Blockchain as a Services Based Deep Facial Feature Extraction Architecture for Student Attention Evaluation in Online Education

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Abstract

Obtaining a person's facial features is necessary for processing techniques like face tracking, facial expression, and face recognition. Many factors are involved in locating and detecting facial features, and the most important is eye localization and detection. Recognition of facial expressions is not about catching expressions; it is about determining whether or not students feel an emotional connection to the material or the instructor who presents it. Using blockchain as a service (BaaS) is the third-party creation and management of cloud-based networks for companies which could use for student attention evaluation without spending time and money developing their in-house solutions. Hence to overcome the problem mentioned, this paper is solved by proposing a new technique named deep facial feature extraction system (DFFE), through which the student's attention is examined. The basic features such as feelings, interest, and attention of students are evaluated by implementing the new Expert Facial Feature Focus Algorithm (EFFF) using deep learning strategies. It is possible that shortly, this algorithm will discover a person's feelings and thoughts accurately comprehensively assess user's attention degrees to help people work, study, and live better with greater efficiency achieving 93.2% by analyzing emotions and feelings.

Keywords: Blockchain as a service (BaaS), Deep learning, Facial extraction, Face recognition

1 An Overview for Facial Extraction in Students

Since the 1960s, scientists have employed various methods for extracting facial features from images to develop cutting-edge face recognition software [1]. These methods include looking at a person's collection features and their relative positions on the face [2]. The four main components of a human face are the eyes, the face contour, the nose, and the mouth [3]. Face characteristics such as cornea magnitude, retina layout, chin distance, nose spacing, tongue contours, mouth opening, pupil size, brows slant, and eye eccentricity can all be used to map dimensions to facial structure [4]. In addition, an edge detection technique can be used to build a model [5]. Extracting facial features such as eyes, noses, mouths, and on from a human face image is known as facial feature extraction, face tracking, facial expression, and face recognition; all require the extraction of facial features before they can be used in processing [6]. However, the Feature Matching method uses previously defined or modeled face templates connected to image pixels to locate or detect faces [7]. Organizations can use the blockchain provider's service to construct blockchain applications for a nominal fee due to the blockchain as a service approach. Computer-aided classification algorithms that can accurately classify facial expressions in images of people [8]. Preprocessing steps in a face detection system are typically used to speed up the detection method while lowering the number of false alarms [9]. All network nodes actively validate and verify data in a decentralized blockchain network. To protect the information stored in the blockchain, cryptography will be employed. Tolerable numbers of non-face windows should be rejected in the preprocessing stage [10]. Detecting faces in an image is a challenging problem in computer vision because faces are difficult to recognize and locate without assistance [11]. OpenCV feature-based cascade classifier can be used to perform face detection. A Multitask Cascade can be used to achieve cutting-edge face detection. These methods, however, may fall short due to the wide range of lighting conditions, f4acial expressions, and other variables [12]. It becomes a significant problem because the face patterns are embedded in a nonlinear and nonconvex manifold in high-dimensional space [13]. Men prefer several characteristics in women: fuller lips, a manly face, an open face with little definition around the eyes and no prominent cheekbones, clean and attractive skin, and wide-set eyes, while women prefer facial symmetry. While the obvious suspects are nose, eyes, and mouth, the brows are the most important part of our face [14].

To solve the problem of face recognition and referencing style, Cascaded is created. Expressions and feature areas like the eyeballs, nose, and mouth are recognized by three deep convolutional in the process. Multitask Cascaded uses a three-stage neural network sensor for face recognition. Cascaded work visualization for multitasking for starters, the image is scaled several times to identify faces of various sizes in it.

A feature-based approach to face identification is given using intensity data instead of prior knowledge of facial

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shape. For a face to be considered complete, the nose, eyes, and mouth features must be placed inside specific parameters. An important drawback of these approaches is the difficulty in constructing a suitable set of rules, and too broad or to narrow a set of rules could lead to an excessive number of false positives.

A high-quality image is more likely to be recognized than a low-quality one. Face recognition is hampered by the difficulty of extracting features from noisy photos. A preprocessing step is performed before information extraction from a low-quality image. It is impossible to send raw data through one model since it is incorrect, resulting in errors. Before running a model, one needs to do some preprocessing.

1.1 E-Learning and Emotional Computing

A person's emotional state can be inferred from their facial expressions. Social psychology, medicine, and cinema are normal fields of study for facial expressions [15]. Advances in machine learning, computer animation, and computer vision have allowed animators and computer scientists to conduct facial expression recognition research [16]. The cognitive approach of preferentially focusing on a specific task while disregarding other right things in the right environment is known as attention [17]. It has a significant impact in various fields, including distance classes, advanced driver assistance systems, and multiplayer video games [18].

