



AROGYA CHINTAK

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Abstract : Arogya Chintak is a groundbreaking mobile application that is poised to revolutionize the way individuals understand, manage, and take control of their health. This innovative and intelligent app harnesses the power of advanced AI and natural language processing to provide users with swift, precise, and personalized insights into their health concerns. The exploration of Ayurvedic practices and personalized healthcare in the literature encompasses various dimensions, including the application of machine learning models for Prakruti identification [1]. Studies delve into the correlation between Prakruti and Sharirika Bala [2], employing intelligent Prakruti assessment with machine learning classifiers [3], and conducting clinical observational studies on Prakruti [4]. Ayurgenomics is utilized for drug discovery [5], while ensemble machine learning methods contribute to dosha prediction [6]. Surveys on human Prakruti and Tridosha [7] provide valuable insights, and a portable pulse detector is developed using artificial neural networks [8]. Recent advances underscore the fusion of genomics and Ayurveda [9], highlighting technology's transformative potential. The computerized pragmatic assessment of Prakruti Dosha using tongue images demonstrates the integration of modern tools into Ayurveda for personalized treatments [11]. Clinically adaptable Prakruti assessment tools are developed, emphasizing India's rich medical heritage [13] and the crucial role of Prakruti assessment in tailoring personalized Ayurvedic treatments [14]. The convergence of Ayurveda and traditional systems opens avenues for herbal drug discovery [15]. In summary, these studies collectively illustrate the synergy between technology and Ayurvedic wisdom, offering innovative approaches to holistic healthcare.

IndexTerms – Arogya Chintak, Mobile health app, AI, Machine Learning, Ayurveda, Prakruti, Personalized healthcare, Dosha Prediction, Tongue image analysis, Survey, Prakruti identification, Clinical studies.

I. INTRODUCTION

INTRODUCTION

Arogya Chintak emerges as a revolutionary mobile application poised to transform how individuals engage with their health. This cutting-edge and intelligent app utilizes advanced AI and natural language processing to deliver swift, accurate, and personalized insights into users' health concerns. Offering a seamless integration of disease identification, comprehensive health information, and personalized home remedy suggestions, Xbot provides a user-friendly platform for health management. Simultaneously, recent research has delved into the convergence of machine learning (ML) and Ayurveda through ten significant papers. These studies explore various aspects, including ML models for Prakruti identification, the correlation between Prakruti and Sharirika Bala, intelligent Prakruti assessment using ML classifiers, clinical observational studies on Prakruti, Ayurgenomics for drug discovery, ensemble ML methods for dosha prediction, computerized pragmatic assessment of Prakruti Dosha using tongue images, surveys on human Prakruti and Tridosha, development of a portable pulse detector using artificial neural networks, and recent advances in Prakruti assessment and application, emphasizing the fusion of genomics and Ayurveda. Collectively, these insights underscore the transformative potential of technology in advancing Ayurvedic practices and personalized healthcare. Computerized tongue image analysis for Prakruti. Dosha assessment aligns with Ayurveda's emphasis on personalized treatments for holistic health. India's varied medical heritage provides holistic healthcare solutions, while a recent study introduces a clinically adaptable prakruti assessment tool, crucial for personalized Ayurvedic treatment. Furthermore, Ayurveda and traditional systems present promising avenues for herbal drug discovery.

II. REVIEW OF LITERATURE SURVEY

3.1 Literature Survey

The following chapter is a literature survey of the previous research papers and research which gives detailed information about the previous system along with its advantages and disadvantages.

Lakshmi Bheemavarapu and K. Usha Rani [1] have proposed a Machine Learning model for Prakruti identification using Prasna Pariksha in Ayurveda. This innovative application of artificial intelligence in healthcare aligns with the holistic principles of Ayurveda, particularly gaining prominence during the Covid-19 era, as traditional practices seek integration with modern technologies for comprehensive health solutions.

