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FORENSIC USE OF DNA **INFORMATION : ETHICS, PRIVACY** **AND OTHER CHALLENGES**

Authored by - AKSHITA.B.N
& R. S. PRAKASH RAJA

ABSTRACT:

DNA profiling came into use around three decades ago in the late 1980s. The development in technology has brought many methods to identify and solve crimes, one such method is DNA phenotyping. The accuracy in phenotyping violates the ethics and privacy of an individual. In a populated country like India there is a huge requirement of DNA databases and the DNA profiling Bill 2019 establishes a national data bank and regional data banks. The bill proposes a written consent by individuals for collection of DNA samples and provides the removal of DNA profiles and after receiving the order of the court. This Bill can be criticised as it is a technique that breaches an individual's privacy. The bill also has a big loophole as it doesn't mention the methods of collecting data and what type of DNA must be collected. The DNA Bill fails to mention that phenotyping of an individual must be restricted. In spite of the necessity for speedy trials in India there arises the question of ethical collection of data and violation of privacy of an individual due to such data banks. The bill has also erred in allowing usage of DNA data for Settlement of civil matters such as surrogacy, maternity, Organ transplantation and immigration. The objective of this paper is to identify whether the privacy of an individual is not violated as guaranteed by the DNA Bill 2019 And if the DNA bill follows the international guidelines for collecting and removing the DNA information of an individual. Convenient sampling method is used to collect the samples. 200 samples-sample size. Independent variables are age, gender, education and occupation. It is found that there is a need for a proper DNA database as phenotyping can be highly misused and target minorities or an innocent individual. Finally, this paper analyses, suggests and concludes that India can also establish a DNA data bank like the Netherlands, Germany, France and Austria where they allow DNA profiling only for serious criminal cases as under such circumstances there is a least chance of any misuse.

KEYWORDS:DNA Bill 2019, Ethics, Privacy, Phenotyping, Violation.

INTRODUCTION:

The DNA of an individual is unique in itself and it varies from One another. DNA profiling and fingerprinting came into use around three decades ago, in the late 1980s and the first case was in a village in the UK. India recognised DNA as evidence in the year 1985. In a criminal trial DNA is one of the common forms of evidence and there are many countries that have specific laws for DNA databases and it is also used for civil cases in a lot of countries like China, Europe and The States. Till now there are no specific laws that can provide guidelines about the DNA storage and the type of DNA that can be stored. Privacy guaranteed under Article 21 of the Indian Constitution is violated and lack of ethical collection of data makes the country very vulnerable to misuse of DNA samples and profiles. In *Ram Jethmalani v. Union of India*¹ The Supreme Court held that the right to privacy is an integral part of the right to life and it is important that human beings are allowed to be domains of Freedom that are free of public scrutiny unless they act in an unlawful manner. It is the responsibility of the state to uphold the fundamental rights of every individual. The DNA database in the USA was developed by the FBI as CODIS. The US Supreme Court in the case of *Maryland v. King*² stated that when the offices make an arrest for serious offences they are authorised to take DNA samples from the accused by the way of collecting cheek swabs and the same can be legitimately used as evidence in the court of law. In Europe the criminal justice system has recognised DNA database collection and the police to an extent is permitted to take the DNA of the arrested person before the investigation process begins so that the process is faster. The DNA database is helpful in old unsolved crimes; it can be useful for speedy trials. Do the storage of DNA is useful, it has a direct violation of privacy and is unethical as the DNA bill fails to establish what type of DNA can be collected and how it can be stored and for what kind of cases such data can be used. Direct phenotyping can identify the appearance, eye colour, Iris, hair, height, weight, ancestral lineage and other numerous external factors of an individual and this model is accurate up to 95%. Indirect phenotyping identifies the geographical or ethnic origin of an individual. Though the phenotyping reduces the suspect list there is a concern that this tool has the risk of perpetrating racial prejudices. There is a possibility that biased law officials may misuse DNA information of an unknown suspects race and might involve minorities. As new forensic applications for DNA evidence are being discovered some of the techniques race complex ethical and legal issues. There are a few jurisdictions that prohibit forensic DNA phenotyping. US states, Belgium, Germany, Europe

¹(2011) 8 SCC 1

²133 S. CT 1958 (2013)

have successfully developed their DNA database and have ensured to harmonise ethical and legal issues of collection of DNA samples. The **aim** of this paper is to identify the ethical and legal issues concerning collection of DNA samples.

