environment can perform autonomous parking. The goal is to propose a method that uses reinforcement learning techniques offered by the Unity ML-Agents framework within Unity's realistic 3D simulation to solve the requirement for autonomous parking solutions. The suggested solution's design, execution, and assessment are highlighted in the paper. The system offers an adaptive and realistic system for autonomous parking in complex situations. The outcomes of thorough performance testing and comparative analysis highlight the usefulness and promise of the suggested approach in the area of autonomous car parking. Discussing the results, difficulties faced, and prospects for additional study and advancement in autonomous car parking technology round up the report.

Keywords: *Unity ML-Agents, Unity Game Engine, Autonomous Parking System, Reinforcement Learning*

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Chapter 1

Introduction

1.1 Background

The fusion of artificial intelligence and virtual simulation has ushered in a new era of technological advancements. Within this paradigm, Machine Learning (ML) and, more specifically, Reinforcement Learning (RL), have emerged as transformative tools for training intelligent agents to autonomously perform intricate tasks. This project focuses on harnessing the capabilities of RL within the Unity simulation environment to address the challenging domain of automated car parking.

Unity, with its robust physics engine and realistic rendering, provides an ideal platform for creating simulated environments that closely mimic real-world challenges. As autonomous vehicle technology progresses, the development of intelligent parking systems becomes crucial. This project leverages Unity's capabilities to create a simulated environment where a virtual car equipped with an RL agent can learn to navigate diverse parking scenarios.

Through a comprehensive analysis of the proposed system's design, implementation, and evaluation, this project aims to shed light on the potential of RL-based autonomous parking simulation as a viable approach for addressing the challenges of autonomous vehicle development. Furthermore, the findings and methodologies presented in this project may pave the way for future advancements in autonomous vehicle training, with broader applications in other domains of autonomous systems.

1.2 Identification of the Problem

Automated car parking represents a multifaceted challenge in the field of autonomous vehicle control. The intricacies of spatial awareness, tra[illegible]al-time

decision-making.

These challenges combined are so significant that a traditional algorithm can not overcome them. This project identifies this problem and aims to train an RL agent to navigate and park a car autonomously, recognizing the dynamic and complex nature of the parking situation. The main reason to opt for the RL technique over other sorts of algorithms, and the Unity Environment is due to the facilities provided, we will take a closer look at the Unity Engine, and the Unity ML-Agents framework (including RL tools provided) in further sections.

The project seeks to address fundamental questions such as:

- How can we construct a system capable of parking a vehicle on its own?
- What factors contribute to successful navigation in various parking scenarios?
- and How efficient will the system be?

By honing in on these challenges, the project aims to contribute to the development of robust and adaptive RL models capable of handling the nuances associated with automated car parking.

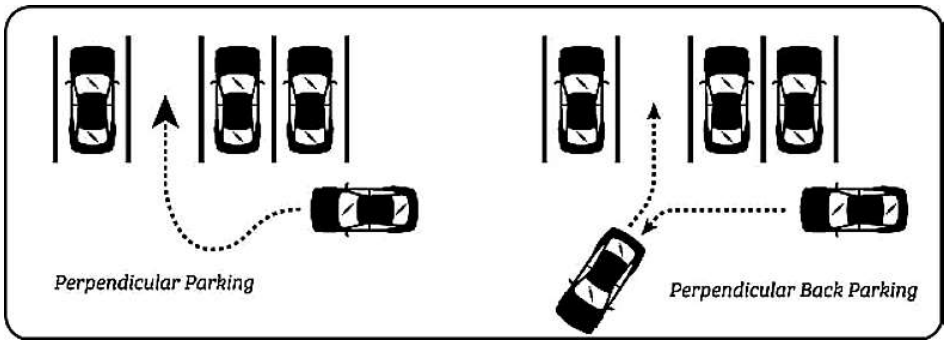

Figure 1.1: Identification of the Parking Problem

1.3 Significance of the Problem

The significance of this project lies in its direct relevance to the advancement of autonomous vehicles. Automated parking systems, an integral part of the broader self-driving technology, demand intelligent agents capable of making swift and accurate decisions in real time. By employing RL techniques, this project endeavours to create a model that not only learns optimal parking strategies but also adapts to diverse scenarios, showcasing the adaptability necessary for real-w[illegible]

As autonomous vehicles become an increasingly viable mode of transportation, the ability to navigate and park autonomously becomes a defining factor in their widespread adoption. This project addresses the significance of the problem by contributing to the growing body of knowledge surrounding ML applications in simulated environments, with a specific focus on enhancing the capabilities of RL agents in the context of automated car parking.

