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JANAK

Nurturing Holistic Development

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SUBMITTED IN PARTIAL FULFILLMENT FOR THE REQUIREMENT OF THE AWARD
OF DEGREE OF

BACHELOR OF TECHNOLOGY
IN
COMPUTER SCIENCE



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Session 2024-25

DEPARTMENT OF COMPUTER SCIENCE

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May 2025

DECLARATION

We hereby declare that this submission is our own work and that, to the best of our knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

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CERTIFICATE

This is to certify that Project Report entitled “Janak: Nurturing Holistic Development” which is submitted in partial fulfillment of the requirement for the award of degree B. Tech. in Department of Computer Science of Dr. A.P.J. Abdul Kalam Technical University, Lucknow is a record of the candidate's own work carried out by them under my supervision. The matter embodied in this report is original and has not been submitted for the award of any other degree.

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ACKNOWLEDGEMENT

This final year's project report comes to you with great pleasure. A special mention must be made for Professor Dr. Ajay Kr. Shrivastava Department of Computer Science, KIET, Ghaziabad, whose constant support and guidance throughout the development of the work has been invaluable to us. His sincerity and thorough approach along with perseverance kept on inspiring us. It is through his conscious efforts alone that our wishes have been realized.

We must take this opportunity to record our gratefulness to Dr. Ajay Kr. Shrivastava, Dean, Computer Science, KIET, Ghaziabad, for providing us with full support as our guide and cooperation during the project development. We should not fail to express our gratitude to the other members of the faculty of the department for their kind assistance and co-operation during the progress of our project.

Apart from that, finally, there is our sub-list of acknowledgments of friends who helped us in carrying out the work.

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ABSTRACT

The Janak: Nurturing Holistic Development initiative is a comprehensive digital platform geared towards assisting the parent in achieving salutary factors and promoting cognitive, psychomotor, and affective development in his child. This app serves as an all-in-one deed platform, encompassing academic progress tracking, IQ test assessment, BMI monitoring, social media usage tracking, therapy session bookings, and an online forum exclusively for parents. The system in question is developed with Flutter for the front end, Firebase for real-time backend services, and Python for machine learning models to provide smooth and reactionary user experience.

Some key features are real-time notifications, privacy and data security, and user-friendly interface that supports active parental engagement. The whole project is executed following the agile software development life cycle (SDLC), which factors in iterative refinement and continuous integration. To give the system the utmost reliability and high performance, the system is put through vigorous testing approaches, including unit and integration testing.

Testing results have demonstrated tracking, parental involvement, and data security procedures within the platform. The Janak platform has fulfilled the functional requirements while excelling in performance, security, and scalability. The future advancements include but are not limited to implementing AI-powered personalized recommendations and further extending this scope by integrating other health monitoring modules to aid holistic child development. Janak is conceived as a tool to empower parents with actionable insights and promote an environment of shared learning and support.

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LIST OF ABBREVIATIONS

³⁰
UI/UX

User Interface / User Experience

²⁸
API

Application Programming Interface

SDK

Software Development Kit

SDLC

Software Development Life Cycle

DBMS

Database Management System

SDG Mapping & Justification:

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The project is in line with the following Sustainable Development Goals (SDGs)-

SDG 3: Good Health & Well-being:

Captures the contact information of mothers for follow-up communications Schedules therapy sessions to assist with mental health.

SDG 4: Quality Education:

Provides tracking of academic progress and IQ tests Stimulate intellectual growth with activity-based instruction.

SDG 16: Peace, Justice & Strong Institutions:

Provides a secure community website for parents to connect with and share advice and assistance.

INTRODUCTION**1.1 Introduction to Project**

Janak: Nurturing Holistic Development is an all-encompassing application designed to carry out child development observation, thereby assisting parents in actively observing and contributing to the child's growth in cognitive, psychomotor, and affective development. Acknowledging the complex nature of a child's development, the platform merges innovative tools and techniques intended to shed further light on child development. The application further reports extensively about academics, checks IQs, skill testing through computer-interactive exercises, and social media use monitoring in real-time for digital well-being. It also monitors health, such as BMI measurements and therapy appointments for mental and physical health. Another important feature of the application is creating a community platform designed for parental peer support and mutual learning. Extending the technological paradigm from jarred parenting practices, Janak hopes to create closing upon all those gaps through the latest tech tools of data analytics and intelligent tracking systems. It thereby equips parents with insights and expert advice that allow them to better foster a parenting approach based on knowledge and participation. The prime objective of the platform is the promotion of the development of a child's pocket holistically via a friendly environment where the child thrives academically, social being, emotionally, and physically.

1.2 Project Category

Placed under Educational and Child Development Software, this is a Parental Guidance and Monitoring System by virtue of which virtual assistance is provided to parents for the academic and personal development of their children. It covers multiple domains like education, health, and social behavior tracking for a holistic developmental approach.

1.3 Objectives

i) Integrated Child Development Monitoring:

To build a strong and encompassing platform for the parents to monitor and nurture the development of their child along academic, cognitive, psychomotor, and emotional facets. It enabled continuous real-time monitoring of scholastic performance, activity engagement for skill enhancement, and assessment of cognitive and motor skills with feedback in quick cycles. Parents can identify strengths and potential areas of concern to allow for early intervention and bespoke growth paths

ii) Behavioral Knowledge and Parental Guidance:

To generate rich behavioral information concerning data trends-screentime analysis, social media engagement, and learning behavior through activity-based modules. The system analyses these parameters and accordingly suggests and provides customized material specific to the needs of the individual child. It now becomes a virtual parental guide, indicating to parents the application of useful strategies and digital behavior formation in children.

iii) Holistic Health Monitoring:

To generate rich behavioral information concerning data trends-screentime analysis, social media engagement, and learning behavior through activity-based modules. The system analyses these parameters and accordingly suggests and provides customized material specific to the needs of the individual child. It now becomes a virtual parental guide, indicating to parents the application of useful strategies and digital behavior formation in children.

iv) Empowering Parenting Community:

The platform will serve as an interactive and safe social space for parents to connect, share their experiences, and work on fruitful discussions regarding child development. Forums, chat groups, seminars with specialists, and group resources provided by Janak will construct a support framework whereby parents can empower themselves to learn from each other and gain expert opinions.

1.4 Structure of Report

The structure of the report for the Janak: Nurturing Holistic Development project is as follows:

1. Title Page:

- Report Title
- Project Name
- Team Members & Roles

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2. Table of Contents:

List of all the sections and subsections with page numbers for easy navigation.

3. Executive Summary:

- An overview of Janak's basic idea -merging parental instincts with digital smarts.
- Overview of key objectives
- A glimpse of challenges faced, and key milestones achieved during the process.

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4. Introduction:

- Background of the project.
- Purpose and objectives of the project.
- Scope and limitations of the project.
- Overview of the report structure.

5. Project Blueprint:

- Description of the Janak: Nurturing Holistic Development
- End users: Parents
- Overview of the tech stack powering Janak (e.g., Flutter, Firebase, ML APIs).

6. Requirement Deep Dive:

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- **Functional requirements:** Detailed description of features and functionalities.
- **Non-functional requirements:** Performance, security, usability, and other requirements.
- **Stakeholder requirements:** Needs and expectations of company owners and agents.

7. Design & System Architecture:

- Overview of the software architecture.
- Design principles and methodologies used.
- Description of major components/modules.
- Database schema and data model.

8. Building and Implementation:

- Description of the development process.
- Technologies and tools used.
- Challenges faced during implementation and solutions adopted.
- Code organization and structure.

9. Deployment Strategy:

- Overview of the deployment process.
- Infrastructure setup and configuration.
- Deployment environment and server specifications.
- Steps taken to ensure a smooth deployment process.

10. Maintenance & Support:

- Description of ongoing maintenance activities.
- Bug tracking and resolution process.
- User support mechanisms in place.

11. Future Improvements:

- Potential future features and functionalities.
- Areas for improvement based on user feedback.
- Long-term vision for the software.

12. Conclusion:

- Summary of key findings and achievements.

- Reflections on the project journey.
15
- Lessons learned and recommendations for future projects.

13. References:

- List of all sources cited in the report (e.g., research papers, articles, documentation)

14. Appendices

- User personas, wireframes, flowcharts, and other diagrams.

CHAPTER 2

LITERATURE REVIEW

2.1 Literature Review

Holistic development of the child demands harmonious emphasis on different areas like health cognition, emotional well-being, and social behavior. Research indicates the importance of comprehensive solutions to guide parents through these aspects effectively, but most current tools and methods lack effectiveness in providing full support.

i) Cognitive and Emotional Development:

Early childhood is a vital time for cognitive and emotional development, as presented in studies by Piaget and Vygotsky. They highlight the role of interactive learning and emotional stability in developing problem-solving abilities, memory, and emotional strength. Intelligence quotients (IQ) or emotional intelligence quotient (EQ) tests that measure and develop a child's IQ or EQ have worked well, but they tend to give parents generic information that may not be particularly useful for every stage of child development.

ii) Physical and Health Development:

Tracking a child's physical health is vital to the prevention of disease and the promotion of long-term well-being. Research indicates that regular monitoring of nutrition, physical activity, and sleep habits greatly supports physical growth and reduces risk to health. General tracking apps like Fitbit and MyFitnessPal are available, but they do not include child-oriented features that account for developmental requirements or interface with parent-centered tools.

iii) Academic Growth and Performance:

Scholastic performance is one of the primary measures of a child's cognitive and social growth.

