

# PREDICTION OF POSTMORTEM INTERVAL USING ARTIFICIAL INTELLIGENCE

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**ABSTRACT:** Determining the postmortem interval PMI/ time of death is a critical step in forensic investigations. Accurate estimation of the PMI is a important task for a Forensic examiner. Recent developments in biochemical technologies have started to identify biomarkers in the different biological fluids such as blood, urine for PMI estimation. Researches focusing on the use of blood in PMI estimation suggest that the femoral vein blood must be Collected for measuring biochemical components . Forensic Investigations are hurtling towards the introduction of - AI, an intelligence exhibited by machines that are trained to learn and solve problems. The present project outlines a concept of a device that can be used in the prediction of the PMI through Providing the profile of different metabolites in blood such as Lactate dehydrogenase LDH, Aspartate aminotransferase AST, triglycerides and cholesterols. In addition to the measurement of blood ph. Use of these biochemical markers could be the promising tools in forensic death investigations.

## INTRODUCTION

Artificial intelligence is actually developing in most of the fields including forensic science. People are trying to understand the impact of the AI in everybody's life through digital science which is now easily available. In forensic investigations, when investigators encounter a deceased, the main task is to decipher the time that has Elapsed between death and discovery of the body. Time since death is defined as postmortem interval (PMI).

Estimation of a time frame of death can help the investigators to reach to a conclusive state of the appropriate time of death which can further assist the courtroom proceedings accepting or rejecting the statements of suspects and witnesses. Prediction of PMI is one of the most challenging variables to quantify and establish for forensic examiners for over years despite numerous development in this area.

Several approaches have been established to define the time of death depending on short or longer PMI. Determining the time of death is more difficult with longer PMI. Electrical and mechanical stimulation of skeletal muscles few hours postmortem have been used. Another researches consider entomology as one of the best method for determination of short as well as long PMI. In multiple studies, a relationship was established between decomposition of the body and PMI. Few minutes after death, many biochemical changes startin the body. These changes were divided into five Phases of decomposition -----fresh, bloat, active decay, advanced decay and dry remains. Recent studies focus on the estimation of the PMI by biochemical markers through the analysis of chemical substances released after death and accumulated in the body. Researchers studied these biochemical markers in PMI determination in different body tissues such as blood, brain, skeletal muscle and pancreas. Biochemical changes of blood biomarkers have been related to three elements including the agonal period of anoxia, the extension of biochemical fluctuations in the early PMI, and the repartition of diffusible constituents between red blood cells and blood serum.The blood markers can be classified within two main categories: metabolites such as sodium, chloride, potassium, ammonia, urea and proteins such as lactate dehydrogenase (LDH) and Aspartate aminotransferase.

Determining the postmortem interval (PMI) or time of death is a critical step in forensic investigations. Accurate estimation of PMI is an important task for a forensic pathologist. Recent developments in biochemical technology have led to the identification of biomarkers in various biological fluids such as blood and urine for PMI estimation. Research focusing on the use of blood for PMI determination suggests that blood must be drawn from the femoral vein for measurement of biochemical components. Forensic investigations are rapidly approaching the advent of artificial intelligence AI, intelligence demonstrated by machines trained to learn and solve problems. The proposed system provides the profile of various metabolites in blood such as lactate dehydrogenase LDH, aspartate aminotransferase AST, triglycerides and cholesterols. This is complemented by the measurement of blood pH. The use of these biochemical markers could be a promising tool in the forensic investigation of deaths.

### **EXISTING SYSTEM**

Predicting PM interval has been one of the most difficult variables for forensic scientists to quantify and determine for years, despite numerous developments in the field. The Egyptians and Greeks performed autopsies on criminals as early as the first century BC. Later, all methods for the estimating PMI were derived from these earlier performances. Research on the determination of the time of death can be divided into two main groups-----the early postmortem period and the late postmortem period. The early postmortem period is defined from death to the onset of tissue decomposition. The late postmortem period, on the other hand, is referred to as skeletonization or alteration of the bone matrix. There are several approaches for the determining the time of death, based on a short or longer PMI. Determining time of death is more difficult with a longer PMI. Electrical and Mechanical stimulations of skeletal muscles several hours post mortem have been performed. Other research considers entomology as one of the best methods for determining short and long PMI.