Dr. Manish Kumar, Dr. Srikanta Kumar Panda, and Dr. Shubhangi Mishra [2] delve into the A Review on Relation of Prakruti and Sharirika Bala, emphasizing the nuanced strength variations among individuals with different dosha-dominant Prakruti types. Their exploration not only underscores Ayurveda's holistic approach but also brings attention to the intricate relationship between constitutional types and physical strength.

Majumder et al. [3] On intelligent Prakruti assessment in Ayurveda: a comparative study discusses the shift from reactive healthcare to predictive medicine in the modern era and the relevance of Ayurveda, an ancient medical system, in this context. It discusses the transformative shift from reactive to predictive healthcare, utilizing machine learning classifiers for a comparative study on Prakruti assessment. By incorporating artificial intelligence into Ayurvedic practices, the study aims to enhance consistency, accuracy, and objectivity, addressing the evolving healthcare landscape.

Dr. Vedashri Abhijit Kalavade, Dr. Prakash Mane, and Umesh Ghate [4] contribute a clinical observational study emphasizing Prakruti's fundamental role in personalized medicine. Their research not only recognizes the predictive nature of Prakruti in guiding responses to medications and susceptibility to diseases but also highlights the significance of Vikriti in accurate diagnosis and treatment planning.

Swati Dhole, Yedey S.E. [5] propose an A Review Paper on Identification of Ayurvedic Prakruti Types. Ayurveda, an ancient medical system, prioritizes individual well-being by emphasizing the balance of doshas (Vata, Pitta, Kapha) and unique prakriti. Identification methods include clinical examination and predictive models for personalized healthcare. Ayurvedic physicians employ observation and pulse examination to tailor treatments, aiming to restore balance and prevent disease. By recognizing and maintaining tridosha and prakriti equilibrium, Ayurveda fosters holistic well-being through personalized interventions, addressing root causes for optimal health in individuals.

Zoufang Huang, Vivek P. Chavda, Rajashri Bezbaruah, Vladimir N. Uversky, Sucharitha P., Aayushi B. Patel and Zhe-Sheng Chen [6] have proposed An Ayurgenomics Approach: Prakruti-Based Drug Discovery and Development for Personalized Care. Ayurveda, originating in ancient India, is a holistic healthcare system rooted in the concept of tridoshas (Vata, Pitta, Kapha) and Prakruti, reflecting individual constitution. Genetic and environmental factors shape Prakruti, while doshic imbalances can lead to diseases. Ayurveda emphasizes personalized treatments based on dosha dominance and whole-body well-being, encompassing physical, emotional, and mental health. It classifies conditions based on doshic disturbances and offers tailored therapies encompassing dietary and lifestyle adjustments. The integration of Ayurveda's Prakruti and tridoshas into modern medicine seeks a molecular understanding to enhance personalized treatment.

Vani Rajasekar, Sathya Krishnamoorthi, Muzafer Saračević [7] have pioneered Ensemble Machine Learning Methods for predicting the balance of Ayurvedic constituents in the human body. Ayurvedic medicine relies on the "Prakruti" concept, categorizing individuals into seven constitutional forms for drug responsiveness and drought tolerance. Despite its historical use, the traditional approach involves a thorough physical examination and queries about physiological and behavioral traits, lacking quantitative reliability in dosha assessment. Their study employs machine learning methods, such as SVM, NB, DT, KNN, ANN, and Adaboost, revealing Adaboost's superior performance with enhanced accuracy, precision, and recall, promising a bright future for machine learning in this domain.

Abdul Kareem, Yoganandham Govindharaj [8] The Indian Medicine System and Homeopathy- A Overview. The Indian Systems of Medicine, including Ayurveda, Siddha, Unani, Homoeopathy, Yoga, and Naturopathy, deeply embedded in society, provide effective treatments. Ayurveda, the oldest traditional system, seamlessly blends with modern practices, thriving alongside Allopathy. Homoeopathy, integrated in the 18th century, is integral to India's healthcare, valued for its cultural assimilation, cost-effectiveness, and holistic benefits. These indigenous systems reflect India's commitment to preserving ancient healing traditions, showcasing enduring relevance and widespread acceptance in the country's healthcare practices.