1.4 Scope of the Project

The scope of this project encompasses the development of an autonomous car parking system using Reinforcement Learning (RL) within the Unity simulation environment. The primary focus is on training a virtual agent to autonomously navigate and park a car in diverse scenarios, emulating real-world challenges. The system will address various aspects of automated parking, including spatial awareness, trajectory planning, and real-time decision-making.

The simulation environment, powered by Unity, provides a flexible and realistic platform for creating parking scenarios that mimic the complexities of urban environments. The scope extends to the exploration of RL algorithms to optimize the learning process, with an emphasis on adaptability and efficiency.

1.5 Project Objectives

Objective 1. Develop an RL model tailored for car parking in Unity, integrating state-of-the-art algorithms to enable effective learning and decision-making.

Objective 2. Design and implement a simulation environment within Unity that encompasses a range of parking scenarios, capturing the complexities of real-world parking challenges.

Objective 3. Train the RL agent to navigate and park a virtual car autonomously, emphasizing adaptability to different parking space configurations and dynamic environments.

Objective 4. Evaluate the performance of the trained RL agent based on key metrics, including success rate, parking accuracy, and computational efficiency.

Objective 5. Contribute insights to the broader field of ML applications in simulated environments, offering solutions and methodologies for training RL agents in complex tasks, specifically in the context of automated car parking.

Figure 1.2: Parking scenario simulated in the Unity Engine

1.6 Outline of the Report

This document outlines the key aspects of the projects and serves as a detailed and essential guide for the "iPark: Intelligent Parking" project. Its overarching purpose is to provide comprehensive insights into the intricacies of the system, offering a roadmap for developers, stakeholders, and all involved parties.

Key Aspects:

1. System Architecture: Detailed exploration of the architectural framework, highlighting the interplay between components, modules, and their respective functionalities.

2. Functionalities: In-depth coverage of the system's functionalities, elucidating how each component contributes to the overall autonomy and efficiency of the car parking system.

3. Design Strategies: An overview of the design strategies employed, focusing on how Unity's simulation environment and Reinforcement Learning techniques synergise to create an intelligent parking model.

4. Development Guidelines: A reference for developers, providing guidelines and insights into the coding, implementation, and integration processes crucial for the successful realization of the system.

5. Decision-Making Reference: Facilitation of informed decision-making among stakeholders by offering a clear understanding of design choices, methodologies, and anticipated outcomes.

By addressing these key aspects, this document aims to be a foundational resource, ensuring clarity, alignment, and efficient display of information on the autonomous car parking system.

Project ID: 24/CSE-AIML/1/108

ESTIMATING TOPIC BASED PUBLIC ANXIETY USING FUZZY LOGIC

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Submitted in partial fulfilment of the requirements for the degree of Bachelor of Technology in Computer Science and Engineering - Artificial Intelligence and Machine Learning

to

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May 18, 2024

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Declaration

We hereby declare that the work presented in this report entitled "ESTIMATING TOPIC-BASED PUBLIC ANXIETY USING FUZZY LOGIC", was carried out by us. We have not submitted the matter embodied in this report for the award of any other degree or diploma of any other University or Institute. I have given due credit to the original authors / sources for all the words, ideas, diagrams, graphics, computer programs, experiments, results, that are not my original contribution. I have used quotation marks to identify verbatim sentences and given credit to the original authors / sources.

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We would like to express our sincere gratitude to several individuals for supporting me throughout our final year project. First, We wish to express our sincere gratitude to our supervisor, Ms. Neeharika Tripathi, for her enthusiasm, patience, insightful comments, helpful information, practical advice and unceasing ideas that have helped us tremendously at all time in our project. her immense Knowledge, profound experience and professional expertise in Machine learning along with AI has enabled us to complete our project successfully. Without her support and guidance, the project would not have been possible. We could not have imagined having a better supervisor in our study.

We also wish to express our sincere thanks to the Institutions for accepting our piece of work. In addition, we are grateful to the Faculty of CSE, Ajay Kumar Garg Engineering College.

Thanks for all your encouragement!

