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When Will We Say No to Corruption

"Corruption is not inevitable
Corruption is not inevitable
Corruption is not inevitable"

Tweeted Transparency International in a recent tweet. They asked the readers to repeat this message. A very optimistic stance by them but far from the ground reality in Pakistan.

Pakistan's position has dropped to 140th position, (with 28 points out of 100), in 180 in Corruption Perception Index (CPI) of Transparency International in 2021. Transparency International annual report mentions "In 2021 alone, our chapter in Pakistan sent over 60 complaints to public authorities for not following procurement regulations. As a result of their advocacy, several major contracting processes were reviewed, saving the public purse billions of rupees (millions of US dollars)".

Corruption is bad for the economy of any country. Third world countries with weak economies are suffering with high amount of corruption. High corruption impact on the growth of economy and businesses, effects inequality in distribution of wealth and effects the overall governance of the economy and business environment.

In a nutshell, Corruption can affect income inequality and poverty through various channels, including overall growth, biased tax systems, and poor targeting of social programs as well as through its impact on asset ownership, human capital formation, education inequalities, and uncertainty in factor accumulation. It discourages investment, limits economic growth, and alters the composition of government spending, often to the detriment of future.

In addition, corruption generates enormous profits to be laundered. It is a key factor in both predicate criminal activities and money laundering. Systemic corruption undermines regulatory and legislative Anti money laundering and counter financing for terrorism AML/CFT regimes. Systemic corruption undermines institutional development.

FATF in its first recommendation mentions:
"Countries should identify, assess, and understand the money laundering and terrorist financing risks for the country, and should take action, including designating an authority or mechanism to coordinate actions to assess risks, and apply resources, aimed at ensuring the risks are mitigated effectively. Based on that assessment, countries should apply a risk-based approach (RBA) to ensure that measures to prevent or mitigate money laundering and terrorist financing are commensurate with the risks identified. **This approach should be an essential foundation to efficient allocation of resources across the anti-money laundering and countering the financing of terrorism (AML/CFT) regime and the implementation of risk-based measures throughout the FATF Recommendations**. Where countries identify higher risks, they should ensure that their AML/CFT regime adequately addresses such risks."

In Pakistan, the National Accountability Bureau, Federal Investigation Agency, Anti-Narcotics Force, Directorate General (Intelligence and Investigation – Customs) Federal Board of Revenue, Directorate General (Intelligence and Investigation Inland Revenue) Federal Board of Revenue, Provincial Counter Terrorism Departments and any other law enforcement agency as may be notified by the Federal Government for such investigation or prosecution are the prosecuting agencies responsible for investigating or prosecuting crimes under this act.

Allocation of efficient resources is the key to solving white collar crime. Efficient resources including competent and sufficient human resources, technical resources, sufficient funding, and authority to achieve the investigative goals.

Fighting corruption and white collar crimes is a difficult task. Often investigators find themselves against the elites of the society, who are connected and powerful, ready to destroy whoever challenges them. In such situations, investigators rely on the authority and protection granted to them by the law of the country. It is popular belief that the recent amendment in NAB Act will affect the process of combating corruption, anti-money laundering and combating the financing of terrorism in the country.

Some of these amendments are clearly against the recommendations of FATF. For example:

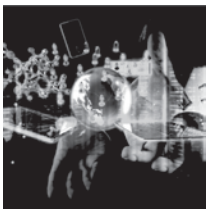
- The amendments will be applicable from 1.1.1985.
- The assets of the family members will not be deemed assets of the accused.
- The obligations to prove the assets of the accused on NAB.
- NAB act will not be applicable on the procedural mistakes of the bureaucrats like issuance of funds to projects without proper approval of ENEC etc.
- The price of the property will be calculated at DC rate which is much lower than the market value.
- Granting permission to the accused to dispose of the controversial property.
- If the case is not proved against the accused, then granting punishment to the NAB officer for five years.

Pakistan is going through a critical phase. It is still in gray list. We have a low position in CPI.

We are in dire need to strengthen our law enforcement agencies with competent personnel, appropriate laws and allocated resources.

We must come out of gray list to invite foreign investment and decrease the ever weakening economy due to corruption in the various sectors. We must improve our position in CPI and come out as a clean economy.

Perhaps this is the time to say no to corruption.



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Research Article

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Abduction, Kidnapping, Fornication, Torturing Killing Minors and Teen Aged Girls and Smuggling to Other Places for Nefarious Illicit Motives

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Abstract

The cases human trafficking and cruelty to minor and teen aged innocent girls increasing. Apart from this young and middles aged women are abducted, kidnapped for fornication nefarious and illicit purpose. They are smuggled to other places inside the country and sometimes sold out abroad; where they are tortured and abused. A few minor girls are procured either by persuasion, influence, inducement or other stimulus or incentive. When such offences are committed, they are carried out by a series illegal actions like a chain of crimes. The person or persons collaborating with the main accused deliberately in committing the offence are equally responsible for the consequences. In this paper, the analysis of offences connected with fornication, abduction and kidnapping and their effects will be highlighted at depth. Kidnapping and abduction are different offences, though in literature and legal language, sometimes used as if they are similar offences. Several minor and teen aged girls have been abducted by criminal and after committing rape and torture, murdered them. Abduction and kidnapping by means of motivation, by force, deception or for the purpose of marriage (fake). There was a dispute regarding marriage between Noor Muqqadam and Zahir Jaffer (both family friends), but the girl was slaughtered after kidnapping and rape, at the residence of Zahir. Another minor School girl Zainab from Kasur was kidnapped, tortured, raped and murdered. The most serious aspect of the Kidnapping and Abduction is the sale of innocent minor and young teen aged girls to the "red light areas" for illicit purposes or selling abroad for slavery. There must be special task force to investigate such offences, who possess expertise in forensic and law. A case study consistent with research is presented in this paper, how a minor school girl was abducted, tortured and abused. The negative role of the investigating an officer and negligent approach of other institutions spoils the case.

Key words: Abduction, Kidnapping, fornication, Rape, murder, human trafficking

1. Introduction

According to [1], the dreadful crimes are committed as concerning a chain of crimes associated with abduction, abuse sexual violence, torture, rape and killing against innocent women, teen aged girls and children. The number of such cases are increasing rapidly with time. According to [2], the legal structure in these cases is naïve and not too reliable, particularly when the torture leads to death of the victims. According to [3], it is stressed that the law regarding legal / forensic evidence, its obtaining, protection, preservation and then successfully presentation by prosecution in court of using Federal Bureau of Investigation (FBI) techniques by FIA must be Standardized. In order to facilitate further elaboration of this research paper, we first distinguish conspicuously and distinctly the areas of offences connected with Fornication, Abduction, and Kidnapping, Firstly, we define the term Fornication. When a male and a female, being unmarried to each other, commit fornication, if they deliberately do sexual intercourse with one another. In Pakistan, the punishment of fornication is five years with a fine of rupees 10 thousand. However, the law is different in various states of United States of America and Britain. Fornication is referred to as sex before legal marriage. Example: If and when two unmarried male and female engage in sexual intercourse. The legal provision also exists against fornication referred precisely to heterosexual couples, as separate laws administered homosexual relations. The important ingredient of fornication is clearly direct: either it requires open and notorious sharing, cohabitation, or it is as intercourse between two unmarried people, depending on the jurisdiction.
Secondly, Abduction is comprehensive, when the minor has been shifted from the custody of the guardian to the custody of another person not entitled to it.

Thirdly, kidnapping legally speaking is the offence or an act or occurrence or the crime of seizing, confining, entangling, or transporting away a person by force or trickery, frequently with a demand for ransom or in furtherance of another crime, is a crime. According to [4] defines child abduction as the illegal removal, retention, detention, or concealment of a kid or infant. A person is said to have been abducted if they had been taken away using coercion, trickery, or overt force or violence.

2. Fornication

Two single people having sex together is referred to as fornication, or premarital sex in more modern usage. Laws prohibiting fornication have historically applied only to heterosexual couples because homosexual relationships were handled by different legislation. Additionally, some jurisdictions' fornication laws solely took a woman's marital status into account and did not take a man's into account. In some countries, having sexual relations with an unmarried woman would be considered fornication, whilst having relations with an unmarried man would be considered adultery. In USA, because of the ruling in Lawrence v. Texas by the Supreme Court, fornication laws are no longer enforceable (2003). The Court determined that the Due Process Clause of the Fourteenth Amendment protects a person's private sexual conduct. Therefore, government officials are unable to interfere with or make these private acts illegal. the fact. According to the provision of Pakistan Constitution, any such law, being repugnant to the Quran and Sunnah is liable to be set aside by the "Supreme Court of Pakistan" as well as the

parliament.

3. Difference between Kidnapping and Abduction

A person is kidnapped when they are taken by force, threat, or deception with the intention of keeping them in captivity against their will. Kidnapping is usually committed for ransom, political, or other reasons. Abduction is when a criminal takes someone away using open force, fraud, coercion, or persuasion.

4. Wrongful Confinement and Wrongful Restraint

In the next section of this paper, we present a case study, where all the elements of offences such as abduction, kidnapping, fornication, rape, wrongful confinement or restraint are existing.

5. Under the Provision of PPC Section 339 the Wrongful Restraint is Defined as Under;

Quote: "Whoever voluntarily obstructs any person so as to prevent that person from proceeding in any direction in which that person has a right to proceed, is said wrongfully to restrain that person".

As per provision of PPC section 340 the wrongful confinement is defined as under;
Quote:
If anyone wrongfully restrains any other person in such a manner as to prevent that person from proceeding beyond certain circumscribing limits, is said to "wrongfully confine" that person".

Application of PPC 361 Kidnapping from lawful guardianship: "Anyone who takes or lures any minor under fourteen years of age if a male, or under sixteen years of age if a female, or any person of unsound mind out of the custody of the minor's or person of unsound mind's lawful guardian without the consent of such guardian is said to kidnap such minor or person from lawful guardianship."

364. Kidnapping or abducting in order to murder: Anyone who kidnaps or abducts another person with the intent of murdering or disposing of them in such a way that they are in danger of being murdered faces life imprisonment or rigorous imprisonment for a term of up to ten years with fine.

TABLE 1: LEGAL PROVISIONS ON ABDUCTION AND KIDNAPPING

Sr	PPC Sections	Relevant titles to applicable in this case
1.	361	Kidnapping from lawful guardianship
2.	362	Abduction
3.	364	Kidnapping or abducting in order to murder
4.	364A	Kidnapping or abducting a person under the age of fourteen
5.	365	Kidnapping or abducting with intent secretly and wrongfully to confine person
6.	365 B	Kidnapping, abducting or inducing woman to compel for marriage etc
7.	366 A	Procuration of minor girl
8.	368	Wrongfully concealing or keeping in confinement, kidnapped or abducted person
9.	375	Rape

5.0 High Profile Case Study of abducted minor, a school girl followed by illegal marriage

This case study is about a minor School girl recently promoted from class 5 to class 6, who was kidnapped from Karachi in April 2022 and took away to Punjab, has resentful, annoyed, upset and piqued the public's interest. The authors use the name of victim as Minor-Baby in this case study in place of actual name. The kidnapping and decampment of the girl, whose father insisted, she is a minor, sparked outrage in Pakistan and abroad and the tortuous legal process in two provinces became dominant talk on television. At the time of abduction, in accordance with her birth certificate, educational certificates and B-form of NADRA she was of 14 years. These particulars were to be essentially observed at time of ascertaining the age of the girl. This information was initially not considered to determine her age and the court declared her an adult on the basis of wrong information provided by the criminals. The criminal obtained a fake and bogus medical certificate illegally from an unauthorized, inexperienced and unqualified "Person", against the prescribed SOP's showing her an adult.

5.1 A Medical Commission formulated

A high powered medical committee was formed to assess the age of Minor-Baby, the teenage girl who went missing from Karachi and later known to have married Zaheer Ahmed. The Committee determined her age to be 14 to 15 years based on her physical appearance, while her teeth determined her age to be 13 to 15 years. Her bone ossification test, on the other hand, revealed that she was between the ages of 16 and 17. The report concluded that after consulting with medical experts on a variety of factors determining her age, it was determined that the girl is between the ages of 15 and 16, but near to15. The chairman and the other ten members of the medical committee signed the report.

In this section, we examine the case's recent developments. Minor-Baby was kidnapped in Malir area, when she went outside home to throw garbage. Minor-Baby 's parents filed the FIR on the same day. Ghulam Nabi Memon, the chief of police in Karachi, has formed three special teams to track down the suspects. For the girl's recovery, police investigators pursue technical assistance from intelligence agencies. Sindh CM says investigators have tracked down the girl's location, but he wants to keep the details private. Meanwhile, on the same day, police claimed Minor-Baby married on her own will. Minor-Baby was transported, before a judicial magistrate at Lahore's Model Town Courts, by the criminals, where she claimed under enormous pressure, that she willingly entered into a marriage with a Lahore person named Zaheer Ahmad. Because of her testimony, the magistrate granted her permission to accompany him without checking up her documents regarding age. Couple of days afterwards, she and Zaheer were apprehended in Okara and turned over to Lahore police.

The Karachi Police issued an FIR against 4 persons who were present in the bogus "Nokah" ceremony. They were also accused of kidnapping, rape and "forced" marriage. The father of the minor Baby filed a writ petition in Sindh High Court (SHC) for the purpose of annulment of marriage. The SHC directed the prosecutor General to submit his comment and ordered for the production of the minor girl by May 30,2022. The honorable SHC bench

expressed concern over the slow progress of case and ordered for the replacement of the then IG Sindh Police Kamran Afzal with a competent officer. Consequently, the minor baby was recovered from Lahore and produced before the SHC bench by 3rd June 2022. Later the baby girl was sent to Daru Amman in Kararchi.

5.2 The father of Challenged SHC decision in Supreme Court

The Supreme Court rules on the father of Minor-petition Baby's five days after he withdrew it. According to Kazmi's attorney, they will now file a petition with the high court to establish a new medical committee and with a family court to contest the bogus marriage. A 10-member medical board made up of highly qualified and competent experts and professional doctors, radiologist, dentist, and gynecologist was established for this reason after a court in Karachi ordered Sindh police to continue their inquiry to determine Minor-age. Baby's The father of Minor-Baby petitions the district and sessions court to remove the case's investigating officer on the grounds that he is ostensibly conducting an unfair investigation. The 10-member new medical board's inaugural meeting was held to determine Minor-age. The medical Committee determined that abducted baby is minor with the age near 15.

5.3 Interim Investigation Report in Minor-Baby's case

Investigation Officer confirms Zaheer's presence in Karachi on day of incident of abduction. The officer in charge of the investigation into Minor-Baby case stated that the case had been completely changed after a medical report revealed that the girl is 15 years old. "The investigation officer is not investigating the matter following the medical report," it stated, adding that the applicant and family in the case no longer trust the Investigation Officer. A new instigating officer has been appointed.

5.4 Afresh Hearing at SHC Karachi

In the middle of July 2022, the minor victim appeared in the court of magistrate in Lahore and disclosed that her relations with husband are not maintainable any more, therefore, she be sent to Dar ul'Amman. Consequently, she was shifted to Dar ul'Amman on her own will. In the third week of July 2022, the Sind High Court held that the victim girl may be shifted to Karachi from where she was abducted and legal cases are pending regarding her abduction and kidnapping. There have been reports on social media, of extending and subjecting the minor girl Minor-Baby to serious tortures by her husband and other members of the gang. The SHC court ordered Minor-Baby to be transferred from Lahore to a shelter home in Karachi after the young teen, who had apparently married out of choice, stated that she is unhappy in her marriage with Zaheer; she pleaded with the court to allow her to stay in Dar-ul-Aman away from her parents, whom she also expressed fears. The court granted her request, noting that there were no legal obstacles to bringing her to Karachi for a stay rather than Dar-ul-Aman. Meanwhile, the police presented Minor-Baby 's bogus husband Zaheer in front of the Sindh High Court.

The SHC ruled that if the case is being heard in Karachi, Minor-Baby should also be kept there. The court also stated that there is no danger to the girl's life in Karachi, so she can

be housed at a shelter home here. Zaheer's counsel, on the other hand, tried in vain to appeal the decision. In light of the fears she expressed before the judges, the court also stated that it will not award the girl's parents custody. The federal government's lawyer has also backed the decision to relocate Minor-Baby to Karachi. Earlier Minor-Baby stated that she is unhappy in her marriage with Zaheer. On the active social media there have been reports to be thoroughly investigated by Police regarding alleged plans of gang of criminals to kill her or sell her. Moreover, Zaheer demanded from Minor-Baby something inhuman, which also must be investigated to depth. According to Police, there are 33 members of the criminal gang engaged in this case, the major two central criminals both real brothers are on Bail.

