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Smart Invigilation System: Examinations through IoT to avoid Academic Dishonesty (SIS-eAAD).

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Abstract— In Covid-19 Pandemic, all over the world academic institutions facing problems to conduct the academic examination for the students and providing grades to the students. Now examinations are conducting through online mode. It is a big challenge to the academic institution throughout the world to conduct academic examinations honestly through online mode. It is an idea to conduct academic examinations in the institutions by providing a hygiene environment to the institution before the Covid-19 Pandemic (C19P) and after the C19P and monitor the students through IoT technology to Avoid Academic Dishonesty (AD) by the name of smart invigilation system for examinations through IoT to avoid Academic Dishonesty (SIS-eAAD).

Keywords— IoT Monitoring system, Managing Pre and Post C19P situations, Avoid Academic Dishonesty, Hygiene Environment in Institutions.

I. INTRODUCTION

Academic Dishonesty (AD) or Academic Integrity Violations (AIV) in the examination hall is a big challenge (problem) for all institutions in the world. Through this problem, the institute doesn't get an idea to whom the institution provides grades and marks and to whom not. To stop the Academic Dishonesty (AD) in between the examination hall, the institution uses the traditional way which is manually the faculty who has conducted the examination, will observe and monitor each student and satisfied through their observation? But sometimes students have their ideas and tricks to complete their examination paper through Academic Dishonesty (AD) and faculty who has conducted examination didn't get an idea that particular student is doing Academic Integrity Violations (AIV) to complete their paper.

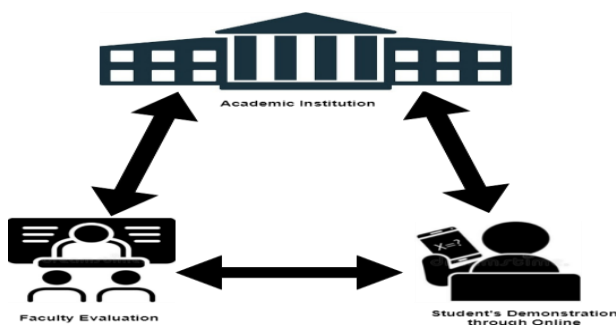
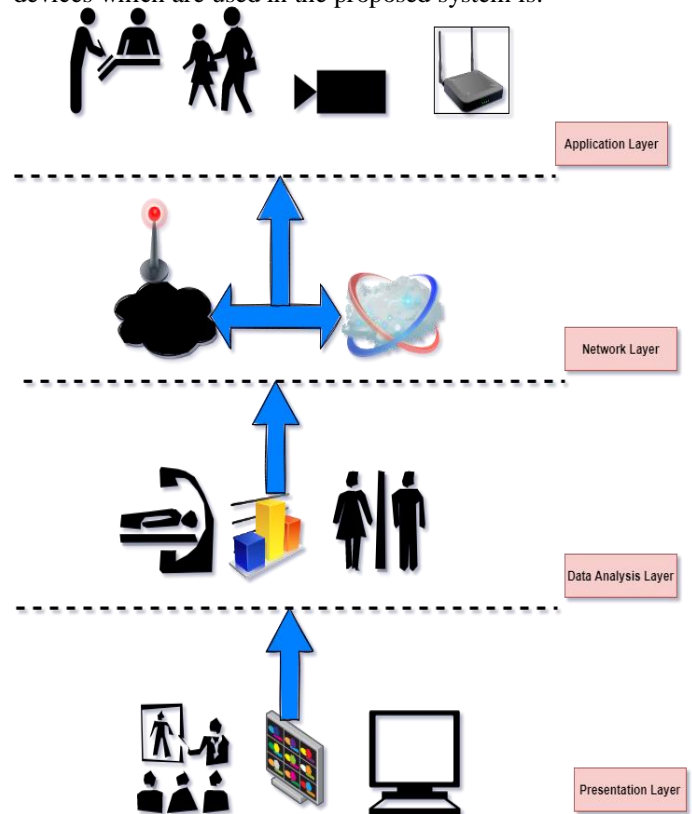


Fig1: Examination Evaluation during C19P

This paper is based on IoT technologies that are used to detect Academic Dishonesty (AD) or Academic Integrity Violations post situation of Covid-19 pandemic (C19P). The conceptual diagram of the proposed system and the devices which are used in the proposed system is:



II. LITERATURE REVIEW:

Bai Yan and Liu Mei examined the video monitoring system for invigilation of exams and proposed an intelligent invigilation system with computer vision design-based AI system and projected results over the reduced video packet loss, improved invigilator's video coverage area [1]. The invigilators' selection and the complete invigilation system of exams are discussed by the Jamal Othman et. al. and presented the results on the proposed invigilators' exchange through their algorithm, yields satisfaction on the users' as the invigilators, upon the duties are exchanged and was evaluated through a survey through TAM methods [2]. A new method of evaluation with a computerized and web-

based system for the medical students was proposed by Abdullah Yousef et. al. and presented the satisfactory acceptance of the proposed system with a survey that all the involved examiners are appreciated to follow further examinations with the proposed system [3]. Hussaini Abubakar Zubairu et. al. proposed a method of students' e-assessment, where the verification and validation of the original student authentication were highly concerned to move further with the online examination process and presented their results as the continuous authentication is required by a student during the entire exam period to eliminate or avoid the cheating in e-exam [4]. As our proposed work of this article, a method with avoidance of malpractices using IoT model of the online exam was presented by Shameemul Haque et. al. and discussed in detail about the model with circuit diagram [5]. Konstantinos Tsiknas et. al. presented the potential risks in the form of security threats available for the industrial IoT systems and presented a survey on various attacks and measures [6]. Patil et. al. represented a review on the web-based examination system with evaluation and described the live monitoring of the exam for the avoidance of malpractice in the exam process [7]. The role and importance of artificial intelligence (AI) equipped operations in educational institutions were presented as research by Linyan Man and detailed the discussion on the AI adaptation in the educational institutional operations [8]. Hu Zheng and Wang He described in their work with AI+ education models [9]. Due to the covid-19 pandemic situation in china, the convergence of the exam model from traditional to cloud national examination with online mode was described by Zhu Tiejun [10]. An automation work on a remote invigilator system for examination is proposed by Zamri Abu Bakar et. al. and performed an end-user satisfaction analysis to project their work efficiency [11]. Based on the computer vision, through video surveillance, unwanted human activities were detected by Divya and Josephine Prem Kumar, and the importance of the monitoring was concluded with the model design [12]. Chaitra et. al. presented their work on the examination systems with the smartness included and described the easier and efficient handling of exams with the reduction in the workload on the traditional invigilators [13]. By considering the educational institutional environment as a smart campus the computer vision-based application research was presented by Xiang Zhou and presented a design and implementation on the dormitory management system with computer vision [14]. The design and implementation of automatic invigilation functions of an exam hall were considered by Xin Guo Yu et. al. and concluded with the proposed work reduces the workload of the invigilators [15]. The C19P situation-based network distance in teaching and resource sharing system was proposed by Shun Yao et. al. and presented the fairness on the remote handling of academic activities online [16]. The impact on the adaptation of IoT systems in organizations was detailed by Paul Brous et. al. and performed a systematic review on the pros and cons of the decision on IoT adaptation [17]. Ylber Limani et. al. detailed their work on the digitalization of higher education institutions and presented a case study with the AI, IoT, and Cloud technologies [18]. Sabina Cerimagic and Rabiul Hasan

presented their work on the role of educational institutions in the prevention of AD and misconduct during online exams and given the results for Australian Universities [19]. A comprehensive study on the e-exam systems was done by Jeremy Pagram et. al. and presented their analysis on the transition from the traditional mode of exams to e-exams in detail [20]. Cramp et. al. listed the findings on the implementation of remote invigilation on e-exams, where issues for the teachers are resolved, and did systematic and effective design implementation of the proposed system [21]. The student's involvement in the online exams, their satisfactory participation were detailed by James and investigated on the technologies to enhance the e-exams with more stability and reliability [22]. The learner's view on the online examinations was carried out by Khitam Shraim and the online exam practices were listed in his proposed work [23]. Julia M. Christensen Hughes and Donald L. McCabe [24] described the details of misconduct in the academic sector in higher education in Canada and the exam cheating habits of Cambodia students' were presented by Mitsuko Maeda [25]. The placement of educational robots with AI principles in the exam hall and its significance is narrated by Omar Mubin et. al. [26]. Lilley, M et. al. detailed their studies on distant real-time monitoring of the exam halls of examinations and suggested that such invigilation may enhance the creditability of the academic operations [27].