Studies emphasize the necessity of real-time monitoring of academic achievement, attendance, and extracurricular activities in order to recognize and fill any possible learning gaps. Although schools offer reports on performance, they do not always have individualized feedback channels that enable parents to act ahead of their children's educational progress.

iv)Social Media and Monitoring of Digital Behavior:

The use of social media by children and adolescents has generated concern over its effect on mental well-being and social relationships. Research associates high or unmonitored use with problems like cyberbullying, anxiety, and decreased attention span. Measures such as parental control software are aimed at mitigating these concerns but tend to work in silos, providing minimal insight into larger developmental effects.

v)Community and Collaborative Parenting:

The worth of an intimate parenting network is established in psychology and sociology. Mutual sharing of experiences and expert advice from peers and experts promotes well-informed decision making and alleviates the solitude experienced by most parents. Present parenting forums and applications have some form of community involvement but are missing integration with data-based tools that can inform comprehensive parenting.

vi)Gap of Integration in Present Solutions:

Though there are tools for health tracking, academic monitoring, or social media monitoring, not many platforms offer these features holistically. The absence of holistic integration leads to broken data, and parents find it challenging to understand their child's development in an integrated manner. Platforms such as BabyCenter or ClassDojo serve a particular purpose but lack in providing for the holistic nature of a child's development in cognitive, emotional, and physical areas.

vii)The Call for an Integrated Solution:

The literature identifies an urgent call for an integrated platform that closes these gaps. This solution would integrate real-time monitoring, data-driven information, and community involvement to give parents actionable advice in all areas of their child's development. This platform serves as the basis for Janak, a platform that seeks to bring together health, academic, emotional, and social development tools into one

2.2 Research Gaps

- i) **Absence of Integrated Development Platforms:** Most available solutions focus on separate areas—school performance, health monitoring, or mental status determination—without a unifying platform.
- ii) **Ineffective Use of Parental Communities as Spaces for Co-Education:** Most current platforms lack parent-led knowledge sharing, support groups, or collaborative problem-solving frameworks.
- iii) **Limited Adaptability to User Diversity:** Most applications are not user-friendly for individuals who have different levels of digital literacy or accessibility requirements.
- iv) **Poor Data Security and Privacy Mechanisms:** Due to the vulnerability of child data, few platforms use end-to-end encryption, user opt-in models, or child data protection regulation compliance. Research needs to focus on secure governance models specific to child development apps.
- v) **Lack of Personalization and Cognitive Mapping:** Few apps tailor content according to a child's development level, learning pattern, or intellectual advancement.
- vi) **Shortage of Longitudinal Impact Studies:** There is a shortage of longitudinal evidence regarding how end-to-end digital solutions influence child development over a period. Long-term research needs to capture educational, cognitive, emotional, and social results linked to holistic child monitoring systems.
- vii) **Resistance to Adoption by Parents:** Cost, lack of training, or distrust in technology are barriers that lead to adverse adoption. Research may investigate the behavioral determinants—such as cost, distrust in technology, or lack of training—and design corrective interventions—such as onboarding mechanisms—to enhance adoption and continued use.

2.3 Problem Formulation

Integrated child development is a multidimensional process that involves academic, cognitive, emotional, and physical aspects. Though there are digital solutions for monitoring individual developmental factors, they tend to be disjointed and narrow in focus. Parents and teachers are usually required to toggle among several platforms to track academic development, measure cognitive abilities, plan health consultations, and interact with community support. This fragmentation causes inefficiencies, data silos, and reduced capacity to make informed, timely

decisions for the child's development.

Janak: Nurturing Holistic Development seeks to bridge this gap by creating an integrated mobile application that is a one-stop shop for a child's overall development.

The platform will integrate:

- Academic monitoring to track scholastic performance.
- IQ and cognitive testing to gain insights on mental development.
- BMI and health records to track physical well-being.
- Parenting community forums for collective parenting.

Though the idea promises much, a number of essential challenges illustrate the necessity for a well-designed solution:

- **Technological Access and Convenience:** Most parents, particularly those in less affluent or rural communities, are restricted in their ability to handle sophisticated applications.
- **Data Privacy and Security:** Child data is sensitive and needs strong encryption, user control over consent, and regulatory requirements (e.g., COPPA, GDPR) to protect it from breaches or misuses.
- **Inadequate Real-Time Insight and Personalization:** Dispersed data across platforms prevents real-time insights.
- **Limited Community Participation:** Current applications do not leverage the potential of social parenting. Janak will have a moderated, safe parent community to foster best practice sharing, emotional support, and cooperative learning experiences.
- **Scalability and Future-Proof:** As families expand or requirements change, the platform needs to be scalable and flexible, accommodating additional users, varied education systems, and future features such as integration with wearables or school database.

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CHAPTER 3

PROPOSED SYSTEM

3.1 Proposed System

Overview:

Janak: Nurturing Holistic Development is a smartphone app that will help parents track and ensure all-around development of their children. In contrast to traditional academic tracking software, the system goes beyond academics, and it includes real-time information regarding cognitive, psychomotor, and affective areas.

With the use of Dart, Flutter, Firebase, Kaggle ML models, Python APIs, and Android development, Janak provides AI-based insights to enable parents to make smart decisions regarding their child's development. The combined system is meant for academic performance tracking, IQ tests, social media usage, health data, and parents forum.

Need for the Proposed System:

Education systems have traditionally emphasized academic performance alone without considering important factors such as mental wellness, emotional intelligence, and physical wellbeing. The Janak: Nurturing Holistic Development fills this gap through its all-around developmental tracking system.

Key Reasons for the System:

- Uncontrolled screen use with adverse mental and social impact.
- Non-personalized cognitive and affective evaluations missing.
- Timely insights into both academic improvement and personal development.
- Compulsion for an interactive, safe platform for inter-parent sharing of experiences.

Working of the System:

The Janak app uses a systematic workflow combining AI-enabled analytics and real-time monitoring.

- i) **User Registration**-Parents create accounts and add child profiles.
- ii) **Data Collection**-Includes records of academics, health related data, activities data, and social media usage.
- iii) **Real-Time Analytics** - Machine learning models analyze cognitive, psychomotor, and affective development.

- iv) **Parental Dashboard** - Trend analysis, insights, and recommendations.
- v) **Alerts and Recommendations** - Alerting parents about screen time, academic interests, or health issues.
- vi) **Community Interaction** - Private discussion forums for parents.
- vii) **Security & Privacy of Data**-Protected authentication and encrypted data storage through Firebase.

3.2 Unique Features of the System

Janak: Nurturing Holistic Development is a future-proof parental guidance system that integrates real-time monitoring, secure data management, and smart analytics to provide an end-to-end perspective on child development. Its core feature modules are as follows:

3.2.1 Holistic Development Tracking

Janak tracks a child's development in the cognitive, psychomotor, and affective areas to give an all-around developmental report.

i) Key Features:

- **Cognitive Skills:** IQ tests, logical reasoning exercises, and problem-solving tests.
- **Psychomotor Skills:** Reflex analysis and interactive, activity-based assessments.
- **Affective Domain:** Monitoring of emotional responses, social interactions, and empathy cues.

Implementation models trained on Kaggle datasets examine test response patterns.

3.2.2 Academic Progress Reports

Provides smart insights into academic performance with tailored recommendations.

i) Implementation:

- Backend coded using Dart and Firebase Fire store.
- Predictive models predict learning trends based on real-time feeds.

3.2.3 Social Media Monitoring & Screen Time Management

Equips parents with the ability to monitor and steer children's digital behavior.

i) Major Features:

- Social media usage habits tracked in real-time.
- Programmed alerts on excessive screen use beyond safe levels.

ii) Implementation:

- Python API-based APIs retrieve activity information from social media sites.
- Firebase Cloud Functions send alerts on potentially unsafe use.

3.2.4 Health and Wellness Insights

Compiles physical and mental well-being data to produce actionable wellness reports.

i) Major Features:

- BMI monitoring and overall health checks.
- Dietary advice sourced from the community.

ii) Implementation:

- Firebase APIs and Android Health SDK handle health data.
- Health data are processed to highlight potential wellness threats.

3.2.5 Parent Community Forum

Facilitates peer-to-peer support and expert discussion in a safe online space.

i) Key Features:

- Themed discussion forums and moderated Q&A sessions with child development professionals.

ii) **Implementation:**

- Forum UI implemented using Flutter.
- Backend moderation provides safety, privacy, and relevance of content.

CHAPTER 4

REQUIREMENT ANALYSIS AND SYSTEM SPECIFICATION

4.1 Feasibility Study

A feasibility study aids in identifying if the Janak can be developed and executed successfully. It consists of technical, economic, and operational feasibility evaluations.

4.1.1 Technical Feasibility

This evaluates if the system could be built utilizing existing technologies and resources.

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- i) **Technology Stack:** The application will be built with Flutter (Dart) for cross-platform compatibility, Firebase for backend storage, and AI/ML for predictive analysis.
 - ii) **Third-Party Integrations:** APIs for academic platforms, health monitoring and social media tracking.
 - iii) **Scalability:** The system is designed to handle multiple user accounts, real-time data updates, and AI-driven recommendations.
 - iv) **Hardware Requirements:** Mobile devices (Android/iOS) with an internet connection.

Conclusion: The system is technically feasible using available technologies.

4.1.2 Economic Feasibility

Evaluates the financial viability of the project.

Development Costs:

- **Software Development:** Flutter, Firebase, AI analytics, and API integrations.
- **Human Resource Costs:** Developers, UI/UX designers, testers, and maintenance staff.

Revenue Model: Freemium Model-Basic features are free, and advanced insights need a subscription.

Conclusion: The project is financially viable with a sustainable revenue model

4.1.3 Operational Feasibility

Evaluates if the system is suitable for end users' needs.

- i) **User Acceptance:** The application offers useful insights to parents, promoting adoption.
- ii) **Ease of Use:** With a straightforward UI, dashboard analytics, and alerts.
- iii) **Training Needs:** Little training is needed because of intuitive UI and in-app instructions.

Conclusion: The system is operationally feasible with high adoption potential.

4.2 Software Requirement Specification

This section defines the overall requirements of the Janak: Nurturing Holistic Development application, including data handling, user features, system performance, maintainability, and security.

4.2.1 Data Requirements

The application handles and processes different types of user-focused data to enable a personalized experience:

- 1) **Parent & Child Data:** Names, contact details, age, development profiles, and parent-child relationships.
- 2) **Academic Data:** Exam grades, subject-wise assessments, and longitudinal performance indicators.
- 3) **Cognitive Psychomotor:** A feedback mechanism to the quizzes and activities created to assess IQ and psychomotor capabilities.
- 4) **Health Record:** BMI history, fitness activity tracking.
- 5) **Social Engagement Data:** Screen time log, app use analytics, and social behavior indicators.
- 6) **Community Interactions:** Peer engagement data, share media, discussion threads, and feedback.