5.6 Unhappy acts of criminals and their supporters belonging to the Gang

In the opinion of the authors of this research paper, all the presiding officers of the courts Magistrates, Civil Judges, Judges of High Courts and Supreme Court are very respectable men of integrity, uprightness and eminence. All citizens must extend respect to the honorable courts and Judges.

a) In this case, some persons supporting the gang of criminals in Minor-Baby case, committed contempt of court which is condemned. No other comment will be possible as proceedings are pending In SHC.

b) Causing harassment, intimidation and embarrassments to the family at the residence of the minor abducted girl Minor-Baby , at Karachi by the associates and members of the gang including some social media supporters.

c) Posting undesired harmful videos on social media, of the child to extend the mental torture of highest degree to the innocent parents of the minor victim.

d) The parents have not been allowed to meet their daughter Minor-Baby for the last three months by filing obnoxious applications in courts.

e) On the second last day of July 2022, another case against the parents of the minor victim on behalf of minor Minor-Baby has been filed in a court at Lahore to harass, intimidate, annoy her parents. The purpose of gang is to force the parents of minor to accept their plea to withdraw their hands from the guardianship of the minor victim, This case is just blood sucking. Why public authorities are sleeping? It's just outrageous, disgraceful, and shameful. The parents are already so stressed for the baby victim Minor-Baby also sickly worried about other children's future. It amounts to damage the future of a young and a minor girl. The advocate representing the gang has filed Minor vs parents, a new case i.e Minor-Baby vs Mehdi Kazmi and Saima Kazmi, the parents denying illegal nikah of the minor. The case on behalf of a minor prima-facie is not maintainable.

f) As per complaints of parents over the social media, the central criminal Zaheer managed to send his private photographs with the victim Minor-Baby to the parents

to inflict and cause mental torture.

6. Child Marriage Restraint Rule

The beloved Prophet (peace and blessings be upon him) stated that "The virgin shall not be married until her consent is sought neither a previously married woman until she overtly states her acceptance,". **He (peace and blessings be upon him) said : "and the virgin's consent shall be sought by her father."** Therefore, according to Islam, Wali is the guardian of a Muslim woman and is responsible for marrying her off. According to one Hadith, "a marriage contract is not valid without a Wali." According to the Hadith, the presence of Wali is required for the Nikah to be valid.

According to [12], the majority of academics concurred that the guardian's consent is necessary for the marriage contract to be valid. This is based on the Prophet's (peace and blessings be upon him) admonition that "no marriage is to take place without the guardian," and that "any lady married without the approval of her guardian is untrue."

Marriage is a social institution that predates the human race. It is defined as a relationship between a man and a woman that is recognized by custom or law and entails certain rights and duties, both for the parties entering the "Union" and for the children born from it. Marriage serves two primary functions: it is the means by which human society regulates sex relations, and it provides the mechanism by which a child's relationship to the community is determined. Marriage rites and ceremonies have varied over time and across cultures.

Let us quote an Hadith from [14]:


حدیث نمبر: 2083

حَدَّثَنَا مُحَمَّدُ بْنُ كَثِيرٍ. أَخْبَرَنَا سُفْيَانُ. أَخْبَرَنَا ابْنُ جُرَيْجٍ. عَنْ سُلَيْمَانَ بْنِ مُوسَى. عَنِ الزُّهْرِيِّ. عَنْ عُرْوَةَ. عَنْ عَائِشَةَ. قَالَتْ: قَالَ رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ: أَيُّمَا امْرَأَةٍ نَكَحَتْ بِغَيْرِ إِذْنِ مَوَالِيهَا فَنِكَاحُهَا بَاطِلٌ ثَلَاثَ مَرَّاتٍ. فَإِنْ دَخَلَ بِهَا. فَالْمَهْرُ لَهَا بِمَا أَصَابَ مِنْهَا. فَإِنْ تَشَاجَرُوا فَالسُّلْطَانُ وَلِيُّ مَنْ لَا وَلِيَّ لَهُ.

This famous and important Hadith was narrated by Aisha (RA) Ummul Muminin :

Quote:
Translation: "The messenger of Allah said: the marriage of a women who marries without the consent of her guardians is void. (He said these words) three times. If there is cohabitation, she gets her dower for the intercourse her husband has had. If there is a dispute, the sultan (man in authority) is the guardian of one who has none".

In this subsection, the law regarding child marriage is reviewed to understand legal issues in Minor-Baby case. The important Rules are:

- Sindh Child Marriage Restraint Rule 2016
- Child Marriage Restraint (Amendment) Bill, 2018

Child marriage is practiced in some parts of Pakistan, with the Sindh province having the highest prevalence. It disproportionately affects females.

a). According to a UNICEF report from 2018, approximately 18 percent of Pakistani girls are married before the age of 18,

giving Pakistan the lowest rate of child marriage among South Asian countries.

b). Child marriage is most common in rural areas, and the primary motivator is poverty in low-income households with limited access to education. Mrs Sherry Rehman, a Pakistani senator, introduced legislation in the Pakistani Senate to raise the minimum age for female marriage to 18. The bill's goal was to put an end to child marriage in Pakistan. The bill was passed with a massive majority.

Section 3 of the Sindh Child Marriage Restraint Act states that "whoever, being a male above the age of eighteen, contracts a child marriage shall be punished with rigorous imprisonment which may extend to three years but shall not be less than two years and shall be liable to fine." Mr Jibran Nasir filed a criminal case in the Court of Civil and Judicial Magistrate in Karachi on behalf of the victim's mother, Minor-Baby , for the recovery of her daughter and production in court. He argued under Rule 9 of the 2016 Sind Child Marriage Restraint Rule. As a result, the Advocate's plea was accepted by the court.

On the other hand, the legal teams of 35 member's criminal Gang, Zaheer being the central criminal, filed obnoxious, void and invalid applications to restraint the Minor Victim at Lahore, the resident province of Zaheer. All application filed by the councils of Zaheer were rejected and the Victim Baby being minor was rescued from Lahore and taken to Karachi, by SIU (Sind Investigation Unit) on 23 July 2022. Now the Karachi trial court having jurisdiction on the case and SHC will consider the pending issues against the Gang. According to [13], during the hearing, the court had stated that the order to present Minor-Baby was to ensure that the environment was right at "child protection center" and that she should not be presented until other court orders. The judicial magistrate had directed the public prosecutor to present the teenager only when the court ordered.

7. Case Study 2:

Egyptian Girl murdered publically at University after rejecting marriage proposal

According to [15], Naiyera Ashraf, a twenty-one-year-old Egyptian woman, had her throat slit in front of the entrance to her university in Egypt by a man whose marriage proposal she had rejected. The heinous crime occurred on Monday at the Mansoura University gate, where the victim was violently attacked with a knife. According to the Egyptian Public Prosecution, the man, whose name has not yet been officially confirmed, was arrested. The public prosecution said in a statement that witnesses to the crime handed the suspect over to police.

After examining the victim's body, the prosecution discovered injuries on her neck and chest, among other places, and obtained statements from university security personnel who confirmed the suspect's identity. The suspect killed the 21-year-old on a busy street in University, according to a video of the incident that has been circulating on captured from CCTV. He was then seen being beaten and restrained by onlookers.

The girl was stabbed several times with a knife before her assailant was arrested. Eyewitnesses said the killer was a third-year student at Mansoura University's Faculty of Arts, and

that he stabbed the girl, Naiera Ashraf, he slaughtered her with a knife to her neck. He was eventually apprehended and controlled by security and a passerby. According to eyewitnesses, the young man desired to marry. The accused has been sentenced to death.

An Egyptian court has requested that the execution of Naira Ashraf's murderer be broadcast live on television. According to local media, the court stated that the punishment of those who consider innocent girls to be toys should serve as an example, and the souls of those who think this way about women should be shaken. The convict's name is Mohammad Adal. He was apprehended and sentenced to death by a court of law. Adal was Naira's university senior.

PICTURE 1: Naira Ashraf Egyptian Ref [15]

8. Human Trafficking in Pakistan

The most obvious reasons for human trafficking are the **cheap and forced labor, criminal activities, removal of human organs for transplantation, girls and women for sexual abuse.** The Pakistani government does not fully meet the minimum standards for trafficking elimination, but it is making significant efforts to do so. In order to prevent and combat trafficking in persons especially women and children, **the Prevention of Trafficking in Persons Act, 2018 was promulgated [7].**

According to [7], according to section 7, the court may not consider the consent of the victim as the defense. As per section 11, the Federal Government or provincial governments must take appropriate measures for the safety of the victim.

9. Domestic Human Trafficking In Pakistan

Most of such offences are committed by the persons from villages staying and opting to work in cities. During holidays, the villagers go back to their homes and the reported crime rates are minimized.

10. Medico-Legal Opinions (MLO) and Forensics

In the case study presented in this paper, a series of crimes have been allegedly committed by the central criminal Zaheer with minor Victim and kept in his custody on the pretext of invalid and fake marriage for three months. In order to rule out the possibility giving slow poising, torture, narcotics, other drugs and rape, the **Medico Legal Opinion** (MLO) was extremely and essentially required, in the opinion of the Investigating Officer, Prosecution, lawyers and parents of the minor victim. A few important notions and points in connection with **MLO** are presented here. Unfortunately, the honorable court rejected permission of investigating officer to obtain MLO. **The new Investigating officer, in his progress report has also included the Sections 364-A, 368 and 375 PPC, therefore, the MLO was required.**

11. Recommendations

There are some useful preventive measures, which can be adopted to prevent the offence of abductions, kidnapping and smuggling of women, children and minor girls. Both parents must understand that their children are a gift from Allah, and He will inquire about their upbringing. If the children do not grow up practicing Islam as a result of their parents' negligence, it will not be pretty in this or the next life. It entails involving them in useful activities around the house and soliciting their feedback on important issues. Set up an Islamic library in your home with books, videos, and audio cassettes on various aspects of Islam.

SR#	TABLE 2: GUIDELINES FOR PARENTS HAVING TEEN AGED AND MINOR CHILDERN
a)	Take parenting more seriously than you would a full-time job
b)	Reduce or change work hours and exchange them for time with the family
c)	Read the Quran, understanding its meaning, for five minutes every day
d)	Respect your teen
e)	Take an interest in what they do
f)	Be aware of problems and address them straightforwardly
g)	"Date" your teenager for outside trips
h)	Don't just be your teen's parent, be his or her partner
i)	Build a Masjid in your home
j)	Don't practice "men's Islam"
k)	Establish an Islamic library and choose a librarian
l)	Take them out.....to Islamic activities such as prayers etc
m)	Move to a racially and religiously mix neighborhood in your city
n)	Establish a TV-free evening and monitor TV watching in general
o)	Have weekly family meetings
p)	Read books on Positive Parenting
q)	Get them married early

How can you avoid kidnapping and prevent: How to Prevent Child Abduction?

i. **Child Safety:** Take adequate measures given in Table 2 and also as follows:

ii. Keep strangers at a distance.

iii. Avoid anyone who is following you on foot or in a car.

iv. If someone tries to force you to go somewhere with them or pushes you into a car, flee and scream.

v. Remember a secret code word.

vi. Adults should not seek assistance from children.

vii. If you believe the other parent has abducted your child, take action. Obtain a court order or custody order: The most important preventative measure may be a clear court order. Court orders, for example, may include provisions addressing passports, travel restrictions, or custody.

viii. **Preventing Child Abduction:** According to [11], if you believe the

other parent has abducted your child, take action.

ix. Obtain a court order or custody order: The most important preventative measure may be a clear court order.

x. The guardian/parents must engage a lawyer for legal opinion.

xi. The parents/guardian may also seek the help from FIA or Local Police /Law Enforcement Agency.

xii. Let the law enforcement agency officers have your complete information and particulars such as full name, e-mail address and mobile number.

xiii. A call on **dispatch line 15 with** 24-hour **coverage can be helpful**.

xiv. The parents / guardian may request FIA, to place the names of offenders, if known on ECL.

12. Conclusions

All the cases of abduction, kidnapping, fornication, torturing and killing minors and teen aged girls and smuggling to other places for nefarious illicit motives must sternly dealt by investigating agencies, officers, prosecution and the courts. Strict punishment as prescribed in law must be awarded. No mercy be extended to the criminals proved guilty by courts. The case mentioned in case study 1, it seems, the entire system is favoring the criminals and the entire Gang who abducted the child. The Gang in this case seems very effective and rich paying handsome amounts as professional fee to legal teams and spending lavishly. The central criminal Zaheer, his brother and mother who abducted the Minor-Baby were not arrested for 4 months from the occurrence of the abduction. There is need to review the existing legislation in such cases. For cases of abduction, kidnapping followed by rape with minors. The punishment of death penalty be awarded by publically hanging as in case of decision of Naira Ashraf in Egypt. This will certainly have deterrent effect.

13. Acknowledgement

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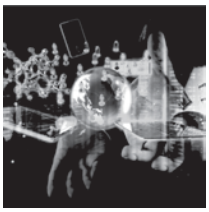

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The role and impact of Aluminium oxide nanoparticles in crime investigation

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Abstract

Nanotechnology is an important and powerful tool in most the areas including medicine, imaging, and forensic sciences. It is rapidly growing region of research with potential in various fields, running from medical care to production and physical science. Nanotechnology has a potential to make significant positive contribution in forensic science in crime detection. Forensic science applies knowledge and methods from natural science in order to identify, individualize, and assess evidence. Hence, with the aid of evidence, crime scenes can be rebuilt, investigations can be directed, and offenders can be prosecuted. Nano-analysis use tools like UV Vis spectroscopy, atomic force microscope (AFM), XRD, EDX, Raman micro spectroscopy (Raman), scanning electron microscope (SEM), and transmission electron microscope (TEM) (Raman). Moreover, in current article, an attempt was made to elucidate how nanotechnologies could be crucial in addressing current forensic investigation issues such as explosive detection, forensic toxicological analysis, finger print analysis, forensic DNA analysis, detection of explosive residue, forensic nano trackers, drug facilitated crime.

Keywords: Nanotechnology, Forensic investigation, Nano trackers, DNA analysis, explosive detection.

1. Introduction

A variety of physical, biological, and chemical disciplines are combined in nanotechnology to explore phenomena at the nanoscale scale (1 nm^{-1} billionth of a meter). One of the main aspect of nanotechnology is the synthesis of metal and metal oxide nanoparticles (McNeil, 2005). The leading method for the synthesis of nanoparticles is green synthetic access to synthesize nanoparticles of assortment of metal and metal oxides are deprecation of hazardous chemicals (Duan, Wang, & Li, 2015). Green synthesis methods has gained attention because of low cost, efficiency and relatively high yield of products. The nanoparticles can be characterized by using UV Vis spectroscopy, Infrared spectroscopy, Scanning electron microscopy, X-ray diffraction spectroscopy and EDX (Jadoun, Arif, Jangid, & Meena, 2021).

Real-time crime scene can benefit from the manufacture of nanosensors and nanotechnical equipment. Nano-forensics is an emerging field of forensic science that focuses on finding

explosive gases, biological agents, and residues. (Mandal & Mandal, 2015). Research in forensic science is thought of as the process of examining, gathering, and evaluating trace evidences at the site of a crime using particular procedures and methods. These days, the application of nanotechnologies in forensic science can fundamentally alter the investigative processes by making them quicker, more accurate, more potent, more sensitive, and simpler to use, which clarifies the undeniable significance of these technologies.Identification, investigation of the crime, and making linkages between pieces of evidence and criminals are the core concerns of forensic science (Srividya, 2016).

Now, it become so easy togather, analyse, and find the complicated hidden evidence from the scene of the crime.The application of nanotechnology in forensics has only recently begun but is already showing signs of becoming a game changer (Chen, 2011). Various components of nanotechnology in medicine, genetics, analytical chemistry and forensic sciences can act as catalyst in the speed of evidence analysis in real-time (Tambo & Ablateye, 2020).

A fascinating topic in nanotechnology over the past ten years has been the development of new synthesis techniques for nanomaterials including metal nanoparticles, carbon nanotubes, quantum dots (QDs), graphene, and its composites. Two distinct fundamental concepts of synthesis i.e. top down and bottom up techniques have been applied to produce nanomaterials with the necessary sizes, shapes, and functions (Saxena, Jain, & Saxena, 2021). Nanocomposites (NCs) are materials with at least one nanoscale phase and a mixture of matrix and filler components (0-100 nm). They are very important to many industrial and technological fields as well as to forensic science. Based on their host matrix, the first NCs are divided into three groups (metal, ceramic, and polymer). They can all be applied in many situations and scenarios (Shah, Dasgupta, Chakraborty, Vadakkekara, & Hajoori, 2014).

