Relationship Identification & Prediction of Diseases Association using Micro-RNA of Genomic Data

C Nalini, S. Amudha, S. Sangeetha

Abstract : ***The current process of finding the relationship between the father and the son and also predicting the diseases that is yet to occur is quite inaccurate because it includes only the gene-id of the respected person. In order to handle or to make this system more accurate, we propose this system by using the chromosome structure of the person. This system takes the input of the chromosome structure of the son that has been partitioned from the father's chromosome structure. It initially preprocesses the image of the son using the collaborative filtering for making it look different from the input image to show the similarity between the father and the son. It then detects the edge of the structure after preprocessing it using the SOBEL edge detection algorithm. The SOBEL edge detection algorithm is that the gradient of the image is calculated for each pixel position in the image. After detecting the edges of those input images, matching process starts between the input image and the list of father chromosome images. Then the matched output appears. In order to predict the diseases which is yet to come in future for the son is represented graphically by dividing it into three colors, firstly green represents there is less possibility of the son getting the disease, secondly yellow represents there may be any chance of son getting the disease and finally red represents there is high possibility of son getting the disease.***

KEYWORDS: Image processing, Edge detection, Image matching, Graphical representation

.

I. INTRODUCTION

Information mining is the route toward discovering plans in broad instructive accumulations including strategies at the intersection purpose of AI, bits of knowledge, and database systems. It is a crucial technique where canny methodologies are associated with expel data plans. It is an interdisciplinary subfield of programming building. The general goal of the data mining procedure is to remove information from an instructive list and change it into a sensible structure for further use. Other than the unpleasant assessment step, it consolidates database and information the authorities' viewpoints, information pre-taking care of, model and induction contemplations, enrapturing quality estimations, multifaceted nature contemplations, post-arranging of found structures, acknowledgment, and web fortifying Information mining is the assessment adventure of the "learning disclosure in databases" methodology or KDD.

Picture handling is arranging of pictures utilizing numerical activities by a banner preparing for which the information is a picture, a development of pictures or a video, for example, a photo or a video format; the yield of picture pre-preparing may be either an image or a great deal of characteristics or parameters related to the image. Most picture getting ready techniques incorporate seeing the image as a two-dimensional banner and applying standard banner taking care of strategies to it. Pictures are moreover taken care of as three-dimensional signs with the third estimation being time or the z-center.In recent years, the technology is being increased to greater level in several fields. This system focuses on the medical field. our system helps the doctors or the admins to predict the diseases easily with help of some tools and technologies.

In our system, we are going to find the relation of father and son using two of the factors. One is the gene id and the other is the chromosome structure. Nextly the diseases that the father has, can also occur for the son are being predicted. When dealing with gene id it was bought from the real time hospitals. Using the father's gene id, the son's gene id is bought by the way of molecular weight and the possibilities of the diseases for the son are displayed by using some of the algorithms. When dealing with chromosome structure, son's structure is given as input and the fathers structure is retrieved using the cM (Centimorgan) and SNP (Single-nucleotide Polymorphisms) values and the diseases are predicted and the disease severity is displayed in a graph. This project not only deals with human chromosome but little process on rat chromosome structure are also being included.

The performance is more accurate when dealing with chromosome structure than with gene id. It also becomes more realistic when dealing the chromosome. The understandability is also very easy with chromosomes. When dealing with gene id it speaks of molecular weight which is the back-end calculation. When with chromosome structure it gives the visual similarity which the user or the admin can easily view the relation between the father and the son. The gene id format differs from organization to organization but the structure is standard format for any type of chromosome.

Revised Manuscript Received on July 22, 2019.

Dr. C Nalini, Professor, Department of Computer Science and Engineering, Bharath Institute of Higher Education and Research, Chennai, Tamilnadu, India **Email ID:**drnalinichithambaram@gmail.com

Ms. S. Amudha, Department of CSE, Bharath Institute of Higher Education and Research, Chennai, Tamilnadu, India. amudha17s@gmail.com

Ms. S. Sangeetha, Department of CSE, Bharath Institute of Higher Education and Research, Chennai, Tamilnadu, India. Sangeethasathya01@gmail.com

A.Micro-RNA Of Genomic Data

Quality verbalization in cells and tissues of each staggering animal is certainly controlled and, as it were, subject to different conditions, (for instance, improvement, changes in nature, sicknesses or prescriptions). Various cells and organ structures inside such living thing (tallying individuals) contain differing quality enunciation profiles, thusly genuine understanding of regulatory frameworks drew in with such verbalization addresses one of the key issues in genomic medicine.