Being careless can have disastrous consequences in certain professions. Deficit hyperactivity disorder (DHD) involves young and is characterized by excessive impulsivity. ADHD affects approximately 4.5 percent of the population worldwide. Many accidents would be prevented if people could pay attention to doctors' operations, driving, and engineers' exact device maintenance. These days, online education systems provide a conducive learning environment for students and professionals. They want to improve their skills and knowledge in specific fields by staying abreast of new developments. Many people could heavily utilize these systems at once regardless of time, location, or previous usage.

Designing a system that can understand the patterns of activity of its users and tailor its material to their preferences and needs is becoming increasingly difficult as education is made available to a wider range of students [19]. Using cloud computing, IoT, and the decentralized blockchain, the blockchain as a service enables anyone to create their unique apps while maintaining the system's transparency and accessibility. Online learning is rapidly growing in popularity because of the numerous benefits it offers students inaccessibility and openness. It is less 74expensive than traditional classroom settings, and it provides students with a greater return on their time and investment [20].

Focusing intently on learning is essential for self-improvement success, and engagement is closely linked to thought and behavior. Researchers are working on e-learning validation independent inspection and reduce detection to encourage the perseverance of reinforcement learning to meet the requirements of learning approaches and human-computer interaction from now on, based on educational, cognitive, and psychological theories [21].

1.2 Interaction in E-Learning

These days, the biggest challenge for an e-learning system is to move from providing "amount" of educational aids to "value" of services. Inter, cross, diversified learning approaches such as self-directed learning, active learning, hybrid learning, and classroom can be realized using the truly united MOOCs resources into innovation [22]. Knowledge of learning resources, teaching materials, and learning effects is exploding, detailed monitoring and mental assessment of learning activity are still lacking [23]. There are numerous issues because of the separation between teachers and students, including a lack of ambition, a high dropout rate, and an interactive monotony prone to inattention. All of these drawbacks jeopardize online education's long-term viability. Lending verification policy design and quality assurance system for instructional offerings are required for the development of e-learning, in addition to basic science prerequisites for teaching and learning activity inspections, advice, and assistance.

Give the students a wide range of options to try out the major before deciding to stick with it and learn about college-level education before attending. Make sure to regularly intellectually for college, learn from people worldwide, and MOOCs are free and offered in many languages.

Students or instructors should receive suggestions from an e-learning system to help them reach their learning objectives in an automated way based on patterns that the system tracks when they interact with it. As a result, student modeling is crucial for enhancing e-educational learning's impact. Blockchain services include network setup and supervision, smart contractual research and verification in cloud computing and edge computing settings [24]. As a result, paying attention is critical in our daily lives. Accurately assessing the level of attention, a person has can help find and solve problems faster. People often judge a student's concentration level in a class by watching their facial features and motion. They will rapidly report those who are not paying attention to their experiments to get back on track or change the content and teaching style to engage the students better. Even a student's attention level cannot solely be determined by looking at their looks. Consequently, many researchers have continued to assess the degree of attention, with some promising results [25].

The main objective of this paper is

1. A system called Deep Facial Feature Extraction (DFFE) examines students' attention to determine whether traditional e-learning strategies are missing the human connection and touch.

2. Facial Feature Focus Algorithm (FFF) uses deep learning strategies to evaluate students' basic features like feelings, interest, and attention.

3. The blockchain as a service is securely utilized to find the student attention evaluation online.

4. As a final measure of attention and emotional satisfaction, the time-sequence statistics of behavioral features are used and determine how much attention students are paying to the screen that they can be more productive. At the same time, they perform, study, and survive, and the same is evaluated.

Separation of solutes from content, exclusively starting materials or contaminants, is achieved by transferring the solutes from one phase. Extraction can be utilized to extract a difficult-to-evaporate reaction solvent, such as a solute with high vapor pressure, from a solution. As a measure of selectivity, the ratio of the partition coefficient of A to the predicted values of B is used to calculate the selectivity between A and B. Selectivity must be greater than one for extraction to be useful. If the selectivity is equal to one, there can be no division.

The following sections make up the body of the paper. There is a brief introduction to facial extraction for students in Section 1. Following this, section 3 goes into greater detail about the facial feature extraction system and supporting algorithm. Analysis, discussion of the results, and conclusions are discussed in Section 3. Endnotes are described in section 4.