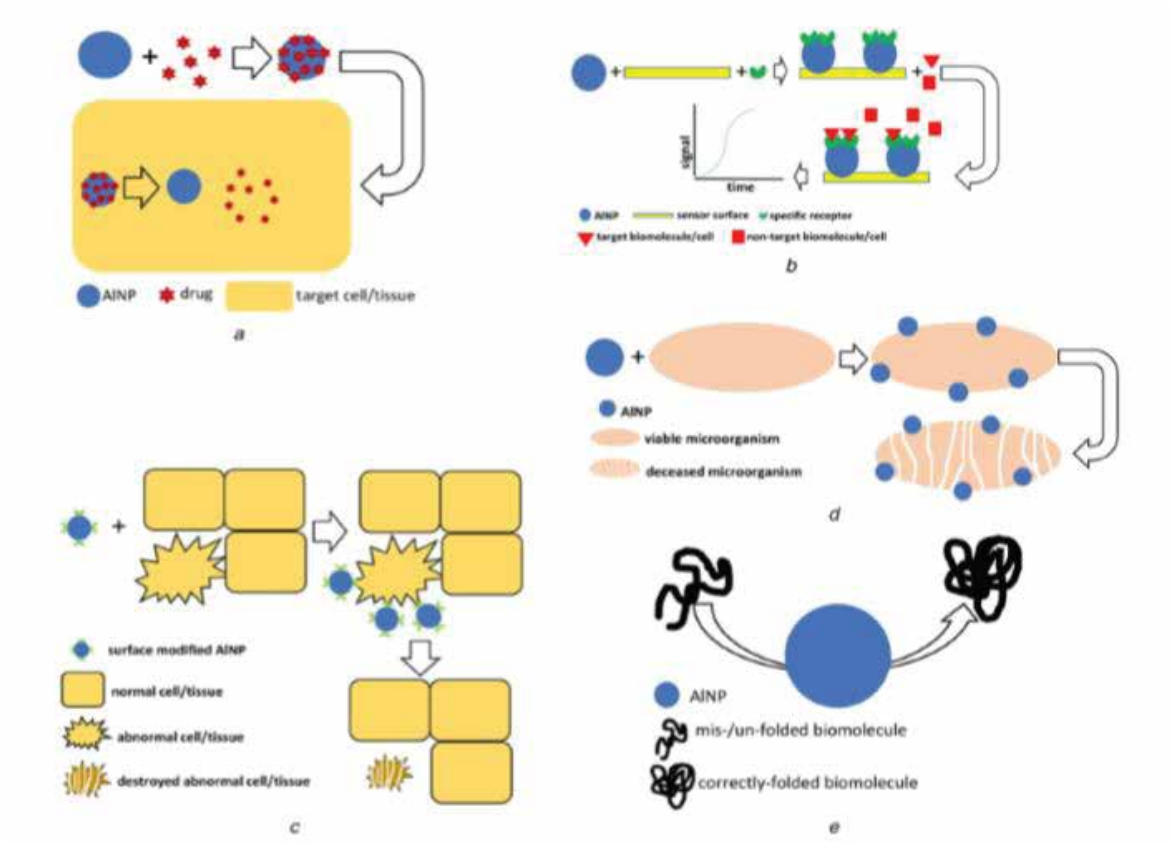
Nanotechnology has become an essential tool in many scientific domains. The use of hazardous chemicals in the physical and chemical procedures used to synthesize metal nanoparticles has a negative impact on the environment (Gopi, Amalraj, Haponiuk, & Thomas, 2016). Green synthesis offers an inexpensive and environmentally benign alternative method for creating metal nanoparticles, which aids in limiting the drawbacks of chemical methods. Since nature provides a variety of products in the form of bacteria, fungi, and plant/biopolymers that fulfill the objective in an unharmful manner, green resources such as plant extracts, specific bacteria, fungi, and biopolymers are used to synthesize metal and metal oxide nanoparticles (Saxena et al., 2021)**.** Due to their small size and high surface area to volume ratio, nanomaterials are extensively used in a range of industries, mechanics including medicine, optics, electronics, microbiology, material science, biotechnology, numerous engineering fields and crime investigations (Konjari, Jacob, Jayanthi, Ramalingam, & ETHIRAJ, 2015).

Al_2O_3 Nanoparticles

Aluminum oxide nanoparticle are metal oxide nanoparticles that have a variety of forensic applications due to their exceptional physicochemical/structural types, including resistance

to wear, mechanical, and chemical pressures as well as their favorable optical properties/a porous huge surface area (Menaa, 2014). The extensive use of aluminum oxide nanoparticles is partly a result of their inexpensive preparation costs and straightforward handling. As a result, this investigation over analyzed the significance of aluminum oxide nanoparticles (Oliveira-Filho et al., 2016).

One aluminium atom is surrounded by six oxygen atoms, giving aluminium oxide nanoparticles (Al_2O_3NPs), a class of porous nanomaterials that are part of the metal oxide nanomaterials family, a corundum-like structure. Aluminum oxide nanoparticles, like other metal oxide nanoparticles, are easily controlled and accessible (NPs). The enormous surface area, powerful mechanical characteristics, and outstanding chemical resistance to high temperatures and harsh environmental conditions are all features of these competitively economical nanoparticles (Sadiq, Chowdhury, Chandrasekaran, Mukherjee, & Medicine, 2009). The techniques used in the synthesis include solution reduction, decomposition/gas evaporation, mechanical ball milling, laser ablation, bursting wires, and mechnochemical (Ghiuță et al., 2018).



Synthesis of Al_2O_3 NPs (Abdelghany et al., 2018).

Aluminium oxide (Al_2O_3) nanoparticles (NPs) have drawn particular attention because of its distinctive characteristics, such as excellent mechanical strength, high hardness and good chemical stability (Abdelghany et al., 2018). Al_2O_3 NPs can be produced using a variety of methods, such as laser ablation, sputtering, sol-gel, pyrolysis, ball milling, and hydrothermal procedures (Abdelghany et al., 2018).

Metallic oxides (MOs) are regarded as a further fascinating topic with numerous scientific applications. Aluminum oxide nanoparticles are among the suitable types of metallic oxides nanoparticles. Aluminum oxide nanoparticles have a variety of uses in a variety of fields, including forensic sciences (Sivaramakrishnan & Neelakantan, 2014). water remediation, biological applications, catalysts (Mittal, Chisti, & Banerjee, 2013).

Aluminum oxide nanoparticles can be produced by using waste aluminium foil. Aluminum oxide nanoparticles can be created by co-precipitating old aluminium foils at room temperature and mechanically milling. Ultraviolet-visible spectroscopy, infrared and as well as X-ray diffraction can be used to characterize their functional groups and optical activity as well as their particle size and phase (Sharma & Sharma, 2020).

In order to create stabilised zero valent Al_2O_3 nanoparticles that aggregated in a chain with individual particles having a diameter of 20 to 75 nm, ascorbic acid was used in the synthesis process. Ascorbic acid has also been employed in the stabilisation and functionalization of nanoparticles (Babaei Savasari, Shiravi, & Hojati, 2018).

Al_2O_3 nanoparticles can be produced by using the thermal breakdown technique. They employed agarose dextran/gelatin as the building blocks for the polysaccharide. They were able to produce Al_2O_3 crystals with an average size of 10 nm (Magro, Baratella, Bonaiuto, de A Roger, & Vianello, 2018).

Aluminium oxide nanoparticles can be biosynthesized by using tea extract. The extract's polyphenol/caffeine concentration served as a decreasing/capping agent. Magnetite/magnetite nanoparticles with a zero valent iron content were characterized using XRD/FTIR spectroscopy (Herlekar, Barve, & Kumar, 2014).

2. Characterization of Nanoparticles

Size and shape are two of the key elements that can be considered in the description of NPs. It is also possible to determine the size distribution, surface area, surface charge, level of aggregation, and surface chemistry (Minelli, 2016).

As nanoparticle production goes up, more accurate measurement skills will be required. It is necessary to characterize the nanomaterials produced in diverse methods more thoroughly. The description of the nanoparticle core can be important as the surface ligands can influence the physical properties (Peters et al., 2015).

Aluminum oxide nanoparticles synthesized from leaf extract can be characterized from X-ray diffraction spectroscopy (XRD), Energy dispersive X-ray spectroscopy (EDS/EDX), and Fourier transform infrared spectroscopy (FTIR)(Fahmy et al., 2018)

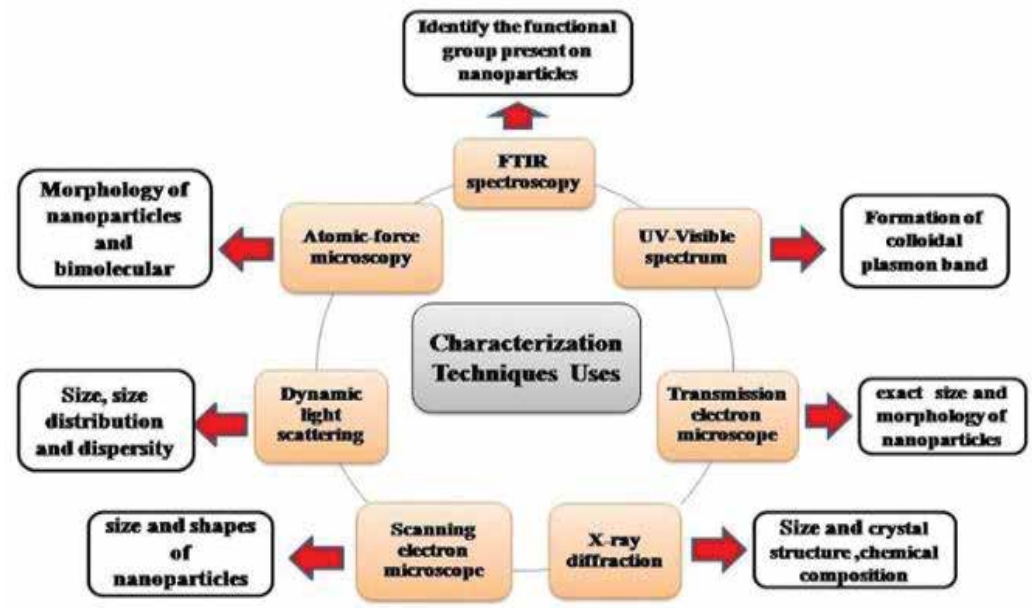


Fig 2.3 Characterization of nanoparticles (Peters et al., 2015).

3. Nanotechnology in Crime Scene Investigation

Forensic Toxicological Analysis

Nanotechnology can be used in forensic toxicology to examine various toxic substances from a variety of significant forensic evidences, including hair, blood, saliva, vitreous humour, and even skeletal remains and samples of fingerprint evidence. To increase the detection limit, gold, silver, and titanium oxide nanoparticles are frequently utilized (Mandal & Mandal, 2015). The low-cost, active, stable, and time-limited nanosensor produced with novel methodologies may be employed as an immediate spot test and a significant replacement for on-the-field testing methods for forensic toxicological drug screening (Reece & Hulse, 2014). The use of forensic nanotechnology on actual samples can successfully demonstrate how well the nanosensors are suited for toxicological investigation (Boumba & Vougiouklakis, 2015).

Fig: Toxicological analysis by nanoparticles

Forensic Fingerprints Analysis

Since the beginning of time, criminologists have employed fingerprints as a distinctive kind of evidence. Latent fingerprints may be created using a variety of coloured materials, such as carbon soot on a light backdrop or aluminium flake on a dark background. However, these products have significant flaws

including fuzzy fingerprint pictures. Materials based on nanotechnology are used to tackle this issue. In 1980, latent fingerprints on the surface of porous paper were frequently seen using gold and silver nanoparticles (Prasad, Lukose, Agarwal, & Prasad, 2020). However, over the past 20 years, a number of other nanoparticles have gained popularity for the detection of latent fingerprints on porous and non-porous surfaces, including silicon dioxide, fluorescent starch-based carbon, Eu^{+3}-doped Al_2O_3, aluminium oxide, and CdS (a photoluminescent nanocrystal capped with dioctysulfo-succinate) (Pandya & Shukla, 2018).

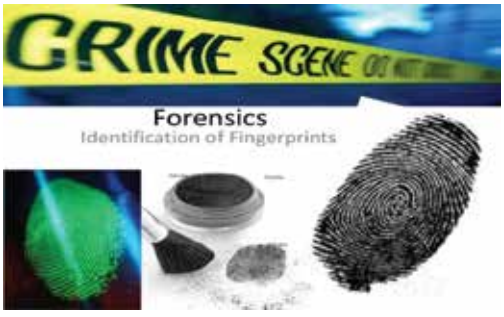


Fig: Identification of finger prints

Forensic DNA Analysis

Forensic DNA analysis is carried in murder cases, rape cases and other crime cases. DNA examination of blood stains, hairs, fibres semen can be carried out. The most latest and cutting-edge tools used for forensic DNA analysis are microfluidic devices (R. K. Singh et al., 2015). These devices have the advantages of quicker inspection times, lower contamination risks, and direct application to crime scenes. Microfluidic chip technology is another crucial advancement that has already shown promise in medical settings, including point-of-care applications (Rakesh, Divya, Vishal, & Shalini, 2015).

Fig: DNA analysis

Detection of Explosive Residue

Nanotechnology can used to determine unfragmented remnant (trace quantity) of the explosive that may stay at the crime scene, the fragmented residues of explosives (bomb explosion) are dispersed far from the actual location of occurrence (Jahangir, 2012). The trace amount of shattered explosives recovered from the crime scene may be easily identified using nanotechnology. Additionally, this technique aids the investigators in finding minute gun powder particles on the shooter's hand (Muro, Doty, Bueno, Halamkova, & Lednev, 2015).

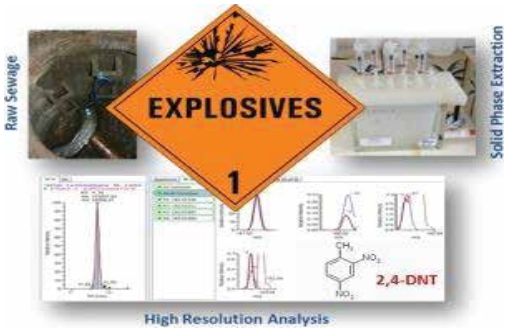


Fig: Explosives analysis

Forensic Explosive Detection

Globally, terrorist actions have escalated,

which has boosted interest in finding hidden bombs. Nanomaterials offer the active potential to develop explosives detectors. Systematic and effective finding of explosives concealed in luggage, cars, and other objects. Explosives tracing is a very expensive and challenging task. Nanostructures are utilized as sensors to find various chemical and biological components, including explosives. The ultra-compact gadgets are highly capable of sensing (Sree Satya Bharati, Byram, & Soma, 2018). Dogs can recognize various types of odours including explosives; however, at the moment, dogs have been trained for detecting out hidden explosives which is too expensive and time consuming. To detect conventional bombs, grenades and plastic explosives, advanced nanosensor concept devices such as electronic noses, nanotube, and nanomechanical devices are employed. .As a result, dogs may now readily and disadvantagelessly trace using the electronic nose approach. Typically, an electronic nose has a chemical detection mechanism like an artificial neural network (Muthukumar, 2012).

Forensic Nano Trackers

Nowadays, trackers and barcodes are used to combat the crime. In order to stop people from stealing, trackers are utilized as a preventative strategy in the form of a covert pattern on the merchandise (Murray, 2022). Trackers are not only a preventative measure, but they can also be used to find lost or stolen objects. Trackers can be used for security purposes as well because they can stop prisoners from eluding capture (Lohiya & Shah). Nano trackers are put into the prisoners' bodies in this situation to help catch them if they escape. Nano trackers make it possible to keep tabs on prisoners after their release. If they commit a crime again, nano trackers make it easier to find them (S. Singh & Samal, 2021).

Fig: Forensic nano trackers

Drug-Facilitated Crime (DFC)

DFC, sometimes referred to as "date rape," is the use of psychotropic chemicals that impair one's ability to make decisions or regulate their conduct. These substances are utilized in a variety of criminal activities, including rape and other horrifying sexual assaults against people of all ages (minors to adults). It is also employed in robberies and financial extortion. The sensitivity, cost-effectiveness, and other instrumental constraints that forensic professionals confront when using the current standard procedures for the identification of these types of drugs are significant. Recently, with the use of nanotechnology, researchers created a clever and effective way for identifying these illegal medicines (Pandya & Shukla, 2018). This "smart" approach allows for the rapid qualitative and quantitative detection of codeine sulphate using smartphone cameras and citrate-stabilized gold nanoparticles as a probe. Because of its extreme sensitivity, this approach may accurately and immediately identify very small amounts of codeine sulphate by examining colorimetric changes in the probe. Gold nanoparticles have also proved to be efficient for the detection of trace

amounts of clonazepam (S. Singh & Samal, 2021).