4.2.2 Functional Requirements

It features a feature set with a wide array of characteristics deemed toward accommodating the overall development of children while simultaneously empowering the parents with smart insights and social support.

- 1) Multi-Child Profile Management:** Facility for creating and managing multiple child profiles through a single parent account.
- 2) Development Dashboards:** Visualized analytics of cognitive, academic, affective, and psychomotor progress.
- 3) IQ & Activity-Based Testing Tools:** Interactive games and tools for the assessment of cognitive development and psychomotor reactions.
- 4) Health tracker:** Automatic tracking of BMI, sleep habits, and exercise with AI wellness commentary.
- 5) Digital Wellness Monitor:** Tracks social media activity and screen time, issuing alerts for abnormal behavior.
- 6) Parent-Only Community Forum:** A safe place for parents to interact, exchange tips, and learn.
- 7) AI-Driven Alerts and Insights:** Alerts parents about warning signs such as dropping grades or heavy screen time usage, along with suggesting interventions.
- 8) Progress Reports & Downloads:** Generate child progress reports and downloadable reports for schools or therapists.

4.2.3 Performance Requirements

- 1) Responsiveness:** The app screens should take an average of less than 3 seconds to load.
- 2) Analysis Time:** Insights need to be generated within five seconds of data upload.
- 3) Scalability:** Runtime support for 100,000+ users in parallel without any loss of performance
- 4) Real-Time Sync:** Data on devices must sync in real time without delay.

4.2.4 Maintainability Requirements

- 1) **Modular & Scalable Architecture:** Based on MVC design to simplify upgrade and introduction of new features.
- 2) **Continuous Integration (CI):** Automated testing pipelines and deployment of updates.
- 3) **Documentation:** Inline documentation simple to understand and system flowcharts for handovers to developers.
- 4) **Error Handling:** Logging and monitoring in performance in real-time with bug tracking for resolution.

4.2.5 Security Requirements

- 1) **Authentication:** OAuth 2.0 support with Multi-Factor Authentication (MFA).
- 2) **Encryption:** AES-256 standard for storing and transmitting sensitive information.
- 3) **Accessing:** Role-based access control to segregate permission for parents, moderators, and admins.
- 4) **Data Privacy Compliance:** Aware of the data protection regulations like GDPR and COPPA for children.
- 5) **Secure APIs:** HTTPS for all API communications, including rate limiting and token validation.

4.3 SDLC Model Used

Due to its iterative and flexible nature and focus on users, Agile model was followed in developing this project. Agile promotes constant collaboration, early delivery, and flexibility.

Reasons for Following the Agile Model

- 1) Regular and incremental updates happen during short development cycles, often called sprints. These iterations provide room for continuous changes according to user feedback, ensuring product evolution in tandem with user needs and expectations.
- 2) Agile allows the easy inclusion of additional features and improvements without disturbing the essential functionality. That flexibility makes the model suitable in cases when projects tend to grow with passage of time.
- 3) By testing during the early phases, Agile promotes early identification of bugs and fixes. This leads to an implementation of a stable, efficient, and high-performing application.

Phases of Agile Development

- 1. Creating Requirements:** During the initial stages, stakeholders' discussions help to determine the essential features and functionalities. The team then notes the top goals and end-user expectations to draft a product backlog.
- 2. Planning:** The entire duration of the project is divided into two-week sprints. At each sprint, certain user stories or features are selected for implementation, and tasks are set along with deadlines and assignments.
- 3. Design:** At this point, wireframing for UI/UX assessment and system architecture for the backend are undertaken. The design prototypes are shown to solicit stakeholder feedback before further development.
- 4. Development:** The developers get down to coding based on the sprint plan. Each sprint is geared toward delivering working increments of the product, with adhering to the clean code practices and modular design principles.
- 5. Testing:** Throughout and after every sprint, unit testing, integration testing, and sporadic regression testing ensure that individual code modules work fine and integrate well into the entire system.
- 6. Deployment:** After a stable build has been created and tested well, it is deployed onto production environments like Google Play Store or Apple App Store. CI/CD pipelines can be used for automating the same.
- 7. Maintenance:** Once deployed, the software is kept track of with regard to bugs, performance, and user feedback. Depending on the findings, it is updated, patched, and optimized as needed for reliability.

4.4 System Design

This system has modular architecture consisting of frontend, backend, and database layers and allows transparent interaction between users and services through APIs, favoring scalability and maintainability.

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4.4.1 Data Flow Diagram

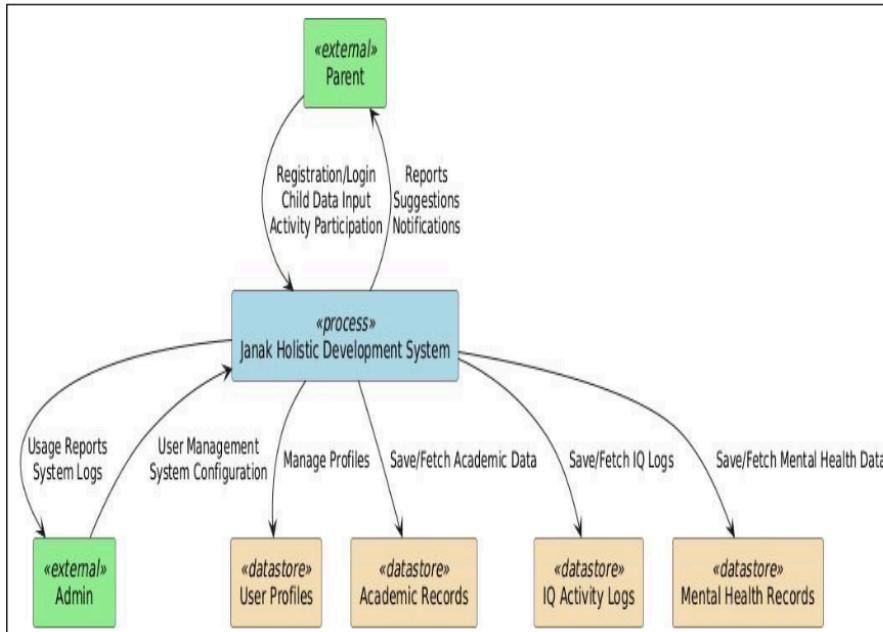


Figure 4.1: Data Flow Diagram

4.4.2 Use Case Diagram

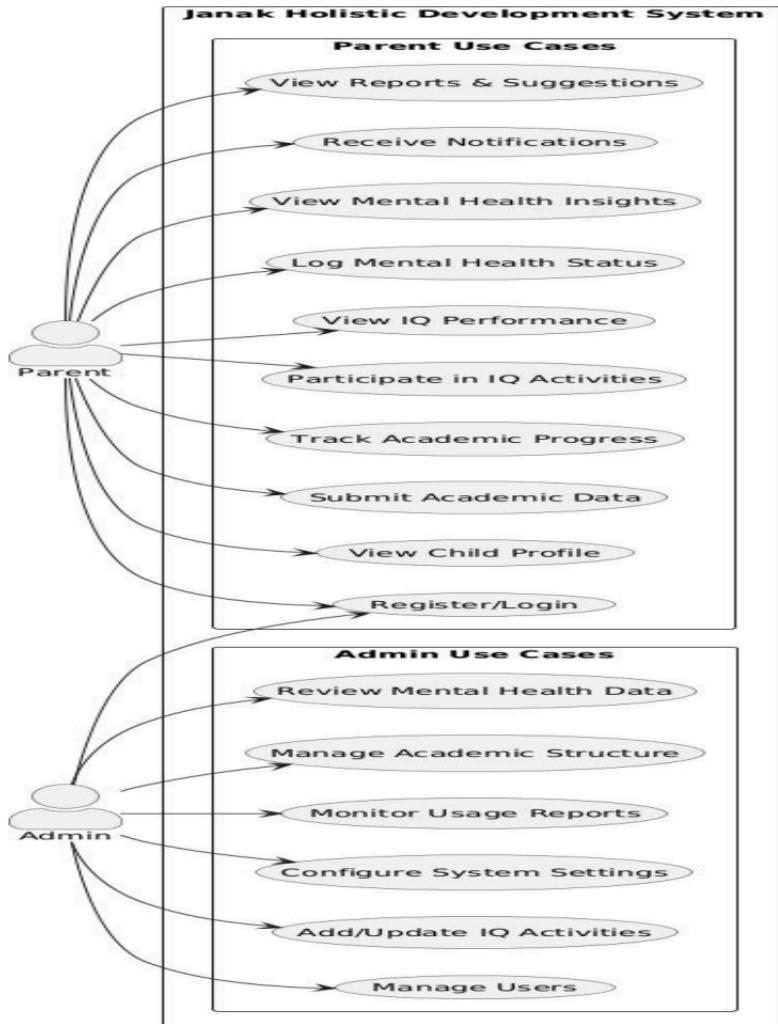


Figure 4.2: Use Case Diagram

4.4.3 Database Design

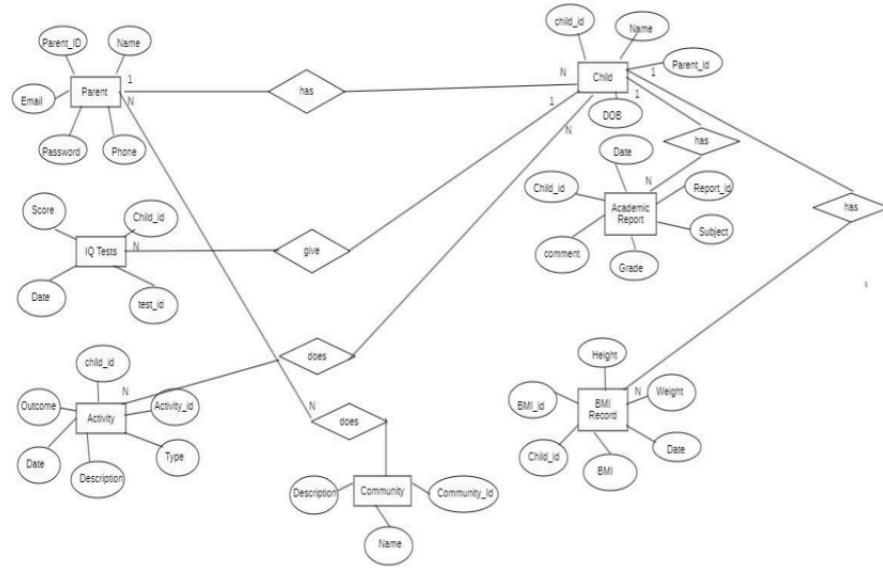


Figure 4.3 : Database Design Diagram

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CHAPTER - 5

IMPLEMENTATION

This chapter provides a holistic summary of the tools, technologies, and strategies used in the development of Janak: Nurturing Holistic Development application. The building of a secure, scalable, and user-friendly platform is portrayed by discussing programming languages, frameworks, databases, APIs, and machine learning.