2 Facial Feature Extraction System

Facial feature extraction refers to the process of taking a snapshot of a human face and trying to extract facial features like the eyes, nose, and mouth. First, it is critical to extract facial features to begin using processing methods like detecting the face, expression recognition, or face recognition. It is possible to locate or detect faces using the Template Matching method, which uses predefined or parameterized facial template images. A human face, for example, can be broken down into four distinct parts: the eyes, the face contour, the nose, and the mouth. It is possible to build a face model from edges by employing edge detection.

These methods, however, may not accurately describe the faces because of the large differences in lighting conditions, facial expression, and other factors. This is a significant problem because the face patterns are embedded in a nonlinear and nonconvex manifold in high-dimensional space.

A timeline is used with an e-learning platform to create an engaging learning experience. During an e-learning course, a framework keeps tabs on classroom observations and gathers data on how they communicate with the material. After the subject, students take questionnaires predicated on the concepts taught to determine their grades. These trends and their correlating test scores are examined to assess students' flow state. The suggested learning algorithm and blockchain as a service reduce the aspects of this system's behavior patterns and outperforms all other methods by a wide margin.

Face electromyographic activity (fEMG), live monitoring and human coding of face activity, and automatic facial expression analysis using computer vision monitor facial action. Thus, for instance, facial expressions often transmit considerably more often than words ever could. Supplementing: It may add to or enhance the specific communication. In addition to praising a worker, a boss can improve the effectiveness of their message by patting them on the back.

The above Figure 1 shows the broad overview of this e-learning. Students will use an e-learning platform with two components: an interpretation tool and traditional e-learning pages, as described above, to follow a course. Then, each student's behavior will be examined using activity heat maps and deep neural networks to generate services that can be offered, representing a student's activity on the platform. Upon completing the course, the student will take a quiz to determine their Performance value, which shows how well they have learned. Finally, using a flow state diagram, the interaction and achievement value generate the flow state for the project. By looking at the stream states of all students, a teacher can estimate whether the majority of students are in the flow or are not.

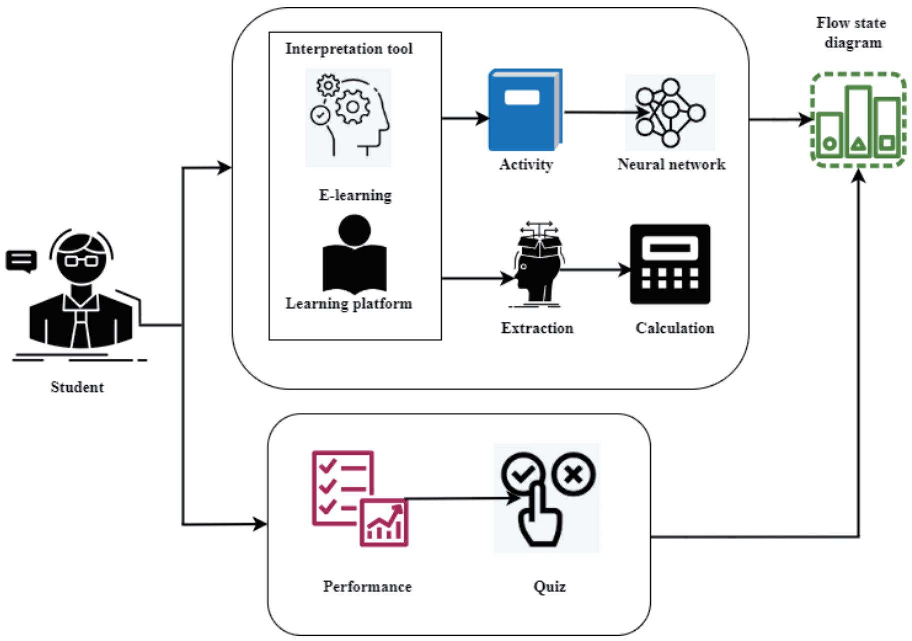

Figure 1. An overview of the E-Learning platform

Using the face recognition technique, neural networks may be trained to classify the feature extraction coefficients correctly [26-27]. A face database is used to train the network, and subsequently, the network is utilized to detect new faces. Face-recognition software can benefit from the latest advances in deep learning. Deep learning employs a trained model to recognize images from a database in other photographs and videos by extracting different facial vector representations from face images.

A state of complete concentration, enjoyment, and fulfillment occurs when someone is fully immersed in a task. There is a balancing act between the difficulties involved in the challenging task presented and the person's skill when engaging in activities that generate this feeling. People will experience anxiety if their skill level is lower than the difficulty of the challenge, while those with higher personal skill levels will experience boredom.