4. Using Nanotechnology to Estimate the Time of Death

An important aspect of a criminal investigation is estimating the exact moment of death. To anticipate the time of death in the traditional system, numerous factors are studied. postmortem hypostasis, changes in the eye, contents of the urinary bladder, rigor mortis, changes in decomposition are the various factors. However, traditional approaches can only roughly forecast the time of death. Fluorescent nanoparticles, according to researchers, might be employed in conjunction with flow cytometry to determine the quantity of amino acids (VH) (Andrews et., al 2021).

5. Conclusion

The current review explained the significance of nanotechnology in the field of crime scene investigation. The different techniques of nanotechnology in different stages of criminal investigation have been discussed. Potential of nanotechnology can make a positive social contribution and it would not only help to solve the crime but also prevent the crime. The rapid advancements in forensic science come with technological improvements in nanotechnology. In the near future, nanotechnology may assist as an innovative and preventive tool in the various field of forensic science like virtual autopsy, crime scene investigation, fingerprint identification, questioned document, ballistics, and toxicology.

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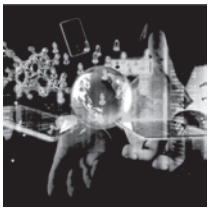

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Research Article

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ZnO Nanoparticles: Synthesis, Characterization and Applications in Forensics

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Abstract:

In most fields, including health, imaging, and forensic sciences, nanotechnology is a significant and potent tool. It is quickly expanding and has potential in a number of areas, including industries, physical science, and medical care. ZnO nanoparticles has potential in advance forensic science and aid in crime detection. Advanced art analytical techniques can be used in characterization of ZnO nanoparticles, such as High-performance liquid chromatography (HPLC), X-ray diffraction spectroscopy, and SEM. Nanotechnology forensic investigations include questioned documents, in estimating the time of death and age of blood. Moreover, nanomaterials can be used for forensic inquiry, such as quantum dots, which can be employed as luminous materials for security features in official and private documents. Therefore, the purpose of this study was to introduce and explain the application of ZnO in forensic science as well as the equipment needed to conduct nano-analysis.

1. Introduction

With the development of nanotechnology, it is now possible to manipulate a substance's atoms and molecules at the atomic and molecular level to create unique materials and devices with a wider range of potential remarkable qualities. The word "Nano" relates to one billionth size, or 10^{-9}, which is equivalent to around one nanometer and denotes little (nm). In other terms, it is 40,000 times thinner than the width of a virus or human hair, or around 3-5 atoms broad (100 nm).Thus, nanotechnology is concerned with new materials that range in size from 1 to 100 nm (Hofmann et al., 2020). The newest and fastest-growing area of innovation that deals with the use of nanotechnology is called nano-forensics (Oh, Park, & Choy, 2011). With the development of nanosensors, huge, heavy instruments have been replaced with considerably smaller chip-based platforms. ZnO nanoparticles substantially facilitates the investigation of crimes and also helps to locate anonymous evidence using a quicker analysis technique of investigation with more sensitivity and precision. ZnO nanoparticles can be characterized by SEM, TEM, XRD, EDX, FTIR spectroscopy and Raman-IR radiation

(Smijs, Galli, & van Asten, 2016). The unique characteristics of nanomaterial aid in the discovery and gathering of crucial data that was previously impossible to get. ZnO nanoparticles can be used in explosives detection, DNA extraction from fingerprint or palm print are a few cutting-edge techniques that make it easier to provide concrete evidence in a court of law. Therefore, an effort has been made in this work to highlight the novel viewpoint or notion of nanotechnology with its applications in several forensic science areas, i.e., nano-forensics.

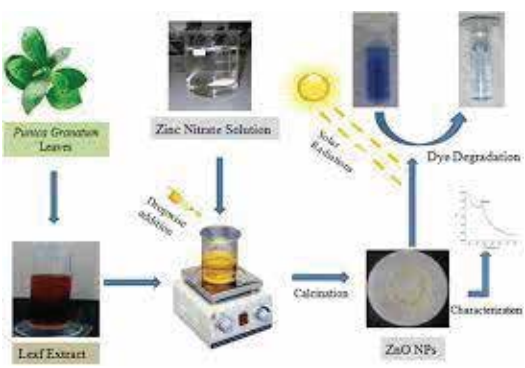
Nanotechnology

Nanoparticles are the cornerstone of nanotechnology. Nanoparticles range in size from 1to100nm. Different kinds of nanoparticles, including inorganic, organic, ceramic, and carbon-based nanoparticles are important (Kausar, 2020). The top-down strategy and bottom-up approach are two methods used to create the nanoparticles (Ijaz, Gilani, Nazir, & Bukhari, 2020).

Synthesis of Zinc oxide nanoparticles

The two major kinds of ZnO nanoparticle synthesis methods are the bottom-up and top-down approaches. Based on the types of processes involved, the top-down method can be split into 2 broad classes, physical and chemical. Physical Top-down technique encompasses the standard method of metallurgy. The metallurgical synthesis of ZnO nanoparticles is classified into 2 types. The first one is the direct process in which any ore of zinc heated with anthracite for the reduction of zinc .It is followed by the zinc vapour oxidation. It then leads to the ZnO powder formation, It is then followed by indirect(-French)process,where the metallic zinc melts,then vaporization at approximately 910^0C to give ZnO nanoparticles takes place (Jamkhande, Ghule, Bamer, & Kalaskar, 2019).

Mechanochemical (or mechanical attrition) production of ZnO nanoparticles is one of the chemical top-down approaches. Figure 3 depicts the usual fabrication process of ZnO nanoparticles using this process. In this process, sodium carbonate(Na_2CO_3) and zinc chloride($ZnCl_2$) are ground in enormous ball mills. Ground (NaCl), a solvent, function is to provide the reaction media,separating the resulted reaction mixture.The mixture is then heated between 170 and 380 degrees Celsius to obtain powdered ZnO.Although the mechanochemical process is a cheap way to create large amounts of ZnO nanoparticles.It may take some time to uniformly grind zinc oxide powder and reduce granules to the necessary size resulting in extended millingtime (Otis, Ejgenberg, & Mastai, 2021).



Bottom up approach includes the green synthesis. With the advent of green chemistry and scientists all over the world are introducing green synthesis techniques to produce nanoparticles. This technique of synthesis does not include the use of chemicals that are toxic, but rather environmentally beneficial resourc-

es such as plant parts with biomedical applications (flowers, leaves, roots, etc.) and microbes (fungi, algae, bacteria) (Bandeira, Giovanela, Roesch-Ely, Devine, & da Silva Crespo, 2020). Unlike the chemical technique, this method of synthesis also regulates the creation of hazardous byproducts. In addition to being safe, the advantages of this method over others include cost-effectiveness and manufacturing of impurity-free nanoparticles (Basnet,Chanu,Samanta,&Chatterjee,2018).

ZnO nanostructures can be created using an environmentally friendly method. Natural materials include phytochemicals that serve as both capping and reducing agents, such as polyphenols and terpenoids. The polyphenols (or other phytochemicals) and zinc ions in the solution of the natural extract combine to generate Zn^{+2}, which is a compound. Following this, zinc is hydrolyzed to produce zinc hydroxide (Zn(OH)2), and following calcinations, the complex disintegrates, and aid in the production of ZnO nanostructures (Sana et al., 2020).

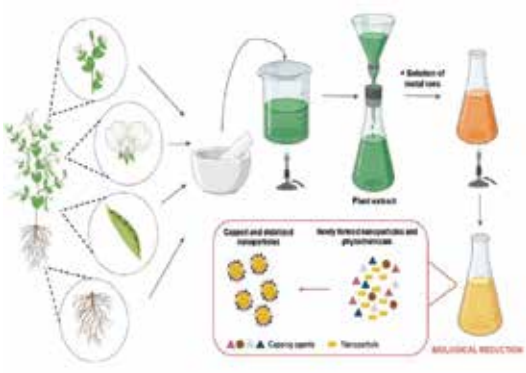


Fig: Green method for ZnO nanoparticles synthesis

Characterization of ZnO Nanoparticles:

Two important characteristics that may be considered important are size and structure of ZnO nanoparticles. Additionally, the particle sizes, surface characteristics and amount of agglomeration may be determined. The common techniques of characterizing ZnO nanoparticles are UV–visible spectrophotometry. Utilizing UV-visible spectrophotometry, distinctive peaks at different absorptions can be observed showing formation of metallic nanoparticles are formed from their respective metallic salts (Noruzi, 2015). Fourier transform infrared spectroscopy (FTIR) is also an important characterizing technique which can effectively analyze the type of the functional groups and their role during bioreduction. To learn more about the functional groups involved for bioreduction, the FTIR spectra of fabricated nanoparticles and virgin plant biomass/extract can typically be compared. (Srinivasan et al., 2019). X-ray diffraction (XRD) is used to study structural data concerning crystalline metallic nanoparticles. The powerful X-rays may penetrate into materials deeply and provide details about their bulk structure (Patil, Ryu, & Kim, 2018). The topography and morphology of the nanoparticles may be learned using scanning electron microscopy.Energy dispersive X-ray spectroscopy may be used to figure out the elemental composition of metallic nanoparticles. Each element has a distinct atomic structure that results in a distinctive collection of peaks on its X-ray spectrum. This allows the elements to be characterized (Thakur et al., 2022).

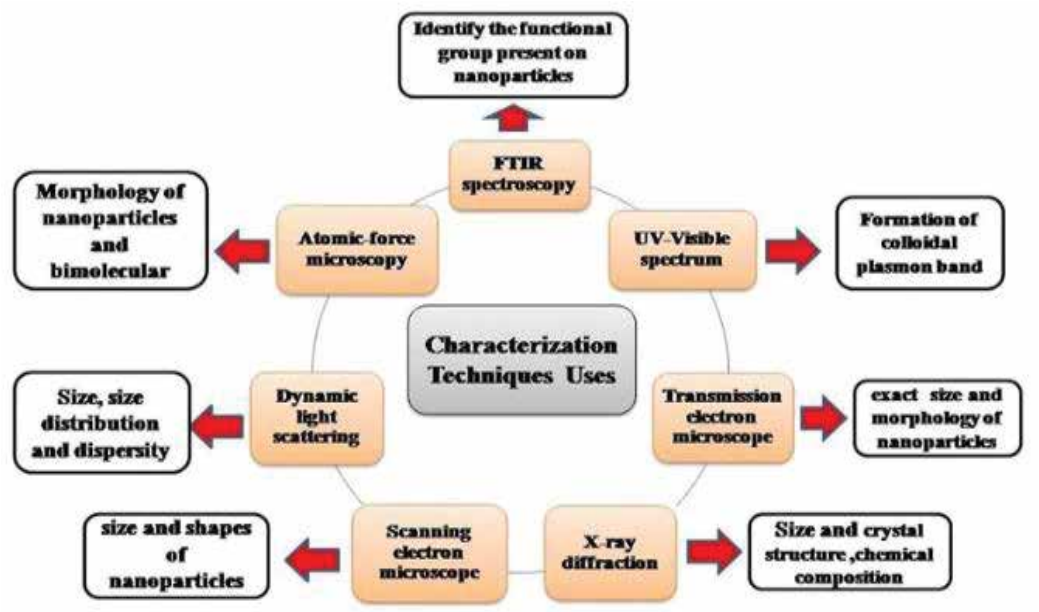


Fig : Characterization of ZnO nanoparticles

2. Applications Of ZnO NPs

Fingerprints Analysis

Fingerprints are regarded as crucial evidence at scene of the crime since they serve as significant physical evidence and may be used to positively identify a suspect. The traditional techniques for developing fingermarks occasionally have drawbacks such limited contrast, low selectivity, strong background interference, and toxicity. (Kesarwani, Parihar, Sankhla, & Kumar, 2020). ZnO is a great material because of its broad bandgap (3.37 eV), high excitation binding energy (60 meV), which allows it to transition at room temperature, and additional adhesive property, which facilitates fingerprint residue interaction with lipids and proteins at ambient temperature. In the form of nanopowder, ZnO nanoparticles were employed to generate aged, LFPs on non-porous surfaces (Deepthi et al., 2018)ZnO nano-powders (20 nm) have recently been discovered by Sydney University researchers to spontaneously glow in UV light when exposed to moisture, in addition to producing clear prints. When lit by long-wave UV light, ZnO nanostructure provides a fine fluorescent image of the LFPs. A team of researchers discovered unique ZnO-SiO_2 nano-powder for the detection of latent fingerprints on diverse surfaces. This nanopowder is extremely effective in visualising the finger ridge in great detail, which is crucial for criminologists (Lodha et al., 2016).

Fig: Finger print analysis by ZnO NPs**DNA**

Analysis

The advancement and improvement of DNA analysis looks to be the most promising use of nanotechnology. DNA may now be extracted, amplified, separated, and sequenced more quickly and conveniently by use of nanotechnology. In addition to revealing the physical characteristics of the owner of the DNA, such as gender, age, the colour of the hair, eyes, and skin, among other things. Nanotechnology is also assisting the detectives in determining the origin of DNA. It does not matter whether the DNA lifted from the crime scene came from saliva, blood skin,s emen, etc. DNA is now extracted from several biological sources, including blood, hair, skin, semen, and saliva, using magnetic nanoparticles. By placing the sample in a carbon nanotube, it is now also able to analyse DNA sequence using AFM (Prasad, Lukose, & Prasad, 2016).

Biosensors

ZnO nanoparticles might be interesting materials for forensic applications as biosensors might be due to their luminescent characteristics, electrocatalytic activity, and excellent performance towards latent fingerprints detection (Naik et al., 2021).

Explosives Detection

Due to several circumstances, detecting explosives is the major problem for law enforcement authorities worldwide. These factors includes the various compounds that have a potential to explode, andthe absence of inexpensive sensors with simultaneous high selectivity and sensitivity. In order to defeat explosives-based terrorism, high sensitivity along with the ability to reduce the costs of sensor production and deployment, are essential (Bhatt, Pandey, Tharmavaram, Rawtani, & Mustansar Hussain, 2020). In addition, various nanosensor devices, including electronic noses, nano-curcumin based probes, lasing plasmon nanocavities, nanowire/nanotube, and nano-mechanical concepts, are used to create workable technological platforms for trace explosive detection **(**Prasad et al., 2016)**.** Nanotechnology plays a significant role in the study of nerve agents and trace explosives (To, Ben-Jaber, & Parkin, 2020).

3. Conclusion

Applications of nanotechnology for the detection of explosives or dangerous compounds relates to stability, sampling, and accurate calibration. The most promising strategy for the development of advanced solutions appears to be the combination of modern nano sensors with traditional detection platforms.The review paper makes evident the possible applications of nanotechnology, such as fingerprint enhancement, DNA fingerprinting and explosive detection. The different branches of forensic science ,fingerprint enhancement, crime scene investigation, ballistics, and forensic toxicology, will undergo radical change as a result of this technology. For a successful transition from the lab to the real world of tomorrow, it will be important to take into consideration certain patterns.

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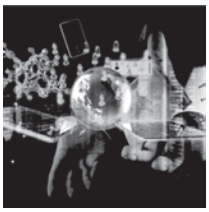

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Availability and Load Balancing in Cloud Computing

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Abstract

Cloud computing is new model that permit to the clients, associations, to buy the necessary administrations as indicated by our requirements. It is used to upload their data and retrieve data according to the needs over the internet. This model offer several services like to store data, easy and convenient web services, etc. In this era Cloud Application is developed the different services some are Platform-as-a-Service (Paas), Software-as-a-Service (Saas), Infrastructures-as-a-Service (Iaas), and Cloud computing improve their services day by client also demand reliable and new services for efficiency and reliability. Load Balancing be major provocation in cloud computing. Technique called load balancing is used to distribute load of the data over the cloud network. It is also used to minimize the resource usage.

Keywords: Cloud computing; QoS parameter; cloud service providers; ranking; prediction.

1. Introduction

A tool called Cloud computing permits and is convenient according to the user demand. It is very famous around the world last some years they provide flexibility also easy to access data retrieval and files over the internet also provide facility to send and receive large data spread around the world easily through cloud. Cloud computing show a continuous growth of the business due to cause of less expenses. Users increase day by day we use some technique to handle the large data required different methods to optimize and streaming operations that provides best and satisfactory levels of performance for the user. [1 (Mortada, 2020)].

0.1 Cloud Service Models

Service can be described as the endpoint of a connection; it should be well-defined, self-explained, and independent of context.