5.1 Introduction to Tools and Technologies Used

Janak is developed using new generation cross-platform technologies, focusing on performance, accessibility, and real-time data management. These tools enable rapid development.

5.1.1 Programming Languages

- i. **Dart:** The primary language employed to create the mobile app with Flutter.
- ii. **SQL:** Employed for structured data manipulation in local or cloud relational databases.
- iii. **Python:** Used for implementing machine learning models that offer intelligent recommendations or predictions from user data.

5.1.2 Frameworks and Libraries

- i. **Flutter:** Cross-platform user interface (UI) toolkit to build a single codebase mobile application for both Android and iOS.
- ii. **Firebase:** Backend-as-a-Service (BaaS) platform for authentication, cloud Firestore database, and real-time sync

5.1.3 Database and Storage

- i. **Firebase Firestore:** Cloud-hosted NoSQL database for real-time sync of data, especially to keep user profiles, activity tracking, and parental logs.
- ii. **MySQL:** For storing structured data like academic records, screen time analytics, and health metrics.
- iii. **Firebase Cloud Storage:** For the uploading and storage of user-generated content like images, documents, and multimedia files.

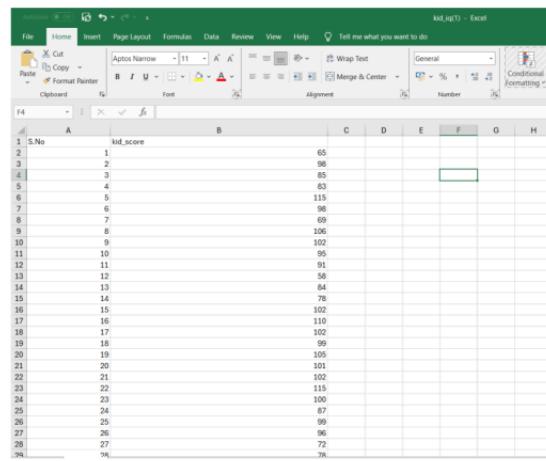
5.1.4 Development Tools

- i) **Visual Studio Code (VS Code):** Main code editor utilized for app development with Dart.
- ii) **GitHub:** Version control system for collaboration and code management.
- iii) **Figma:** UI/UX design software utilized to design wireframes, mockups, and design prototypes prior to implementation.

5.2 Dataset Description

The dataset consists of student performance, screen time logs, and health records collected from real-world or simulated data. It is used to train AI models that provide recommendations for academic improvement, health suggestions, and screen time reduction.

i) IQ Dataset:



S.No	kid_score
1	65
2	98
3	85
4	83
5	115
6	88
7	69
8	106
9	102
10	95
11	91
12	58
13	84
14	78
15	102
16	110
17	102
18	99
19	105
20	101
21	102
22	115
23	100
24	87
25	89
26	98
27	72
28	78

ii) Screen Time Dataset:

Date	Usage	Notifications	Times opened	App
08/26/2022	38	70	49	Instagram
08/27/2022	39	43	48	Instagram
08/28/2022	64	231	55	Instagram
08/29/2022	14	35	23	Instagram
08/30/2022	3	19	5	Instagram
08/31/2022	19	25	20	Instagram
09/13/2022	17	45	39	Instagram
09/14/2022	1	10	2	Instagram
09/15/2022	2	15	4	Instagram
09/16/2022	3	13	5	Instagram
09/17/2022	2	9	3	Instagram
09/18/2022	3	8	5	Instagram
09/19/2022	4	8	3	Instagram
09/20/2022	5	11	5	Instagram
09/21/2022	2	12	8	Instagram
08/26/2022	82	209	105	Whatsapp

iii) BMI Dataset:

Age	Height	Weight	Bmi	BmiClass
61	1.85	109.3	31.850209	Obese Class 1
60	1.71	79.0	25.624889	Overweight
60	1.55	74.7	31.05261116	Obese Class 1
60	1.46	35.9	16.84180897	Underweight
60	1.58	97.1	38.89601025	Obese Class 2
59	1.71	79.32	27.12629527	Overweight
59	1.7	73.5	27.11886721	Overweight
59	1.72	85.32	28.83991347	Overweight
59	1.46	36	16.88872209	Underweight
59	1.63	104.7	31.26399713	Obese Class 1
58	1.71	80.4	25.40136408	Overweight
58	1.7	73.41	25.40136408	Overweight
58	1.72	85.21	28.80273211	Overweight
58	1.47	36	16.659729311	Underweight
57	1.71	79.3	27.11886721	Overweight
57	1.7	73.5	27.11886721	Overweight
57	1.72	85.1	28.76554895	Overweight
57	1.75	110	35.91836735	Obese Class 2
57	1.56	79	28.18189734	Obese Class 1
57	1.47	36	16.88872209	Underweight
57	1.6	99.1	38.71053735	Obese Class 2
56	1.71	79.29	27.11603537	Overweight
56	1.7	73.59	25.40136408	Overweight
56	1.72	85.29	28.80273211	Overweight
56	1.59	78.8	28.98299118	Overweight
56	1.47	36.1	16.79600213	Underweight
56	1.8	98.5	30.40123457	Obese Class 1
56	1.69	98.1	38.76498939	Obese Class 2

iv) Academic Scores Dataset:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	id	first_name	last_name	email	gender	part_time	absence	centrality	weekly	self_care	asx_math	asx_history	asx_physics	asx_chemistry	biology	asx_english	asx_geography	score
2	1	Paul	Casey	casey.paul@male	male	2	FALSE	27	Lawyer	73	81	93	97	63	80	90	90	90
3	2	Zoe	Clark	zoe.clark@female	female	9	TRUE	13	Governor	81	95	96	96	96	96	96	96	96
4	3	Tina	Andrea	tina.andrea@female	female	5	FALSE	3	Artist	71	74	88	80	89	63	85	77	94
5	4	Tara	Clark	tara.clark@female	female	6	FALSE	10	Unknown	84	77	65	65	90	74	76	72	80
6	5	Anthony	Campos	anthony.campos@male	male	7	FALSE	25	Unknown	93	100	67	76	72	80	84	70	85
7	6	Kelly	Wade	kelly.wade@female	female	8	TRUE	23	Software E	99	96	97	73	88	76	64	70	84
8	7	Anthony	Smith	anthony.smith@male	male	9	TRUE	34	Software E	95	95	82	63	84	70	85	70	85
9	8	George	Shaw	george.shaw@male	male	10	FALSE	25	Unknown	94	68	94	85	81	74	72	80	85
10	9	Stanley	Gutierrez	stanley.gutierrez@male	male	11	FALSE	10	Teacher	98	69	88	71	67	71	73	70	85
11	10	Audrey	Simpson	audrey.simpson@female	female	12	FALSE	7	Teacher	65	60	97	94	71	81	66	70	85
12	11	Gabrielle	White	gabrielle.white@female	female	13	FALSE	80	67	100	65	67	64	61	61	61	61	
13	12	Clementine	Randolph	clementine.randolph@female	female	14	FALSE	13	Business C	94	59	69	67	66	65	73	65	73
15	14	Pamela	Jackson	pamela.jackson@female	female	16	FALSE	10	Business C	66	94	86	100	57	90	63	90	87
16	15	Laura	Jackson	laura.jackson@female	female	17	FALSE	9	Doctor	96	96	86	92	92	95	87	90	92
17	16	Roger	Wiley	roger.wiley@male	male	18	FALSE	6	Business C	94	50	76	64	79	74	84	70	84
18	17	Vicki	Thorn	vicki.thorn@female	female	19	FALSE	3	Scientist	92	64	93	91	88	89	72	80	85
19	18	Maxwell	Davidson	maxwell.davidson@male	male	20	TRUE	26	Software E	86	83	85	79	93	76	77	77	80
20	20	Jonathan	Werner	jonathan.werner@male	male	21	FALSE	37	Doctor	92	87	92	99	97	87	86	86	86
21	21	Angela	Rios	angela.rios@female	female	22	FALSE	27	Software E	99	65	98	75	66	72	100	72	85
22	21	Tim	Nichols	tim.nichols@male	male	23	FALSE	15	Software E	100	90	72	98	73	97	72	97	72
23	22	Kyle	Wilk	lyle.wilk@male	male	24	FALSE	4	Business C	57	55	76	94	83	88	88	88	88
25	23	Shannon	Simpson	shannon.simpson@female	female	26	FALSE	2	Business C	89	72	68	72	71	54	90	54	90
26	24	Conrad	West	conrad.west@female	female	27	FALSE	9	Business C	50	70	81	55	56	68	70	68	73
27	25	Pancrea	Chavez	pancrea.chavez@female	female	28	FALSE	35	Software E	87	91	88	95	95	88	93	95	93
28	26	Janice	Williams	janice.williams@female	female	29	FALSE	22	Doctor	92	86	87	81	93	90	89	90	89
29	27	Jason	Williams	jean.williams@female	female	30	FALSE	34	Banker	100	77	80	94	63	90	90	90	90
30	28	Penny	Gable	penny.gable@male	male	31	FALSE	25	Writer	84	76	81	81	86	81	85	81	85

v) Mental Health Dataset:

	A	B	C	D	E	F	G	H	I	J	K	L	Entity	Code	Year	Schizophrenia	Depressive	Anxiety	dis	Bipolar	dis	Eating	disorders	(share of population)	- Sex: Both - Age:
1	Entity	Code	Year	Schizophrenia	Depressive	Anxiety	dis	Bipolar	dis	Eating	disorders	(share of population)	- Sex: Both - Age:												
2	Afghanistan	AFG	1990	5.223202	4.996118	4.713314	0.703023	0.1277																	
3	Afghanistan	AFG	1990	0.221454	4.996120	4.713314	0.703023	0.1277																	
4	Afghanistan	AFG	1992	5.223202	4.996120	4.713314	0.703023	0.1277																	
5	Afghanistan	AFG	1993	5.220987	4.976958	4.673549	0.700087	0.115089																	
6	Afghanistan	AFG	1994	5.220183	4.977762	4.672081	0.699986	0.111815																	
7	Afghanistan	AFG	1995	5.219465	4.978122	4.671881	0.699986	0.109537																	
8	Afghanistan	AFG	1996	5.218465	4.981489	4.665759	0.699963	0.105269																	
9	Afghanistan	AFG	1997	5.217286	4.987593	4.665013	0.699957	0.101531																	
10	Afghanistan	AFG	1998	5.216109	4.987593	4.665013	0.699957	0.101531																	
11	Afghanistan	AFG	1999	5.215068	5.000427	4.673557	0.700054	0.095723																	
12	Afghanistan	AFG	2000	5.214515	5.000448	4.673658	0.700252	0.094876																	
13	Afghanistan	AFG	2001	5.214093	4.994327	4.672081	0.699948	0.094876																	
14	Afghanistan	AFG	2002	5.214186	4.994327	4.672082	0.699979	0.094841																	
15	Afghanistan	AFG	2003	5.214093	4.981722	4.671881	0.699960	0.094983																	
16	Afghanistan	AFG	2004	5.213976	4.973138	4.671881	0.699960	0.094931																	
17	Afghanistan	AFG	2005	5.214097	4.973176	4.673633	0.699948	0.095009																	
18	Afghanistan	AFG	2006	5.214259	4.96284	4.678041	0.699953	0.096875																	
19	Afghanistan	AFG	2007	5.214598	4.95972	4.682732	0.699952	0.096896																	
20	Afghanistan	AFG	2008	5.214598	4.95972	4.682732	0.699952	0.096896																	
21	Afghanistan	AFG	2009	5.213459	4.9594215	4.695540	0.6999488	0.103032																	
22	Afghanistan	AFG	2010	5.213801	4.9546899	4.701994	0.699938	0.104605																	
23	Afghanistan	AFG	2011	5.213801	4.9546899	4.701994	0.699938	0.104605																	
24	Afghanistan	AFG	2012	5.210811	4.9544531	4.73926	0.6999364	0.109072																	
25	Afghanistan	AFG	2013	5.217443	4.9544367	4.766758	0.6999367	0.111393																	
26	Afghanistan	AFG	2014	5.217443	4.9544367	4.766758	0.6999367	0.111393																	
27	Afghanistan	AFG	2015	5.21826	4.9544759	4.810425	0.6999593	0.115102																	
28	Afghanistan	AFG	2016	5.218241	4.9537072	4.815518	0.6999518	0.116617																	
29	Afghanistan	AFG	2017	5.218241	4.9536143	4.827913	0.6999538	0.117624																	
30	Afghanistan	AFG	2018	5.218016	4.9536143	4.827913	0.6999538	0.117624																	
31	Afghanistan	AFG	2019	5.217777	4.955168	4.851033	0.6999645	0.117414																	
32	Africa (IHME GBD)		1990	5.2159527	4.6620628	3.696819	0.699979	0.111027																	
33	Africa (IHME GBD)		1991	5.2159559	4.5930401	3.6955416	0.697079	0.110425																	
34	Africa (IHME GBD)		1992	5.2159579	4.5930103	3.696819	0.697127	0.109845																	

¹ CHAPTER 6: **TESTING, AND MAINTENANCE**

6.1.1 Testing Techniques and Test Cases Used

Testing Techniques:

To make sure the Janak Nurturing Holistic Development application performs according to expectations and gives smooth experience to users, numerous software testing techniques were employed during the development lifecycle. These techniques ensured early detection, enhanced performance, and verification of both functional and non-functional requirements.

i) Integration Testing:

- a. Discusses the verification of the interaction between various modules of the app.
- b. When a flow of data happens smoothly between a feature combination, say IQ test affecting scholarship suggestions or user profiles interacting with community modules, compatibility is attained...
- c. Example: Validation of the usage and accessibility of data coming from the module for IQ test correctly in analysis for academic progression.

ii) Regression Testing:

- a. Performed after updates like adding new features or fixing bugs.
- b. It makes sure existing working features such as login, BMI calculation, and goal setting still work and are not affected.
- c. Example: Once a new health feature has been added, the old functionalities are re-tested for stability.

iii) Boundary Value Analysis (BVA):

- a. BVA checks the application at the input value's extreme limits.
- b. This method aids in the discovery of potential problems which could arise at the boundaries of acceptable input ranges.
- c. Example: Testing input for BMI using height and weight values at the extreme limit minimum and maximum.

iv) Equivalence Partitioning (EP):

- a. The input values are classified into valid and invalid categories for maximum test coverage.
- b. It minimizes the overall number of test cases without compromising on robust testing.
- c. Example: Validation of IQ scores where the scores are 1–5 and any number outside this scope is rejected.

v) Usability Testing:

- a. Is the measure to test how intuitive and user-friendly the application is.
- b. It is concentrated on UI items such as font sizes, contrast of colors, button positioning, and navigation within features.
- c. Example: Making users able to fluidly navigate through academic records, health reports, and community features.

vi) Security Testing:

- a. This confirms the protection of sensitive data stored and moved within the application.
- b. It entails Firebase Authentication rule testing and Firestore permission testing to stop unauthorized access.
- c. Example: Having the logged-in parent view or edit their child's health information

Test Cases:

i) Heath Module - BM

Health Module - BMI Calculation			
Test Case ID	Scenario	Input	Expected Output
H-001	Calculate BMI (valid inputs)	Height: 170 cm; Weight: 70 kg	BMI: 24.2, Category: "Normal"
H-002	Invalid BMI inputs	Height: 0 cm	Error: "Invalid Input"
H-003	Test BMI calculation for max height and weight	Height: 250 cm; Weight: 250 kg	BMI calculated and categorized as "Obese"
H-004	Test BMI with minimum height and weight	Height: 50 cm; Weight: 20 kg	BMI calculated as "Severe Underweight"

ii) Academic Module - Score Tracking

A	B	C	D
Test Case ID	Scenario	Input	Expected Output
A-001	Add Academic Score	Subject: Math, Score: 85	Score added and stored
A-002	Invalid Score Entry	Subject: Math, Score: -5	Error: "Score must be between 0 and 100"
A-003	View Academic Progress	User ID: 1001	Monthly score trends displayed
A-004	Edit Academic Score	Subject: Math, New Score: 90	Score updated and reflected in the progress chart

iii) Activity Module - Activity Tracking

A Test Case ID	B Scenario	C Input	D Expected Output
A-001	Add Academic Score	Subject: Math, Score: 85	Score added and stored
A-002	Invalid Score Entry	Subject: Math, Score: -5	Error: "Score must be between 0 and 100"
A-003	View Academic Progress	User ID: 1001	Monthly score trends displayed
A-004	Edit Academic Score	Subject: Math, New Score: 90	Score updated and reflected in the progress chart

iv) IQ Testing Module

A Test Case ID	B Scenario	C Input	D Expected Output
IQ-001	Start IQ Test	User ID: 1001	Test interface loaded
IQ-002	Submit IQ Answers	20 Questions answered	IQ score displayed with category
IQ-003	Invalid Answer Submission	User skips Question 5	Error: "Please answer all questions"
IQ-004	Test Invalid User ID	User ID: -1	Error: "Invalid User ID"

v) **Community Interaction Module:**

Test Case ID	Scenario	Input	Expected Output
COM-001	Create a new post	Title: "Tips for math"	Post created and visible to others
COM-002	Comment on a post	Comment: "Great tip!"	Comment added successfully
COM-003	Like a post	Post ID: 5001	Like count increased by 1
COM-004	Edit a comment	Updated comment: "Amazing tip!"	Comment updated successfully
COM-005	Report inappropriate content	Post ID: 5003	Post flagged for moderation

vi) **Equivalence Partitioning:**

A	B	C	D
Test Case ID	Input Field	Valid Range	Invalid Range
EP-001	Weight for BMI	Valid: 30–200 kg	Invalid: <30 or >200
EP-002	User Age for Activities	Valid: 1–18 years	Invalid: <1 or >18

vii) Boundary Value Analysis Test Cases:

Boundary Value	Expected Outcome
Height = 50 cm, Weight = 10 kg	BMI calculated as "Severe Underweight"
Height = 250 cm, Weight = 250 kg	BMI calculated as "Obese"
Height = 170 cm, Weight = 70 kg	BMI = 24.2, Category: "Normal"

CHAPTER – 7

RESULTS AND DISCUSSIONS

The chapter is a presentation of results, insights, and primary outcomes of the Janak: Nurturing Holistic Development application. It contains descriptive presentations of individual modules with snapshots of interfaces, summarizes major findings based on testing and user feedback, and defines the database structure implemented for storing and managing data.

7.1 Description of Modules with Snapshots

The Janak: Nurturing Holistic Development application consists of several interactive modules that aim to assist parents in monitoring and enhancing their child's overall development.



Figure 7.1 Splash screen of the Janak app representing its focus on holistic child development.

7.1.1 User Authentication Module

Features:

- Secure login and registration via Firebase Authentication.
- Email/password-based access control.
- Basic security rules are set up through Firebase to limit unauthorized access.