OBJECTIVES:

- To find the advantages of a national DNA database and to analyse the phenotype usage of DNA.
- To identify the misuse of phenotype use of DNA in identifying the Iris Colour, Hair Colour, race, family lineage etc. of the individual.
- To find the ethical challenges in using Forensic DNA information.
- To identify the effectiveness ensured by DNA databank for protecting individuals' privacy.

REVIEW OF LITERATURE:

(**Bonomi et al., 2020**) found that traditional privacy models designed for health data provide limited protection for genomic data. An attacker learns sensitive information about the target and accesses data like: family name, demographic data, the eyes, iris, Hair colour etc about a person. (**Kumar, 2020**) found that DNA polymorphism is useful for assisting the policemen with information on who might have been there at the crime scene. Forensic DNA databases are currently in 69 countries (approximately). Such databases are necessary in India as there are a lot of pending cases and lack of speedy trials. (**Bradbury et al., 2019**) found that recent advances in DNA sequencing technologies have become more feasible and cost-effective to genotype Larger market sets for forensic purposes. (**Sero et al., 2019**) found a new aspect of 3D facial phenotype DNA. Using it the researchers find 3D points comprising each facial segment and use principal component analysis. The authors also state that The storage and computational capabilities of biometric storage will improve. (**Ibrahim & Ali, 2017**) used the educational variable and have found that respondents do not feel safe about their privacy with the DNA bill and 40 percentage of the respondents have questioned the efficiency of such storage. (**Kumar et al., 2016**) found that in a populated country like India, there is a huge requirement for DNA databases which may help in stopping different types of fraud. The major motive to provide a DNA database is to investigate and find leads to solve a crime. (**Kayser, 2015**) Identifies that forensic DNA phenotyping refers to the prediction of appearance traits of unknown sample donors or unknown deceased (missing) persons, directly from biomaterials found at the crime scene. (**MacLean & Lamparello, n.d.**) (2015)

Phenotyping estimates the extremely visible characteristics of the source of human DNA left at the crime scene. It is approached for hundred percent accuracy of hair, iris, height and 3-D facial recognition of an individual that is available from the samples left from the crime scene. **(Wallace et al., 2014)** find the major issue of the public on data collection of DNA. They include: unfairness, tracking Individuals or groups of people or their family, misuse of data by corrupt police officers, possibility of being falsely accused of the crime and so the study has found a number of areas that require exploration so they include conditions on DNA to be stored, length of storage, The type of security to be used for storage etc. **(Walsh et al., 2014)** Found that rigorous testing of blood samples (DNA) that Is hair semen et cetera Such phenotyping matches 88 percent of the cases and the Eye, Gait, Iris etc. Traits of an individual can be easily identified. **(Schadt et al., 2010)** Identify that they (USA) Can generate hundreds of gigabases Of DNA and RNA sequencing data in a week for less than US\$5000. The rate of data is low cost and the storage is allowing individual labs to even access At a reasonable rate. The major issue with such accessibility is that such confidential data sold at low-cost would lead to the misuse and again there will be the question of ethics and privacy of an individual being violated. **(Curtis, 2009)** has identified that some tribal groups must be treated with cultural respect as individuals of such tribes cannot give blood samples without the consent of the whole group. The ethnicity issues must be addressed as the group feels non-have rights to access their genetic information. **(Kayser & Schneider, 2009)** has a major objective of proving the forensics motivations for DNA based predictions of human externally visible traits as well as the scientific challenges of finding DNA makers does not lead to violation of privacy. **(Stajano et al., 2008)** compare and find that the adoption of DNA in forensic context grows rapidly in some countries (notably UK) and is building a very large DNA database. The storage privacy and ethics of such databases were questioned as it is still an unsolved issue. **(Cho & Sankar, 2004)** find the importance of data on human genetic variation and how it is crucial to prove a crime, at the same time it affects the ethics, privacy of an individual as the data is poorly classified in the country and they are labelling people according to their race, community, caste etc.

