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Mathematical Representation of the Process Of Determination of Mijaz the Unani Temperament

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Abstract
Unani medical experts both classical and modern have developed various methods for determination of the human temperament called "mizaj" in Unani terminology. The present research proposes to develop a temperament classification system where individual temperament based on the fundamentals of Unani medical science can determined from the subject or patient available data, the temperament can be validated by human expertise, machine intelligence and modern technologies. In this paper, computational and mathematical modelling have been applied to determine the Unani temperament. The derived model can be validated and calibrated using real data to make it more robust. The model can be converted into an algorithm and can be integrated into a health care system using modern data analytics approaches.

INTRODUCTION:

Personalized medicine is also playing an increasingly important role in the treatment of diseases. By taking into account a patient's lifestyle, environment, and medical history, doctors can develop a treatment plan that is tailored to the individual patient. As technology continues to advance and our understanding of genetics and disease mechanisms improves, precision medicine and personalized medicine will likely become even more important in the years to come [1]. Although individual difference was an important consideration in ancient approaches of human wellbeing, were the restoring of individual person's health was priority rather than treating the diseased part in isolation. The first step in ancient medical practices was to identify the temperament of an individual and to find out deviation in the original temperament. This evident from the methodology adopted in Ayurveda and Unani medical approaches. Personalized medicine can increase efficacy and safety with customized diagnosis and treatment. If identification of Temperament is included in hospital Management system it could lead to better decisions, right diagnosis and treatment [2]. Hence the present research proposes to develop a temperament classification system where individual temperament based on the fundamentals of Unani medical science can determined from the subject or patient available data, the temperament can be validated by human expertise, machine intelligence and modern technologies.

In recent years, the integration of traditional medical practices with modern technology has shown great potential for improving healthcare outcomes. In Recent years, modern medical scientists are inclining towards personalized medicine. Personalized medicine gives outmost importance to the individual differences, and it stresses that individual characteristics of individual can influence disease manifestations and treatment patterns. Modern medicine focuses on general treatment for all, most of the traditional medicine like Ayurveda, siddha Unani, Chinese medicine etc. all focus on individual temperament since ancient times [16].

Concept of Temperament in Unani Medicine(Mizaj)

According to the fundamentals of Unani medical practices. Human subjects can be classified into four major groups based on the dominance of the major body fluid, namely, sanguine (Damvi), phlegmatic (Balghami), choleric (Safrawi) and melancholic (Saudawi). The quality and quantity of the fluids in person's unique, determines and guarantee healthy conditions, while misbalance may result in ailment or disease Temperament (temperament) which is an important concept of Unani medicine, represents

the metabolic constitution, psychological makeup and behavioral pattern of an individual [13, 17, 18, 26].

Determination of Mizaj

Unani medical experts both classical and modern have developed various methods for determination of mizaj (Temperament) of an individual, for instance Ibn-e-Sina (Avicenna) in his famous book canon of medicine (Al-Qanoon-fil-Tibb) suggested 10 parameters for the assessment of Temperament, [19] Ahmed (1980) has developed a questionnaire 55 items based on the Ibne-e-sina's 10 parameters [20]. According to Mojahed et al. (2014) and Akhtari (2020) there is no standard method of determination of mizaj and a self-administrated questionnaire was suggested [21, 22]. Most of the researcher in India use a standard questionnaire formulated by Central Council for Research in Unani Medicine (CCRUM), Ministry of AYUSH, Govt. of India, for assessment of Mizaj [23]. Similar attempts were made in Iran by researchers likes Mozaffarpur et. al (2019) and Roshandel et.al (2016) tried to develop the standard questionnaire for assessment of Mizaj [24,25].

Endeavors of applying modern data analytics approach in Determination of Mizaj

The researchers globally have adopted various modern scientific tools for automatic assessment and analysis of temperament like artificial intelligence and data analytics. Machine learning technique used for assessments of Temperament were suggested researchers like by Tiwari et al. [5], Madaan et al. [6] Farooque et.al [7], [8] etc. Similarly, data mining techniques were suggested by researchers like Farooque et al. [9] Bandgar et al. [10] Roya et al. [11] Sultana et. al [12] Fahrudy et. el [2022] etc. Artificial Neural network was suggested by Mulla et.al [14], and mathematical modelling was suggested by Rasheed et.al [15].