Isolating miRNAs from various classes of little RNAs that are accessible in the telephone is habitually awkward – particularly the capability from endogenous small interfering RNAs (siRNAs). The most basic refinement among miRNAs and siRNAs is whether they quietness their own one of a kind appearance. For all intents and purposes all siRNAs (paying little notice to their viral or other beginning stage) calm a comparative locus from which they were resolved. On the other hand, most miRNAs don't peaceful their own one of a kind loci, yet various characteristics. miRNAs control arranged pieces of progress and physiology, thus understanding its natural employment is exhibiting progressively basic. Examination of miRNA verbalization may give gainful information, as dysregulation of its ability can provoke human ailments, for instance, threatening development, cardiovascular and metabolic contaminations, liver conditions and insusceptible brokenness.

II. OVERALL ARCHITECTURE

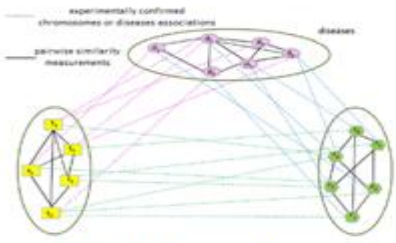

Fig:1:Chromosome Structure

IV.METHODOLOGY

A. Dataset

The picture chromosomes of dataset have been made for examination of ailment. This dataset contains twenty two cases and five characteristics are utilized in this similar examination. The chromosome legacy in Fig:1 and how to examining chromosomes by utilizing GEDmatch databases to discover One-to-numerous Matches, One-to-one Compare, and People who coordinate either of two kits, the ideas are relevant to comparative databases given by the DNA real testing administrations. This implies your DNA information is in the GEDmatch database so it very well may be utilized to contrast with others. Here the backend of the coding utilizing by java stage. Java is a comprehensively valuable PC programming language that is synchronous, class-based, object-arranged, and unequivocally planned to have as few execution conditions as could sensibly be normal. It is planned to give application designers "a chance to write once, run anyplace ", implying that accumulated Java code can keep running on all stages that help Java without the requirement for recompilation.

B. Chromosome Basics

Fig:2: Chromosome Basics

Chromosomes are small structures found inside your cells. They contain the DNA data and guidelines that characterize your identity - what you resemble, how your body works, and even what hereditary ailments you may have. People have 46 chromosomes. Be that as it may, chromosomes come in sets, so we ordinarily consider them 23 sets of chromosomes in Fig:2. The initial 22 chromosome sets (called autosomes) are numbered 1 through 22. We'll basically concentrate on these autosomal chromosomes.

C. Chromosome Inheritance

One autosomal chromosome from each pair originates from your mom and alternate originates from your dad. This implies you get half of your DNA from your mom and half from your dad. Every chromosome they pass on to you is their very own blend pair of chromosomes which they got from their folks (your grandparents) as in Fig:3.

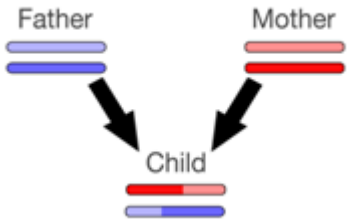

Fig:3: Chromosome Inheritance

The picture above delineates how one sets of chromosomes might be passed from your folks to you. The hues don't mean anything unique - they basically portray the individual chromosomes and chromosome areas

V.IMAGE PREPROCESSING

Image processing is a method to perform in the use of computer algorithm to create, processing and convert signals from an image sensor in to digital image. Image processing toolbox provide a comprehensive to the set of reference in a standard algorithm work flow in a image processing in Fig:4 to visualize perform in a image segmentation.

A. Edge Detection

Edge detection is an image processing technique for finding the boundary of object within the image as in Fig:5. It works by discontinuities in brightness. Edge detection is used for image detection data extraction in area such as image processing, computer version and machine version.