RESEARCH METHODOLOGY:

The current study is based on empirical research. It is consisting of the scientific frame of research. It began with the finding of research problems based on the review of literature. The major contribution of the study is to collect the legal facts of a particular area and to test the hypothesis of a cause and effect relationship between variables. The research design is

exploratory and experimental. It explored the problem tested with hypotheses and provided the solution from the analysis. Convenient sampling method is used (Non probability sampling). The sample size is 200. Data is collected through online sources. **Questionnaire** is used as the primary data collection and the articles, journals, reports, newsletters are considered as the secondary sources. The analysis is carried out for demographic statistics (Age, Gender, Educational qualification and Occupation) and hypothesis testing graphs are used.

ANALYSIS:

VARIABLES:

Age:

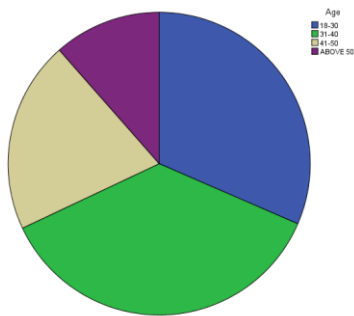


FIG. 1

LEGEND: From fig. 1 it's observed that, majority of the respondents are from the age group 31-40 with 36.5%, 11.5% of above 50, 31.5% of the age group 18-30 and 20.5% of the age group 41-50.

Gender:

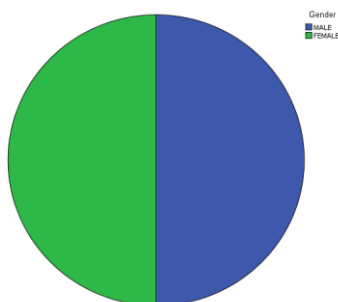


FIG. 2

LEGEND: From fig. 2 it's observed that 50% of the respondents are men and 50% are women.

Education:

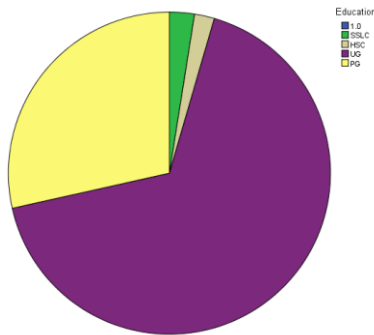


FIG. 3

LEGEND: From fig. 3 it's observed that, majority of the respondents have completed their UG or pursuing their UG with 67%. 28.5% respondents have completed their PG, 5% completed HSC and 3% have completed SSLC.

Occupation:

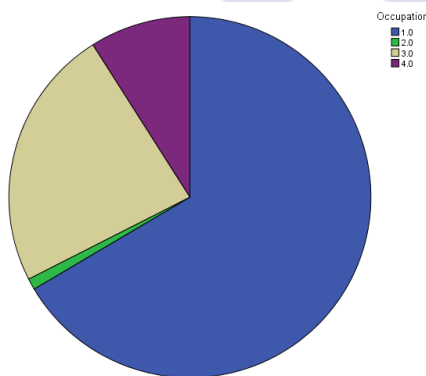


FIG.4

LEGEND: From fig. 4 it's observed that 66.5% (majority of the respondents) are private employees, 23.5% are self employed, 9% are unemployed and a mere 1% of the respondent is a government employee.

QUESTIONS:

- 1. DNA REGULATION BILL 2019 IS VIOLATION OF HUMAN RIGHTS AND CAN COMPRISE PRIVACY OF INDIVIDUALS.**

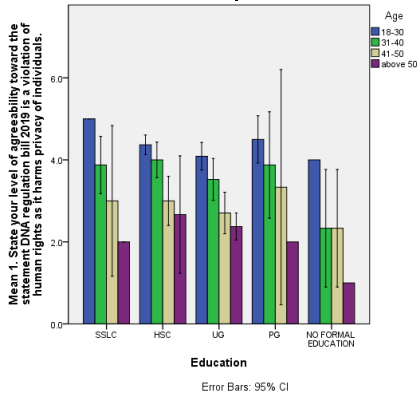


FIG. 5

LEGEND: From Fig.5 it’s observed that the majority of the respondents agree to the violation of human rights and compromise of privacy of individuals by the DNA bill 2019.