The term "activity" refers to how much a student participates in class. If a lecture is challenging, students must conduct extensive research and engage intensively with the course material to gain the knowledge they need. However, intentional knowledge can be made accessible more easily in a lesson with simple content. As a result, students are exempt from demonstrating a high activity level. If a student must actively engage with course content, this student will find the course challenging. Students' actions will be measured through their interactions based on these presumptions to reflect the degree of difficulty or challenge.

When it comes to evaluating a student's performance, it means how well they know a subject. When someone understands or skill is put to the test in an official exam, they receive a grade representing their performance. In general, a well-versed student can learn most of what they need to know from the content of a course and achieve high marks on exams. Without sufficient skill, the student finds it difficult to learn, which shows in their exam results as a poor performance. Consequently, this research proposes to assess students' abilities utilizing their exams.

Students will feel a sense of accomplishment and enter flow if the activity and performance balance. Students who are out of balance feel anxious or bored. According to the flow theory, boredom sets in when a challenge is simple and the student is proficient. Students in this study would become disinterested and bored if they received high grades while engaging in little activity.

2.1 Strategy for Gathering Information

Two new models are discussed and adjusted from the original flow state model, along with an overland flow prototype from behavioral data to demonstrate how the information gathering strategy works: Activity and Performance.

Figure 2 depicts the study's research methodology described in the following section. Students from various mental abilities participate in maintaining a diverse group of participants. It is possible to teach two distinct courses simultaneously using a timetabling tool and an e-learning platform. There is a test at the end of the course. Each student's activity value is generated using a multi-step process incorporating deep neural networks. The quiz results are then used to derive a selected Performance value (representing the student's newly acquired skills). Students fill out surveys about their emotional states to verify the accuracy of the values mentioned above. Finally, every educator is depicted using the 'Activity' and 'Performance' values in a flow graph. Student flow can be seen in the diagram, and the course flow can be evaluated. When all schoolchildren are shown in the diagram, it is possible to see the course flow.

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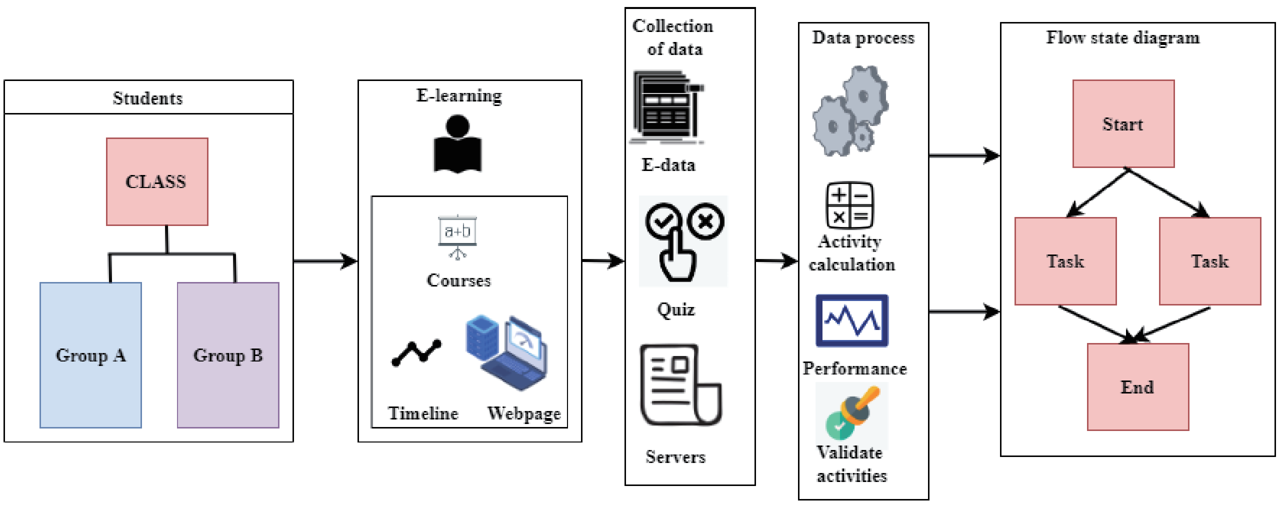

Figure 2. Visualization of the research process

2.1.1 Collection of Data

Interaction Data from an E-Learning Platform

An analytics tool built into the e-learning platform gives users access to raw statistics for internet applications, like mouse click coordinates and the places visited with a mouse.