Similarly, Wedaduru and Ayusoft were decision support system developed in Sri-Lanka and India respectively are used to determine temperament based on principles of Ayurveda [3,4] however there is no such system till date for Unani temperament. Various Attempts were also made to compare both Unani and Ayurvedic temperaments and developments of tools for Mutual conversion like Mulla et al. (2014) compared both system using questionnaires [13]. Mulla et al. [15] used artificial neural networks to get Unani Temperament from Ayurvedic Temperament and vise-versa. Similarly, Rasheed et.al (2022) developed a mathematical model to establish the relationship between two different temperaments to deal with COVID-19 situation [16]. The Researchers found that it is mathematical possible to obtained one from another with some amount of error, which is very small. The output can be used an algorithm in the mutual conversion module of proposed Health information system.

Mathematical Representation of Mizaj

According to Unani postulates, there are four major fluids in a human body, i.e four independent parameters which determine the health status of an individual. These are named balgham (phlegm), dam (blood), safra (yellow bile), and sauda (black bile) respectively. When these fluids are present in the right proportion in the body, the body remains healthy. On the basis of dominance of anyone of the fluids the Mizaj of a person is determined. Doctors generally arrive at these classifications based on the patient information gathered from the individual using a set of questions. The basic points required for classification as given by doctors are clinically validated. In the approach of decision making system a simple mathematical description of the problem is possible. We define Def1: $\mu(i,j) = \mu(j) = \text{Unani (Mizaj)}$ scores of individual j, with $i=1,2,3,4$ the four parameters of temperament such as Balghami, Damvi, Saudwi, and Safrawi are represented as β , δ , σ and φ respectively. The $\boldsymbol{\mu}$ is a vector of four components as indicated above.

$$\mu = [\beta, \delta, \sigma, \varphi]$$

Each parameter of temperament is represented individually as

$$\text{Balghami} - \beta = \beta[1] + \beta[2] + \beta[3] + \cdots \ldots \ldots \ldots \ldots + \beta[n-1] + \beta[n]$$
$$\text{Damvi} - \delta = \delta[1] + \delta[2] + \delta[3] + \cdots \ldots \ldots \ldots \ldots + \delta[n-1] + \delta[n]$$
$$\text{Saudwi} - \sigma = \sigma[1] + \sigma[2] + \sigma[3] + \cdots \ldots \ldots \ldots \ldots + \sigma[n-1] + \sigma[n]$$
$$\text{Safrawi} - \varphi = \varphi[1] + \varphi[2] + \varphi[3] + \cdots \ldots \ldots \ldots \ldots + \varphi[n-1] + \varphi[n]$$

According to data collection procedure in Unani sciences, the mathematical representation of the diagnostic steps can be derived as follows:

$$\mu = \begin{bmatrix} \beta[1] & \delta[1] & \sigma[1] & \varphi[1] \\ \beta[2] & \delta[2] & \sigma[2] & \varphi[2] \\ \beta[3] & \delta[3] & \sigma[3] & \varphi[3] \\ \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots \\ \beta[n-1] & \delta[n-1] & \sigma[n-1] & \varphi[n-1] \\ \beta[n] & \delta[n] & \sigma[n] & \varphi[n] \end{bmatrix}$$

Hence, the Balghami, Damvi, Saudwi, and Safrawi values can be derived and calculated as:

$$\beta = \sum_{i=1}^{n} \beta[i]$$

$$\delta = \sum_{i=1}^{n} \delta[i]$$

$$\sigma = \sum_{i=1}^{n} \sigma[i]$$

$$\varphi = \sum_{i=1}^{n} \varphi[i]$$

The following algorithm help is to identify the dominant value of the of temperament (μ_0) $\mu_0 = \begin{Bmatrix} \beta & IF & \beta > \delta \text{ and } \beta > \sigma \text{ and } \beta > \varphi \\ \delta & IF & \delta > \beta \text{ and } \delta > \sigma \text{ and } \delta > \varphi \\ \sigma & IF & \sigma > \beta \text{ and } \sigma > \delta \text{ and } \sigma > \varphi \\ \varphi & IF & \varphi > \beta \text{ and } \varphi > \delta \text{ and } \varphi > \sigma \end{Bmatrix}$

Hence, the final value and identification of temperament will be μ_0.

CONCLUSION AND FUTURE WORK

Unani medicine faces challenges in adapting to modern healthcare systems, primarily due to the qualitative and subjective nature of its diagnostic methods. This problem can be resolved by development of a system or a method, which can validate and facilitate determination this ancient practices. The above model is an attempt to application of computational and mathematical approach to the process of determination of Mizaj. The parameters used to determine the mizaj are organized in structured matrix framework. Weight are assigned to individual parameter with respect to their diagnostic significance. Although there exists a complex relationship between various parameters along their respective values and weights, the dominant temperament can be determined. Application of normalization ensures accuracy, reliability and comparability.