RESULT: The results of Fig.5 proves that the privacy violation of the DNA Bill 2019 is a serious issue as it does not include the word phenotype and it can lead to misuse of privacy of an individual as the phenotype can predict the hair colour, iris colour and can also predict the ancestors of a person. It is also considered to be dangerous because this method can be used to over power the minorities.

DISCUSSION:

From the above results it’s observed that respondents from the age group 18 to 30 from every educational qualification including the no-formal education are highly aware of the privacy issues and the human right violations in the new DNA regulation Bill 2019. The age group of 31 to 40 do not have any great differences, they all have a neutral opinion on the violation of privacy. From the above image it can be interpreted that the age groups 41 to 50 and above 50 are unaware of their privacy violations by the DNA Bill 2019 and the special observation is on the age group of above 50 from no formal education as they do not agree to the privacy violation of the DNA Bill 2019.

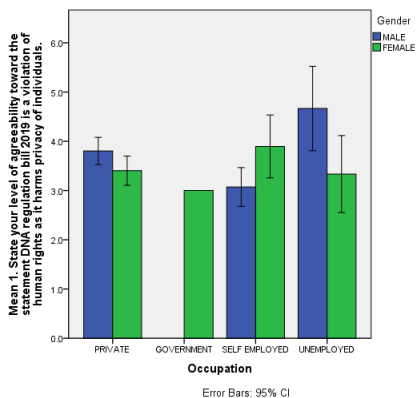


FIG. 6

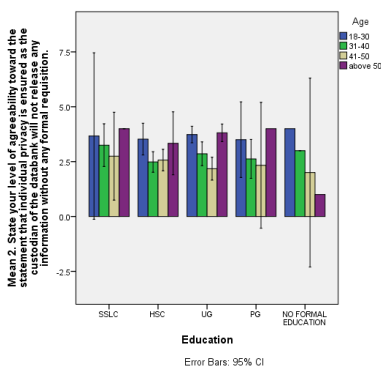
LEGEND: From Fig.6 it's observed that the majority of the respondents agree to the violation of human rights and compromise of privacy of individuals by the DNA bill 2019.

RESULT: The results of Fig.6 proves that the privacy violation of the DNA Bill 2019 is a serious issue as it does not include the word phenotype and it can lead to misuse of privacy of an individual.

DISCUSSION:

From the above results it's observed that Men from private companies and women from private companies or private jobs agree to the privacy violation done by the DNA Bill 2019. There are only women respondents from the government occupation who have a neutral opinion on the violation of their privacy. Self employed men also have neutral opinions On the topic and self employed women are aware about their privacy violations unemployed women also have neutral opinion on the DNA violation. The special observation to be made is that men who are unemployed or highly aware of their privacy violations due to the DNA Bill 2019.

2. INDIVIDUAL PRIVACY IS ENSURED AS THE CUSTODIAN OF THE DATABANK WILL NOT RELEASE ANY INFORMATION WITHOUT A FORMAL REQUEST.

**FIG. 7**

LEGEND: From Fig.7 it's observed that the majority of the respondents disagree or neutralize their responses to the question of safety of DNA information of individuals.

RESULT: The results of Fig.7 proves that the privacy violation of the DNA Bill 2019 is a serious issue as it questions the security and maintenance of the DNA storage.

DISCUSSION:

From the above results it's observed that the respondents from the age group 18 to 30 agree that the information stored with the DNA database would be safe and secure and the respondents from the age group 31 to 40 of all educational qualifications also have a neutral opinion on it. The special observation over here is to be given to the age group of 50 and above from the educational qualification that is the category of new formal education as they highly disagree that the information that is the DNA information stored in the DNA database is violative of individual's privacy and can be highly misused.

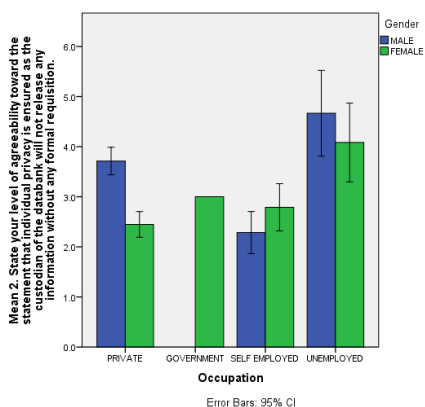


FIG.8

LEGEND: From Fig.8 it's observed that the majority of the respondents agree to the question of safety of DNA information of individuals.