Table 1. Quantification definitions in statistics

Indicator	Definition
Time Spent as a whole (tt)	A total of studentstime spent after signing in
Actively Spent time (ts)	a total studenttime spent performing mouse-based tasks
The number of times users have clicked the mouse (mc)	A student's total number of mouse clicks.
Tracking the Mouse Movement (mm)	The number of places that a student has been to while studying

Table 1 shows the results of the calculations made using the raw statistics. The timeframes tool and the e-learning websites were used to collect the data for these measurements.

Questionnaires: Ten multiple-choice questions were given to the students at the end of each lesson. There were ten questions on the closed-book exam, and there was no way to cheat. Questions came first from timeframes tool content and the e-learning static website content. In average difficulty, the instructors created the quizzes, and the questionnaires reflect the knowledge gained by studying the online course material.

Reviews: Students responded to the survey at the end of the course to learn about their emotional responses during lectures, which is a common technique for identifying flow states.

2.2 Expert Facial Feature Focus Algorithm

Algorithm 1. Expert facial feature focus

for all*child***do**
    if*child* has highest *grade,***then**
        ATTACH *child* to *expert students group*
for all*expert students,***do**
    if*child* has higher than *minimum***total-timethen**
        DETACH **child** from *expert students group*
    if *child* has lesser than *maximum* **total-timethen**
        DETACH **child** from *expert students group*
    if *child* has greater than *maximum* **mouse activity**,
then
        DETACH *child* from *expert students group*
if any 1 *child* in the *expert student's* group, **then**
    Expert<---------- *expert students group*
else
    Expert<---------- *random (expert students group)*

The above algorithm helps to trace out expert students from a class. The Expert student demonstrates the highest concentration and achievement in a specific course taught to a specific group of students. Because of this, they are comparing schoolchildren with the Expert provides a metric for gauging how focused students are during their work. Clicks, mouse movements, and time spent exploring the system are all elements in deciding how active the system is, and the student's behavior is observed from this algorithm. As a result of interaction, features of different can be selected or calculated in various ways; as discussed below, Consider

$$Y = \{y_1, y_2, y_3, y_4, y_5, ..., y_n\}. \quad \textbf{(1)}$$

Equation (1) represents a set of vectors in vector space Q, where Q is the interaction between students. In this y_m $m \in (1, n)$ shows the vector activity of a child.

Y ─ communication among learners, y_1, y_2, y_3, y_4, y_5, …, y_n ─ storage for a collection of physical quantities.

$$y_m = \{f_{m_1}, f_{m_2}, f_{m_3}, f_{m_4}, f_{m_5}, ..., f_{m_n}\} y_m \in Y. \quad \textbf{(2)}$$

The above Equation (2) represents the definition of a student's activity vector in Q, where each f_{m_j} , $j \in (1, n)$ means to future interaction.

$$ACT_m = y_m \cdot y_E = \sum\nolimits_{j=0}^{n} f_{m_j} f_{E_j}. \quad \textbf{(3)}$$

As per Equation (3), activity is calculated as shown above where ACT_m is the activity of a student m, y_m is the vector activity of a student, y_E is the vector activity of an expert student, and the student's attention is calculated.

Students' attention is indeed taken into consideration when calculating vector activity. The number of objectives divides by the number of hyperlinks on a homepage. In a well-executed campaign, one must have a 1:1 attention ratio. As a result, each campaign's main site should only feature one call to action — one spot to click – because each effort has a single aim.

$$y_m = \{F_{ts}{}^T, F_{mc}{}^T, F_{mm}{}^T, F_{ts}{}^P, F_{mc}{}^P, F_{mm}{}^P\}. \quad \textbf{(4)}$$

Equation (4) indicates the measurement calculated from data interaction. It is evidenced by the timeline tool's first three features and e-learning web pages, which provide the final three attributes.

2.3 Deep Learning Techniques

Artificial Intelligence has entered a new era thanks to advances in neural networks, and these channels have been able to solve problems that could not previously be solved. It is common to refer to neural nets as "Deep Learning," though the underlying concepts are much older.

Figure 3 depicts the architecture of the deep learning method. It is important to understand that deep learning is composed of three layers: input (the visible layer), hidden (the hidden layer), and output (the reconstructed input). The input forms are x1, x2, ..., xn, the hidden layers are h1,h2,...hk, and the output unit is the restored form of the input X1, X2, X3, ..., Xn.