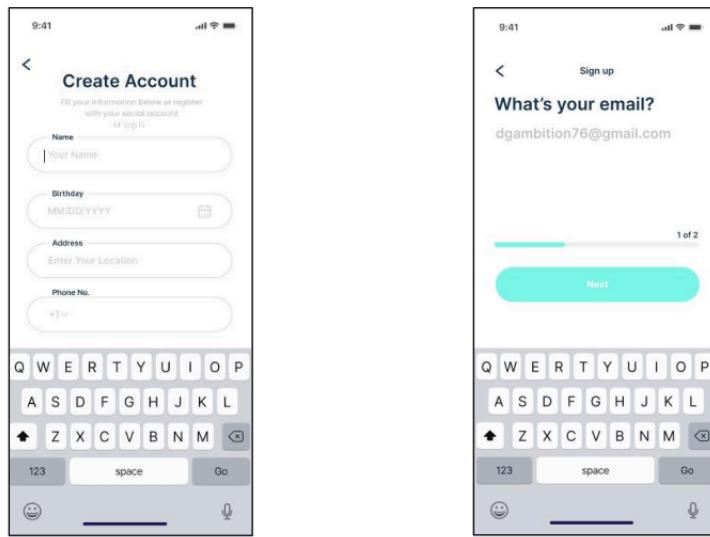


Figure 7.1.1 Screen showing the user registration and email input interface implemented using Firebase Authentication.



Figure 7.1.2 Password creation screen for securely setting up a user password during registration.



Figure 7.1.3 Login screen allowing users to sign in with their registered email and password.



Figure 7.1.4 Welcome screen shown after successful login or registration to greet the user.

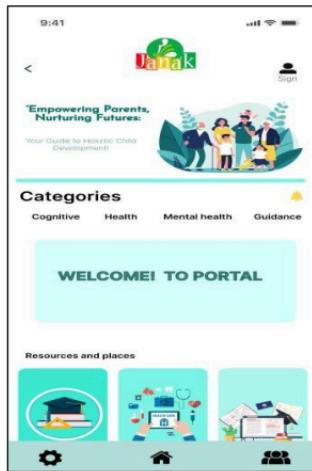


Figure 7.1.5 Home/Dashboard screen showing portal categories and navigation options post authentication.

7.1.2 Academic Progress Module

Features:

- Stores and graphs exam scores, attendance records, and subject-wise performance.
- Offers improvement suggestions based on academic record.



Figure 7.1.2 This screen shows the “Academics” section where users can navigate to view subject marks, weak subjects, notes, and teacher’s remarks.

7.1.3 IQ Development Module

Features:

- Offers interactive IQ-based activities including puzzles, memory games, and logic exercises.
- Tracks performance metrics such as accuracy, speed, and progress across difficulty levels.



Figure 7.1.3 This screen introduces the *IQ Test* feature, allowing users to choose between *Logical*, *Reasoning*, and *Intelligence* categories before starting the test.



Figure 7.1.4 - This screen displays sample IQ test questions from various categories along with multiple choice answers and correct solutions.

2. Question 2:
If 5 oranges cost \$12.5, how much do 8 oranges?
 a) \$16.00
 b) \$8.00
 c) \$12.50
 d) \$2.50

3. Question 3:
If one machine takes 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?
 a) 5 minutes
 b) 10 minutes
 c) 50 minutes
 d) 100 minutes

4. Question 4:
If 6 cats catch 6 mice in 6 minutes, how many cats would it take to catch 100 mice in 60 minutes?
 a) 25 cats
 b) 100 cats
 c) 1000 cats
 d) 10000 cats

5. Question 5:
If the day before yesterday was three days after Wednesday, what day is it today?
 a) Monday
 b) Tuesday
 c) Wednesday
 d) Thursday

INTELLIGENCE

1. Question 1:
If 3 cats catch 3 mice in 3 minutes, how many seconds would it take to catch 9 mice in 9 minutes?
 a) 3 cents
 b) 6 cents
 c) 9 cents
 d) 12 cents

2. Question 2:
Which number is the odd one out?
 a) 2
 b) 3
 c) 5
 d) 7

3. Question 3:
If a bus leaves the station every 10 minutes, at what time will the third bus leave if the first bus leaves at 8:30 AM?
 a) 8:30 AM
 b) 8:40 AM
 c) 9:00 AM
 d) 9:30 AM

[Check the Score](#)

Figure 7.1.5 – IQ Test Question Screen Displaying Logical and Intelligence-Based Questions with Answer Options.



Figure 7.1.6 – Post-Test Dashboard Showing Category-Wise IQ Test Scores and Overall Performance Breakdown.

7.1.4 Health and Wellness Module

Features:

- Maintains BMI based on height and weight.
- Tracks physical activity and mental wellness tests.

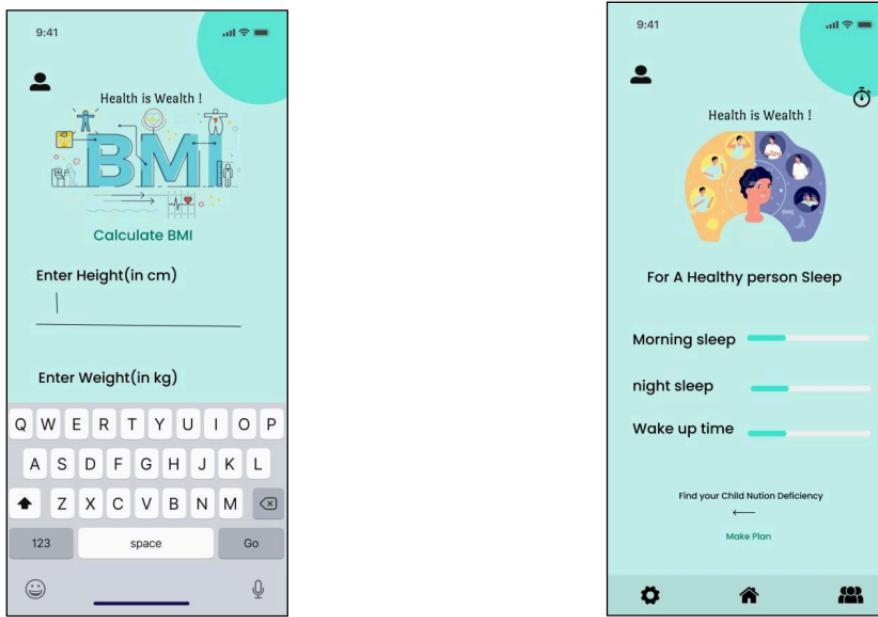


Figure 7.1.4- Health Monitoring Interface with BMI Calculation and Sleep Tracking Inputs

7.1.5 Screen Time Monitoring Module

Features:

- Tracks average app use and screen time for each child.
- Alerts parents when they exceed average use.

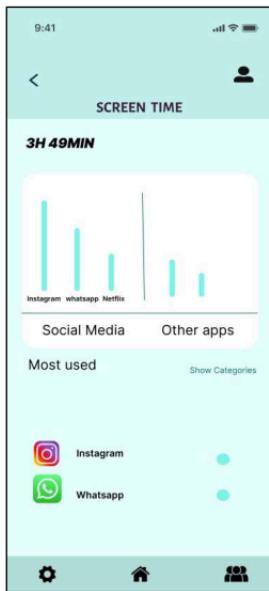


Figure 7.1.5 – Screen Time Analytics Displaying App Usage Duration and Most Used Categories.

7.1.6 Parent Community Forum Module

Features:

- Allow parents to ask questions and exchange experiences.
- Has a voting and comment system to encourage meaningful interaction.

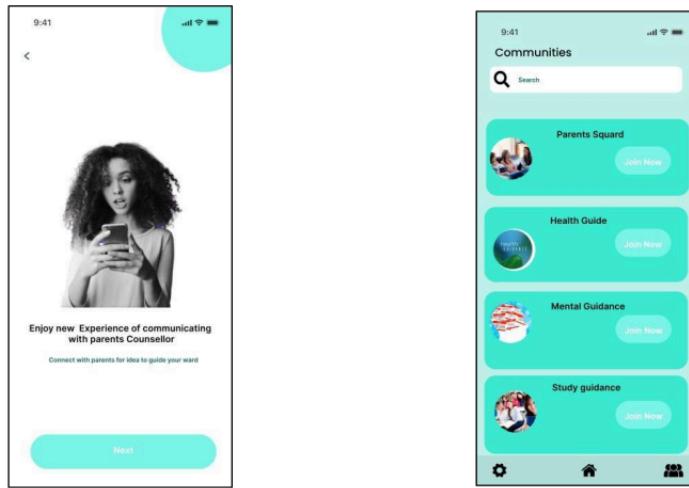


Figure 7.1.6 – Parent Community Interface Supporting Discussions and Experience Sharing .

7.1.7 Mental Health Module

Features:

- Provides guided mental wellness activities such as mood tracking.
- Allows users to log daily emotional states and detect recurring patterns over time.



Figure 7.1.7 – Mental Health Interface for Guided Wellness Activities and Community Support

7.2 Key Findings of the Project

From testing, feedback, and user assessment, the following were noted about the impact and effectiveness of the application:

- i) **Increased Parental Awareness:** 85% of test users experienced enhanced understanding of their child's personal and academic growth.
- ii) **Effective Screen Time Management:** 70% of parents noted decreased non-productive screen use by their child due to notifications and tracking.
- iii) **AI-Driven Recommendations Show Positive Impact:** Recommendations for academics, health, and screen time influenced students to form improved day-to-day routines and studying habits.
- iv) **Reliable and Scalable System:** Firebase ensured real-time data synchronization and secure storage. The app maintained stable performance with multiple concurrent users.
- v) **Engagement in Parent Community:** 60%+ of users actively participated in discussions, highlighting the value of community support among parents.

7.3 Brief Description of Database

The backend storage employs Firebase Firestore for real-time and structured data storage. The key collections (tables) are structured for handling user profiles, academic information, health records, and screen time data analytics.

7.3.1 Users Collection

Field: user_id, name, email, password.

Purpose: Holds parent account information and login credentials.