Abstract

In this present era everyone is using social media in there are some messages, posts or comments that create anxiety or depression for users. Although the assessment of personal stress has been well studied, there has not been much work done to accurately assess social stress, especially in the social community, that can be used to identify mental illness in the community. However, we cannot average the scores of individual stressors to measure stressors in the population, as the following must be taken into account:-

(1) The effect of interpersonal relationships on stress in all groups (design).
(2) Discussion-based content (content summary) showing the stress situation in the community. In this project, we first started to explore social anxiety in social networking (TSNC)-based issues. We evaluate the working framework for TSNC to score in the range of stress levels [0, 1].

We developed a cascade model to measure individual stress scores using a structured model. We developed a fuzzy model to assess the stress score using users' phone calls and wrote a tree model (MC-Tree) to calculate the stress score for TSNC from the subjects.

Project ID: 24/CSE AI ML/1/09

Sign Language Translator

A PROJECT REPORT
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We also wish to express our sincere thanks to the Institutions for accepting our piece of work. In addition, we are grateful to the Faculty of CSE, Ajay Kumar Garg Engineering College

Abstract

The abstract summarizes various research projects that aim to enhance communication for individuals with speech and hearing impairments. These projects concentrate on the development of applications that can comprehend and translate sign languages such as Indian Sign Language (ISL) and American Sign Language (ASL) using advanced technologies like speech recognition and natural language processing. Real-time systems utilize computer vision and deep neural networks for gesture recognition, enabling seamless two-way communication between individuals with speech impairments and those who can speak. Ongoing research explores techniques like Mel-Frequency Cepstral Coefficients (MFCCs) and convolutional neural networks (CNNs) to improve the accuracy and efficiency of sign language translation systems. Given the millions of people worldwide who face these disabilities, these efforts aim to create accessible solutions, including portable mobile applications, to promote inclusive communication and connectivity.

Project ID: 24/CSE AIML/112

Profit Optimization of Retail Store

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We hereby declare that the work presented in this report entitled "PROFIT OPTIMISATION OF RETAIL STORE", was carried out by us. We have not submitted the matter embodied in this report for the award of any other degree or diploma of any other University or Institute. I have given due credit to the sources for all the words, ideas, diagrams, graphics, computer programs, experiments, results, that are not my original contribution. I have used quotation marks to identify verbatim sentences and given credit to the original sources.

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The author extends sincere appreciation to all those who contributed to the completion of this report on "Profit Optimization for Retail Store."

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Last but not least, appreciation is expressed to the friends and family of the author for their unwavering support and understanding during the course of this project.

Thanks to all for their contributions and encouragement.

Abstract

In an ever-evolving retail landscape, the pursuit of profit optimization stands as a paramount objective for retailers seeking sustained success. This report delves into the multifaceted realm of profit optimization within the context of a retail store environment. Through comprehensive analysis and strategic evaluation, the report aims to elucidate key factors influencing profit margins and offer actionable insights to enhance profitability.

Forecasting plays a pivotal role in enabling retail establishments to anticipate future demand, optimize inventory levels, and ultimately enhance profitability. This report explores the application of the AutoRegressive Integrated Moving Average (ARIMA) model as a forecasting tool in the pursuit of profit optimization for retail stores.

The report begins by providing a comprehensive overview of the ARIMA model, elucidating its theoretical underpinnings and practical applications in time series analysis. Through a meticulous examination of historical sales data and relevant economic indicators, the report demonstrates the efficacy of the ARIMA model in capturing underlying patterns and trends inherent in retail sales.

Utilizing real-world data from a retail store, the report presents a step-by-step implementation of the ARIMA model for forecasting sales figures over a specified time horizon. Leveraging the flexibility and adaptability of the ARIMA framework, the model accounts for seasonality, trend fluctuations, and exogenous factors to generate accurate and reliable forecasts.

Drawing upon a blend of empirical research, industry best practices, and theoretical frameworks, the report identifies critical drivers of profitability and evaluates their efficacy in different retail settings. Moreover,

Project ID: 24/CSE-AIML/1/113

E-Kissan: Advanced Crop Disease Detection System

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I would like to express my deepest gratitude to all those who have supported me throughout the development of this project. Firstly, I would like to thank my project guide, Mr Yogendra Narayan Prajapati, for his invaluable guidance, patience, and encouragement. His insights and suggestions have been crucial to the success of this project.

I extend my heartfelt thanks to Dr Avdhesh Gupta, our professor in charge, for providing the neces- sary resources and support. His expertise and feedback have been instrumental in shaping the direction and quality of this work.

