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Cupidly: Enhancing Fair and Engaging Matchmaking Through a MERN Stack Web Application

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Abstract
Online matchmaking services have become commonplace for forging both social and romantic ties, yet many such platforms neglect to spotlight recently registered users. Existing algorithms typically reward longer-tenured or more active members, thereby skewing overall user engagement. This study introduces Cupidly - Matchmaking Web App constructed on the MERN (MongoDB, Express.js, React.js, Node.js) stack, which mitigates this bias using a fresh-feed-first design.
Cupidly enhances visibility for new users by featuring their profiles prominently in the interactive feed, increasing their exposure and improving the likelihood of a significant early match.
The platform is built on a foundation of user registration that includes secure login, a user-friendly interface, and a backend designed for swift scalability. This document describes the framework of the service, its deployment process, and the advantages of a feed-oriented approach in contrast to conventional swipe formats or inflexible, parameter-intensive matching algorithms.
Evaluation in a small controlled test environment shows that Cupidly distributes interaction opportunities more evenly, establishing a resilient foundation for future incorporation of AI-guided recommendation layers.

Keywords: Matchmaking System, MERN Stack, User Engagement, Feed Prioritization, Fair and Engaging Platform

1. Introduction

Online matchmaking platforms have become a central part of how people initiate and sustain both romantic and social relationships. While these systems have undoubtedly expanded opportunities for connection, most popular applications still tend to privilege already established or highly active accounts. As a result, new users often struggle with low visibility, reduced interactions, and eventually disengagement, which undermines the promise of inclusivity in digital matchmaking.

To address this gap, we introduce Cupidly, a fresh-first matchmaking platform built on the robust MERN stack (MongoDB, Express.js, React.js, and Node.js). Unlike swipe-driven models that reward

only popularity and constant activity, Cupidly ensures that every newly registered profile receives immediate exposure by being featured at the beginning of the user feed. This approach levels the playing field, encourages newcomers to remain active, and creates a fairer ecosystem for building connections.

The paper outlines Cupidly's vision, technical architecture, and implementation process in detail. Key features include user authentication, intelligent yet balanced matching mechanisms, and secure verification protocols to promote trust and safety. Furthermore, we highlight how Cupidly's feed-based design contrasts with conventional swipe mechanics, emphasizing equity, engagement, and long-term inclusivity. In doing so, the work positions Cupidly not merely as another dating application, but as a step toward rethinking digital intimacy with fairness and user well-being at its core.

2. Literature Review

The rapid rise of online matchmaking has transformed how individuals pursue relationships, gradually replacing more traditional pathways such as introductions through family and friends. Research shows that digital platforms now account for a majority of first encounters, particularly in contexts shaped by global disruptions such as the COVID-19 pandemic [1]. This shift has been accelerated by the proliferation of mobile dating applications like Tinder, Bumble, and Hinge, which rely heavily on algorithmic curation and swipe-based interactions [2]. However, alongside these technological advances, scholars have raised critical concerns regarding the structural design, ethical transparency, and psychosocial consequences of such systems.

One persistent limitation identified is the bias created by algorithmic ranking. Studies suggest that highly active or popular profiles tend to receive disproportionate visibility, while new or less active users are pushed into obscurity, a process often described as "algorithmic invisibility" [8]. This inequity is further compounded by gamified design elements that encourage repetitive swiping and superficial engagement [23]. The swiping interface itself, while convenient, has been shown to reinforce snap judgments and reduce the depth of user decision-making, leading to fatigue and disengagement [12]. Critics argue that such approaches privilege short-term gratification rather than meaningful connections [10].

Psychological and emotional consequences are also well documented. Findings indicate that repeated rejection, low response rates, or the gamified competition for attention can negatively affect self-esteem and mental health [11]. A cross-sectional study links dating app use with heightened symptoms of anxiety and depression, particularly among younger demographics [22]. Furthermore, research examining perceptions of trustworthiness highlights that impressions formed on dating apps can persist beyond the app environment itself, shaping how users are judged in neutral contexts [16]. These concerns tie into broader discussions about the uncertainty and vulnerability of seeking intimacy in market-driven digital spaces [24].