The application of quantitative and standardized computation of mizaj determination makes this model reliable and acceptable in modern setup. The model can be validated and calibrated using real data to develop a more robust model for the same. Once the model is validated it can be converted into an algorithm, which can be letter transformed into a comprehensive software. etc.

The once developed the comprehensive system will be able to determine an individual's temperament based on Unani Mizaj classifications. By employing advanced data science and data analysis techniques, this system will provide accurate temperament assessments, aiding healthcare providers in personalized treatment and patient care. The proposed system can be made accessible through both web and mobile platforms and can be seamlessly integrated with any Hospital or Health Management Information Systems (HMIS).

The system will Collect relevant patient data, including medical history, lifestyle, and habits. Using available and acquired data to capture physiological parameters for the temperament assessment and validation. It will use data analytic like machine learning, Data Mining, big data Analytics etc. this will validate the results.

Once developed the system will result in Improved patient care by assisting healthcare providers in tailoring treatments according to individual temperaments. Integration of the temperament determination system with Hospital HMIS, enhancing the overall healthcare management process.

REFERENCES

1. Hotea, I., Sirbu, C., Plotuna, A. M., Tîrziu, E., Badea, C., Berbecea, A., ... & Radulov, I. (2023). Integrating (Nutri-) Metabolomics into the One Health Tendency—The Key for Personalized Medicine Advancement. Metabolites, 13(7), 800.
2. Afrough S, Murtaza M, Junaid Farooque. Integrating the process of Determining Mizaj (Temprament) in a Hospital Management System. Allana Management Journal of Research. 2012; 11(2):82–87
3. Bandara, R.I.S., Shageesha Prabagaran, S.A.K.G Perera, M.N Rumana Banu, and K.A.D.C.P Kahandawaarachchi. "Wedaduru -An Intelligent Ayurvedic Disease Screening and Remedy Analysis Solution." 2019 International Conference on Advancements in Computing (ICAC) (December 2019). doi:10.1109/icac49085.2019.9103410
4. Eranezhath, S. (2011). Ayurveda poised for change, So is the 'Ancient Science of Life'. Ancient Science of Life, 30(3), 63.
5. Tiwari, Pradeep, Rintu Kutum, Tavpritesh Sethi, Ankita Shrivastava, Bhushan Girase, Shilpi Aggarwal, Rutuja Patil, et al. "Recapitulation of Ayurveda Constitution Types by Machine Learning of Phenotypic Traits." Edited by Gyaneshwer Chaubey. PLOS ONE 12, no. 10 (October 5, 2017): e0185380. doi:10.1371/journal.pone.0185380.
6. Madaan, Vishu, and Anjali Goyal. "Predicting Ayurveda-Based Constituent Balancing in Human Body Using Machine Learning Methods." IEEE Access 8 (2020): 65060–65070. doi:10.1109/access.2020.2985717.
7. Junaid Farooque, Murtaza M., Mohammed Aref, Mohammed Imran Khan, and Shareque Mohammed. "Data Mining Application in Classification Scheme of Human Subjects According to Ayurvedic Prakruti – Temperament." Indian Journal of Science and Technology 9, no. 13 (April 18, 2016). doi:10.17485/ijst/2016/v9i13/84658
8. K. Usha Rani, L. B. . (2023). Machine Learning Models Used For Prakriti Identification Using Prasna Pariksha In Ayurveda – A Review. Mathematical Statistician and Engineering Applications, 72(1), 1942–1951. https://doi.org/10.17762/msea.v72i1.2613
9. Farooque, Murtaza M. Junaid, Sayyed Abidurrahman, and Farhana Sarkhawas. "Identification of Mizaj (Temprament) Based on Tibbi Fundamentals using Classification as Tool." in National Conference on Data Minning, Pune, India (2011): 94-97.
10. Bandgar, B. M., A. D. More, and Binod Kumar. "Analysis of Temperament (Mizaj) by Using Different Data Mining Techniques," International Journal of Data Warehousing and Mining, vol. 3, no. 2, (2013): 79-81.