Sonali Joshi, Preeti Bajaj [10] focus on the design and development of a portable Vata, Pitta & Kapha [VPK] Pulse Detector using Artificial Neural Network for Prakruti classification. The research employs Ayurvedic Nadi (wrist pulse) analysis with a sophisticated hardware setup. Feature extraction based on the frequency spectrum of pulses is performed, utilizing an Artificial Neural Network for the classification of an individual's Prakruti.

Abhilash Mangampadath [11] proposed on Development of a clinically useful tool for Prakruti assessment. This study addresses the need for a clinically adaptable prakruti assessment tool in Ayurveda. Evaluating three established methods and a novel questionnaire on 100 healthy volunteers and 150 individuals with doshavridhi, the new tool demonstrates moderate concordance with Ayusoft and TNMC. Reliability testing and factor analysis support its robustness, with heightened agreement with the TNMC questionnaire. Clinician feedback underscores its clinical utility, positioning the new questionnaire as pivotal for investigating patient variability and advancing personalized healthcare delivery within Ayurveda, optimizing patient care and realizing Ayurveda's potential in modern healthcare.

Zoufang Huang, Vivek P. Chavda, Rajashri Bezbaruah, Sucharitha P., Vladimir N. Uversky [12] has proposed on Recent Advances in assessment and application of Prakruti. Ayurveda, originating in ancient India, offers a unique approach to healthcare, delving into all aspects of life through a theoretical analysis. Unlike modern medicine, Ayurveda is rooted in tridoshas (Vata, Pitta, and Kapha) and Prakruti. The fusion of genomics and Ayurveda, known as ayurgenomics, sheds new light on tridosha, potentially paving the way for precision medicine. By integrating "omics"; Prakruti-based treatments can revolutionize healthcare. Prakruti, an Individual's inherent behavioral trait, remains unchanged throughout life. Ayurvedic methodologies, centered on medication (aushadhi), lifestyle (vihara), and diet (ahara), form the basis of Prakruti-based medicine. This approach not only emphasizes preventive medicine but also enhances life quality and longevity.

Joshi Manisha, Umadevi, Akshitha. Raj B N [13] propose a computerized pragmatic assessment of Prakruti Dosha using tongue images in a pilot study. The intelligent system utilizes tongue image analysis and machine learning (KNN, Neural Network,

Decision Tree) to identify an individual's Prakriti (Vata, Pitta, Kapha). Findings indicate Decision Tree outperformed, achieving sensitivities of 83.33% (Vata), 75% (Kapha), and 71.42% (Pitta). Blind validation by a physician demonstrated 81.25% and 84.61% sensitivity, affirming the system's potential in accurate Prakriti identification, particularly Decision tree classification.

Vinotha Sanmugarajah [14] A Study of the Standard tool for Prakriti Assessment in Indigeneous Medicine. Prakriti, the inherent psycho-somatic constitution in Ayurvedic medicine, is vital for personalized treatment. This study aimed to develop a standardized assessment tool for Prakriti evaluation, drawing from traditional texts and documents. The tool encompasses 33 categories and 60 subdivisions, facilitating accurate identification of an individual's Prakriti. This advancement promises improved treatment outcomes and management strategies, both in health volunteer programs and clinical settings. However, challenges such as subjectivity, cultural nuances, and the need for further clinical validation persist. Integrating technology could streamline the assessment process but requires careful consideration of traditional practices and modern methodologies to ensure effectiveness and relevance.

Yogini S. Jaiswal, Leonard L. Williams [15] A glimpse of Ayurveda – The forgotten history and principle of Indian traditional medicine Ayurveda, among the oldest traditional medicine systems globally, holds vast untapped knowledge. Exploring its ancient wisdom and integrating it with other traditional systems can revolutionize herbal drug discovery. Understanding the similarities and differences between these systems is crucial for convergence. This review delves into Ayurveda's history and principles, aiding scholars, researchers, and practitioners in gaining profound insights. By strengthening commonalities and addressing challenges, such as global acceptance and harmonization, the convergence of traditional medicinal systems can be advanced.