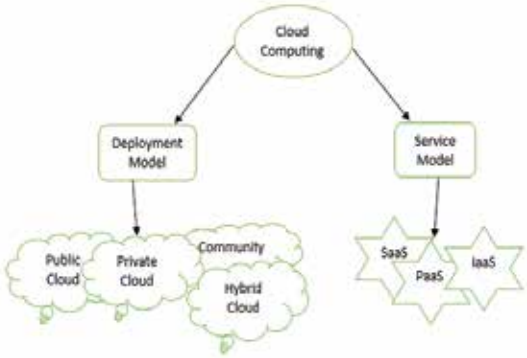


Figure 1. Cloud Deployment and service model

0.1.1 Software as a service (SaaS).

In cloud software as a service also called software on the demand of the user or customer. This service can availed on any part of the world by subscription or consumer based. Some examples are Drop Box, Google Apps, Microsoft office 365, big commerce etc. [2 (Geetha, 2017, August))]

0.1.2 Infrastructure as a service (IaaS).

In cloud infrastructure as a service (pay as you go for the service like storage, networking and virtualization) has the opportunity to grasp the basic in other worlds we say root infrastructure of providing the network operating systems, data storage, & many other basic cloud computing materials where user can run and deploy the software.it is time saving and have better flexibility also provide Resource Management and Remote Access. E.g., are, Amazon Web Services (AWS), Microsoft Azure and Google Compute Engine (GCE) etc. [(Chen, 2018)2]

0.1.3 Platform as a service (PaaS)

In Cloud platform as a service offering many software and hardware tools available over the internet, APIs and allow impulsively deployed on virtual Machine Infrastructure. In this era there is no generic methodology are followed. In Paas multiple user adaptable and ideal for the business point of view where multiple experienced developers are working on the single project. Some examples are Force.com, Microsoft Azure, and AWS etc.

1.2 Deployment Models

Four deployment models are currently used in cloud computing.

1.2.1 Public Cloud

Public Cloud model is the most extensively used cloud service. Public Cloud type is an admired preference for web applications, file sharing and insensitive data storage. Service supplier owns and manipulate the hardware's pass needs to run for a public cloud. Public cloud play a very essential role in testing and development.

1.2.2 Private Cloud

Private cloud is basically used for a specific organization. Private cloud organization control the system and manages it in a compact fashion. While a 3rd party can host a Private cloud server, mostly the organizations select and support the hardware in their own place data center. Only authorized person can access data in private cloud. It has a full owner control.

1.2.3 Hybrid Cloud

It is a combination of two or more infrastructure. Every infrastructure in this model have a separate system, but they all are the part of the same architecture. It has high set-up flexibility, low cost.

1.2.4 Community Cloud

Model called Community cloud, work same as a public cloud but the main difference is that

community cloud allow a specific access group of persons with shared interest and use cases. This architecture can be hosted according to own rules, or 3rd party provider and a spy organization. In cloud community, all organization have the same polices for security, government issues and application types.

Comparison:

Types	Private Cloud	Public Cloud	Community Cloud	Hybrid Cloud
Description	Used for specific organizations. Private cloud is build up with existing private infrastructure.	Services available for public users.	Different type of cloud are integrated together to meet a common or particular need for some organization.	Hybrid cloud is a distributed heterogeneous distributed system.
Scalability	Limited	Very high	Limited	Very high
Reliability	Very high	Moderate	Very high	Medium to high
Security	High class security	Totally depend on service model	Secure	secure
Performance	Good	Low to medium	Very good	Good
Cost	High cost	Cheaper	Costly	Costly
Examples	VMWare, Microsoft	Amazon EC2,Google App Engine	SolaS Community cloud	IBM,HP,V Cloud

2. Cloud Architecture

Cloud computing is divided into two main parts: the front end and the back end. It gives you the apps and interfaces you'll need for your Cloud-Based service. It is based on web browsers such as Google Chrome and Internet Explorer, which are client-side programmers. Virtualization, data storage, and other software and hardware components are included in cloud infrastructure. Cloud computing includes a graphical user interface (GUI) that may be used to control views and execute applications on the front end. It then examines the economics of cloud computing in terms of lowering costs, converting capital expenditures into operational expenses, boosting quantity demand, improving accuracy, and lowering latency.[(Asghari, 2021)] Some advantages are it solves latency issues, Reduce costs, its helps businesses, Flexibility features, High security, Encourages remote access, Auto services.

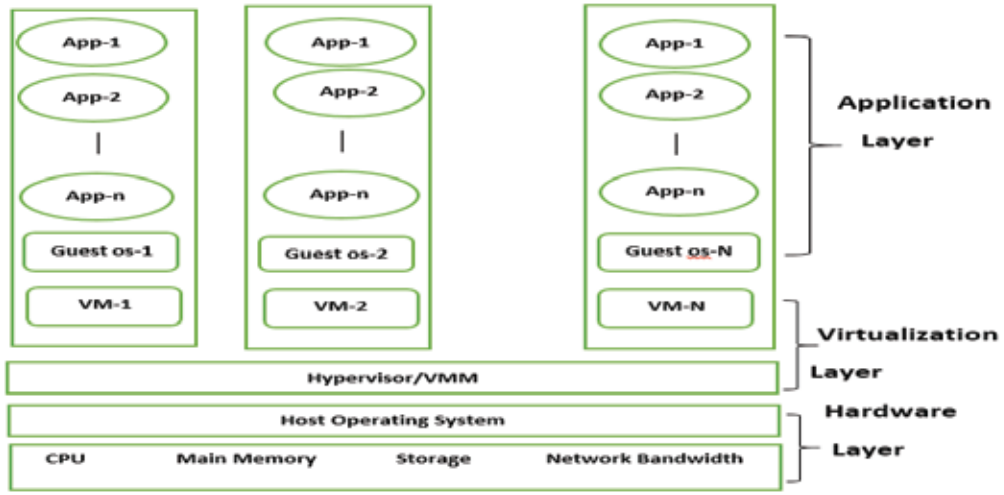


Figure 2. Single Host Architecture

3 Literature Review

After study, the different algorithms and techniques and cloud software's I am able to write something about the cloud computing here some point of views. Literature deal with Heuristic Algorithm & Nature Inspired Algorithm it's the part analysis the advantages for cloud analyst. Li and Wu (2019) presented the Load Balancing Ant Colony Optimization (LBACO) algorithms & find best offers that are finding in Load Balancing coupled with best make-span. [4 (Al Nuaimi, 2012)]

In other hand, the best simulation results given to us when the algorithm provided 30 % boost the execution time, waiting time & make-span compared to earlier algorithm with highest resource utilization and minimum overhead. [5 (Arulkumar, 2021)]

We examine about the difficulties of the entrance in an application improvement Methodology For programmed advancement of cloud based business application this is fundamentally intended for the non-it client resembles' partners and business specialist for application development. We have find the administrations for work process, script produced likewise test the programmed organization deployment process measure [6 (nzinger, 2014)].

Despite the various previous research organizations in the field of Cloud Computing, numerous questions remain associated with duty shifting in applications based on cloud and, more explicitly, in the IaaS model. IaaS is one of the innovation models that looks at the back end, where management of servers, data centres, and virtual machines takes place. In such setups, Providers of Cloud Service should provide high direct help delivery, avoiding situations like these. For example, having being overburdened or under-stacked, as this will result in a longer performance time or machine collapse, and so on Errand booking significantly adds to stack adjusting, and planning assignments closely sticks to the Service Level Agreement (SLA) requirements, a document provided by cloud engineers to clients.[7 (Panda S. K., 2019)]

In the LB computation, significant SLA limits, such as Deadline, are taken into account. Considering the Quality of Services task specifics, the requirement for VMs, and asset identification, the suggested computation is predicted to improve assets and improve Load Balancing. The suggested LB Algorithms address the concerns raised as well as the ebb and flow research hole caused by the writing's conclusion. The suggested LB computation yielded a typical of 78% asset utilization when compared to the genuine Dynamic LBA Algorithm. It likewise accomplishes great execution regarding less Execution time and Make span.[8 (; Yoo, 2011)]

The searcher will try to further optimize cloud resources and improve cloud-based application performance, such as for as many SLA criteria as possible. For example, for good outcomes, the algorithm will be assessed based on the number of infractions and migration count. In addition, the method will be compared against other algorithms in the literature. [9 (Mallikarjuna, 2019)]

One of the major struggling in cloud computing is Load balancing. This paper

focus mostly on how load balancing affects new technologies that rely on cloud computing. Furthermore, effective load balancing on the cloud using IoT, Big Data, & Self-learning systems can be used to achieve the present ways of trustworthy and dependable cloud computing. The effectiveness and value of the DBLA and NDLBA algorithms for next-generation cloud computing have been demonstrated. The main goal of this research is to increase overall achievement and to maximize re vitalization for task assignment on virtual machines. This paper explain the distinct static and dynamic load balancing algorithms & its types. In the coming up , the need to design fully autonomic new Dynamic load balancing algorithms empower good resource utilization, minimum make span [88], improvement in the degree of imbalance, effective task migrations, and minimum make span of time for next generation cloud computing.[10 (Jena, 2020)]

4 Characteristics

Here we discuss some characteristics about the cloud computing.

4.1.1 On Demand Self services:

Cloud services deliver services without requiring the user or the service provider to interact. Amazon Web Services, IBM, and Microsoft are examples of cloud service providers that deliver services based on customer requests such as self-services.

4.1.2 Broad Network Access:

Cloud potential are at hand on the network and obtained the standard mechanized that provide and promote the different users who used laptops, mobiles etc.

4.1.3 Rapid Elasticity:

Rapid elasticity have the ability can be elastically the girding and let out, in some situations automatically, to scale rapidly external and internal with some demands. Here some applications adding or removing the nodes, resources and services. [11 (Ibrahim, 2021)]

4.1.4 Measured Services:

In this case automatically optimized and control the recourse usage grip a metering capability at some level of abstraction in an appropriate way. The recourse usage can be monitor, reported and control & also providing some glassiness for consumer as well as the provider for the provide on-self services.

4.1.5 Resource Pooling:

The service provider providing the computing recourse pooled together and to serve multiple customer, with different customer behavior like some physical & virtual resources randomly assigned and re-assigned according to the user or customer demands. In this case customer or not bounded “geographically” but they may have some specific location at higher level query. Some examples are storage, processing, network bandwidth and memory. [12 (Lyu, 2020)]

4.2 Cloud Infrastructure

1. The cloud services are accessed through web services over the Internet. Cloud service providers offer versatile services such as computing services, storage services, and content delivery networks [13 (Khan, 2020)]. A single service can be offered in multiple regions. The main module of the proposed model is the QoS ranking module, which is further divided into three sub-modules:

- Similarity analysis module
- QoS parameter module
- Training data module

2. Similarity analysis can be used to identify cloud services of the same type according to the service model, e.g., to differentiate between software-as-a-service or platform-as-a-service [14 (Wagle, 2015)]. QoS parameters can be used to rank the cloud services according to their respective service category. The QoS parameters used are

- Security feathers
- Availability of cloud services
- Downtime
- Outage
- Response time
- Price
- Trust.

Cloud services are compared with the standard cloud benchmark [15 (Kumar, 2019)].

4.3 Cloud Feathers Extractor

All of the cloud services are listed and given to the input layer. First, the services are selected, that is, the cloud services, storage services, and computation services. Next, the input data are given to the next layer for further extraction of the QoS parameter [16 (Ghahramani, 2017)]. Further sampling is done based on QoS parameters.

5 Load Balancing

Load balancing is very important and play a vital role in clouds environment they optimized the resource in VMs in Cloud computing. They also deals the equality of recourse and load distribution of work in an efficient way in the resource utilization. The systematic balanced of work load take higher user gratification & good resources usage. Load balancing decrease the delay sending and receiving data as well as the intercept the overburdened the situation in the nodes that effected the Qos in the data centers of the cloud [17 (Ala'Anzy, 2019)].

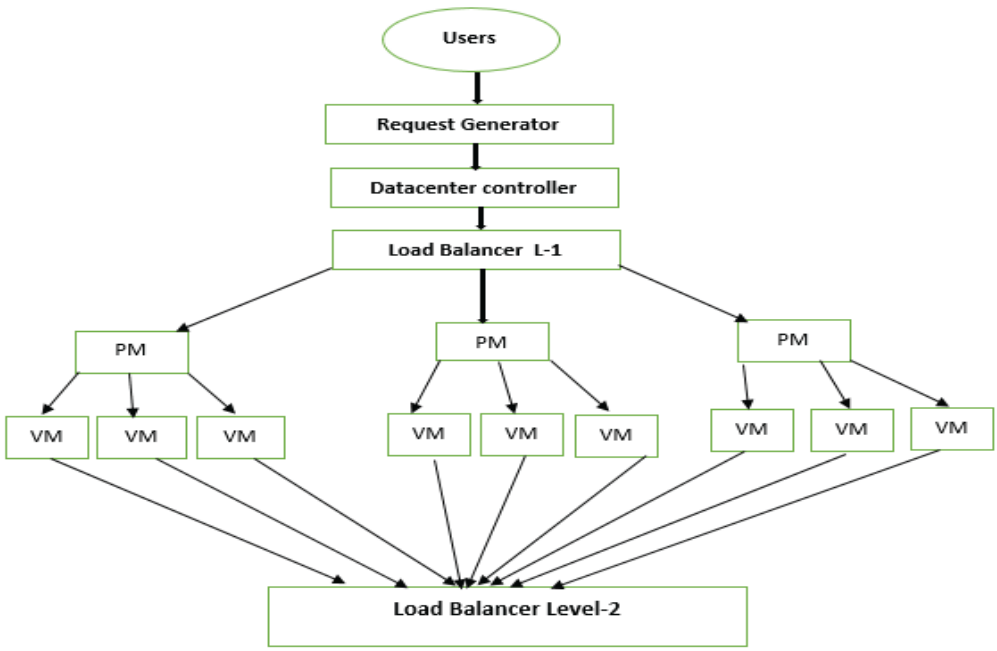


Figure 3 Load Balancing Architecture

As shown in this diagram, two types or designs of load balancing design models are clarified in unbalanced clouds for load scheduling. Gupta et lathe propose a different architecture. Machine Virtuel This approach abstracts the VM management and VM screen. The primary level load balancing is done by The Physical Machine (PM) level, whereas the Virtual Machine (VM) level performs the sub sequential level. According to the outcome, there are two sets of experiments here. [18 (Afzal, 2019)

1. **Intra VM task migration**
2. **Inter VM task migration**

Client requests that need calculating assets for their implementations are generated by the solicitation generator. The server farm regulator is in charge of objective management. The heap balancer determines which VM to assign to a certain client job. The major source of stress by distributing responsibilities among its own linked Virtual Machines, the Balancer modifies the provided Workload on particular Physical Machines. The burden balancer at the next level balances responsibilities among multiple Virtual Machines and Physical Machines. Exercises involving load adjustment the distributed computing responsibility is established by organizing and dispensing tasks to virtual machines based on their requirements. The actions that make up the load balancing process are as follows.

- User task requirements recognition
- resource details of a VM recognition
- Scheduling tasks
- Allocation of resources
- Migration

6 Types of cloud computing:

6.1.1Round Robin:

The Round Robin strategy depends on a revolution framework to sort network and application traffic. An inbound solicitation is designated to the most readily accessible worker, and afterward the worker is knock the lower part of the line. This strategy is especially helpful when working with workers of equivalent worth.

6.1.2 IP Hash:

In this direct load balancing method, the customer's IP address essentially figures out which worker gets its solicitation.

6.1.3 Least connection:

As its name expresses, the least association strategy guides traffic to whichever workers has minimal measure of dynamic associations. This is useful during heavy traffic periods, as it keeps up even conveyance among every accessible worker.

6.1.4 Least Response Time:

The least reaction time strategy guides traffic to the worker with minimal measure of dynamic associations and most reduced normal reaction time.

6.1.5 Least Bandwidth:

This application load balancer strategy estimates traffic in megabits (Mbps) each second, sending customer solicitations to the worker with the least Mbps of traffic.

7 Load Balancing Algorithm

When a client enters some information into the computer her data produce a task & reach the information center controller. Data center controller at the point apportions this to the load balancer at the starting steps. At that point they asked for the routed to abundant types of

Physical Machines. Inside the physical machines, there exists numerous of various machines which are made as per wants load balancer is transferred in such way to create the stack to be balanced, & smooth exchange is accomplished.

The most objective of any cloud based load balancing algorithm is to supply the administrations to the client without any delay, and smooth exchanges are anticipated b/w the client and the cloud benefits supplier . The cloud service provider's will be in contract with the conclusion client within the form of SLA.[]

Figure 5 shows how to put this underused algorithmic notion into practise. We'll need a few tools to help us with this. We can code in a variety of languages, including Java, PHP, Python, C#, and others. This extension has been updated using PHP. Encouragement, we'll need a text editor, such as Net beans, Eclipse, or Dreamweaver. however, if we want any support mainly back-end for data bases, we may use Xampp, Wamp, SQL Server, MS Access, and so on. Cloud users can connect to the internet via a wired or remote network.

