Facial Emotion Recognition For Drug Use Detection: A Machine Learning Approach Toward Preventive Counseling

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Abstract: Facial expression for emotion detection has always been an easy task for humans, but achieving the same task with a computer algorithm is quite challenging. With the recent advancement in computer vision and machine learning, it is possible to detect emotions from images. With the rapid increase of usage of Drug in our society this article aims to study the usage by providing proper counsel. The article mainly aims to find whether an individual is using drug or not by facial emotion recognition. A registered user can book a counseling session to help the individual to overcome the addictions. This paper aims to have a drug free society.

Index Terms - Facial Emotion Recognition, Drug Abuse Detection, Machine Learning, Web-Based Counseling System, Social Impact Technology

I. INTRODUCTION

Substance abuse, particularly among youth and adolescents, poses a severe social and health challenge in contemporary society. Traditional detection methods such as urine, blood, and hair testing, while effective, are invasive, time-consuming, and often not scalable for preventive or early-stage interventions. With the advancements in artificial intelligence and computer vision, emotion recognition through facial expressions has emerged as a non-invasive and efficient technique to detect psychological states and behavioural tendencies, including substance use.

This paper "Facial emotion recognition for drug use detection: a machine learning approach toward preventive counselling", is a novel web-based system that integrates **facial emotion recognition** with a **counselling appointment platform** to detect potential drug use behaviour and provide timely psychological support. The system uses machine learning algorithms to classify facial expressions into emotional states associated with distress or potential substance abuse. Upon detection, registered users are encouraged to book sessions with professional counsellors. Additionally, the platform facilitates community reporting of drug-related activities and allows police departments and the general public to contribute toward building a drug-free society.

"Facial emotion recognition for drug use detection: a machine learning approach toward preventive counselling" aims to combine **AI-driven preventive screening** with **accessible support services**, enhancing public awareness and early intervention. The ultimate objective is to reduce drug dependency through timely detection, targeted counselling, and community participation.

II. SYSTEM ANALYSIS

"Facial emotion recognition for drug use detection: a machine learning approach toward preventive counselling" is inspired by the daily news in papers and other channels. As we all know the drug usage among teenagers and other individuals in our society are increasing day by day. This project aims to find the drug usage and minimize the usage to cultivate an healthy society. The adults are mostly finding happiness on drugs nowadays. Childhood abuse is linked to suicidal thoughts and attempts. The particular mental behaviour that mediates the link between childhood trauma and adult suicidal ideation and attempts is yet unknown. Recent studies show teens experiencing suicidal thoughts, psychiatric illness symptoms like anxiety, mood, and conduct disorders, and various types of child maltreatment like sexual abuse, corporal punishment, and emotional neglect that further leads to children inclining toward intoxicants.

PRELIMINARY INVESTIGATION

Preliminary investigation is the first phase. In this phase, it encompasses a comprehensive assessment of various critical aspects to ensure the project's viability and effectiveness. This investigation involves conducting market research to understand the existing landscape of drug detection and identify potential gaps for improvement of mental strength. Additionally, drug usage analysis is conducted through observations with movies, pictures, articles, and other websites about the reasons and types of drugs. Technical feasibility is evaluated to determine the viability of implementing the predictive system within the Django framework, considering factors such as data availability, privacy, and integration with machine learning tools. Furthermore, considerations regarding user interface design, legal and ethical compliance, budget allocation, resource management, and risk assessment are crucial in laying the ground work for the successful development and implementation of the paper. Through this preliminary investigation, the project can gain valuable insights and mitigate potential challenges, ensuring its effectiveness in addressing the causes of drug usage among adults and help to reduce it.

FACT FINDING TECHNIQUES

Fact finding is a process of collection of data and information based on techniques which contain sampling of existing documents, research, observation, questionnaires, interviews etc. There are several methods for gathering this sort of information. We can use all these methods for gathering information from the user of the existing system.

1. Sampling

   Sampling is the process of collecting a representative sample of documents, forms, and records. Because it would be impractical to study every occurrence of every form or record in a file or database, system analysts normally use sampling techniques to get a large enough cross section to determine what can happen in the system. The system analyst seeks to sample enough forms to represent the full nature and complexity of the data. First collected sample is a Sample receipt and conducted a study to know how these data can be converted to a digital method.

2. Research and Visit Sites

   Research and site visits is the process of examining the problems which had previously been solved by other sources that can be either human or documents. To solve the requirements of the problem, the analyst visits to other organization that had previously experienced for similar problems. In addition, the analyst can also find the information from database, reference books, case studies and internet.

3. Observation

   Another fact-finding technique is observation. In this technique, a system analyst participates in the organization, studies the flow of documents, applies the existing system, and interacts with the users. Observation can be a useful technique when the system analyst has a user's point of view. A sampling technique called work sampling is useful for observation. By using this technique, system analysts can know how employees spend their days. This is an effective data collection technique for obtaining an understanding of a system.

4. Interviews
    Interview is the most used technique to collect information from face-to-face interaction. The purpose of the interview is to find, verify, clarify facts, motivate end users involved, identify requirements, and gather ideas and opinions.

5. Questionnaires
    Questionnaires are also one of the useful fact-finding techniques to collect information from large number of users. These are special-purpose documents that allow the analyst to collect the information and opinions from respondents.