RESULT: The results of Fig.8 proves that the privacy violation of the DNA Bill 2019 is a serious issue as it questions the security and maintenance of the DNA storage.

DISCUSSION:

From the above results it's observed that men Who are private employees highly agree to the question of violation of privacy and the DNA Bill releasing data unnecessarily and the women from the private institutions have a neutral opinion on the question. The women who are government employees also have a neutral opinion. The self employed men disagree with the privacy violation and hear the self employed women also have neutral opinions. The special observation to be made here is that men who are unemployed or highly aware that their individual privacy is being violated by the national data bank even the women who are unemployed agree that the privacy is being violated.

3. IS IT ETHICAL TO HAVE A NATIONAL DNA DATABASE?

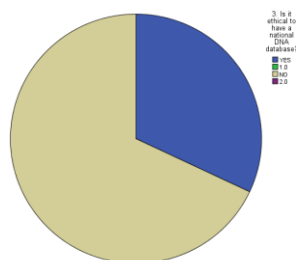


FIG.9

LEGEND:

From Fig.9 it's observed that the majority of the respondents disagree about the ethics of collecting the DNA.

RESULT:

From the results it's observed that the ethics of collecting the DNA And having a database for it has been questioned. In China the DNA of individuals have been collected and this video is a very big loophole to target the minorities and therefore it is very harmful.

DISCUSSION:

The effects of having a DNA database has been questioned and there are 70% of respondents who disagree that it is ethical to have a DNA database and 30% of the respondents agree that it is ethical to have a DNA database.

Tables:

TABLE 1:

H0: There is no significant association between educational qualification and the privacy and human rights of individuals.

Ha: There is a significant association between educational qualification and the privacy and human rights of individuals.

1. "DNA regulation Bill 2019 is a violation of human rights as it harms privacy of individuals."					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Illiterate	3	1.5	1.5	1.5
	SSLC	53	26.5	26.5	28.0
	HSC	27	13.5	13.5	41.5
	UG	62	31.0	31.0	72.5
	PG	55	27.5	27.5	100.0
	Total	200	100.0	100.0	

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	124.522 ^a	16	.000
Likelihood Ratio	131.172	16	.000
Linear-by-Linear Association	12.277	1	.000
N of Valid Cases	200		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 30.45.

DISCUSSION:

The value of the test statistic is 124.522. Because the test statistic is based on a 5x5 cross tabulation table, the degrees of freedom (df) for the test statistic is $df=(R-1) * (C-1) = (5-1) * (5-1) = 4*4=16$. The corresponding p-value of the test statistic is $p < 0.05$. Since the p-value is smaller than our chosen significance level ($\alpha < 0.05$), the null hypothesis is rejected. Rather, we conclude that there is enough evidence to suggest an association between education and how education plays a major role to determine the question of privacy issues related to the DNA Bill. It can be inferred from the results that there is an association between education and how education influences the awareness level ($X^2(8) > = 124.522, p < 0.05$). Amongst the different education levels, those who have completed their masters degree (PG), agree more with the statement that DNA regulation Bill 2019 is a violation of human rights as it harms privacy of individuals.

TABLE 2:

H₀: There is no significant association between educational qualification and agreeability on safety and security of the DNA data.

H_a: There is a significant association between educational qualification and agreeability on safety and security of the DNA data.

2. "Individual privacy is ensured as the custodian of the databank will not release any information without any formal requisition"					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Illiterate	26	13.0	13.0	13.0
	SSLC	46	23.0	23.0	36.0
	HSC	54	27.0	27.0	63.0
	UG	41	20.5	20.5	83.5
	PG	33	16.5	16.5	100.0
	Total	200	100.0	100.0	

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	95.454 ^a	16	.049
Likelihood Ratio	94.515	16	.049
Linear-by-Linear Association	28.662	1	.091
N of Valid Cases	1348		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 64.12.