3.2 Analysis Table

Table 1 Analysis Table

Title	Summary	Advantages	TechStack
Machine Learning Models Used For Prakriti Identification Using Prasna Pariksha I In Ayurveda [1]	This paper highlights the transformative impact of machine learning on Ayurveda, emphasizing its role in health assessment, disease diagnosis, and task automation within the traditional medical system.	Machine learning in Ayurveda provides advanced health assessment, precise disease diagnosis, efficient task automation, personalized treatment, and modernization of traditional practices, leading to improved healthcare outcomes.	Python, R, TensorFlow, Scikit-learn, Pandas, OpenCV, and may involve hardware like Raspberry Pi for specific applications.
A Review on Relation of Prakriti with Sharirika Bala[2]	This research explores the relationship between Prakriti, specifically Deha Prakriti, and the strength or Bala of individuals in Ayurveda	Investigating the connection between Deha Prakriti and individual strength in Ayurveda research yields insights for personalized health strategies, enhancing targeted well-being approaches..	Collaborative platforms for traditional knowledge of Ayurveda, Mobile Applications, Data Mining
On intelligent Prakriti assessment in Ayurveda: a comparative study[3]	The conceptual exploration emphasizes the evolution towards predictive medicine by integrating Ayurveda's Prakriti assessment with artificial intelligence, paving the way for a holistic and personalized approach to healthcare.	The advantage of integrating Ayurveda's Prakriti assessment with artificial intelligence lies in fostering a proactive and personalized approach to healthcare, leveraging traditional wisdom alongside cutting-edge technology for more effective and tailored medical interventions.	Machine Learning Models, Ethical Consideration, Cloud Computing
A Clinical observational study on Prakriti and its Application in Ayurveda [4]	This research uses Prakriti, Ayurvedic constitution, determines health traits, drug responses, and susceptibility, essential for personalized medicine and diagnostics.	Personalized medicines offer tailored treatments, while holistic diagnostic tools provide comprehensive insights, collectively optimizing therapeutic outcomes.	Databases is stored using MongoDB, Machine Learning and Cloud Services