III. SOFTWARE REQUIREMENT SPECIFICATION

The system can be developed with well-defined software requirements to ensure functionality, reliability, and scalability. The functional requirements include key features such as user registration and login, emotion detection through facial expressions, appointment booking with counsellors, complaint registration, and role-specific access for police and public users. These requirements define how users interact with the system and what operations the software must perform. The non-functional requirements focus on system performance, user-friendly interface, security, maintainability, and platform independence, ensuring the application is efficient, easy to use, and adaptable across environments. The system configuration specifies the use of Python with Django framework for backend development, MySQL for database management, and HTML/CSS for front-end design. This configuration supports a responsive, secure, and scalable platform capable of handling concurrent interactions from various user roles while maintaining data integrity and performance.

Requirement	Importance	Description
User Authentication	Essential	Secure login system for admin, users, counsellors, and police officers.
Web Interface	Essential	Enables interaction between users and the application via a user-friendly UI.
Appointment Booking	Essential	Allows users to schedule counseling sessions with registered counsellors.
Complaint Management	Essential	Enables users and public to file complaints and receive responses.
Emotion Detection	Essential	Detects emotional states through facial recognition using ML models.

IV. CONCEPTUAL MODELS

The conceptual model of the EM DRUG system is represented using a Use Case Diagram, which outlines the primary actors and their interactions with the system. The system is designed to support five major roles: Admin, User, Counsellor, Police, and Public User. Each actor interacts with the system through a set of defined functionalities. Users can register, log in, detect emotions via facial recognition, book appointments with counsellors, and post complaints. Counsellors manage schedules and interact with users for counseling sessions. Admins oversee the platform by managing counsellor registrations, conducting awareness programs, and replying to complaints. Public users can view awareness content and report drug-related activities anonymously. Police officers can log in, post reports of criminal activity, and view complaints for further action. This structured interaction model ensures role-based access control, modular system design, and streamlined service delivery for early intervention in drug abuse cases.
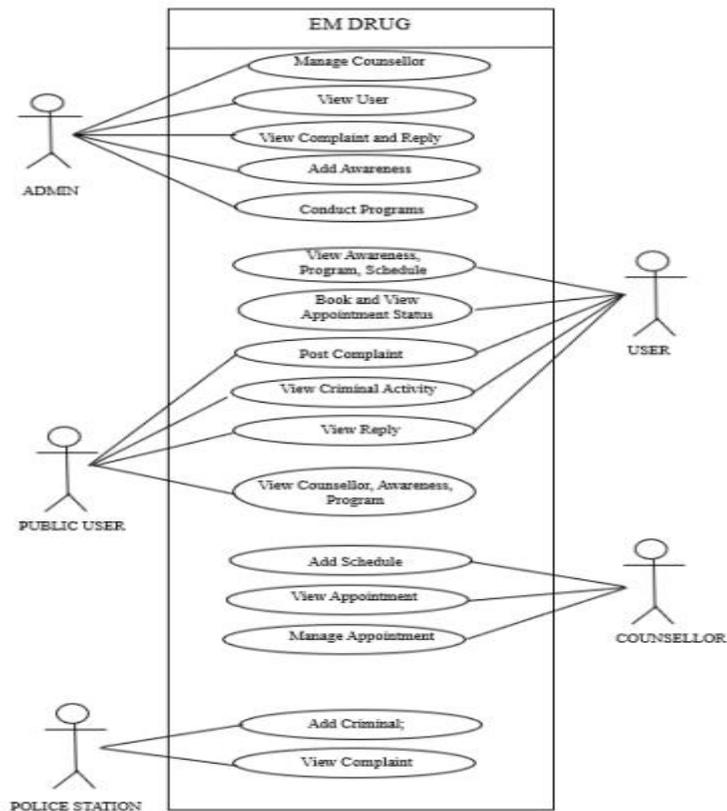
V. SYSTEM DESIGN

The system is architected using a **modular, role-based design** that ensures scalability, maintainability, and ease of use across different user types. It follows a **three-tier architecture** comprising the presentation layer (user interface), application layer (business logic), and data layer (database management). Each user role—**Admin, User, Counsellor, Police, and Public User**—interacts with the system through clearly defined modules. The Admin module facilitates counsellor management, awareness program coordination, and complaint handling. The User module allows individuals to register, detect emotional states using facial recognition, book appointments, and report issues. Counsellors can manage schedules and provide support, while Police modules enable reporting and monitoring of drug-related crimes. Public users can anonymously report drug activity and access awareness content. The system is built using Python with the Django framework for back-end logic, MySQL for data storage, and HTML/CSS for a responsive front-end. This layered, modular design promotes a seamless flow of information while ensuring each user segment has controlled and secure access to relevant system functionalities.

Module	Functionality
Admin Module	Manages counsellor accounts, posts awareness content, conducts programs, views complaints, and replies to user/public issues.
User Module	Allows registration, login, emotion detection, booking counseling appointments, posting complaints, and viewing criminal activities and replies.
Counsellor Module	Enables counsellors to register, manage appointment schedules, view user bookings, and provide counseling services.
Police Module	Allows police to register, view public complaints, report drug-related criminal activities, and respond to concerns.

VI. CONCLUSION

This study "*Facial emotion recognition for drug use detection: a machine learning approach toward preventive counseling*", presents an integrated, emotion-driven system designed to assist in the early detection and intervention of drug abuse through facial expression recognition and AI-powered counseling services. The system successfully combines machine learning with web technologies to offer a preventive framework that supports users through emotion detection, facilitates access to counselling, and enables community participation in reporting drug-related activities.

By adopting a modular architecture and involving key societal stakeholders—users, counsellors, law enforcement, and the general public—the platform enhances the responsiveness and effectiveness of drug prevention efforts. The system's capacity for real-time emotion analysis, combined with structured intervention pathways, establishes its relevance as a socio-technological solution for promoting mental well-being and substance abuse awareness.

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