11. Rezaei, Inanlou Roya, Gharehchopogh Farhad Soleimanian, and Morteza Mojahedi. "A model for temperament (Mizaj) recognition based on fuzzy decision tree in traditional Persian medicine." vol. 9, no. 3 (2018): 227-237.
12. Sultana, A., Begum, W., Saeedi, R., Rahman, K., Bin Heyat, M. B., Akhtar, F., ... & Ullah, H. (2022). Experimental and computational approaches for the classification and correlation of temperament (Mizaj) and uterine dystemperament (Su'-I-Mizaj Al-Rahim) in abnormal vaginal discharge (Sayalan Al-Rahim) based on clinical analysis using support vector machine. Complexity, 2022, 1-16.
13. Mulla, G., Ghawte, S. A., Ajmal. K. , "Mizaj and Prakruti – The twin Temperaments forming the foundation Pillars of Unani and Ayurveda Systems of Alternative Medicine" at "RAJAYUCON 2013" International Conference on "Ayurveda and Complementary System of Medicines" organized by Mission Ayurveda Rajkot in collaboration with Maharashtra University of Health Sciences, Nashik, on 23rd and 24th February, Rajkot, Gujrat, India (2013).
14. Gazala Mulla, M. M., and H. S. Acharya. "ANN based Dual convertor model to get Ayurvedic Prakruiti from fuzzy Unani scores and Unani Mizaj from Fuzzy Ayurvedic scores," in National Confence on data Minning, Pune, India, (2013):67-70.
15. Rasheed, M. A. A., Farooque, M. M. J., Acharya, H. S., & Quadri, M. S. A. (2021). Mathematical Modelling of the Relationship between Two Different Temperament Classifications: During the Covid-19 Pandemic.
16. Ahmadi, M.; Shirafkan, H.; Mozaffarpur, S.A. Assessment of the Diagnostic Methods of Mizaj in Persian Medicine: A Systematic Review. Diagnostics 2023, 13, 818. https://doi.org/10.3390/diagnostics13050818
17. The Editors of Encyclopedia Britannica, Unani medicine, "Mizaj" Arabian medicine, Islamic medicine, Unani Tibb. Available online: https://britannica.com/science/Unani-medicine#ref1167451. (accessed on October 2020)
18. Rafatullah, S., and S. Alqasoumi. "Unani Medicine: An Integral Part of Health Care System in Indian Subcontinent." European Journal of Integrative Medicine 1 (November 2008): 39–40. doi:10.1016/j.eujim.2008.08.076.
19. Avicenna, 980-1037. (1930). A treatise on the Canon of medicine of Avicenna, incorporating a translation of the first book. London :Luzac & co.,
20. Ahmad, Sayeed.I., (1980). Introduction to Al-Umur-Al-Tabiyah, Saini Printers, New Delhi, pp. 55, 57-58.
21. Akhtari, Marjan, Reihaneh Moeini, Morteza Mojahedi, and Narjes Gorji. "Assessment the Studies on the Concept of Mizaj (temperament) in Persian Medicine." Journal of Complementary and Integrative Medicine 17, no. 3 (September 23, 2020). doi:10.1515/jcim-2018-0122.
22. Mojahedi, Morteza, Mohsen Naseri, Reza Majdzadeh, Mansoor Keshavarz, Mohammad Ebadini, Esmaeil Nazem, and Mohsen Saberi Isfeedvajani. "Reliability and Validity Assessment of Mizaj Questionnaire: A Novel Self-Report Scale in Iranian Traditional Medicine." Iranian Red Crescent Medical Journal 16, no. 3 (March 5, 2014). doi:10.5812/ircmj.15924.
23. Naaz, Farah, Adnan Mastan, Mohd Abid, and Noman Khan. "Clinical Evaluation of Mizaj (Temperament) of the subjects of pelvic inflammatory disease." vol. 5, no. 8, (2016): 713-28.

24. Mozaffarpur, Seyyed Ali, Morteza Mojahedi, Roshnak Saghebi, Abbas Alipour, and Hoda Shirafkan. “The Relationship between Mizaj and Its Indices in Persian Medicine.” Advances in Integrative Medicine 6 (May 2019): S81. doi:10.1016/j.aimed.2019.03.233.
25. Roshandel, Hamid Reza Sheikh, Fateme Ghadimi, and Romina Sheikh Roshandel. "Developing and standardization of a structured questionnaire to determine the temperament (Mizaj) of individuals." Greek, (2016)
26. Randy Rolfe, “The Four Temperaments: A Rediscovery of the Ancient Way of Understanding Health and Character”, (2002), Hachette Books
27. D. Fahrudy, “intelligent system for classification of student personality with naive bayes algorithm”, SINTECH Journal, vol. 5, no. 1, pp. 1-9, Apr. 2022.