Acquiring IP addresses of the cloud nodes is the basic principle underlying the network. To initiate, this application will ask the client for a request that may be addressed using any of the assets available. When a client submits a request, the request is sent to the Ace server for load balancing. For the client, this handle is used in the foundation. Currently, a stack balancing server sends requests to various levels of the framework and then to the final product. With the aid of the flow chart in the accompanying Fig, describes the load balancing algorithm in further detail.

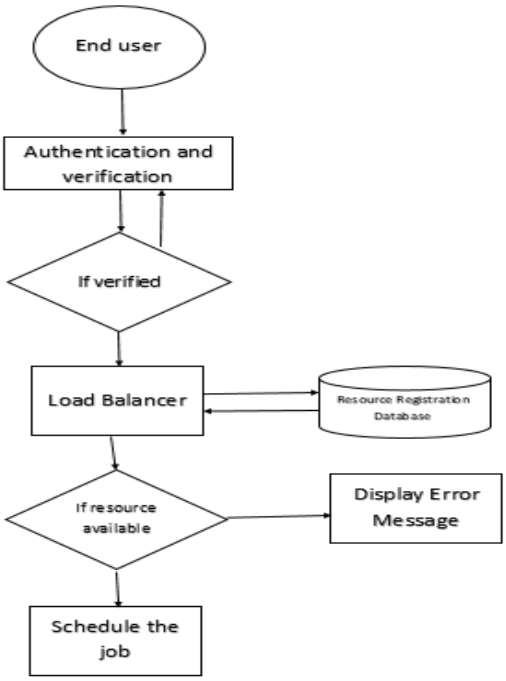


Figure 4. Flow chart of load balancing Algorithm

7 Proposed Methodology

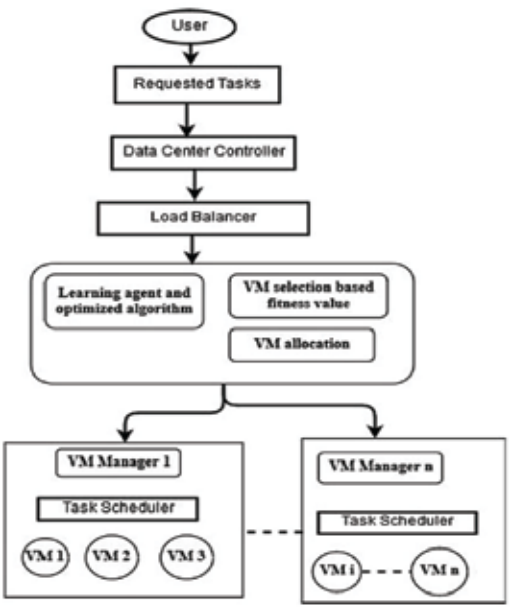


Figure 5 Proposed Methodology

In the above Fig.5. Explain about the propped methodology with a picture for excellent understanding.

Utilizing practical resources whose size or capacity of tasks fluctuate during run time in an irregular fashion, load balancing aims to increase the compilation time of a programme or job. When there is little variation in the load on the virtual machines, static load balancing techniques will be expensive. Because of the loads' unpredictable movement during run time, the static load balancing algorithm will thus not function properly. As loads change as applications run, dynamic load balancing is more advantageous than static load balancing and should take stack data and maintenance into account.Due to the network's rapid development and the demand for resources during operation, dynamical methods and techniques are very important and effective in distributing the load among the various resources. Our hybrid meta-heuristic algorithm is a dynamic approach to load balancing and sets the task's requirement in the queue of VMs that are waiting. This system has carried out user requests for the task. (Sambit Kumar Mishra a, 2020). [(Gundu, 2020)]

The long-term data centres and higher performance for external services are the goals of this research.
Data centres are typically located away from end users. Assignments should be shifted from heavily loaded VMs and distributed to underloaded VMs when multiple tasks are simultaneously assigned to a certain VM and there are still available VMs nearby on the network. As a result, the multiple tasks or assignments can be distributed among all VMs with a combined first priority, which reduces the task's waiting time while also increasing VM throughput and enabling load balancing at the VM level. The load balancing framework concept is depicted in the above figure, where the client requests that the task be carried out on the host. The task given to the load balancer by the board is the data center's responsibility. In order to distribute the assignment to the VMM, the load balancer would be chosen. Verified and active VMM demanded a lot of resources, and the host's resources had to be available. If obtaining VMs is insufficient, it must generate additional VMs in response to task requests. In this way, load balancing will be carried out based on the best value of the VMs since each host can only support a certain number of VMs. [(cloud)]

8. Classification of Load Balancing Algorithms:

Figure 6 Classification of load balancing Algorithm.

Static Strategies:

The Static Load in Cloud Computing Strategies is usually categorized into two categories. Physical machines are available at the beginning of both the initial errand restaurant and the subsequent assignment. After each task has been booked, the asset will be completed. OLB, MET, MCT, GA, Switch Algorithm,

TABU, A*, MIN MIN, MIN-MAX, and other heuristics in static technique include: OLB, MET, MCT, GA, Switch Algorithm, TABU, A*, MIN MIN, MIN-MAX, and so on. [(Gundu, 2020)]]

Dynamic strategies:

This is an important cloud computing methodology. During the run period, they also load distributed the heap among thy Physical Machine (PM). Off-line mode (Batch mode) and On-line mode are two ways to represent these heuristics-based powerful calculations used for load adjustment. The job is allocated exactly at certain preset minutes in Off-line mode heuristics. It is used to determine the true cause for the execution of a large number of jobs. MAX–MIN, MIN-MIN, and Suffrage Algo are some of the newly added heuristics for Off-line modes. When a client interest (task) enters the scheduler in On-line mode (prompt mode), it is organized onto a figuring center point. Each attempt is reserved for a single time, and the booking outcome remains unchanged. OLB, MET, MCT, and SA are some of the heuristics offered for online modes.[(Gundu, 2020)]

9. Result

I try various models : “time Series Models”-like WayeNet, LSTM, ResNet-1d, FCN-1d.Furthermore, I saw that the first preparing informational index is unequal - there is not many information with an opportunity to disappointment of over 8 seconds. Hence, while making my own dataset for train the model, I utilized information from 2, 7, 14 "long" shudders "more" than others, and utilized fourth tremor for approval. This improved the forecast for longer occasions to disappointment. show

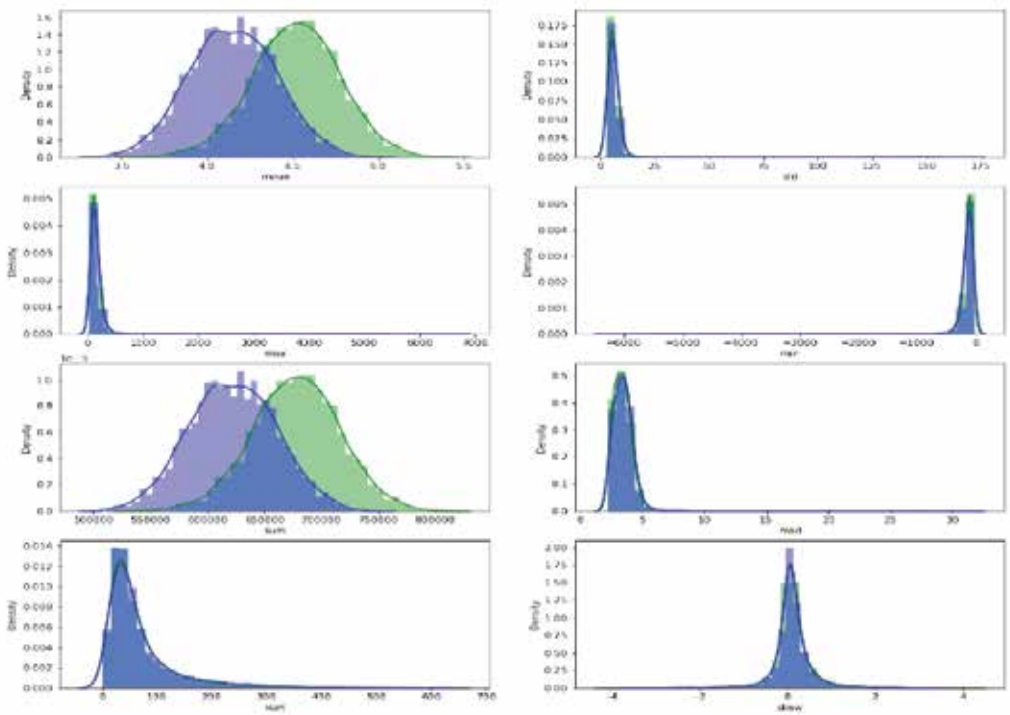
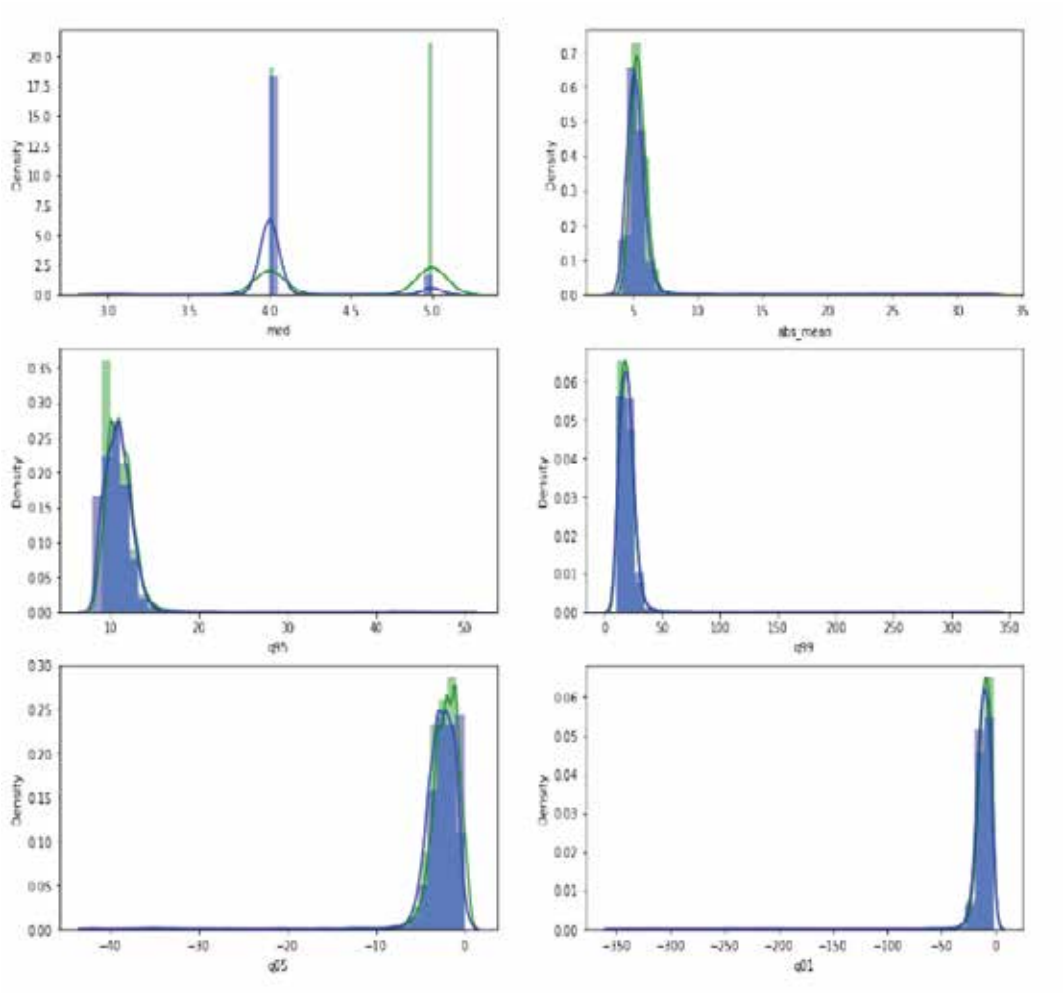


Figure 7



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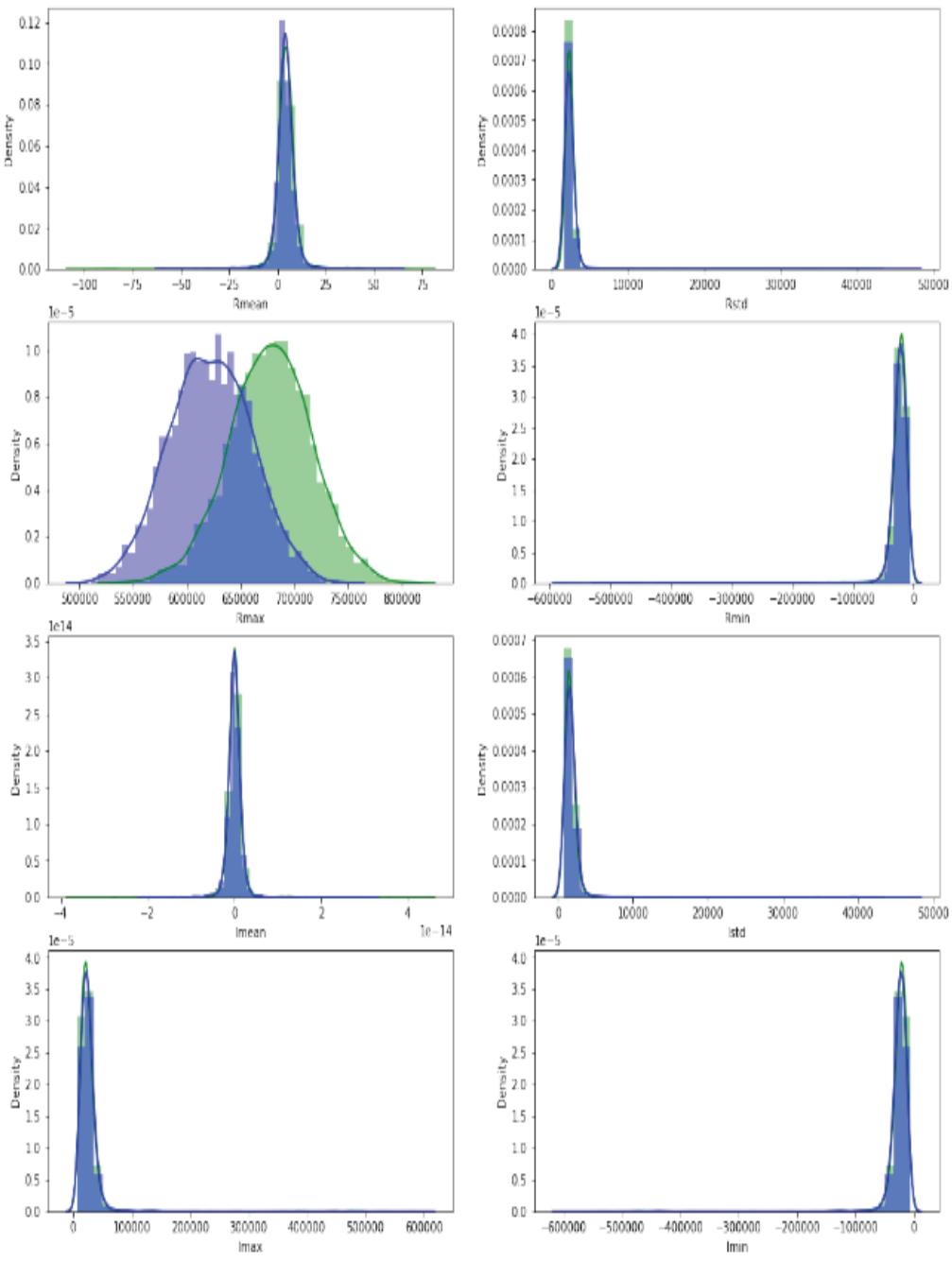
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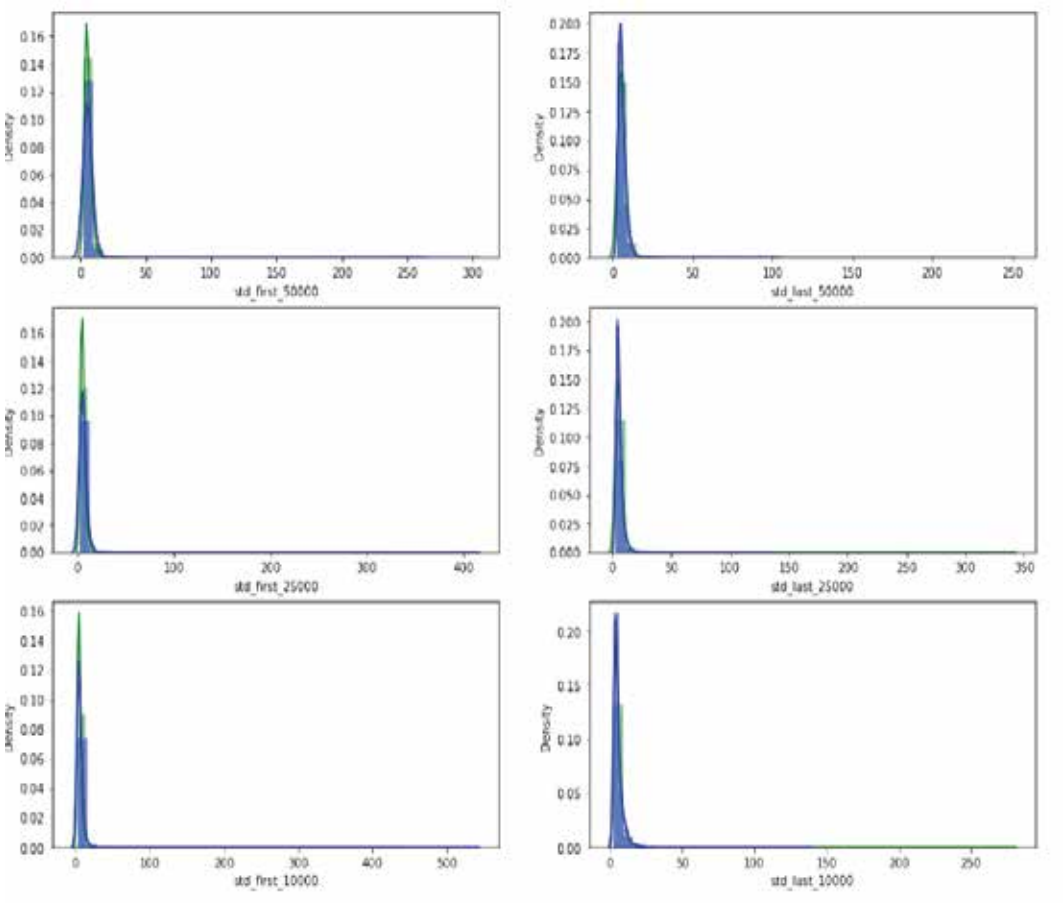
Figure 9