Because of these constraints, learning neural nets with many layers was difficult and time-consuming before the advent of deep learning, making it possible to train neural networks with enormous amounts of data. There is a gradient issue. Fortunately, generative models came up with a solution for this problem with the help of blockchain as a service. As a result of classifiers, data dimensions can be reduced by reconstructing the data through a network of fully connected nodes. The objective is to create an output that is a carbon copy of the input. There are three layers to a network: input, output, and the hidden layer. Unsupervised training is used in autoencoders to train each network. The input data usually has fewer attributes, and the hidden layer represents that at the end of each training. As a result, the size of the feedback data is reduced throughout this process.

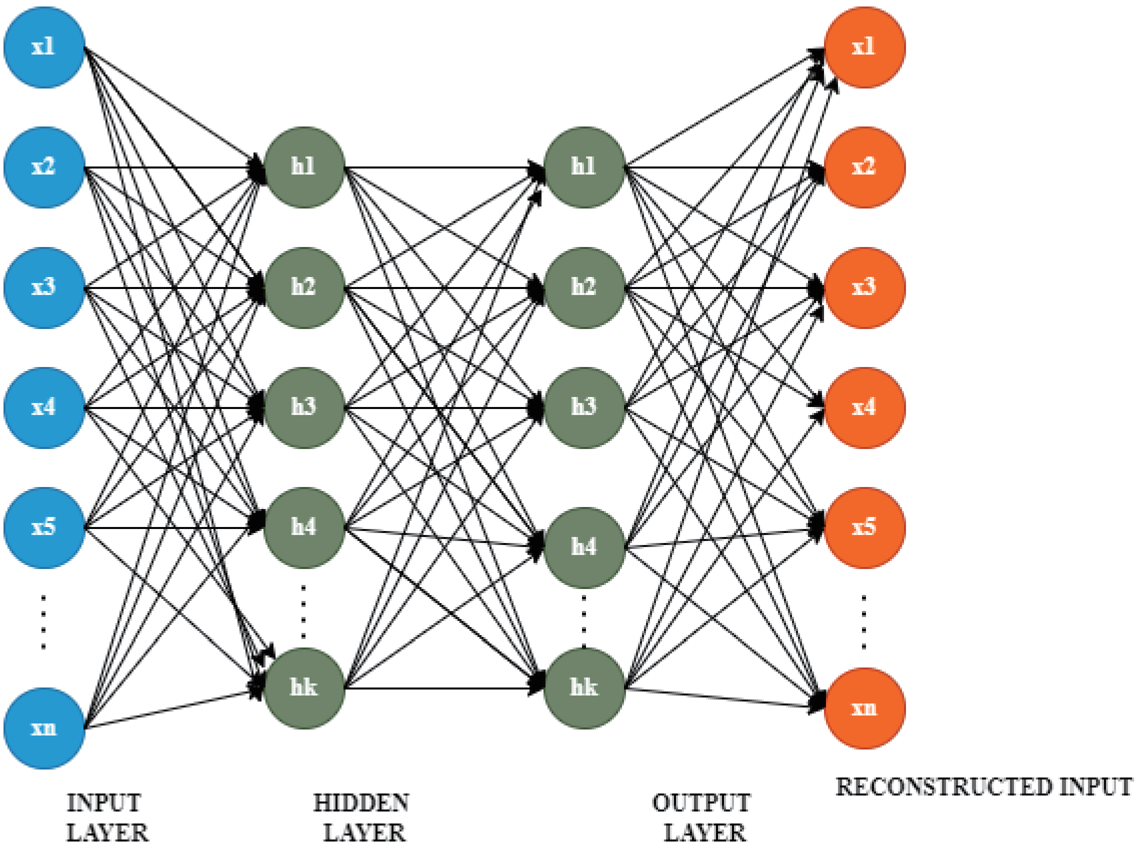

Figure 3. Deep learning architecture

2.4 Facial Feature Extraction System

Figure 4 shows the facial feature extraction system (FFF) for a student's face. The student's faces are scanned from an intensity mapping and ranging map, and the output is listed in different ways. The face is segmented in the first phase, and the Nose tip is extracted in the second phase. Other features such as the eye, chin, forehead, eyebrows are extracted from the third phase. Then face is aligned and compared with the initial face from intensity mapping, and the entire 3D feature model location is observed, and it is secured by blockchain as a service. The above FFF is done based on Deep learning models. Student behavior is observed from the face extraction system, and attention is evaluated.

A faceprint is an integrated face program, and machine learning uses a database to predict the identification linked with a person's face. As it gains more experience, the program learns to make better predictions more quickly. Facial expression, face orientation, feature extraction, and eventually face recognition are all processes in the process of face recognition. Verifying each student's keystrokes is another way to keep track of them, and the program keeps track of a student's typing speed and rhythm. Using this strategy, professors can identify if the same student is typing during a test.