B. Image Matching

Image matching is used to match the similar images from the

multiple set of images with respect to the input image as in Fig:6.It is done by a comparing the input image with the set of images and the finally produce a similar image as output. Here we have used modified greedy algorithm to match the same chromosome structure image based on some similarity between two images.

C.Graphical Representation

Here we have shown the list of predicted diseases and their possibility of occurring with respect to son and is represented graphically by dividing it into three colors, firstly green represents there is less possibility of the son getting the disease, secondly yellow represents there may be any chance of son getting the disease and finally red represents there is high possibility of son getting the disease as in Fig:7.

D. Collaborative Filtering Algorithm

For every client, recommender frameworks prescribe things dependent on how comparable clients loved the thing. Suppose Alice and Bob have comparable interests in computer games. Alice as of late played and delighted in the amusement Legend of Zelda: Breathe of the Wild. Sway has not played this amusement, but since the framework has discovered that Alice and Bob have comparative tastes, it prescribes this diversion to Bob. Notwithstanding client likeness, recommender frameworks can likewise perform synergistic sifting utilizing thing comparability ("Users who preferred this thing additionally loved X").

F. Modified greedy Algorithm

An altered eager calculation called Multi-Tree-based Orthogonal Matching Pursuit (MTOMP). It is an algorithmic worldview that pursues the critical thinking heuristic of settling on the locally ideal decision at each phase with the goal of finding a worldwide ideal. In numerous issues, an eager technique does not for the most part produce an ideal arrangement, yet in any case an avaricious heuristic may yield locally ideal arrangements that surmised a universally ideal arrangement in a sensible measure of time.

VI. EXPERIMENTAL RESULT

In this system a collaborative filtering is used for preprocessing method. In the preprocessing the required information that are related to the chromosome and diseases are processed. We use edge detection method to detect the edges of the chromosome structure and so that it gets the parent chromosome. For the edge detection we use the algorithm called Sobel Edge detection. This algorithm is being used because it gives the exact outer structure when compared to that of other algorithms. Then for matching purpose the Modifies Greedy algorithm is being used to match the related chromosome. Then the bar graph is being generated. From the bar graph the possibility or the chances of the diseases for the son are displayed with the percentage of diseases. The chances are also being displayed with the color differences. Then finally the histogram can be displayed for each of the input structure that is being given. Thus, by using these predictions and the bar graph, the admins and the doctors can be benefited for explaining or show casing the patients or the users to understanding an easy way.

Fig 4:Image preprocessing

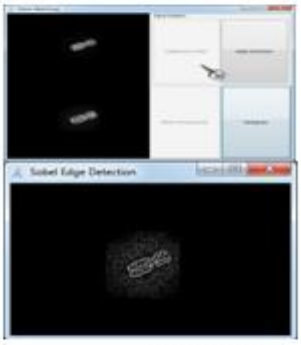

Fig 5: Edge Detection

Fig 6: Image Matching

Fig 7: Graphical Representation

VII. CONCLUSION

In this system a collaborative filtering is used for preprocessing method. In the preprocessing the required information that are related to the chromosome and diseases are processed. We use edge detection method to detect the edges of the chromosome structure and so that it gets the parent chromosome. For the edge detection we use the algorithm called Sobel Edge detection. This algorithm is being used because it gives the exact outer structure when compared to that of other algorithms. Then for matching purpose the Modifies Greedy algorithm is being used to match the related chromosome. Then the bar graph is being generated. From the bar graph the possibility or the chances of the diseases for the son are displayed with the percentage of diseases. The chances are also being displayed with the color differences. Then finally the histogram can be displayed for each of the input structure that is being given.

REFERENCES

[1] Kumaravel A., Rangarajan K.,Algorithm for automaton specification for exploring dynamic labyrinths,Indian Journal of Science and Technology,V-6,I-SUPPL5,PP-4554-4559,Y-2013

[2] P. Kavitha, S. Prabakaran "A Novel Hybrid Segmentation Method with Particle Swarm Optimization and Fuzzy C-Mean Based On Partitioning the Image for Detecting Lung Cancer" International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249-8958, Volume-8 Issue-5, June 2019