### **PROPOSED SYSTEM**

Several studies have found a correlation between body decomposition and PMI. A few minutes after death, numerous biochemical changes begin in the body. These changes have been divided into five decomposition stages: fresh, bloated, active decomposition, advanced decomposition, and dry remains. Recent studies have focused on estimating PMI through biochemical markers determined by analyzing chemical substances released after Death that accumulate in the body. The researchers examined these biochemical markers to determine PMI in various body tissues such as blood, brain, skeletal muscle, and pancreas. The biochemical changes in blood biomarkers were associated with three elements: the agonal period of anoxia, the extent of biochemical fluctuations in early PMI, and the redistribution of diffusible components between red blood cells and blood serum. Blood Markers fall into two main categories: Metabolites such as sodium, chloride, potassium, ammonia, and urea, and proteins such as lactate dehydrogenase (LDH) and aspartate aminotransferase.

### **Advantages –**

1. It is useful to know the exact time duration of the body from it's dead.
2. Prediction of Post Mortem Interval using AI will calculate time duration of the dead body even after 6 months of the dead.
3. The process of calculating the time estimate of the dead body is very simple just by knowing the levels of LDH, AST, triglycerides and cholesterols in the body.

This is possible only if it is feasible within limited resource and time. The different feasibilities that have to be analyzed are

- Economical feasibility
- Technical feasibility
- Social feasibility

Economic Feasibility is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus, the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

Technical feasibility is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

Social feasibility is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

## **SYSTEM ENVIRONMENT**

### PYTHON:

It is an interpreted, high-level and general-purpose programming language. Python's design philosophy emphasizes code readability with its notable use of significant whitespace. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects. Python interpreters are available for many operating systems. Python is managed by the non-profit Python Software Foundation. Python features adynamic types system and automatic memory management. It supports multiple programming paradigms, including object oriented, functional and procedural and has a large and comprehensive standard library. Python is easy to learn yet powerful and versatile scripting language, which makes it attractive for Application Development.

## **IMPLEMENTATION**

### DOCTOR:

In this module, the Doctor can register the first. While registering he required a valid doctor email and mobile for further communications. Once the doctor registers, then the admin can activate the customer. Once the admin activates the doctor then the doctor can login into our system. After login he can see the view-patient data. based on patient symptoms, the doctor will give the precautions and he will give the doctor treatment

### FORENSIC:

In this module, The forensic agency first will collect the details from the body. While registering he required a valid forensic email and password for further communications. Once the forensic registers, then the admin can activate the forensic. Once the admin activates the forensic then the forensic can login into our system. After login he can collect details from the death-body based on symptom the doctor will identify the death-report on patient symptoms, the doctor will submit the details to the forensic agency.

### ADMIN:

Admin can login with his credentials. Once he logs in he can-activate the doctors. The activated user only login in our applications. Once he logs in he can see body details. . first he can get the data from the doctor. then The admin can get the final report from the forensic agency. So this data user can perform the testing process..

### MACHINE LEARNING :

Machine learning refers to the computer's acquisition of a kind of ability to make predictive judgments and make the best decisions by analyzing and learning a large number of existing data. The representation algorithms include deep learning, artificial neural networks, decision trees, enhancement algorithms and so on. The key way for computers to acquire artificial intelligence is machine learning. Nowadays, machine learning plays an important role in various fields of artificial intelligence. Whether in aspects of internet search, biometric identification, auto driving, Mars robot, or in American presidential election, military decision assistants and so on, basically, as long as there is a need for data analysis, machine learning can be used to play a role.

## CONCLUSION

When murder victim is found at crime scene, the blood can be collected from the femoral vein. Then, blood can be analyzed directly using the proposed device with AI for the dosage of LDH, AST, triglycerides and cholesterols but not the glucose. The pH level of blood can also be measured. These data combined can be interpreted and compared to different database to estimate the PMI. The practicality of this device should be evaluated on an institutional foundation and decision made with regard to using this device.

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