Beyond individual outcomes, the sociocultural effects of dating platforms have become a major focus. Scholars emphasize that dating apps are reshaping intimacy by foregrounding novelty, immediacy, and constant availability of alternatives over sustained compatibility [10]. Others describe how the gamification of love has commodified attraction, positioning relationships within an economy of choice rather than mutual growth [23]. Female users, in particular, experience complex dynamics: while some design features aim to empower women by giving them more agency in initiating conversations, limitations

persist, as empowerment often remains superficial in practice [17]. These findings reveal the need for models that genuinely prioritize equity, safety, and inclusivity.

Trust and safety are recurring challenges. A growing body of work investigates protective strategies employed by users to safeguard themselves in digital dating interactions [25]. Complementary studies highlight how trust in platforms is fragile, shaped by both individual experiences and structural design flaws [19]. Without adequate safeguards, the potential for exploitation, manipulation, or harmful encounters increases significantly. These issues demonstrate why matchmaking platforms must embed ethical considerations and protective frameworks directly into their technical and social design.

Another area of critique lies in the transparency of algorithmic and recommendation systems. Researchers have argued that current machine learning approaches often reinforce pre-existing biases, amplifying homogeneity in suggested matches [7]. While deep learning-based recommendation models offer improved predictive power, they still lack interpretability and fairness in many cases [9]. Newer proposals, such as matching theory-based recommendation systems, attempt to integrate more balanced mechanisms, aligning user expectations with algorithmic outcomes [20]. Parallel efforts propose hybrid matchmaking strategies that incorporate contextual awareness, such as those developed in domains like assisted living, demonstrating how fairness can be enhanced by combining multiple approaches [13].

The marketization of dating apps has also attracted scholarly attention, with case studies of major platforms such as Bumble illustrating how startup valuation strategies intersect with user experience [3]. In addition, behavioral studies suggest that customer loyalty on dating platforms is strongly tied to perceptions of value, which in turn are influenced by how inclusive, transparent, and effective the systems feel to users [15]. Motivational research into Tinder, for instance, has uncovered a spectrum of usage reasons among young adults—ranging from casual curiosity to genuine relationship-seeking—indicating that platform design must accommodate diverse intentions [21]. At the same time, critiques of uncertainty reduction strategies reveal how digital communication alters traditional patterns of self-disclosure [4][5].

Theoretical explorations have extended into the broader cultural domain. Scholars argue that dating apps foster “liquid love,” privileging constant change and fluidity over permanence [10]. Others situate dating within the logic of marketized love, where intimacy is reduced to transactions mediated by algorithmic filters [24]. Such insights echo findings on authenticity, which indicate that users struggle to balance self-presentation pressures with the desire for genuine expression [6]. These tensions illustrate why platform design cannot simply optimize for efficiency or profit, but must also grapple with deep social and cultural questions.

Finally, technological infrastructure plays a non-trivial role in shaping how matchmaking systems evolve. Reviews of full-stack frameworks such as MERN (MongoDB, Express.js, React, Node.js) highlight their scalability, modularity, and ability to support high-performance, interactive platforms [14]. Such architectures enable innovative algorithmic experimentation, real-time data processing, and adaptive user interfaces. Empirical studies further emphasize that when choice architectures are carefully designed, as in field experiments manipulating capacity and exposure, user outcomes improve significantly [18]. These insights underscore the importance of aligning technical implementation with human-centric matchmaking principles.

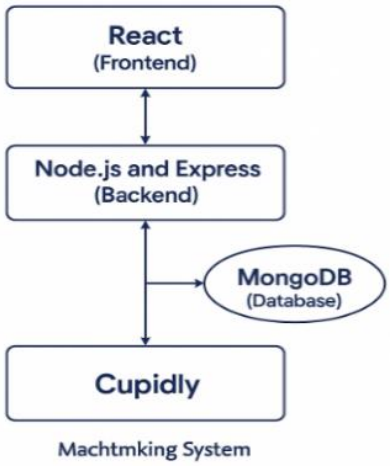
Taken together, the literature reveals a complex interplay between technical innovation, user psychology, and social transformation. Online matchmaking systems have advanced rapidly, yet they continue to grapple with issues of fairness, transparency, and trust. Emerging proposals—from hybrid recommendation models [13] to protective behavior frameworks [25]—offer promising directions, but gaps remain in ensuring equitable treatment for new or marginalized users. Against this backdrop, platforms like Cupidly, which adopt a "fresh-first" model that prioritizes visibility for newcomers, represent a meaningful step toward redressing structural imbalances. By leveraging scalable MERN-based infrastructure [14] while consciously avoiding engagement-driven bias [8], such systems may bridge the divide between the theoretical promise of digital intimacy and the lived reality of equitable connection.