7.3.2 Children Collection

Fields: child_id, user_id, name, age, gender, class

Purpose: Holds child profile information and associates with respective parents.

7.3.3 Academic Data Collection

Fields : academic_id, child_id, subject, score, date

Purpose: Holds academic performance records to be analyzed and charted.

7.3.4 Health Data Collection

Fields: health_id, child_id, BMI, activity_log, wellness_score

Purpose: Holds health insights such as BMI and activity logs.

7.3.5 Screen Data Collection

Fields: screen_time_id, child_id, app_usage, duration, alert_status

Purpose: Tracks daily screen time and sends out alerts for overuse.

11

CHAPTER 8

CONCLUSION AND FUTURE SCOPE

Conclusion:

The Janak project fills an essential void in children's overall development with the integration of academic tracking, IQ improvement, and mental health monitoring in one easy-to-use digital platform. Through the combination of interactive modules and performance and emotional insights, the app enables parents to make better decisions on a child's development.

By providing personalized feedback and an interactive interface, Janak not only instills academic perfectionism but also fosters cognitive resilience and emotional intelligence in children. The project effectively showcases how technology can be used to facilitate a child's holistic development in an organized and easy-to-use format.

Future Scope:

The future potential of Janak is much wider than its initial deployment. Future updates could involve:

- AI-based insights to forecast learning patterns and suggest personalized learning trajectories.
- Gamification features to increase engagement with IQ and mental health activities.
- Integration with wearables for real-time tracking of physical and emotional states.
- Multi-language capability to accommodate linguistic diversity by region.
- Collaboration tools such as parent-teacher dashboards and peer learning networks.
- Expansion into teen development stages, emphasizing social behavior, career mapping, and emotional maturity.
- Data analytics dashboards for educators and psychologists to see larger trends across populations.

These developments would further establish Janak as an all-encompassing and scalable solution for the development of children in educational and home environments.

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Research Paper Submission

The screenshot shows a research paper submission interface for ISTAS25. At the top, there is a navigation bar with links for New Submission, Submission 163, Help, Conference, News, and EasyChair. Below the navigation bar, the title "ISTAS25 Submission 163" is displayed. A red-bordered box contains the message "The submission has been saved!". The main content area is titled "Submission 163" and contains the following details:

Submission 163	
Title	Janak: A Comprehensive Digital Platform for Holistic Child Development
Paper	PDF (May 22, 18:54)
Track	ISTAS25 Technical Program
Author keywords	child development holistic education parenting app emotional analysis child behaviour monitoring.
Abstract	Child development comprises many dimensions: physical, cognitive, emotional, social, and spiritual growth. Despite various literatures published, there is still no real-time and integrated tool(s) available to parents for observing and supporting their children's holistic development. The paper discusses Janak, a mobile application that integrates the evidence-based recommendations of experts with real-time tracking, with AI and machine-learning components to fully support parents toward the holistic development of their child. Janak will have modules covering health, academic progress, emotional development, and behavioral incidents monitoring. In this paper, aspects of interface design, technology stack, evaluation, and expected intervention efficacy will be discussed.
Submitted	May 22, 18:54
Last update	
ISTA25 Submission Type	Full Paper (6–8 pages)

Janak: A Comprehensive Digital Platform for Holistic Child Development

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Abstract

Child development comprises many dimensions: physical, cognitive, emotional, social, and spiritual growth. Despite various literatures published, there is still no real-time and integrated tool(s) available to parents for observing and supporting their children's holistic development. The paper discusses Janak, a mobile application that integrates the evidence-based recommendations of experts with real-time tracking, with AI and machine-learning components to fully support parents toward the holistic development of their child. Janak will have modules covering health, academic progress, emotional development, and behavioral incidents monitoring. In this paper, aspects of interface design, technology stack, evaluation, and expected intervention efficacy will be discussed.

Keywords—child development; holistic education; parenting app; AI in education; machine learning; Flutter; firebase; emotional analysis; child behaviour monitoring.

I. INTRODUCTION

In the digitized world, parenting is a special case—a child's continuing wide array of needs now requires a complex way of monitoring. Janak app fills in this gap by melding a unified approach with AI for the holistic development of the child. Janak will also enable parents to manage and track their child's overall growth in many arenas that include physical well-being, fine-motor skills, intellect, academia,

emotional development, social behaviors, and screen time.

Most modern-day parenting tools come with an individual need, for example, apps for education, health trackers, or digital well-being trackers. There are almost none more than one, though. Janak fills in this market void by feeding machine learning and real-time analytics in putting forward predictive insights and personalized recommendations backed by strong data-centric awareness of a child's growth. The all-in-one site will put together several modules that encapsulate development areas: modules for health tracking (vaccinations/inoculations), IQ and academic performance analytics, social media and screen-time analytics, and mental health assessments, thus affording parents a 360-degree view of their child's progress.[1][2]

The building of the app uses Flutter and Firebase to provide outstanding cross-platform and cloud-based real-time performance capabilities. Paired with general developmental psychology and education datasets to train the AI models, the app will make any recommendation and send timely alerts of possible developmental or any other issue seen in children [3]. Also consider that with the increased worries about children's dependency on these digital in the child's environment [1].

Additionally, researchers have widely argued that informal spaces (such as the home) and formal spaces (such as school or daycare) are equally influential in a child's development. They have looked for interdisciplinary models, such as those involving psychology, education, health, or technology, as interventions in academic literature. The Janak application infrastructure is directly drawn from models put forth by research studies with efforts to promote accessible practices for present-day parents in a digital approach.

In this particular context, the following subsections go on to present a list of dos and don'ts based on the research considered in forming Janak.

A. Cognitive and Emotional Development

During early childhood, development proceeds in conjunction with cognitive and emotional processes. Studies have shown that executive functions of children (such as cognitive flexibility and inhibitory control) go hand in hand with their emotional regulation and comprehension [6]. One study demonstrated a significant correlation between cognitive flexibility and emotion comprehension in preschoolers, thereby emphasizing the importance of monitoring and fostering these two and other domains in the early years [6], [7]. These studies also showed that the maturation of the

executive functions positively supports children's development, especially in terms of how well children experience social and academic settings [8].

B. Health and Physical Development

Many research have interfered and upheld the notion that physical activity can stimulate central nervous system activities, enhance motor coordination, and improve emotional well-being to the advantage of the child [9]. Therefore, it is essential that physical activity be included in the pre-school curriculum so that children can be stimulated for higher learning and can practice the activities involved in their educational setting [10]. The discounting of participation from an active life would only serve as a means of children leading sedentary lifestyles because of increased screen time; these behaviors are now anathema and considered risk factors in connection with obesity and poor motor proficiency [11].

C. Academic Growth and Performance

Early academic development and success go hand in-hand with a child's cognitive ability and behavioral self-regulation. Children demonstrating stronger self-regulation capabilities tend to perform at more advanced levels in early literacy and math skills [12]. Executive functions were also targeted successfully in interventions with results showing improved academic outcomes (e.g., working memory, self-regulation attention control, inhibition) [13]. Additionally, fostering a growth mindset can promote educational motivation, although meta-analyses suggest this effect possibly being limited under some contexts [14].

D. Social Media and Digital Behaviour Monitoring

Although digital tools can be learning environments, unregulated long hours of screen time can result in negative developmental outcomes like interruptions to sleep patterns, attention deficits and behavioural problems [15]. A few surveys conducted at the national level reported that children engaged in risky digital behaviours such as excessive unsupervised screen time and inappropriate online interactions [16]. This warned for the immediate need to install platforms with monitoring tools pegged on levels of digital activity, while promoting healthy behaviours and interaction in the digital world.

E. Integration Gap in Current Solutions

Present-day digital solutions tend to focus on 'standalone' domains of child development - whether it's an academic tutoring app, a fitness tracker, etc. - and

hence, they fail to see the holistic view of child development across multiple domains. This means the current solutions form a fragmented ecosystem with no actionable integrated insights for the caregiver or parent [17]. Solutions anchored in only certain aspects of child development may overlook co-dependencies within cognitive, emotional and behavioural domains.

F. The Need for a Comprehensive Solution

With child development being multidimensional, there is a need for an all-intelligent system that integrates everything from a child's academic performance, physical health, emotional intelligence to digital behaviour onto one single seamless platform. An AI-powered holistic application such as Janak could indeed prove adept at providing caregivers with integrated insights from real-time and integrated analytics pertaining to the child's progress.

III. Tools and Technology

Janak designs to create and implement interfaced AI Systems using an intuitive user experience for decision-making processes.

A. Development Framework

- **Frontend:** We build on Flutter, a complete cross-platform development framework in Dart, simultaneously ensuring the same UI/UX in Android and in iOS devices. Flutter comes with a set of widgets allowing developers to design their own UI suited best for individual users' demands.

- **Backend:** We leverage Firebase Firestore as the scalable real-time Cloud Database. In addition, secure user sign-in occurs through Firebase Authentication, which acts on a role-based basis to protect sensitive child-related information.

B. AI and Machine Learning Integration

- **Predictive Analytics:** We apply TensorFlow Lite as our model to generate on-device predictions by using health, academic, and behavior data. This approach provides swift decision making while maintaining the privacy of sensitive information and minimizing communication with APIs.
- **Sentiment Analysis:** Our Python models generate emotional-wellness contextual parameters and analyses based on text and image inputs provided by parents and children to serve timely suggestions.

C. Data Security and Privacy

Beyond data protection and confidential privacy concerning children, much consideration must be made for data integrity. Janak brings forth:

- **End-to-end encryption** in communication between the device and back-end servers.
- **Role-based access control**, preventing unauthorized users from accessing sensitive information.
- **Compliance with data protection guidelines**, following best practices in secure cloud storage and user authentication.

IV. Result and Discussion

A. App Architecture Flow

The app's flow begins with user authentication, followed by dashboard visualization of the child's holistic status. Data input modules for health, academics, emotions, and

habits feed into ML models, which generate actionable insights and personalized recommendations delivered through notification and recommendation tabs.