DISCUSSION:

The value of the test statistic is 95.454. Because the test statistic is based on a 5x5 cross tabulation table, the degrees of freedom (df) for the test statistic is $df=(R-1) * (C-1) = (5-1) * (5-1) = 4*4=16$. The corresponding p-value of the test statistic is $p < 0.05$. Since the p-value is smaller than our chosen significance level ($\alpha < 0.05$), the null hypothesis is rejected. Rather, we conclude that there is enough evidence to suggest an association between education and

how education plays a major role to determine the agreeability on safety of DNA data. It can be inferred from the results that there is an association between education and how education influences the agreeability level ($X^2(8) = 124.522, p < 0.05$). Amongst the different education levels, those who have completed their bachelors degree agree more with the statement.

LIMITATION:

The Major limitation of the study is the sample frame. The sample frame Collected through online platforms like sending mail, sending links via WhatsApp is the limitation of the study, the real field experience is missed out due to corona pandemic. The restrictive area of sample size is yet another drawback of the research. Collection of data via online platforms is limiting the researcher to collect data from the field. Since the data is collected on an online platform wherein the respondent is not known, the original opinion of the respondent is not found, this research could only come to an approximate conclusion of what the respondent is feeling to convey.

SUGGESTIONS AND CONCLUSION:

DNA phenotyping or molecular photo fitting is primarily used to predict a person's physical appearance and ancestry. DNA technology has been used across the world to solve crimes and helps to identify individuals. It would also help in an investigation relating to victims of natural disasters such as cyclones, tsunamis or those who died in an air crash or train accident. Even though it can be inferred that DNA databases can be used for Domestic or civil cases apart from the criminal case, due to the lack of ethical collection of data it is recommended to use databases only for the serious criminal cases. The major objective of this paper is to find the ethical challenges in using forensic DNA information and how databases violate individuals privacy. It was found that the phenotyping identifies the race of people and in future it may be misused to target a group of minorities or to make an innocent guilty of the crime. India first needs laws to protect privacy and personal data especially after recognising article 21 as a fundamental right. Lack of proper DNA profiling laws coupled with lack of ethics makes India very vulnerable to misuse DNA samples and profiles. Though the bill is clear to some extent, it is not clear on the issues of privacy and consent which is the fundamental right of an individual and it cannot be ceased.

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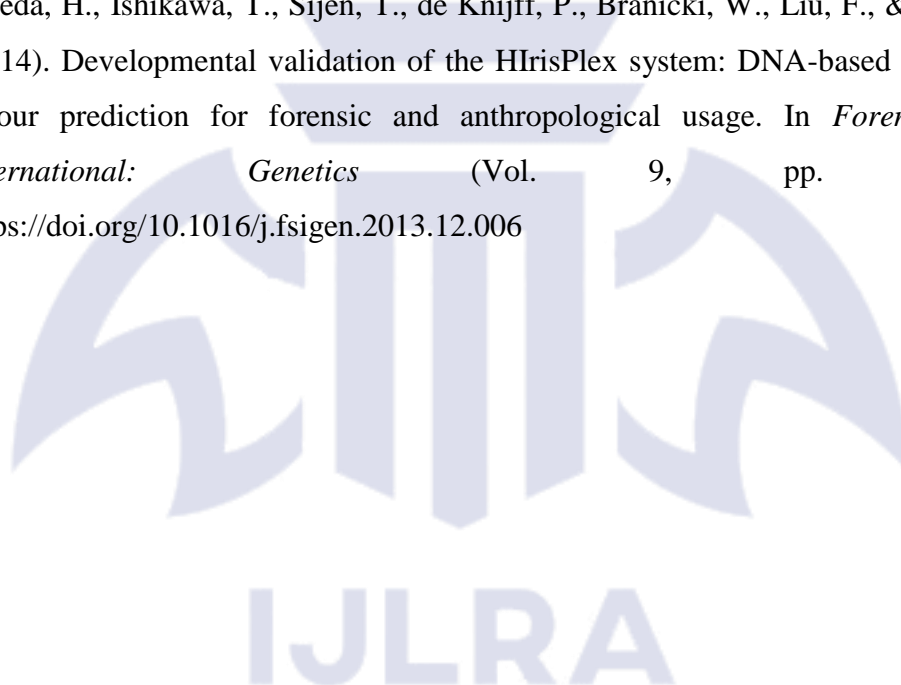
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Page 1