A Review Paper on Identification of Ayurvedic Prakruti Types[5]	This paper utilizes a technique that supports digital media like audio and video storage. The prototype server described has been in use for a number of years and has proved the viability of the techniques.	One feature of the disk is that disk read and write operations are predictable.	This uses Redundant Arrays of Inexpensive Disks (RAID) technology to increase overall bandwidth.
An Ayurgenomics Approach: Prakruti-Based Drug Discovery and Development for Personalized Care [6]	Ayurveda, rooted in tridoshas and Prakruti, emphasizes holistic personalized treatments, integrating ancient wisdom into modern medicine for molecular understanding.	Ayurveda's holistic approach, integrating tridoshas and Prakruti into modern medicine, offers personalized treatments, fostering enhanced well-being and individualized care.	Genetic Analysis, Advanced Diagnostic Tools, Personalized Healthcare, Molecular Understanding, Modern Medical Approaches.
Ensemble Machine Learning Methods for predicting the balance of Ayurvedic constituents in the human body [7]	Ensemble Machine Learning for Ayurvedic balance prediction, the study favors Adaboost, promising machine learning's impactful future in dosha assessment.	Ensemble Machine Learning, particularly Adaboost, enhances Ayurvedic dosha assessment with superior accuracy, precision, and recall, promising a more reliable and quantitative approach in personalized medicine.	SVM, NB, DT, KNN, ANN, and Adaboost, for
The Indian Medicine System and Homeopathy- An Overview[8]	Holistic healing prioritizes well-being and proves cost-effective by addressing health issues, potentially reducing long-term healthcare expenses.	Holistic healing approaches not only prioritize comprehensive well-being but also demonstrate cost-effectiveness by addressing underlying health issues, potentially reducing long-term healthcare expenses.	Word Embeddings, Named Entity Recognition (NER), Sentiment Analysis Algorithms
Survey on human Prakruti and Tridosha based on physiological features using machine learning and image processing techniques[9]	A study introduces computer-based image processing to categorize individuals into Tridosha groups, providing a potential digital solution for precise Ayurvedic health assessments and immune fortification.	The utilization of computer-based image processing for categorizing individuals into Tridosha groups in Ayurvedic assessments offers a digital solution that enhances precision and efficiency in fortifying human immunity for optimal health.	Computer-Based Image Processing, Ayurvedic Assessments, Digital Solution, Immune Fortification
Design and Development of a portable Vata, Pitta & Kapha [VPK] Pulse Detector using Artificial Neural Network [10]	This paper reviews cloud computing, fog computing and the IoT literature. It highlights fog computing's contribution to address IoT challenges, research directions, and the role of 5G-based fog computing in intelligent driving and tactile robots.	The approach of employing Ayurvedic Nadi analysis with advanced hardware and Artificial Neural Network classification offers a precise and non-invasive method for individual Prakruti determination, enhancing personalized healthcare.	Ayurvedic Nadi analysis, sophisticated hardware for pulse frequency spectrum extraction, and an Artificial Neural Network for precise Prakruti classification
Development of a clinically useful tool for Prakruti assessment [11]	The study presents a new prakriti assessment tool, showing moderate agreement with established methods, promising advancements in Ayurvedic diagnostic standardization.	The integration of personalized treatment, combining traditional wisdom with modern technology, offers tailored healthcare solutions that optimize patient outcomes and well-being.	Artificial Neural Network(ANN), Advanced Hardware and software integration
Recent Advances in assessment and application of Prakruti. Ayurveda[12]	Ayurveda, rooted in tridoshas and Prakruti, merges with ayurgenomics, exploring precision medicine through genomics, revolutionizing healthcare with personalized, lifelong, and holistic approaches.	Ayurgenomics merges Ayurveda and genomics, revolutionizing healthcare with personalized precision medicine, preventive measures, and enhanced life quality.	Ayurvedic principles, genomics, and data analytics for personalized precision medicine and holistic healthcare advancements.

A computerized pragmatic assessment of Prakriti Dosha using tongue images in a pilot study. [13]	The intelligent system, employing tongue image analysis and machine learning (KNN, Neural Network, Decision Tree), accurately identifies individual Prakriti, with Decision Tree outperforming and physician validation affirming accuracy.	The system's proficiency in accurately identifying individual Prakriti, particularly with the superior performance of the Decision Tree algorithm, signifies a promising advancement in personalized healthcare.	Tongue image analysis, machine learning algorithms (KNN, Neural Network, Decision Tree), and physician validation
A Study of the Standard tool for Prakriti Assessment in Indigeneous Medicine. [14]	The Prakriti assessment tool, designed for personalized healthcare, has been developed but is encountering validation challenges.	The integration of automation and enhanced predictive analytics is revolutionizing decision-making processes by enabling efficient data-driven insights and streamlining operational workflows.	Machine Learning algorithm, Data Mining technique, Natural Language Processing.
A glimpse of Ayurveda – The forgotten history and principle of Indian traditional medicine [15]	The timeless wisdom of Ayurveda is fostering collaboration and contributing to the global acceptance of traditional practices, as its ancient principles find resonance and application in contemporary healthcare and wellness initiatives worldwide.	The integration of holistic healing, personalized medicine, and a prevention-focused approach in healthcare provides a patient-centric model that addresses individual needs, enhances overall well-being, and significantly reduces the risk of diseases, fostering a more effective and sustainable healthcare ecosystem.	Knowledge graph, Data Mining, Holistic Healing, Personalized Medicine, Advanced Diagnostic, Telehealth Solution, AI-driven Health Analytics.