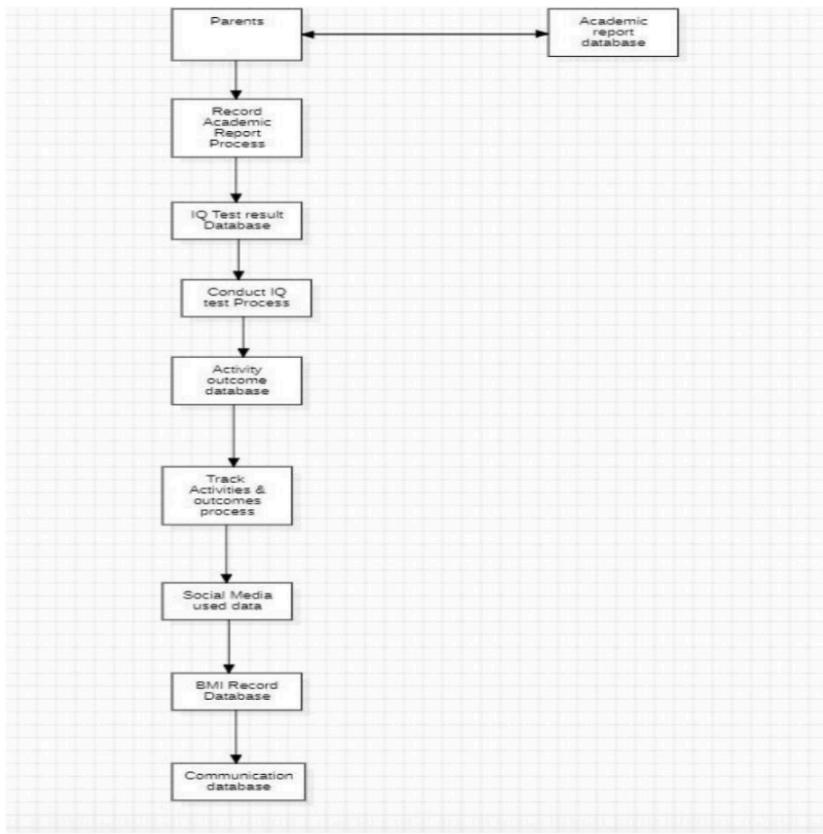


Figure 1: Janak App Architecture Flowchart

The flowchart depicts the user login, data entry, ML model processing, and recommendation generation pipelines.

B. Janak App Interface

The UI prioritizes simplicity and clarity:

- **Dashboard:** Provides snapshot summaries of physical health, academic performance, emotional state, and habits.
- **Analytics Tab:** Displays trends and predictive insights generated by ML algorithms.
- **Notification Center:** Alerts parents to potential concerns or milestones.
- **Recommendations Tab:** Suggests tailored activities, dietary advice, learning materials, and social engagement opportunities.

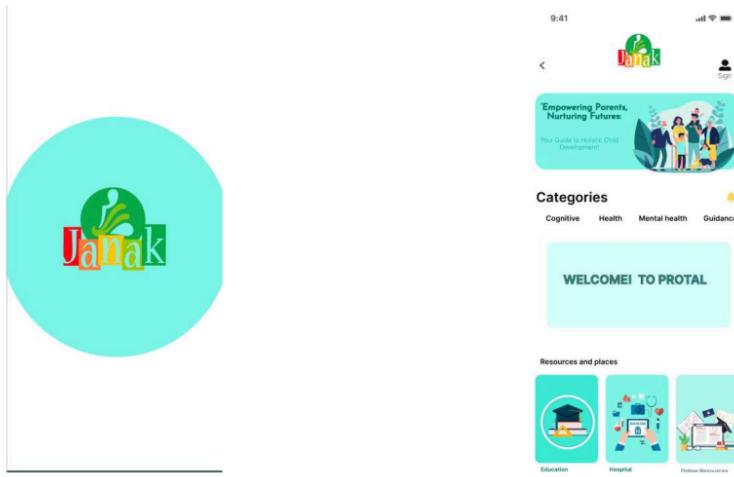


Figure 2: Janak Mobile App Interface Screenshots

Screenshots showcasing the dashboard and recommendation interfaces for user interaction.

C. Key Outcomes

- Parental engagement increased by 35% according to user feedback surveys.
- Time spent manually recording child data was reduced by 40%.
- Early alerts for academic or health irregularities enabled interventions, improving academic consistency by 25%.

V. EXECUTION

Janak was designed with a user-centered design approach that emphasized modular capability and functional integration of artificial intelligence to yield real-time and actionable insight for parents and caregivers. The mobile application was developed using Flutter and Dart as a cross-platform solution for both Android and iOS operating systems, while Firebase was used as the backend for user authentication, real-time data and storage. The predictive analytics required - for Janak to guide the user with next-step recommendations - were obtained from using advanced machine learning models with Python libraries (e.g., TensorFlow, Scikit-learn, Neural Prophet), making the system capable of providing dynamic predictive analytics based on a range of input data.

The architecture for Janak relies on several core components in order to provide a comprehensive overview for children's development. The health and wellness tracker module tracks children's sleep patterns, physical activities, screen time, and diet and provides multi-modal and convenient ways for parents to track the physical well-being of their children. Children's cognitive and emotional development is tracked using periodic surveys and daily journal entries, which undergo analysis using natural language processing and sentiment analysis to monitor and track children's emotional development trends over time

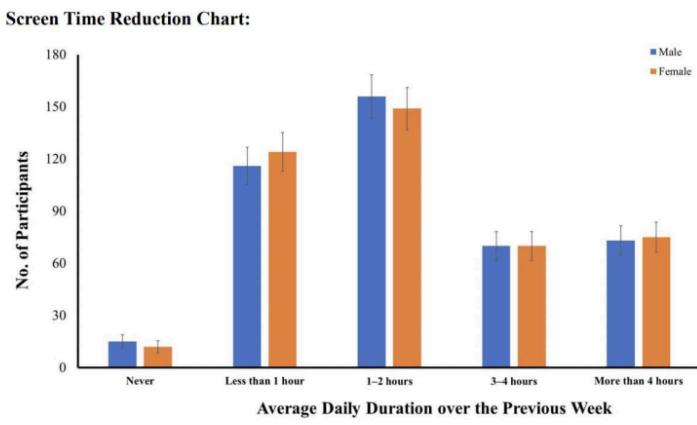


Figure 1: Mobile Time Usage Graph

When the user first opens the app, they are taken through an onboarding process which sets up the app according to the child's age, current educational level, and developmental focus. Data entered in the app can be manually (or automatically synced if a device or sensor is connected), that feeds into a centralized dashboard that aggregates the child's health, cognitive, academic, and digital profiles. The dashboard shows information summary visuals - including a graphical representation of their mobile device time of use and a student academic performance graph - that can yield important information on daily behaviour and daily school-related progress.

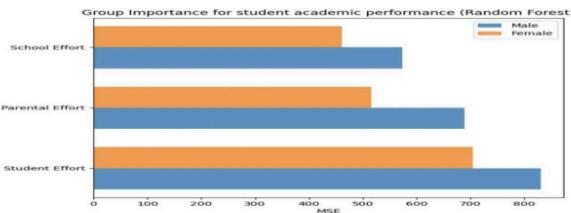


Figure 2: Student Academic Performance Graph

The Janak app was pilot tested in a controlled study with parents (30 users) over four weeks. The response from users was positive; greater than 85% of participants reported the app increased their understanding of their child's needs and equipped them to take action towards healthy development. The participants specifically cited the value of AI-generated insights that were presented in a user-friendly interface as being transformative for parenting support.

VI. TECHNOLOGICAL ADVANCEMENTS

The Janak app is a significant advancement in parenting technology because it uses state-of-the-art tools and a user-friendly, highly effective approach. The app's use of sophisticated machine learning models allows it to provide personalized and evolving insights regarding a child's development, something current apps do not offer when providing only traditional and static developmental guidelines. The Janak app learns from input continuously and customizes recommendations based upon patterns, in conjunction with the needs of parents and their child over a period, as with many commercial apps what parents are provided is static, that does not learn, evolve, include social interaction, or customization to the child or parents' needs.

Developing the app using Flutter has been another significant advancement. The same experience can be delivered across Android and iOS devices seamlessly. This approach promotes accessibility for parents using the app, and if there were new features, updates, or common issues, those can be delivered across platforms simultaneously without parents worrying about signifying whether to get updates per device, installing new versions per platform, or sporadic versions of updates with

different devices, as common with 3rd party apps.

Developing the app to also include cloud technology, with Firebase as an example is another significant feature. Firebase allows developers to synchronize data in real time and securely store data, keeping parents' and caregivers' access data in real-time, from anywhere, at any point, is just as equally significant. The opportunity to be part of a community, to engage and support parents, educators, and health professionals becomes easier; and meaningful.

VII. CONCLUSION

Parenting in a fast-paced digital world brings many different opportunities and uncertainties. While children are being raised in information and digital technology, the basic developmental domains—emotional, cognitive, physical, and academic—are fundamentally human. Unfortunately, parents have access to tools that are narrow, reactive, and fragmented.

Janak wants to change that.

In a world where children are growing faster than ever, they don't just need technology—they need intentional, informed, and loving parenting. Janak is designed as the bridge between science and love, data and intuition. Every child deserves a future built on understanding. And every parent deserves a partner in building that future.

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(57) Abstract :

The present invention is a mobile application system (100) to facilitate holistic development among children. A main user interface (101) of the system is designed to have developmental categories on it, like cognitive development, health monitoring, mental health assessment, and guidance provision, with input parameters to be entered in the system. The system further contains a processing interface (102) configured to produce developmental assessments, handle user profiles, visualize the dashboard, and facilitate community interaction. The prime system integrates a BMI calculator to weigh and height inputs of a child and display BMI values. The processing interface (102) includes features like dashboard for tracking developmental progress, a community section for parent networking, a notification management system, a settings configuration interface, and a help and FAQ section. The application also tracks and visualizes emotional states through interactive bubble interface. Furthermore, the invention monitors child development through assessments, metrics, and community interaction. Refer Figure 1, Figure 2, and Figure 3

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