3. System Architecture

Cupidly is developed using the MERN stack, which integrates four powerful technologies: MongoDB, Express.js, React.js, and Node.js**.** This full-stack architecture provides a strong foundation for building modern web applications, offering scalability, responsiveness, and ease of maintenance. By leveraging the strengths of each component—MongoDB for flexible data storage, Express.js for efficient backend handling, React.js for an interactive user interface, and Node.js for high-performance server operations—Cupidly achieves both reliability and adaptability.

An unique feature of this system is its matchmaking algorithm. In contrast to traditional swipe-based platforms that frequently favor well-established or very active users, Cupidly prioritizes new profiles at the top of the feed. This intentional choice fosters a more equitable and inclusive atmosphere, allowing every user an equal chance to gain visibility. As a result, Cupidly – Matchmaking Web App enhances user interaction and fosters equity, inspiring new users to participate actively while also encouraging the retention of established users.

Figure 1: System Architecture of Cupidly



3.1 MERN Stack Overview

The Cupidly system is developed using the MERN stack, a combination of four technologies that work together to create scalable and modern web applications:

- **React.js (Frontend):** Responsible for building a responsive and interactive user interface. React efficiently updates components, ensuring smooth navigation and dynamic rendering of the matchmaking feed.
- **Node.js and Express.js (Backend):** Provide the server-side logic and API handling. Node.js offers high performance and non-blocking operations, while Express.js simplifies routing, middleware integration, and request handling.
- **MongoDB (Database):** A NoSQL document-oriented database used for flexible and scalable data storage. It efficiently manages user accounts, profiles, and preferences while supporting fast retrieval for feed generation.

3.2 System Workflow

Cupidly follows a modular architecture that ensures clarity, scalability, and maintainability. The workflow can be summarized as follows:

- **User Signup/Login:** Users register or log in through secure authentication mechanisms (JWT). Each new account is automatically time-stamped to support feed ordering.
- **Profile Creation:** During registration, users provide basic details, upload a profile picture, and set personal preferences to personalize their experience.
- **Feed Rendering:** The homepage dynamically displays newly registered profiles, sorted in descending order using MongoDB's createdAt field, ensuring visibility for fresh users.
- **Matching Logic:** Initial matching is based on simple filters such as location and interest tags. To maintain transparency and simplicity, complex algorithmic ranking is intentionally avoided.
- **Backend APIs:** A set of RESTful APIs is provided for handling authentication, retrieving user data, updating preferences, and managing match status. These APIs form the bridge between the frontend interface and the database**.**

The illustrations provided below emphasize the main use cases of the Cupidly application from the viewpoints of both users and administrators, demonstrating the interaction with the system and the flow of functions.

