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Cloud Matrimony: The New Paradigm

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Abstract—*In this paper, we introduce the idea of an online marriage portal which takes the genetic background of the users into consideration while showing them their suitable match (an approach which comes under positive Eugenics). Besides all the other information, users can be asked to provide any information regarding any sort of inherited ailments. A provision can be made for the users to upload information about their DNA structure in the form of a micro array expression. Since we need a model that is ubiquitous, convenient, and that can provide on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications and services) which can be rapidly provisioned and released with minimal management effort, Cloud Computing seems to be the apt choice.*

1. INTRODUCTION

This paper suggests the idea of premarital analysis of human genome integrated along with a marriage portal. An offspring receives almost his/her entire genome from his mother and father. Sometimes along with these traits the offspring also receives some sort of genetic disease. A genetic disease is any disease that is caused by an abnormality in an individual's genome. The abnormality can range from a minuscule to major - from a discrete mutation in a single base pair to a gross chromosome abnormality involving entire set of chromosomes. In 2015, India is estimated to possess 7% share of the total Internet users of the world and now is ranked 4th in the world in terms of Internet usage (which is more than 12 million). 11% of the share is estimated to come from the Internet users who use matrimony sites. The total increase in growth of matrimonial sites is pegged to be 1500%. These matrimonial sites can thus serve as a mode to improve the health standards of India (by improving its gene pool).

1.1. Problem Background

India is considered as one of the richest gene pool. Diversity in genetic structure makes an offspring more resistant to diseases and also decreases the probability of any adverse genetic variation. However, religion, language and geographical location of habitat serve as barriers to random mating in the Indian population. Inbreeding is practiced in some geographical regions of India (*population-inbreeding coefficient: 0.00 to 0.20*). Thus, the overall heterogeneity of population along with the underlying endogamy makes India, a unique case of importance with respect to a high prevalence of genetic diseases and mutations. This highlights the importance of identifying recessive diseases in the Indian groups and screening the causal genes. In addition to the overall effect of 'founder events', in some communities, the load of genetic disorder is relatively higher due to the practice of consanguineous marriage, especially in South India.

In March 2006, a study conducted throughout the month of March by Dimes Birth Defect Foundation, reported the birth defect prevalence in India as 64.4 (per 1000 live births). Rao and Ghosh (2005) reported that 1 out of 20 children admitted to hospitals had a genetic disorder that ultimately accounted for about 1 out of 10 childhood deaths. In India's urban areas, congenital malformations and genetic disorders are the third most common cause of mortality in new-borns. A huge amount of money is invested each year by the government in treatment of these genetic diseases and other diseases which affects the offspring due its weak genetic structure.

1.2. Problem Statement

Cloud matrimony model reduces the probability of a genetically weak offspring. It involves diagnosis of the disease at a very basic level. Both the male and female users will be tested on the basis of the information provided by them. Though the approach seems quiet productive it has its flaws like reduction in gene pool variety. The idea may also seem to be offensive as it suggests the idea of natural selection or selective breeding up to some extent.

2. METHODOLOGY

Online users of the matrimonial sites will be asked to fill in their basic details. Along with this they will be asked about their family history. A list of common genetic disorders (prevalent in India) will be shown to the user and he/she will be asked to select the diseases from which either they or any of their family members (this may involve user's parents, maternal grandparents and paternal grandparents) is/was affected. Our entire genetic structure comprises of 23 chromosome pairs. One of the pair determines the sex of the offspring while the other 22 determines the rest of the characteristics. An offspring inherits 23 chromosomes from his/her mother and the rest 23 from his/her father. A genetic disease or any other sort of anomaly is usually caused due to

the chromosomes inherited from either parent. The chromosomes from both the partners interact with each other, known as Meiosis. The resultant chromosomes are known as daughter chromosomes or in some cases hybrid chromosomes. If a person or someone in his/her family is/was affected by some sort of genetic disorder his chromosomes will carry that particular disease. If the person is suffering from that disease he will possess a dominant trait of that disease otherwise he may possess a recessive trait of that disease (in case if someone from his family is/was suffering from that disease). *The main aim of this model is to avoid a match between two users with dominant trait of a genetic disease.*

After a successful match based on the information provided by the users, information regarding their genetic profile will be checked. In cases in which one of them possesses a recessive and the other one a dominant trait of a disease, they will be given a proper medical counselling by doctors. They will be informed about the percentage of a healthy offspring and about other approaches such as Genetic Engineering, Embryo Profiling, and Gene Therapy that will increase this percentage. A similar model has already been implemented in Saudi Arabia (Premarital Screening and Genetic Counseling) and has shown promising results. The percentage of offspring with a particular type of genetic disease (B-thalassemia syndrome) has dropped down. The details of every user will be kept secret and if under any circumstances it is let out, the conducting authority or the matrimonial site will be punished strictly. Such laws will augment the trust of the user and he will give all the information without any hesitation. The procedure is not meant to hurt someone since it will never release the matches which were cancelled due the genetic anomaly.