Computer vision solutions are used in this module to infer information about students' attention levels during the lecture. The student's behavior is analyzed in real-time using the webcam positioned on the screen, which detects blinks, yawns, and fixations to give the lecturer feedback on the students' attendance effectiveness. Eye health can be retained by blinking, an automated, natural, and spontaneous response. However, it is done regularly to keep the eye's surface moist and clean. A saccade is a rapid shift of the eye's focus from one side of the field of vision to the other. A feature known as fixation reveals how people obtain information: the time that elapses between saccades. It is the product of a combination mechanism designed to keep an eye on the target while allowing the visual cortex to analyze the image.

It is evaluated in blinks per minute, the number of blinks occurring in a particular time. Blink duration is the transition time between the beginning and endpoints of a blink, expressed in seconds. The length of lateral and vertical lines must be calculated to identify blinking. If teachers calculate the distance between points 36 and 39, they can get how long the horizontal line is for the left eye. If then measure it vertically, one can get how long the line is for the right eye.

The proposed attention module includes four tasks based on deep learning and computer vision: To locate the eyes and generate a heat map of sight, Gaze Tracking is used. Eye movement detection- a counter for the number of times the audience member's eyes blinked during the lecture and the frequency they blinked. During the lecture, an ML detector picks up on user expressions. The detection of yawns during a lecture may indicate that students are not paying attention. Many tasks, such as estimating attention level, have automated eye blink detectors proposed. The gaze tracker synchronizes the eye's rotation with the projected point on the screen. A face landmark detection and calibration process focus on the eyes. This module's output is a heat-map of student attention to the lecture's presentation slide.