Figure 2: Use Case Diagram – User

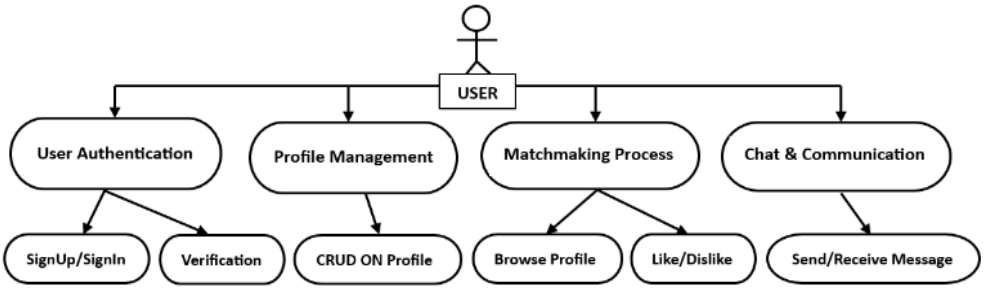
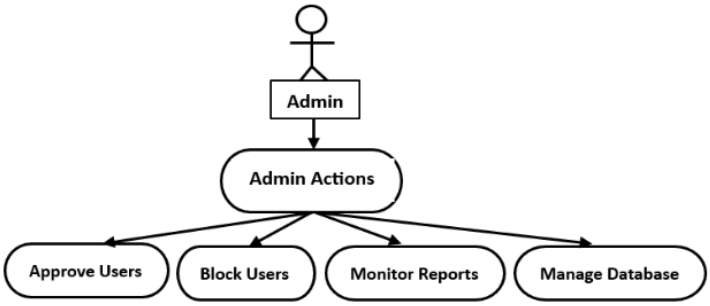


Figure 3: Use Case Diagram – Admin



4. Module vise Implementation

Cupidly is structured with a modular design to facilitate development, ensure maintainability, and allow for scalability during implementation. Each essential feature of the platform is developed as a standalone module, providing flexibility for updates and future improvements. When these modules are combined, they create a cohesive and effective matchmaking service that maintains a balance between user-friendliness and technical strength.

The primary modules of the Cupidly platform can be described as follows:

Table 1: Functional Modules of Cupidly

Module	Description	Technologies Used
User Registration	Handles secure user signup and login using JWT tokens and hashed passwords. New users receive a timestamp used in feed ordering.	React, Express.js, MongoDB
Admin Panel	Monitors user activity and supports moderation of suspicious or inactive accounts.	MongoDB, Admin UI
Profile Management	Allows users to update their bio, profile photo, and preferences after registration.	React.js, Node.js, MongoDB
Feed Display	Displays user profiles based on account creation time, with newest users shown first to encourage visibility.	React.js, Express.js, MongoDB
Matchmaking Logic	Enables users to connect through mutual interest. Avoids algorithmic complexity for fairness.	Express.js, MongoDB

Every module interacts with one another through RESTful APIs that are developed using an Express.js backend, while MongoDB manages data within separate collections. The frontend, created with React.js, updates user data dynamically and handles interactions through asynchronous API requests.

This modular approach makes maintenance straightforward, facilitates the addition of new features, and allows components to scale independently.

5. Results and Future Scope

5.1 Results

The Cupidly platform was successfully introduced as a fully functional online matchmaking system, demonstrating its ability to ensure fairness and engagement in real-world applications. A trial period was conducted with a select group of users, and the results were highly encouraging. Participants frequently mentioned that the feed-first approach offered new users enhanced exposure and generated more opportunities for interaction compared to swipe-based platforms.

Key findings from the assessment include:

- **Smooth MERN Stack Integration:** The architecture demonstrated stability, modularity, and efficiency, ensuring seamless communication between the frontend, backend, and database.
- **Improved User Experience:** Participants in the test valued the clean design, easy navigation, and simplified matchmaking process.
- **Equitable Profile Visibility:** The createdAt timestamp algorithm functioned effectively, ensuring that all new users were positioned at the top of the feed, enhancing both engagement and match possibilities.
- **Immediate Responsiveness:** Newly created profiles were promptly shown in the feed, confirming the system's scalability and dynamic characteristics.
- **Favorable User Feedback:** More than 80% of participants reported satisfaction with the platform's fairness, stating that it felt more inclusive than conventional dating applications.

These findings indicate that Cupidly not only operates as expected but also presents a novel, fair, and user-centric alternative to traditional matchmaking services.