I am also grateful to Mr Akhilesh Verma and Mr Ashish Dixit, whose teaching and mentorship have significantly contributed to my understanding and appli- cation of this report and project related principles. My sincere appreciation goes to my friends and family for their unwavering support and encouragement throughout this journey. Their understanding and patience have been a con- stant source of motivation.

Additionally, I would like to acknowledge the online communities and forums dedicated to machine learning and game development. The shared knowledge and collaborative spirit of these communities have been immensely helpful. Lastly, I am grateful to God for providing me with the strength and persever- ance to complete this project. Thank you all for your continuous support and encouragement.

Abstract

E-Kissan is an innovative crop disease detection system designed to assist farmers in identifying and managing crop diseases effectively. Crop diseases pose significant threats to global food security, impacting agricultural yields and livelihoods. Timely detection and treatment are critical in mitigating these challenges.

The E-Kissan system combines machine learning and web technologies to provide farmers with a user-friendly platform for uploading images of diseased crops. Developed using React, the web interface facilitates seamless interaction, allowing farmers to submit images for analysis. Behind the scenes, a powerful backend, built on FastAPI and Uvicorn, hosts a Convolutional Neural Network (CNN) model trained with TensorFlow.

Unlike traditional methods, E-Kissan's CNN model is trained to detect crop diseases irrespective of their stage of infection. By analyzing the uploaded images, the model accurately identifies the presence of diseases, enabling farmers to take timely action to prevent further spread and minimize crop losses.

The model can detect a wide range of crop diseases, providing comprehensive coverage for various plants. Below are diseases the model can identify:

- **1** Apple
  - Apple Scab

  - Black Root
  - Cedar Apple Rust
  - Healthy
- **2** Corn
  - Gray Leaf Spot
  - Common Rust
  - Northern Leaf Blight
  - Healthy
- **3** Grape
  - Black Root
  - Black Measles
  - Leaf Blight
  - Healthy
- **4** Peach
  - Bacterial Spot
  - Healthy
- **5** Potato
  - Late Blight
  - Early Blight
  - Healthy
- **6** Tomato
  - Bacterial Spot
  - Early Blight
  - Late Blight

- Leaf Mold
- Septoria Leaf Spot
- Spider Mites
- Target Spot
- Yellow Leaf Curl Virus
- Mosaic Virus
- Healthy

The integration of artificial intelligence and web-based technologies empowers farmers with rapid and reliable disease diagnosis, enhancing their ability to make informed decisions and adopt proactive measures. E-Kissan represents a significant advancement in precision agriculture, offering a scalable solution for sustainable farming practices and contributing to global efforts in ensuring food security.

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Chapter 1

Introduction

1.1 Background

Agriculture is the cornerstone of global food security, providing sustenance and livelihoods to billions of people worldwide. However, the agricultural sector faces numerous challenges, with crop diseases posing a significant threat to productivity and food security. These diseases can devastate entire harvests, leading to economic losses for farmers and food shortages for communities. Traditionally, farmers have relied on manual observation and experience to detect and manage crop diseases. However, this approach is often inefficient and prone to errors, resulting in delayed responses and increased crop losses.

Advancements in technology, particularly in the fields of machine learning and web development, present new opportunities to address the challenges of crop disease detection and management. By harnessing the power of artificial intelligence and web-based platforms, it is possible to develop innovative solutions that enable early detection, accurate diagnosis, and timely intervention, thus minimizing the impact of crop diseases on agricultural productivity.

1.2 Identification of the Problem

The timely detection and management of crop diseases remain critical challenges in agriculture. Despite the efforts of farmers and agricultural extension services, the prevalence of crop diseases continues to impact yields and livelihoods worldwide. Several factors contribute to the persistence of this problem:

- Limited Access to Information: Many farmers, particularly those in remote or resource-constrained areas, lack access to timely and reliable information on crop diseases and their management. This hinders their ability to identify and respond to disease outbreaks effectively.

- Inadequate Diagnostic Tools: Traditional methods of disease diagnosis, such as visual inspection and manual sampling, are often labor-intensive and subjective. Moreover, these methods may not be suitable for early detection or accurate identification of diseases, leading to delayed responses and increased crop losses.

- Complexity of Disease Identification: Crop diseases exhibit a wide range of symptoms, making them difficult to identify accurately, especially for farmers with limited training or experience. Furthermore, the similarity between symptoms of different diseases adds to the complexity of diagnosis, increasing the risk of mismanagement.