III. PROPOSED SYSTEM:

The Corona-19 Pandemic (C19P) has given drastic changes in the world. It affects more in Traditional Educational Practice (TEP) which is presented in **Fig-1** and the place of TEP, Digital Educational Practice (DEP) taken, and the Educational institutions are place lectures and examinations in a DEP mode, the result of examinations are not satisfied because of Dishonesty of the students. While the proposed IoT and Machine Learning Technique use Physiological sensors to focus the student's behavior while they are writing Examinations by sitting in Examination Hall.

By using this design work our target is to Avoid Dishonesty (AD) or avoid Academic Integrity Violations (AIV) from the Academic Examination (AE) from the Examination Hall of the institutions. This module can be used in any writing Examination like GRE, TOEFEL, IELTS, GATE, or any Civil Service Examinations in any educational institution and Educational school. In this work, we are going to propose a design through IoT Hub which is connected through university institution's Database (DB) and Examination Department in which Examination Instructor or Observer monitors the Examination Hall through Camera which is connected to IoT Hub. The Proposed System work is:

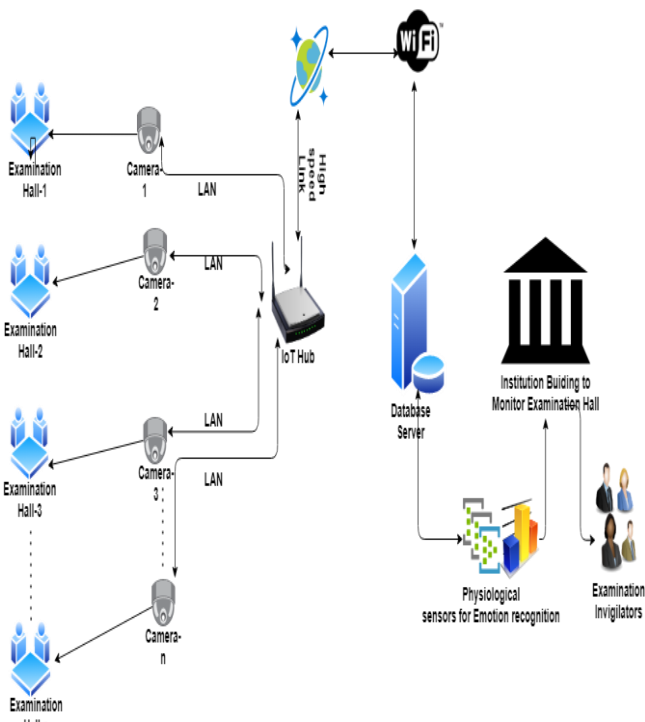


Fig2: Student's data processing system of Physiological sensors for Emotion recognition through IoT-based framework.

In this system design the internet and Wi-Fi which is bridge between two individual working environment, first is IoT Hub and Camera which monitor the Examination Hall where students spend their time doing activities, a second institution working body environment like Institution Building to monitor students activities through the employees, Physiological sensors for Emotion recognition module which is connected with institution's database (DB).

IV. FUTURE ENHANCEMENTS:

This paper is open a new era for researchers who want to do work in Physiological sensors for Emotion recognition through AI and IoT. In addition the, in future we can update the system module which can monitor student's behavior when they are writing examinations online.

V. CONCLUSION:

A real-time students Academic Dishonesty detection design module for Academic Institutions to conduct examination honestly from their institutions. The examination invigilator concludes the student's honesty and dishonesty in the Examination hall through this module design. The system design is divided into two parts. The first part is the overall design framework of Examination Hall which is monitor through a Camera and it has a link with IoT Hub. The second part is Examination invigilators, Examination Monitor building, Physiological sensors for the Emotion recognition module which is connected to the institution database (DB). These two parts are connected and communicated through Wi-Fi and the internet. The result of student's honesty and dishonesty will be displayed through a

monitor which will be placed in Institution Building. The main role will be placed at Physiological sensors for Emotion recognition algorithms which are connected to the institution's Database(DB) and will display the conclude the result of the student's Honesty and Dishonesty by observing student's behavior in the Examination Hall.

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