III. RESEARCH METHODOLOGY

The development of "Arogya Chintak," an Android application designed to promote holistic health through symptom checking, Ayurvedic resources, and Prakriti assessment, involved a systematic approach encompassing several key stages. The methodology adopted for this project aimed to ensure efficient development, robust functionality, and user-friendly features.

The initial phase of the project involved comprehensive research and analysis to identify the target audience, understand their needs, and assess existing solutions in the market. This research phase helped in defining the scope and requirements of the application, ensuring alignment with the project objectives. Additionally, it facilitated the selection of appropriate technologies and frameworks for implementation.

Following the research phase, the project transitioned into the planning and design stage. During this phase, the architecture of the application was conceptualized, considering factors such as scalability, maintainability, and performance. The user interface (UI) and user experience (UX) design were meticulously crafted to ensure intuitive navigation and seamless interaction for both users and doctors. Wireframes and mockups were created to visualize the layout and flow of the application, incorporating feedback from stakeholders to refine the design.

With the design finalized, the development phase commenced, leveraging Flutter for the frontend and Firebase for backend storage. Flutter's cross-platform capabilities provided the flexibility to target Android devices while maintaining a consistent user experience across different screen sizes and resolutions. Firebase's real-time database and authentication services facilitated seamless user registration, login, and data storage, ensuring data security and reliability. The development process followed an agile methodology, enabling iterative development and frequent feedback loops. Features were implemented incrementally, allowing for continuous integration and testing to identify and address issues promptly. Version control systems such as Git were utilized to manage code changes and collaborate effectively within the development team. Central to the functionality of "Arogya Chintak" is the Prakriti assessment feature, which required the implementation of a specialized algorithm. Extensive research into Ayurvedic principles and dosha assessment informed the development of the algorithm, which calculates the user's dominant dosha based on their responses to a questionnaire. The results are presented in a visually appealing manner, utilizing pie charts to illustrate the distribution of doshas and providing detailed insights into the dominant dosha's characteristics. Quality assurance and testing played a crucial role throughout the development lifecycle, encompassing unit testing, integration testing, and user acceptance testing. Automated testing frameworks were employed to streamline the testing process and ensure the reliability and stability of the application. Feedback from testing was incorporated to fine-tune the functionality and address any identified issues promptly. Continuous monitoring and maintenance strategies were implemented to ensure the ongoing performance, security, and usability of the application, with periodic updates and enhancements based on user feedback and evolving requirements. In summary, the methodology employed for the development of "Arogya Chintak" involved thorough research, meticulous planning, agile development practices, and rigorous testing, culminating in a feature-rich and user-centric Android application aimed at promoting holistic health and well-being through innovative technology and Ayurvedic principles.