Addressing these challenges requires innovative solutions that leverage technology to provide farmers with accessible, accurate, and timely information on crop diseases. By developing a crop disease prediction system that combines machine learning and web technologies, it is possible to empower farmers with the tools they need to detect, diagnose, and manage crop diseases effectively.

1.3 Significance of the Problem

The impact of crop diseases extends far beyond individual farms to global food security. Crop losses due to diseases can have profound economic and social consequences, affecting not only farmers' incomes but also the availability and affordability of food for communities. Addressing the problem of crop diseases is crucial for ensuring sustainable agricultural practices and meeting the nutritional needs of a growing population. By providing farmers with the means to detect and manage crop diseases effectively, innovative solutions have the potential to improve agricultural productivity, reduce food waste, and enhance food security worldwide.

1.4 Scope of the Project

The scope of the E-Kissan project encompasses the development of a crop disease prediction system that leverages machine learning and web technologies to provide farmers with a tool for early detection and management of crop diseases. Key components of the project include:

- Development of a user-friendly web interface: The project will involve the creation of a web-based platform that allows farmers to upload images of diseased crops for analysis. The interface will be designed to be intuitive and accessible, catering to users with varying levels of technological literacy.

- Implementation of a machine learning model: A machine learning model, based on Convolutional Neural Networks (CNNs), will be developed to analyze the uploaded images and predict the presence of crop diseases. The model will be trained on a diverse dataset of crop images to ensure accurate and reliable predictions.

- Integration of backend technologies: The project will utilize backend

technologies such as FastAPI, Uvicorn, and TensorFlow to support the operation of the system. These technologies will facilitate the communication between the web interface and the machine learning model, ensuring seamless interaction and efficient processing of user requests.

1.5 Project Objectives

The primary objectives of the E-Kissan project are as follows:

- Develop a user-friendly web interface for farmers to upload images of diseased crops.

- Implement a machine learning model, based on Convolutional Neural Networks (CNNs), for accurate prediction of crop diseases.

- Integrate backend technologies, including FastAPI, Uvicorn, and TensorFlow, to support the operation of the system.

- Evaluate the performance of the E-Kissan system in terms of accuracy, efficiency, and usability.

Chapter 2

Literature Review

The integration of deep learning into agricultural practices has garnered substantial interest due to its potential to address complex challenges in crop disease management. This literature review explores the advancements in using deep learning techniques, particularly convolutional neural networks (CNNs), for automatic crop disease classification.

2.1 Traditional Methods of Crop Disease Detection

Traditional crop disease detection methods have primarily relied on visual inspections conducted by agricultural experts. These methods, while effective, are often time-consuming, subjective, and prone to human error. The accuracy of visual inspections can vary significantly based on the inspector's experience and environmental conditions, leading to inconsistent results and delayed responses to disease outbreaks.

2.2 Deep Learning for Crop Disease Classification

Recent advancements in deep learning have introduced more reliable and efficient approaches to crop disease detection. CNNs have emerged as powerful tools for image recognition and classification tasks due to their ability to automatically extract and learn relevant features from images. These networks have been successfully applied to various agricultural problems, including the identification of plant diseases.

Project ID: 24/CSE AI-ML/116

CANSAT - A Can Sized Satellite

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We extend our heartfelt thanks to Dr Avdhesh Gupta, our professor in charge, for providing the necessary resources and support. His expertise and feedback have been instrumental in shaping the direction and quality of this work.

We are also grateful to Mr Akhilesh Verma and Mr Ashish Dixit, whose teaching and mentorship have significantly contributed to my understanding and application of this report and project related principles. My sincere appreciation goes to my friends and family for their unwavering support and encouragement throughout this journey. Their understanding and patience have been a constant source of motivation.

Lastly we would like to acknowledge the efforts and coordination of team members of TEAM DEBRIS that helped in successful completion of the project.

Abstract

Our project focuses on the design, construction, and operation of a CanSat — a miniature satellite encapsulated within the volume of a cylinder. The objective is to develop a functional CanSat equipped with sensors and communication systems for atmospheric data collection. Through this endeavor, we aim to enhance our understanding of space technology, engineering principles, and practical applications.

The project encompasses various stages, including conceptualization, design iteration, fabrication, and testing. Key components include sensor integration, telemetry systems, and deployment mechanisms. The CanSat will be launched via model rocket or balloon to collect atmospheric data such as temperature, pressure, and humidity. Data retrieval and analysis will provide valuable insights into atmospheric phenomena and satellite functionality. This project serves as an educational platform for hands-on learning in aerospace engineering and fosters innovation in space technology.