3. ARCHITECTURE OF THE MODEL

Since we know nothing about the number of users with the genetic disease, a cloud can be used to store all the information of the users. The number of users can increase or decrease therefore we need a model which provides services, storage and servers on-demand. Cloud computing is such an example, it is a new way of delivering computing resources (network services, servers, data storing) not a new technology. Cloud computing and storage solutions provide users and enterprises with various capabilities to store and process their data in third-party data centres. It relies upon sharing of resources to achieve coherence and economies of scale, similar to a utility (like the electricity grid) over a network. At the foundation of cloud computing is the broader concept of converged infrastructure and shared services.

4. SOME KEY FEATURES

Positive Eugenics: An approach to obtain rich and healthy gene pool using modern technologies like chromosomal testing, embryo profiling and genetic engineering.

Chromosomal Analysis: A test to determine the chromosomal abnormality and thus to detect genetic diseases and other birth defects in an offspring.

Cloud Computing: Also known as on-demand computing, is a kind of internet-based computing, where shared resources and information are provided to computers and other devices on-demand. It is a model for enabling universal, on-demand access to a shared pool of configurable computing resources.

5. RESULTS

This approach aims at removing the cause of a disease instead of curing the disease. It also aims at strengthening the gene. Since the gene will pass on to the next generation, it gives an approach which is both long sighted and more economic. Diseases such as cystic fibrosis (involves problems in digestion and reproduction) and hemophilia (well-known clotting disorder, can result in excessive blood loss via bleeding and the formation of abnormal clots throughout the body) are quite painful and in some cases even fatal. Out of every 1000 births 65 are usually affected by some sort of birth defect, the death of one out of every 10 children is due to some sort of genetic disease. The statistics clearly indicate that if we are able to implement a similar model in our country, it can bring a huge difference in infant mortality rate.

6. CONCLUSION

Though there are some ethical concerns related to premarital diagnosis (Eugenics) that may arise because of its controversial past, yet the applications that it promises cannot be ignored. The establishment of such a model needs a large capital investment. Such an investment can provide us with the health benefits and the valuable data that can serve as the key to unravel the secrets of genetics. Eugenics is no longer a threat to an ethnicity but a positive pre-emptive action on the unborn. Each year government spends a good half of the budget in the health sector for the research and treatment of genetic diseases such as down syndrome (may result in decreased muscle-tone, heart and digestive system defects and developmental delays) and sickle cell anaemia (reduces the red blood cell's ability to carry oxygen to all the tissues of the body). What if, they can prevent these diseases before they even occur!

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REFERENCES

[1] Prevalence of β-thalassemia trait in premarital screening in Al-Hassa, Saudi Arabia By Ahmad Al-Suliman

[2] Anderson, S.L., Coli, R., Daly, I.W., Kichula, E.A., Rork, M.J., Volpi, S.A. et al. (2001). Familial dysautonomia is caused by mutations of the IKAP gene. American Journal of Human Genetics, 68, 753–758.

[3] Anderson, S.L., Ekstein, J., Donnelly, M.C., Keefe, E.M., Toto, N.R., LeVoci, L.A. et al. (2004). Nemaline myopathy in the Ashkenazi Jewish population is caused by a deletion in the nebulin gene. Human Genetics, 115, 185–190.

[4] Andrews, L.B. (2001). Future perfect-Confronting decisions about genetics. New York: Columbia University Press.

[5] Angastiniotis, M. (1990). Cyprus: Thalassaemia Programme. Lancet, 336(8723), 1119–1120.

[6] Angastiniotis, M. (2003) Die Pra¨vention von Thalassa¨mie auf Zypern (Prevention of thalassaemia in Cyprus).

[7] ACOG Practice Bulletin No. 88, December 2007. Invasive prenatal testing for aneuploidy. Obstet Gynecol. 2007 Dec; 110 (6):1459-67

[8] ACOG Committee Opinion No. 446: array comparative genomic hybridization in prenatal diagnosis. Obstet Gynecol. 2009 Nov; 114(5): 1161-3.

[9] Introducing array comparative genomic hybridization inot routine prenatal diagnosis practice: a prospective study of over 1000 consecutive clinical cases. Prenata Diang. 2011 Dec; 31(13): 1270-82. Doi: 10.1002/pd.2884. Epub 2011 Oct 28.

[10] Diagnostic utility of array-based comparative genomic hybridization (aCGH) in a prenatal setting. Prenat Diagn. 2010 Dec; 30 (12-13): 1131-7.

[11] Grossman, R. L., ”The case of cloud computing”, IEEE-2009.

[12] Maria, A. F., Fenu, G., and Surcis, S. “An Approach to Cloud Computing Network”, IEEE-2008

[13] Youseff, L., Butrico, M., and DaSilva, D. “Towards a Unified Ontology of Cloud Computing. Grid Computing Environments Workshop “2008, GCE08'

[14] Pant Durgesh , Sharma M.K. , “Cloud Computing″ ,CSI Communication -2009, pp 10-13 , Vol 32 ,Issue 10