IV. RESULTS AND DISCUSSION

4.1 Results of Arogya Chintak

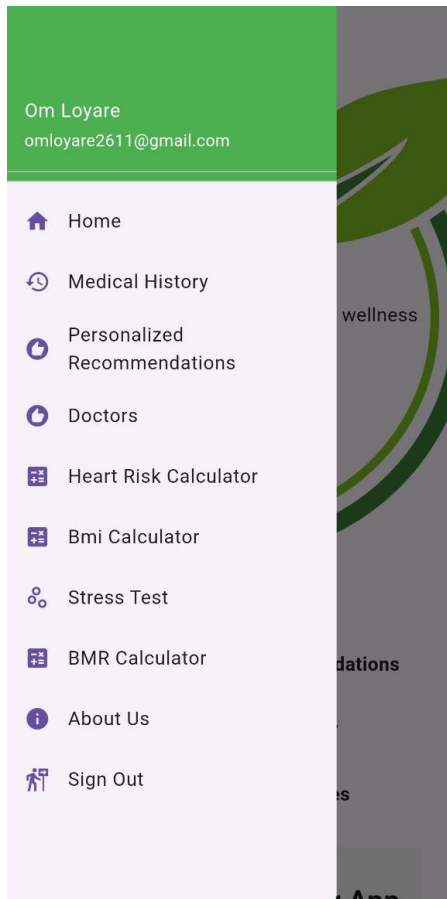


Figure 4.1 Home page Screen

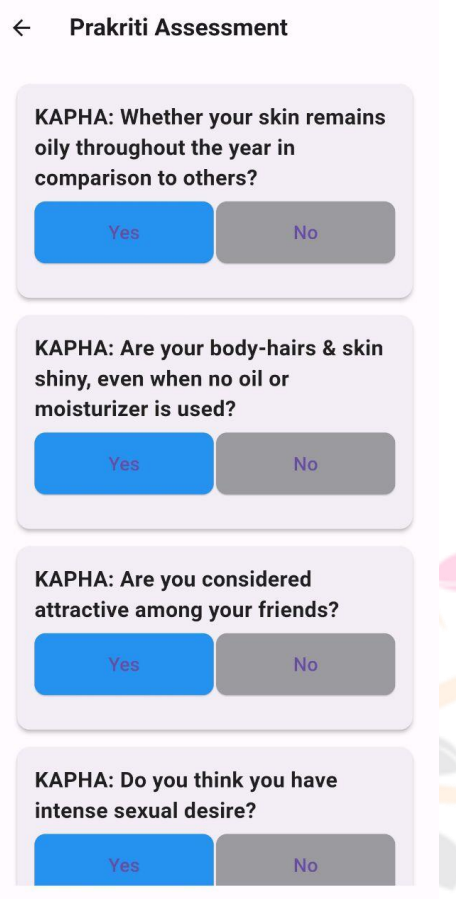


Figure 4.2 Prakriti Questionnaire Screen

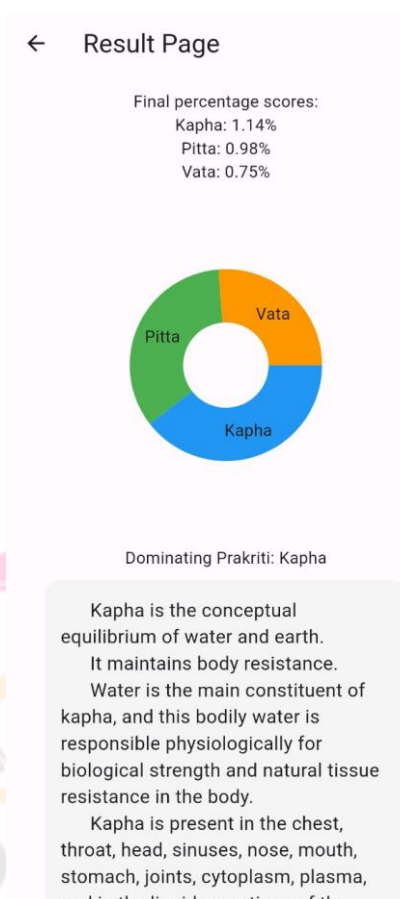


Figure 4.3 Result Screen

The homepage (Figure 4.1) of "Arogya Chintak" is a user-friendly interface designed to facilitate easy access to various health and wellness features. It features a prominently displayed navigation bar that offers quick access to essential functionalities such as BMI and BMR calculators, doctor directories, stress tests, symptom checkers, and Ayurvedic resources. With intuitive design and strategic placement of options, users can navigate seamlessly through the application to explore its diverse offerings.

The Prakriti Questionnaire Screen page (Figure 4.12) within "Arogya Chintak" offers users a structured platform to assess their Ayurvedic constitution. With a user-friendly interface, the page presents a series of questions covering various aspects of physical, mental, and emotional attributes. Users provide responses based on their personal experiences and traits, guiding the application to analyze and determine their dominant dosha. The questionnaire is designed to be intuitive and engaging, facilitating an insightful self-assessment process.