Density
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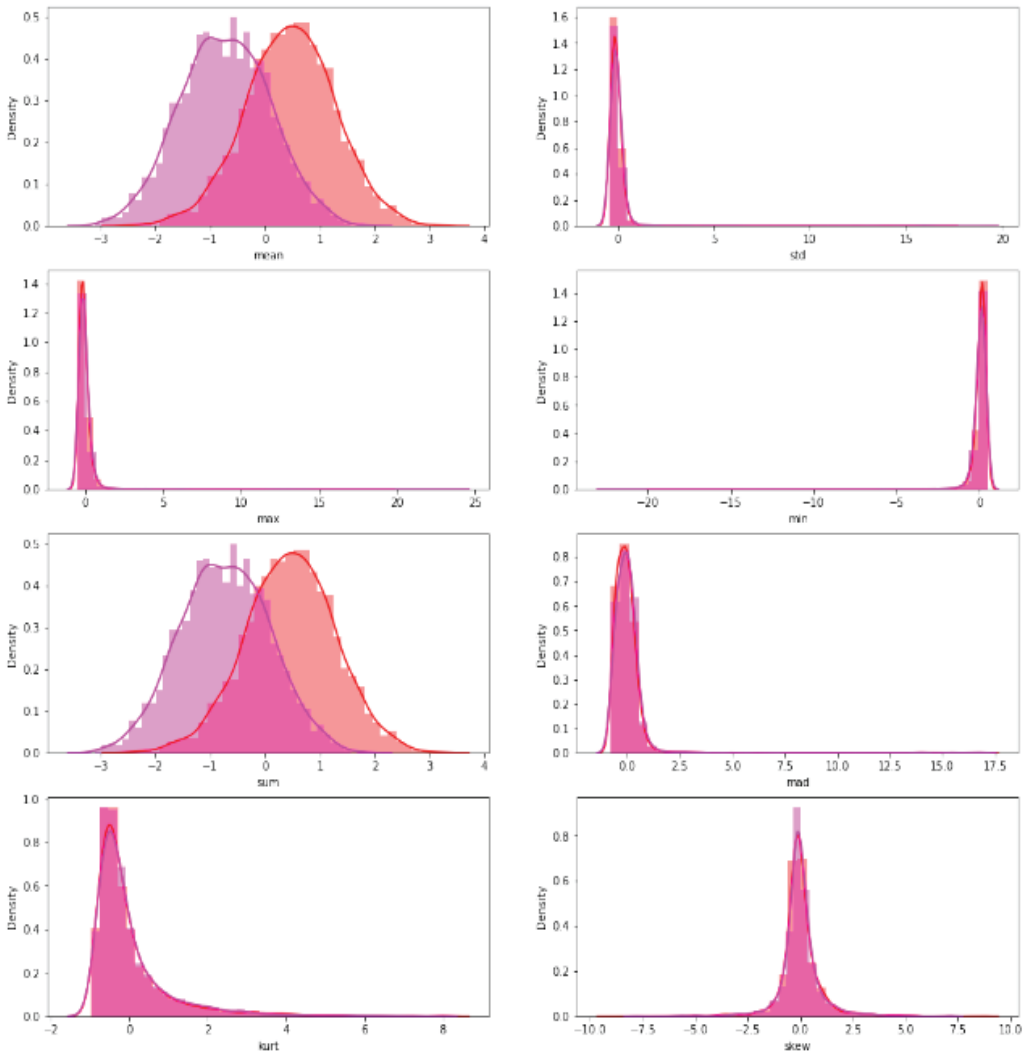
std_last_25000
std_first_10000
std_last_10000

Figure 10



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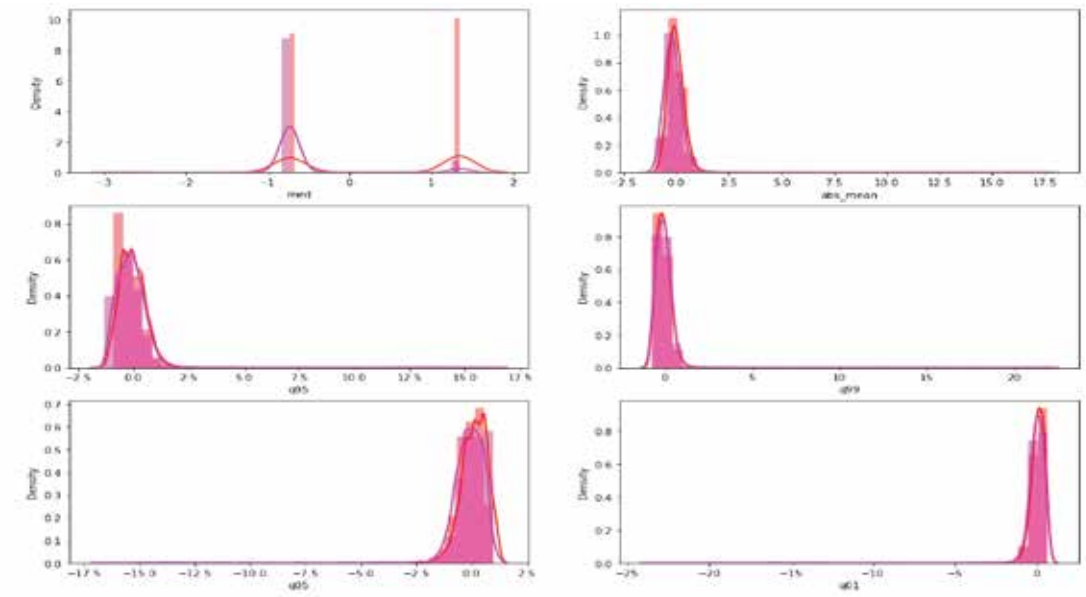

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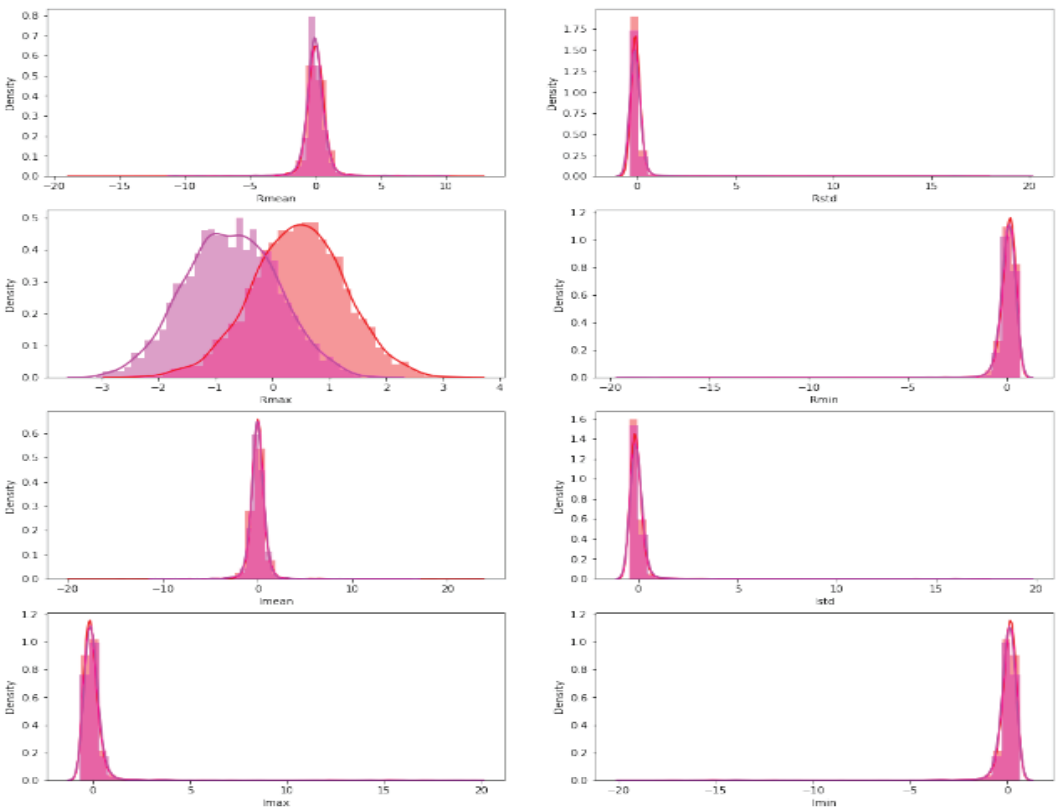

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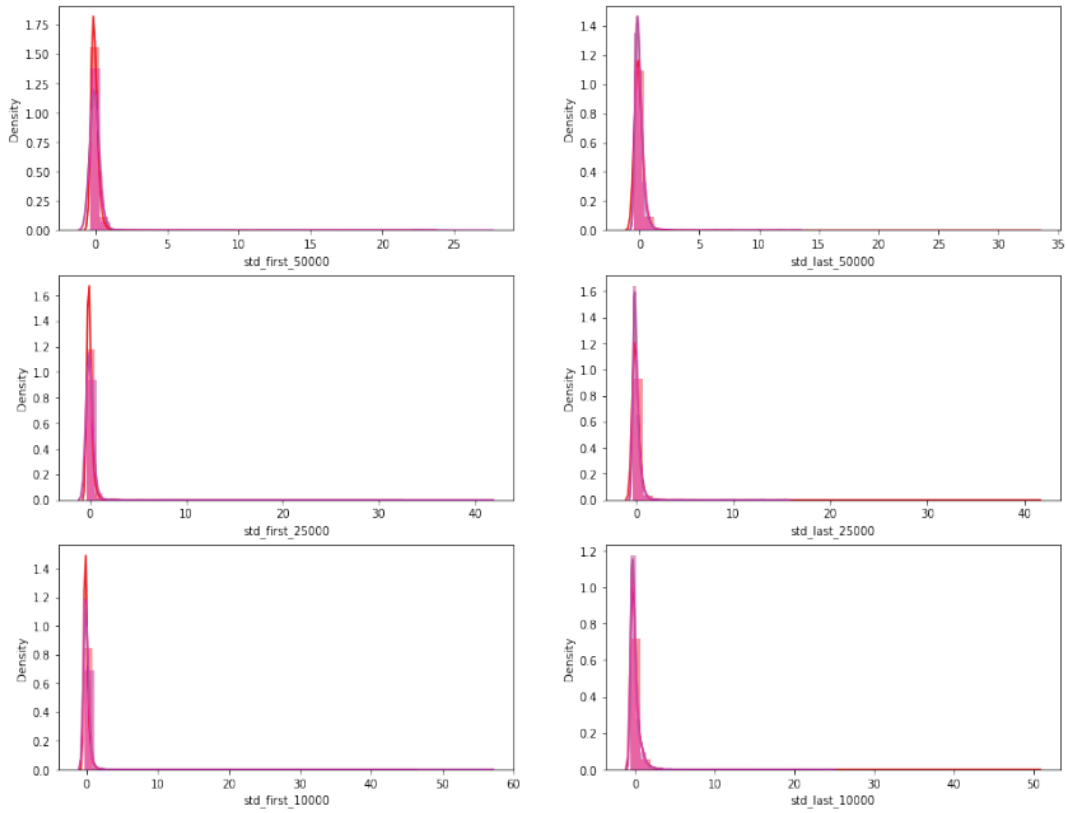
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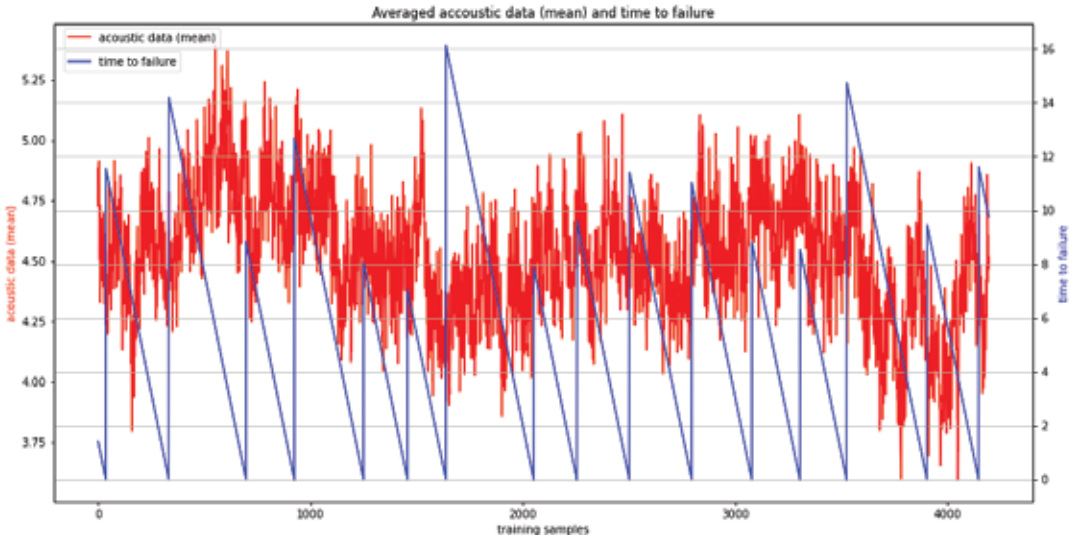
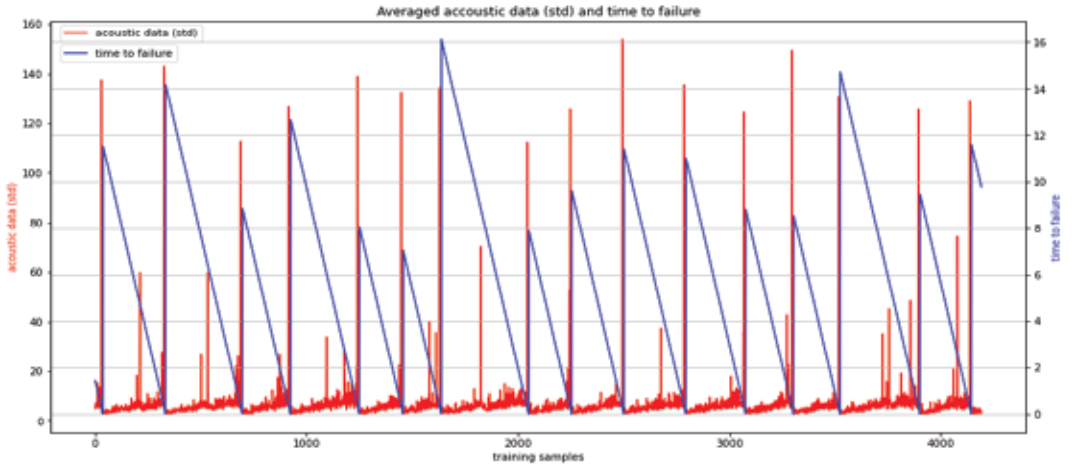
Figure 14