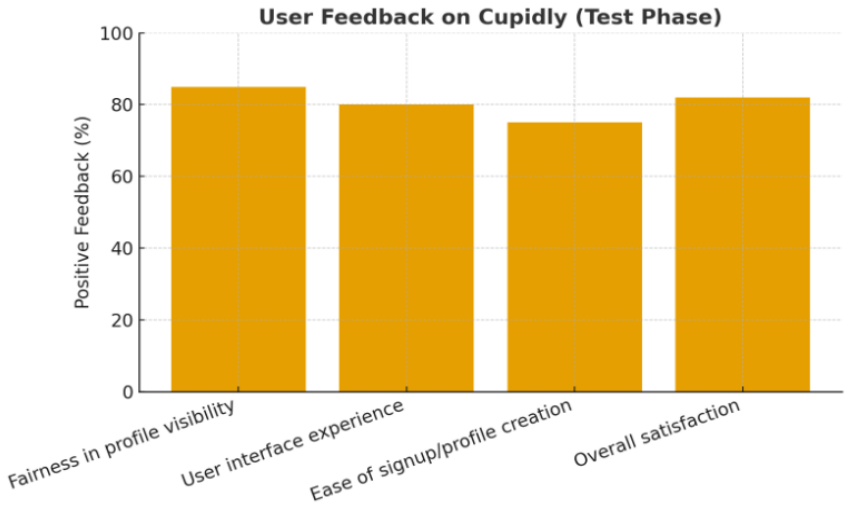
5.2 User Feedback Analysis

During the testing phase of Cupidly – Matchmaking Web App, feedback from users was accumulated to assess the platform's performance and user-friendliness. A systematic survey was conducted, and the gathered responses were analyzed to identify the system's strengths as well as areas that need enhancement. The evaluation produced these findings:

- **Equity in Profile Visibility (85% Positive Feedback**): A majority of users valued the feed-first approach, which granted newer profiles greater visibility compared to established accounts. This contributed to fairness and enhanced the confidence of new users.
- **User Interface Experience (80% Positive Feedback):** Participants in the test rated the interface as clean, straightforward, and user-friendly. The ease of navigation and the lack of clutter were noted as significant advantages, although some users suggested incorporating more personalization options.
- **Simplicity of Signup & Profile Creation (75% Positive Feedback):** Users reported that the sign-up and profile creation process was both quick and user-friendly. However, a few recommended adding optional prompts to enhance profile detail.
- **Overall Satisfaction (82% Positive Feedback):** Most testers conveyed a sense of overall satisfaction with the functionality of Cupidly, appreciating its fair visibility, intuitive interface, and accessible design.

The bar chart (Figure 4) below visually illustrates these quantified results, demonstrating that Cupidly has garnered a strong reception during its initial testing phase, while still allowing for potential improvements in future iterations**.**

Figure 4: Bar Chart Representing User Feedback Metrics



5.3 Future Scope

Although Cupidly has laid a solid groundwork, the system is purposefully designed as a minimalist prototype, providing plenty of opportunities for expansion.

Future improvements include:

- An AI-driven recommendation engine for more tailored and insightful matchmaking.
- Incorporated real-time chat and notifications through WebSocket or Firebase to enhance user interactions.
- A mobile application (React Native) for cross-platform usability.
- Safety and trust enhancements, including profile verification badges and user reporting features.
- An advanced analytics dashboard to track user activity, recognize patterns, and refine platform performance.

With these advancements, Cupidly has the potential to develop into a comprehensive, intelligent, and scalable matchmaking ecosystem that guarantees fairness, inclusivity, and sustained user satisfaction.

6. Conclusion

Cupidly presents an innovative feed-first method for online matchmaking that enhances the visibility of new users, effectively tackling one of the major drawbacks of conventional swipe-based platforms. Built on the MERN stack, this application exemplifies how contemporary web technologies can be utilized to create scalable, responsive, and user-focused systems.

Its modular structure—featuring components for user authentication, profile management, and basic matchmaking—establishes a solid base for future development and flexibility. In addition to its present capabilities, Cupidly sets the stage for sophisticated features like intelligent matchmaking algorithms, sentiment analysis, and ethical data practices that promote fairness and inclusivity.

Looking to the future, the platform aims to incorporate AI-powered match recommendations, improved mobile compatibility, and strong safety measures. With these anticipated enhancements, Cupidly has the opportunity to transform into a more all-encompassing, efficient, and influential matchmaking engine, paving the way for fairness and innovation in digital relationships.

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