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ABSTRACT:
 DNA profiling came into use around three decades ago in the late 1980s. The development in technology has brought many methods to identify and solve crimes, one such method is DNA phenotyping. The accuracy in phenotyping violates the ethics and privacy of an individual. In a populated country like India there is a huge requirement of DNA databases and the DNA profiling Bill 2019 establishes a national data bank and regional data banks. The bill proposes a written consent by individuals for collection of DNA samples and provides the removal of DNA profiles and after receiving the order of the court. This Bill can be criticised as it is a technique that breaches an individual's privacy. The bill also has a big loophole as it doesn't mention the methods of collecting data and what type of DNA must be collected. The DNA Bill fails to mention that phenotyping of an individual must be restricted. In spite of the necessity for speedy trials in India there arises the question of ethical collection of data and violation of privacy of an individual due to such data banks. The bill has also erred in allowing usage of DNA data for Settlement of civil matters such as surrogacy, maternity, Organ transplantation and immigration. The objective of this paper is to identify whether the privacy of an individual is not violated as guaranteed by the DNA Bill 2019 And if the DNA bill follows the international guidelines for collecting and removing the DNA information of an individual. Convenient sampling method is used to collect the samples. 200 samples-sample size. Independent variables are age, gender, education and occupation. It is found that there is a need for a proper DNA database as phenotyping can be highly misused and target minorities or an innocent individual. Finally, this paper analyses, suggests and concludes that India can also establish a DNA data bank like the Netherlands, Germany, France and Austria where they allow DNA profiling only for serious criminal cases as under such circumstances there is a least chance of any misuse.

KEYWORDS:
 DNA Bill 2019, Ethics, Privacy, Phenotyping, Violation.

INTRODUCTION:
 The DNA of an individual is unique in itself and it varies from One another. DNA profiling and fingerprinting came into use around three decades ago, in the late 1980s and the first case was in a village in the UK. India recognised DNA as evidence in the year 1985. In a criminal trial DNA is one of the common forms of evidence and there are many countries that have specific laws for DNA databases and it is also used for civil cases in a lot of countries like China, Europe and The States. Till now there are no specific laws that can provide guidelines about the DNA storage and the type of DNA that can be stored. Privacy guaranteed under Article 21 of the Indian Constitution is violated and lack of ethical collection of data makes the country very vulnerable to misuse of DNA samples and profiles. In Ram Jethmalani v. Union of India The Supreme Court held that the right to privacy is an integral part of the right to life and it is important that human beings are allowed to be domains of Freedom that are free of public scrutiny unless they act in an unlawful manner. It is the responsibility of the state to uphold the fundamental rights of every individual. The DNA database in the USA was developed by the FBI as CODIS. The US Supreme Court in the case of Maryland v. King stated that when the officers make an arrest for serious offences they are authorised to take DNA samples from the accused by the way of collecting cheek swabs and the same can be legitimately used as evidence in the court of law. In Europe the criminal justice system has recognised DNA database collection and the police to an extent is permitted to take the DNA of the arrested person before the investigation process begins so that the process is faster. The DNA database is helpful in old unsolved crimes; it can be useful for speedy trials. Do the storage of DNA is useful, it has a direct violation of privacy and is unethical as the DNA bill fails to establish what type of DNA can be collected and how it can be stored

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OBJECTIVES:

To find the advantages of a national DNA database and to criticise the phenotype usage of DNA. To identify the misuse of phenotype use of DNA in identifying the Iris Colour, Hair Colour, race, family lineage etc. of the individual.

To find the ethical challenges in using Forensic DNA information. To identify the effectiveness ensured by DNA databank for protecting individuals' privacy.

REVIEW OF LITERATURE:

(Bonomi et al., 2020) found that traditional privacy models designed for health data provide limited protection for genomic data. An attacker learns sensitive information about the target and accesses data like: family name, demographic data, the eyes, iris, Hair colour etc about a person. (Kumar, 2020) found that DNA polymorphism is useful for assisting the policemen with information on who might have been there at the crime scene. Forensic DNA databases are currently in 69 countries (approximately). Such databases are necessary in India as there are a lot of pending cases and lack of speedy trials. (Bradbury et al., 2019) found that recent advances in DNA sequencing technologies have become more feasible and cost-effective to genotype Larger market sets for forensic purposes. (Sero et al., 2019) found a new aspect of 3D facial phenotype DNA. Using it the researchers find 3D points comprising each facial segment and use principal component analysis. The authors also state that The storage and computational capabilities of biometric storage will improve. (Ibrahim & Ali, 2017) used the educational variable and have found that respondents do not feel safe about their privacy with the DNA bill and 40 percentage of the respondents have questioned the efficiency of such storage. (Kumar et al., 2016) found that in a populated country like India, there is a huge requirement for DNA databases which may help in stopping different types of fraud. The major motive to provide a DNA database is to investigate and find leads to solve a crime. (Kayser, 2015) Identifies that forensic DNA phenotyping refers to the prediction of appearance traits of unknown sample donors or unknown deceased (missing) persons, directly from biomaterials found at the crime scene. (MacLean & Lamparello, n.d.) (2015) Phenotyping estimates the extremely visible characteristics of the source of human DNA left at the crime scene. It is approached for hundred percent accuracy of hair, iris, height and 3-D facial recognition of an individual that is available from the samples left from the crime scene. (Wallace et al., 2014) find the major issue of the public on data collection of DNA. They include: unfairness, tracking individuals or groups of people or their family, misuse of data by corrupt police officers, possibility of being falsely accused of the crime and so the study has found a number of areas that require exploration so they include conditions on DNA to be stored, length of storage, The type of security to be used for storage etc. (Walsh et al., 2014) Found that rigorous testing of blood samples (DNA) that is hair semen et cetera Such phenotyping matches 88 percent of the cases and the Eye, Gait, Iris etc. Traits of an individual can be easily identified. (Schadt et al., 2010) identify that they (USA) Can generate hundreds of gigabases Of DNA and RNA sequencing data in a week for less than US\$5000. The rate of data is low cost and the storage is allowing individual labs to even access At a reasonable rate. The major issue with such accessibility is that such confidential data sold at low-cost would lead to the misuse and again there will be the question of ethics and privacy of an individual being violated. (Curtis, 2009) has identified that some tribal groups must be treated with cultural respect as individuals of such tribes cannot give blood samples without the consent of the whole group. The ethnicity issues must be addressed as the group feels non-have rights to access their genetic information. (Kayser & Schneider, 2009) has a major objective of proving the forensics motivations for DNA based predictions of human externally visible traits as well as the scientific challenges of finding DNA makers

does not lead to violation of privacy. (Stajano et al., 2008) compare and find that the adoption of DNA in forensic context grows rapidly in some countries (notably UK) and is building a very large DNA database. The storage privacy and ethics of such databases were questioned as it is still an unsolved issue. (Cho & Sankar, 2004) find the importance of data on human genetic variation and how it is crucial to prove a crime, at the same time it affects the ethics, privacy of an individual as the data is poorly classified in the country and they are labelling people according to their race, community, caste etc.

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LIMITATION:

The Major limitation of the study is the sample frame. The sample frame Collected through online platforms like sending mail, sending links via WhatsApp is the limitation of the study, the real field experience is missed out due to corona pandemic. The restrictive area of sample size is yet another drawback of the research. Collection of data via online platforms is limiting the researcher to collect data from the field. Since the data is collected on an online platform wherein the respondent is not known, the original opinion of the respondent is not found, this research could only come to an approximate conclusion of what the respondent is feeling to convey.

SUGGESTIONS AND CONCLUSION:

DNA phenotyping or molecular photo fitting is primarily used to predict a person's physical appearance and ancestry. DNA technology has been used across the world to solve crimes and helps to identify individuals. It would also help in an investigation relating to victims of natural disasters such as cyclones, tsunamis or those who died in an air crash or train accident. Even though it can be inferred that DNA databases can be used for Domestic or civil cases apart from the criminal case, due to the lack of ethical collection of data it is recommended to use databases only for the serious criminal cases. The major objective of this paper is to find the ethical challenges in using forensic DNA information and how databases violate individuals privacy. It was found that the phenotyping identifies the race of people and in future it may be misused to target a group of minorities or to make an innocent guilty of the crime. India first needs laws to protect privacy and personal data especially after recognising article 21 as a fundamental right. Lack of proper DNA profiling laws coupled with lack of ethics makes India very vulnerable to misuse DNA samples and profiles. Though the bill is clear to some extent, it is not clear on the issues of privacy and consent which is the fundamental right of an individual and it cannot be ceased.

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