Averaged accoustic data (mean) and time to failure
acoustic data (mean)
time to failure
training samples



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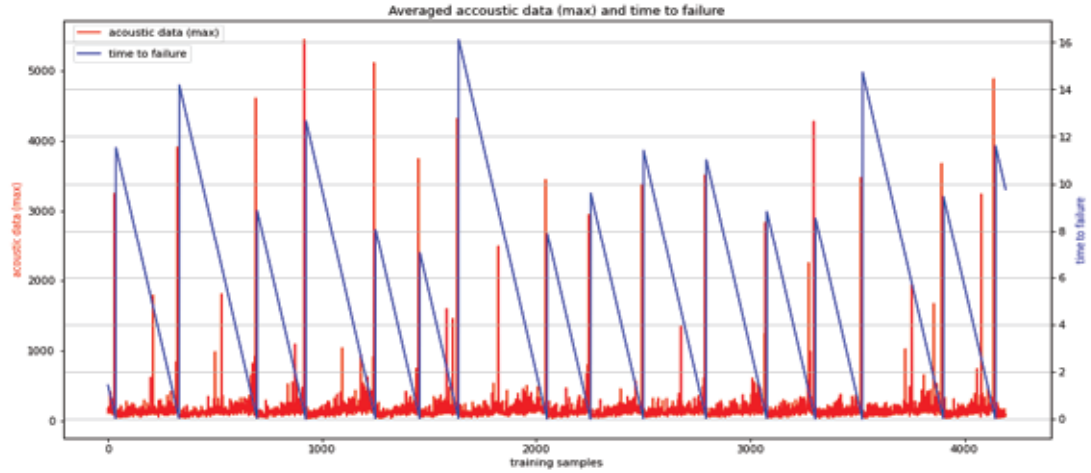

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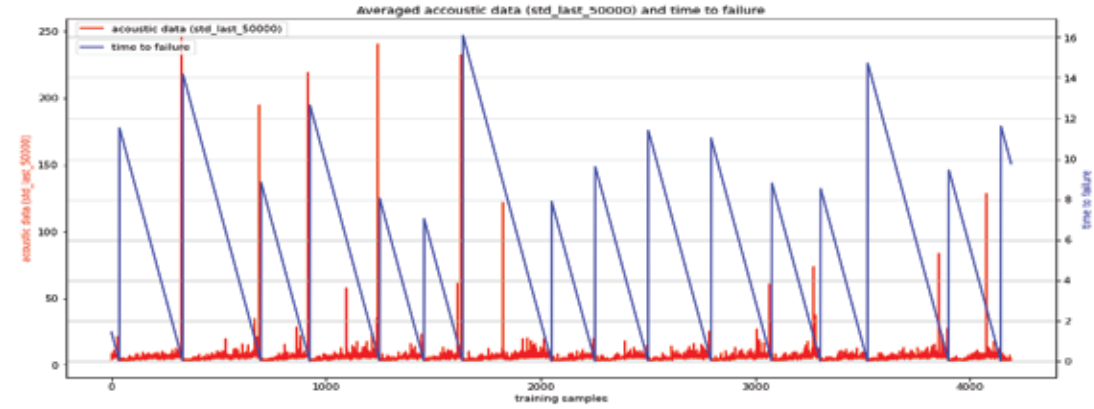

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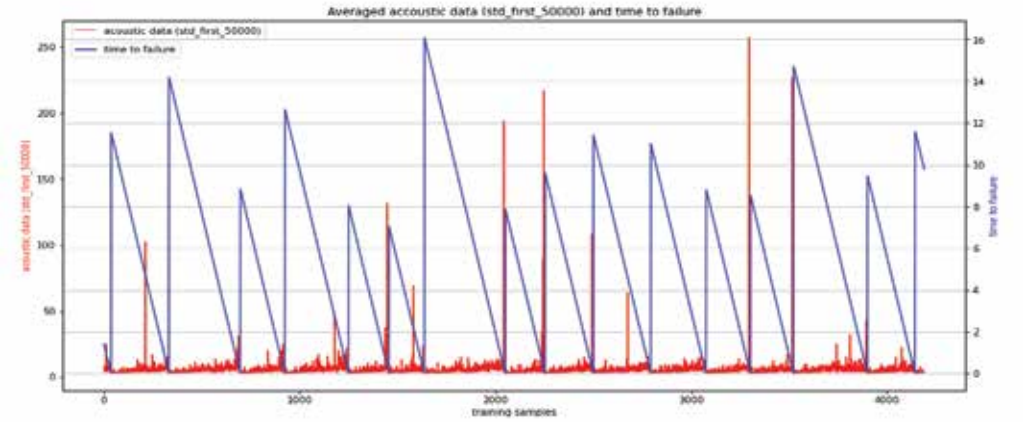

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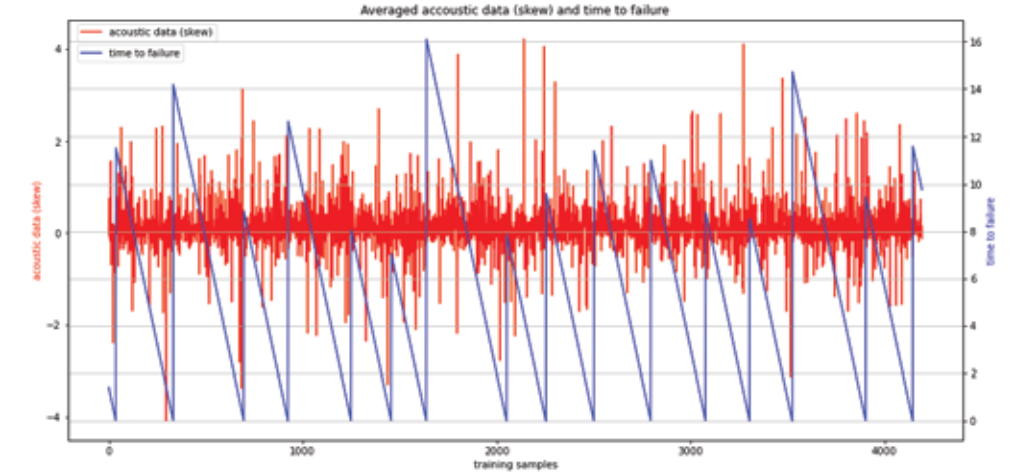

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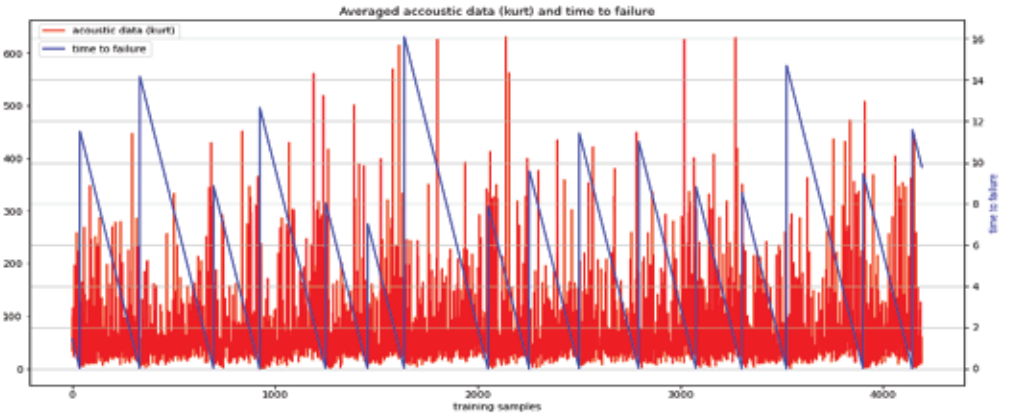

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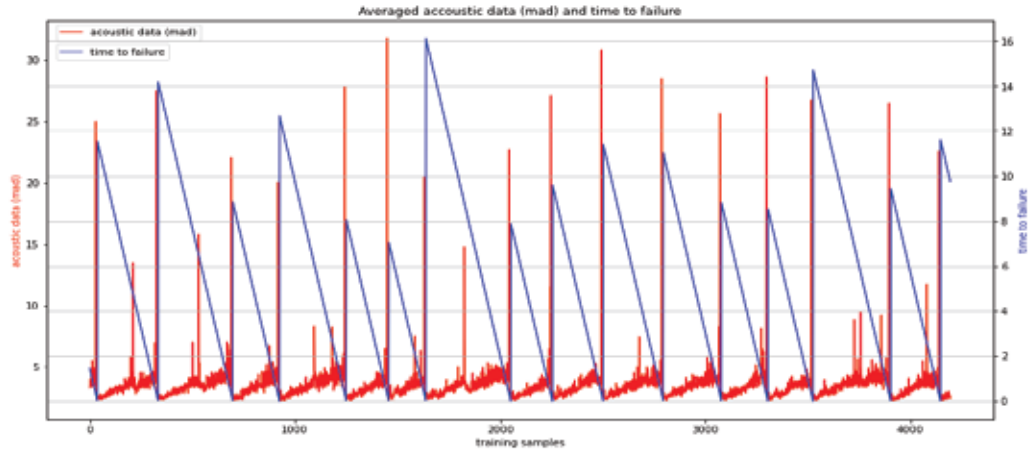

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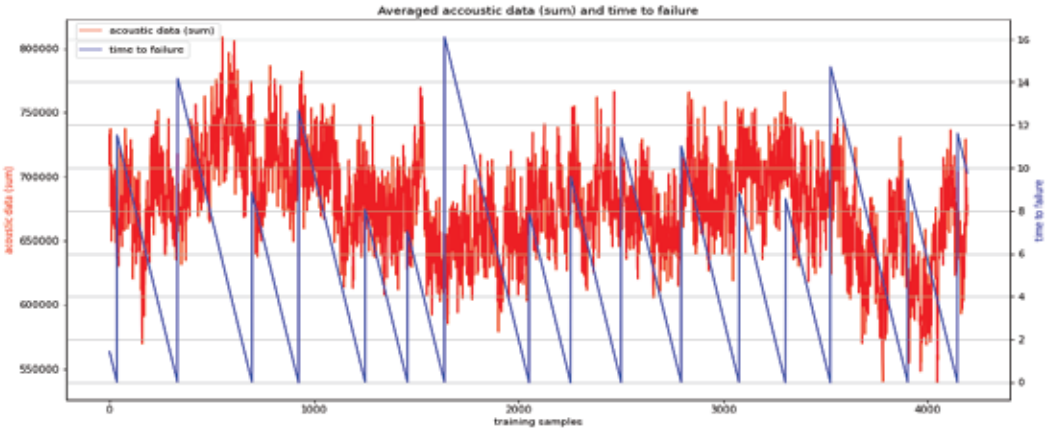

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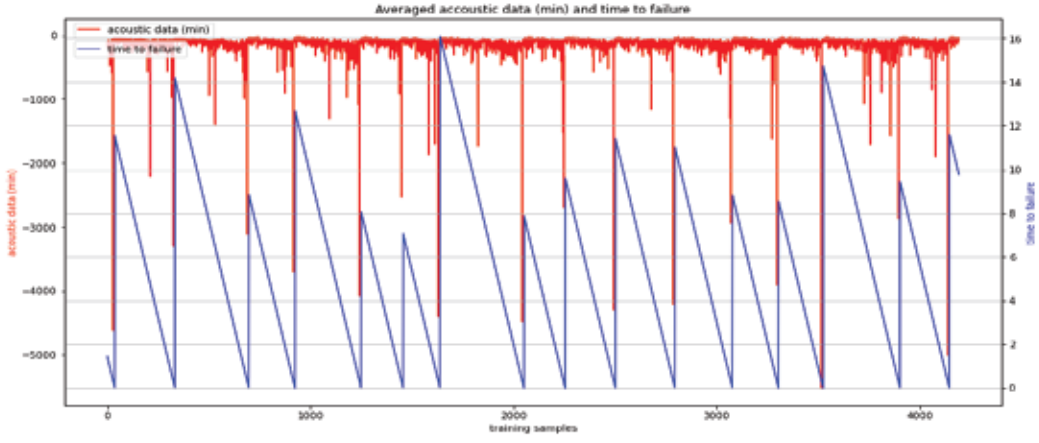

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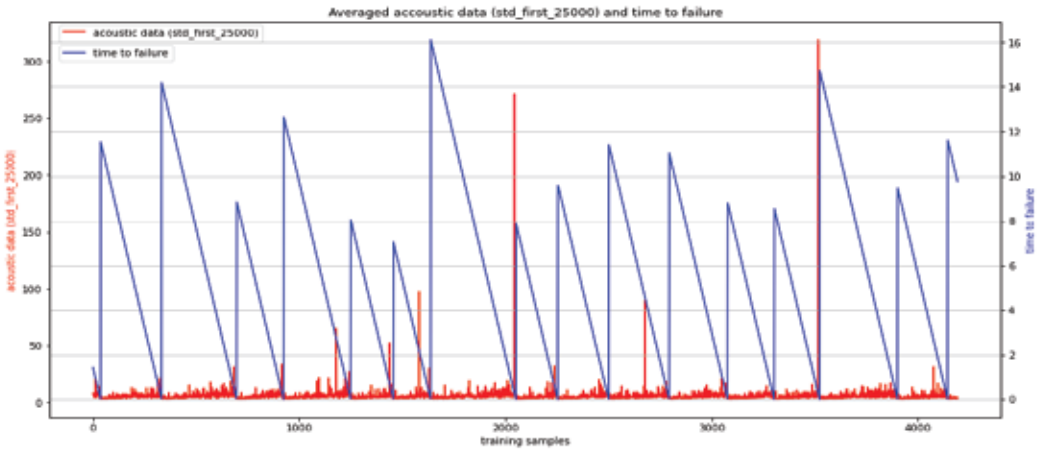

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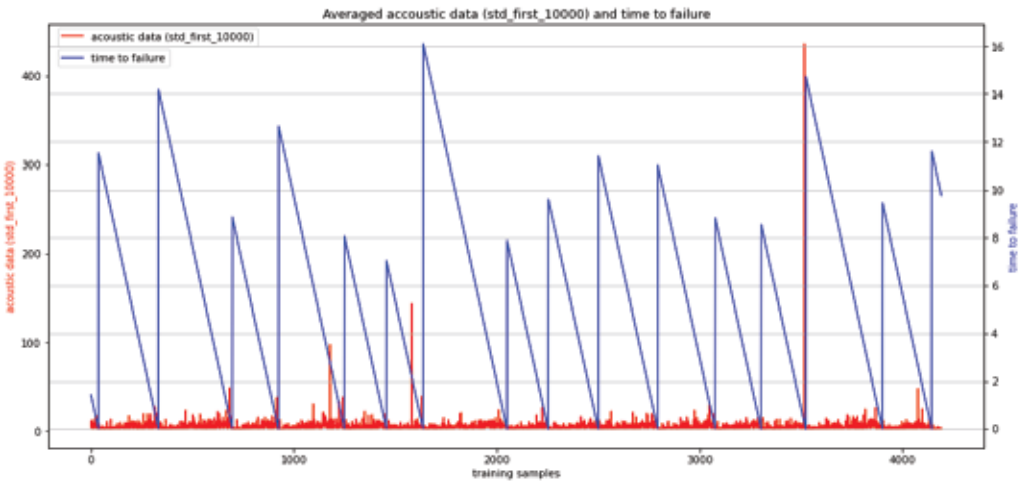

Figure 27

We broke down the conveyance of the accumulated highlights and furthermore the opportunity to disappointment and the totaled highlights on a similar chart

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The format of paper should be as follows:

- Title of the study (center aligned, font size 14)
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- Name of Institution
- Corresponding author email address.
- Abstract
- Keywords
- Introduction
- Literature Review
- Theoretical Model/Framework and Methodology
- Data analysis/Implementation/Simulation
- Results/ Discussion and Conclusion
- References.

Heading and sub-heading should be differentiated by numbering sequences like, 1. HEADING (Bold, Capitals) 1.1 Subheading (Italic, bold) etc. The article must be typed in Times New Roman with 12 font size 1.5 space, and should have margin 1 inches on the left and right. Length of paper should not be longer than 15 pages, including figures, tables, exhibits and bibliography. Table must have standard caption at the top while figures below with. Figure and table should be in continues numbering. Citation must be in according to the IEEE 2006 style

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