[3] Kumaravel A., Meetei O.N.,An application of non-uniform cellular automata for efficient

cryptography,2013 IEEE Conference on Information and Communication Technologies, ICT 2013,V-,I-,PP-1200-1205,Y-2013
[4] Kumarave A., Rangarajan K.,Routing alogrithm over semi-regular tessellations,2013 IEEE Conference on Information and Communication Technologies, ICT 2013,V-,I-,PP-1180-1184,Y-2013
[5] P. Kavitha, S. Prabakaran "Designing a Feature Vector for Statistical Texture Analysis of Brain Tumor" International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249-8958, Volume-8 Issue-5, June 2019
[6] Dutta P., Kumaravel A.,A novel approach to trust based identification of leaders in social networks,Indian Journal of Science and Technology,V-9,I-10,PP--,Y-2016
[7] Kumaravel A., Dutta P.,Application of Pca for context selection for collaborative filtering,Middle - East Journal of Scientific Research,V-20,I-1,PP-88-93,Y-2014
[8] Kumaravel A., Rangarajan K.,Constructing an automaton for exploring dynamic labyrinths,2012 International Conference on Radar, Communication and Computing, ICRCC 2012,V-,I-,PP-161-165,Y-2012
[9] P. Kavitha, S. Prabakaran "Adaptive Bilateral Filter for Multi-Resolution in Brain Tumor Recognition" International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-8 Issue-8 June, 2019
[10] Kumaravel A.,Comparison of two multi-classification approaches for detecting network attacks,World Applied Sciences Journal,V-27,I-11,PP-1461-1465,Y-2013
[11] Tariq J., Kumaravel A.,Construction of cellular automata over hexagonal and triangular tessellations for path planning of multi-robots,2016 IEEE International Conference on Computational Intelligence and Computing Research, ICCIC 2016,V-,I-,PP--,Y-2017
[12] Sudha M., Kumaravel A.,Analysis and measurement of wave guides using poisson method,Indonesian Journal of Electrical Engineering and Computer Science,V-8,I-2,PP-546-548,Y-2017
[13] Ayyappan G., Nalini C., Kumaravel A.,Various approaches of knowledge transfer in academic social network,International Journal of Engineering and Technology,V-,I-,PP-2791-2794,Y-2017
[14] Kaliyamurthie, K.P., Sivaraman, K., Ramesh, S. Imposing patient data privacy in wireless medical sensor networks through homomorphic cryptosystems 2016, Journal of Chemical and Pharmaceutical Sciences92.
[15] Kaliyamurthie, K.P., Balasubramanian, P.C. An approach to multi secure to historical malformed documents using integer ripple transfiguration2016 Journal of Chemical and Pharmaceutical Sciences92.
[16] A.Sangeetha,C.Nalini,"Semantic Ranking based on keywords extractions in the web", International Journal of Engineering & Technology, 7 (2.6) (2018) 290-292
[17] S.V.GayathiriDevi,C.Nalini,N.Kumar,"An efficient software verification using multi-layered software verification tool "International Journal of Engineering & Technology, 7(2.21)2018 454-457
[18] C.Nalini,ShwtambariKharabe,"A Comparative Study On Different Techniques Used For Finger – Vein Authentication", International Journal Of Pure And Applied Mathematics, Volume 116 No. 8 2017, 327-333, Issn: 1314-3395
[19] M.S. Vivekanandan and Dr. C. Rajabhushanam, "Enabling Privacy Protection and Content Assurance in Geo-Social Networks", International Journal of Innovative Research in Management, Engineering and Technology, Vol 3, Issue 4, pp. 49-55, April 2018.
[20] Dr. C. Rajabhushanam, V. Karthik, and G. Vivek, "Elasticity in Cloud Computing", International Journal of Innovative Research in Management, Engineering and Technology, Vol 3, Issue 4, pp. 104-111, April 2018.
[21] K. Rangaswamy and Dr. C. Rajabhushanamc, "CCN-Based Congestion Control Mechanism In Dynamic Networks", International Journal of Innovative Research in Management, Engineering and Technology, Vol 3, Issue 4, pp. 117-119, April 2018.
[22] Kavitha, R., Nedunchelian, R., "Domain-specific Search engine optimization using healthcare ontology and a neural network backpropagation approach", 2017, Research Journal of Biotechnology, Special Issue 2:157-166