Once users complete the questionnaire, they are directed to the Result Page (Figure 4.3), where personalized insights into their Ayurvedic constitution are revealed. This page presents a visual representation, such as a pie chart, illustrating the distribution of doshas based on users' responses. Additionally, users receive detailed information about their dominant dosha, including its characteristics and implications for health and well-being. The Result Page aims to empower users with valuable insights into their Ayurvedic constitution, enabling them to make informed lifestyle choices aligned with their individual needs and preferences.

V. CONCLUSION

In reviewing Arogya Chintak, a cutting-edge mobile app, employs advanced AI for transformative healthcare. It swiftly delivers personalized health insights, integrating disease identification and tailored home remedies. Recent research explores the fusion of machine learning with Ayurveda, focusing on Prakriti identification, correlations, intelligent assessments, and innovative technologies. This collective effort marks a new era in healthcare, enhancing Ayurvedic practices through evidence-based medicine

and inclusive innovations. Arogya Chintak and recent research exemplify technology's transformative role in personalized, evidence-based healthcare.

REFERENCES

- [1] Lakshmi Bheemavarapul, K Usha Rani “Machine Learning Models Used For Prakruti Identification Using Prasna Pariksha In Ayurveda” 2023, Mathematical Statistician And Engineering Application.
- [2] Dr. Manish Kumar, Dr. Srikanta kumar Panda, Dr. Shubhangi Mishra “A Review on Relation of Prakruti with Sharirika Bala” 2022, IJSHR
- [3] Majumder, Saibal, Kutum, Rintu, Khatua, Debnarayan, Sekh, Arif Ahmed, Samarjit, Mukerji, Mithali Prasher, Bhavana “On intelligent Prakruti assessment in Ayurveda: a comparative study” 2023, IOSpress
- [4] Dr Vedashri Abhijit Kalavde, Dr Prakash Mane, Umesh Ghate “A Clinical observational study on Prakruti and its Application in Ayurveda” 2023, Journal of Pharmaceutical Negative Result.
- [5] Swati Dhole, Yedey S.E. “A Review Paper on Identification of Ayurvedic Prakriti Types” 2023
- [6] Zoufang Huang, Vivek P. Chavda, Rajashri Bezbaruah, Vladimir N. Uversky, Sucharitha P., Aayushi B. Patel and Zhe-Sheng Chen “An Ayurgenomics Approach: Prakruti-Based Drug Discovery and Development for Personalized care” 2022, ResearchGate.
- [7] Vani Rajasekar, Sathya Krishnamoorthi, Muzafer Saracevic “Ensemble Machine Learning Methods to Predict the Balancing of Ayurvedic Constituents in the Human Body” 2022, ResearchGate.
- [8] Abdul Kareem, Yoganandham Govindharaj “The Indian Medicine System and Homeopathy- An Overview”, 2022 .
- [9] Arpit Trivedi, Dr Dharmendra Patel “Survey on Human Prakruti and Tridosha (Vata, Pitta and Kapha) Based on Physiological Features Using Machine Learning and Image Processing” 2022, ResearchGate
- [10] Sonali Joshi, Preeti Bajaj “Design & Development of Portable Vata, Pitta & Kapha [VPK] Pulse Detector to Find Prakruti of an Individual using Artificial Neural Network” 2021, IEEE.
- [11] Abhilash Mangampadath “Development of a Clinically useful tool for Prakruti Assessment” 2022
- [12] Zoufang Huang, Vivek P. Chavda, Rajashri Bezbaruah, Sucharitha P. , Vladimir N. Uversky “Recent Advances in assessment and application of Prakruti” 2020, ResearchGate.
- [13] Joshi Manisha, Umadevi, Akshitha Raj B N “Computerized pragmatic assessment of Prakruti Dosha using tongue images- Pilot study” 2020, ResearchGate.
- [14] Vinotha Sanmugarajah “A Study of the Standard Tool for Prakruti Assessment in Indigenous Medicine” 2019
- [15] Yogini S. Jaiswal, Leonard L. Williams “A Glimse of Ayurveda – The forgotten history and principles of Indian Traditional Medicine”