[23] Kavitha, G., Kavitha, R., "An analysis to improve throughput of high-power hubs in mobile ad hoc network" , 2016, Journal of Chemical and Pharmaceutical Sciences, Vol-9, Issue-2: 361-363
[24] Kavitha, G., Kavitha, R., "Dipping interference to supplement throughput in MANET" , 2016, Journal of Chemical and Pharmaceutical Sciences, Vol-9, Issue-2: 357-360
[25] Michael, G., Chandrasekar, A.,"Leader election based malicious detection and response system in MANET using mechanism design approach", Journal of Chemical and Pharmaceutical Sciences(JCPS) Volume 9 Issue 2, April - June 2016 .
[26] Michael, G., Chandrasekar, A.,"Modeling of detection of camouflaging worm using epidemic dynamic model and power spectral density", Journal of Chemical and Pharmaceutical Sciences(JCPS) Volume 9 Issue 2, April - June 2016 .
[27] Pothumani, S., Sriram, M., Sridhar, J., Arul Selvan, G., Secure mobile agents communication on intranet,Journal of Chemical and Pharmaceutical Sciences, volume 9, Issue 3, Pg No S32-S35, 2016
[28] Pothumani, S., Sriram, M., Sridhar , Various schemes for database encryption-a survey, Journal of Chemical and Pharmaceutical Sciences, volume 9, Issue 3, Pg NoS103-S106, 2016
[29] Pothumani, S., Sriram, M., Sridhar, A novel economic framework for cloud and grid computing, Journal of Chemical and Pharmaceutical Sciences, volume 9, Issue 3, Pg No S29-S31, 2016
[30] Priya, N., Sridhar, J., Sriram, M. "Ecommerce Transaction Security Challenges and Prevention Methods- New Approach" 2016 ,Journal of Chemical and Pharmaceutical Sciences, JCPS Volume 9 Issue 3.page no:S66-S68 .
[31] Priya, N.,Sridhar,J.,Sriram, M."Vehicular cloud computing security issues and solutions" Journal of Chemical and Pharmaceutical Sciences(JCPS) Volume 9 Issue 2, April - June 2016
[32] Priya, N., Sridhar, J., Sriram, M. "Mobile large data storage security in cloud computing environment-a new approach" JCPS Volume 9 Issue 2. April - June 2016
[33] Anuradha.C, Khanna.V, "Improving network performance and security in WSN using decentralized hypothesis testing "Journal of Chemical and Pharmaceutical Sciences(JCPS) Volume 9 Issue 2, April - June 2016 .
[34] Anuradha.C, Khanna.V, "A novel gsm based control for e-devices" Journal of Chemical and Pharmaceutical Sciences(JCPS) Volume 9 Issue 2, April - June 2016 .
[35] Anuradha.C, Khanna.V, "Secured privacy preserving sharing and data integration in mobile web environments " Journal of Chemical and Pharmaceutical Sciences(JCPS) Volume 9 Issue 2, April - June 2016 .
[36] Sundarraj, B., Kaliyamurthie, K.P. Social network analysis for decisive the ultimate classification from the ensemble to boost accuracy rates 2016 International Journal of Pharmacy and Technology
[37] Sundarraj, B., Kaliyamurthie, K.P. A content-based spam filtering approach victimisation artificial neural networks 2016 International Journal of Pharmacy and Technology83.
[38] Sundarraj, B., Kaliyamurthie, K.P. Remote sensing imaging for satellite image segmentation 2016 International Journal of Pharmacy and Technology8 3.
[39] Sivaraman, K., Senthil, M. Intuitive driver proxy control using artificial intelligence 2016 International Journal of Pharmacy and Technology84.
[40] Sivaraman, K., Kaliyamurthie, K.P. Cloud computing in mobile technology 2016 Journal of Chemical and Pharmaceutical Sciences92.
Sivaraman, K., Khanna, V. Implementation of an extension for browser to detect vulnerable elements on web pages and avoid click jacking 2016 Journal of Chemical and Pharmaceutical Sciences92.

AUTHORS PROFILE

Dr .S. Nalini,Professor, Dept of CSE,BIHER

Ms .S. Amutha Asst, Professor, Department of Computer Science and Engineering, BIHER

Ms. S. Sangeetha, Assistant Professor, Department of Computer Science & Engineering, Bharath Institute of Higher Education and Research, Chennai, India