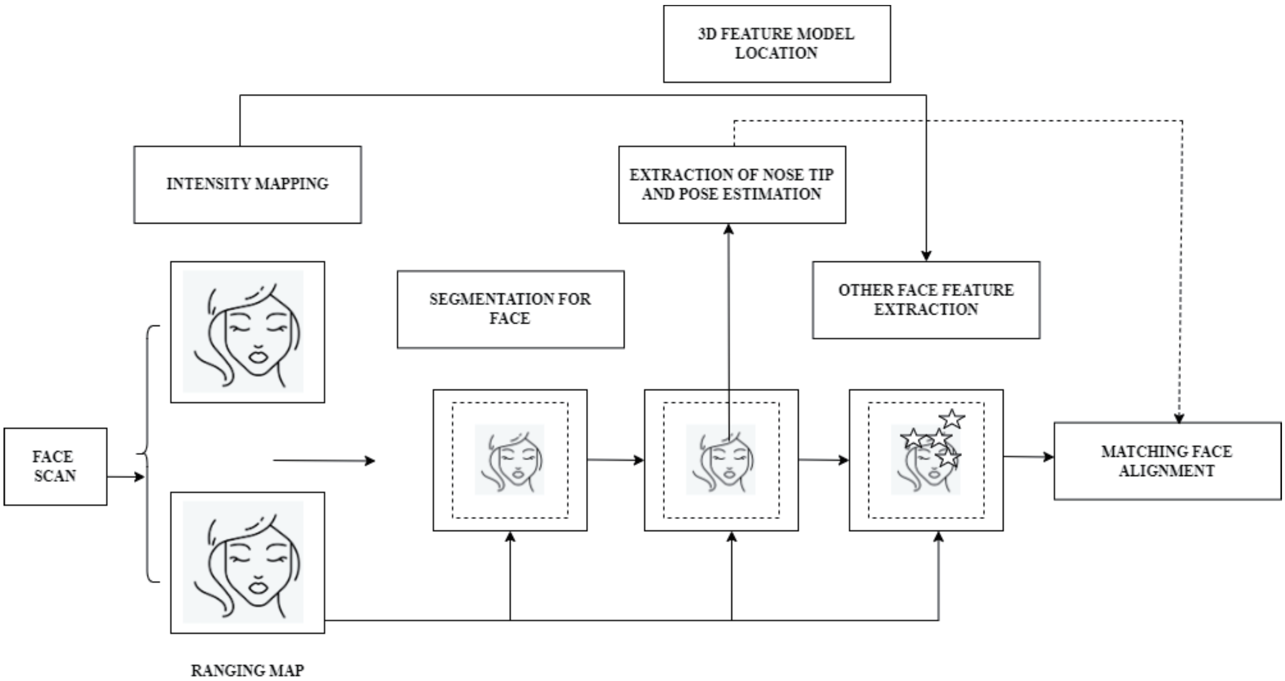

Figure 4. Facial feature extraction system

2.5 Attention & Evaluation

Learning media exposure evaluation complies with the classification of attentional functions and psychological mechanisms. Observation, investigation, questionnaire, pen-and-paper task test, software test, and biological signals feedback are evaluation methods. One method of detecting driver physiological reaction features-based driving fatigue monitoring works could be referred to as related. This research examines how attentive a learner is to an e-learning process by watching and measuring the learner's facial video. A model for learning to pay attention while observing is illustrated in Figure 5. Physical characteristics such as postural stability, stare, blink, mouth opening, and facial expression are identified and derived from video captured by the camera. Details are provided on the relationship among empirical relationships and the ability to pay attention while learning. Attention is characterized by two key characteristics: focus and directionality, and the direction and intensity of one focus constitute the attention aspect.

$$REA = \frac{(|a-b|)+(|c-d|)}{2(|e-f|)}. \tag{5}$$

Equation (5) shows the ratio of the eyes is calculated by counting the number of blinks, where a is the blink rate, b is the duration, c is the amplitude, d is the average blink rate, e is the total number of blinks, f is the time between two blinks. Emotion is calculated from this equation.Concentration measuresour attention and how much of that focus is relevant to our brain's activation. Psychological studies show that the arousal level of emotion activates the body's energy level, namely the distinction between physical exercise and a mental clarity level of arousal is. Sleepiness, exhaustion, and distraction are all low or high arousal symptoms. The intensity and type of pleasure make up the pleasure dimension. Expressions of joy, confusion, and quietness are examples of emotional types.

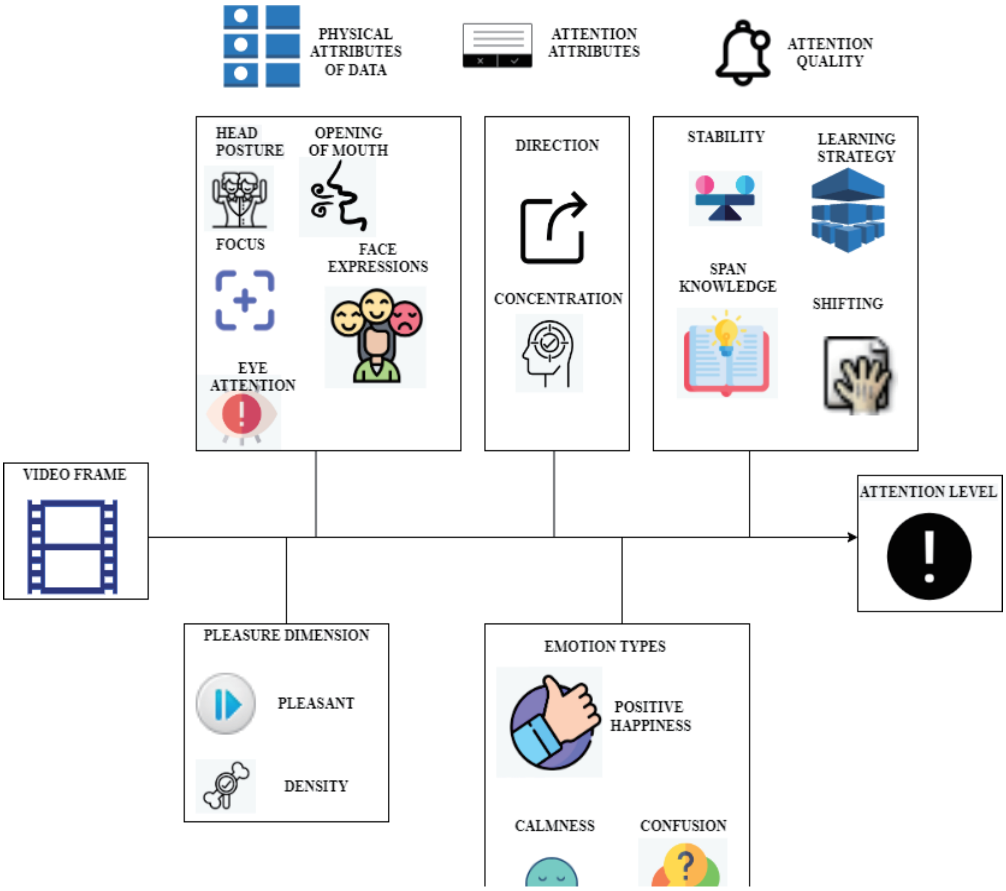

Figure 5. A model for learning to pay attention while observing

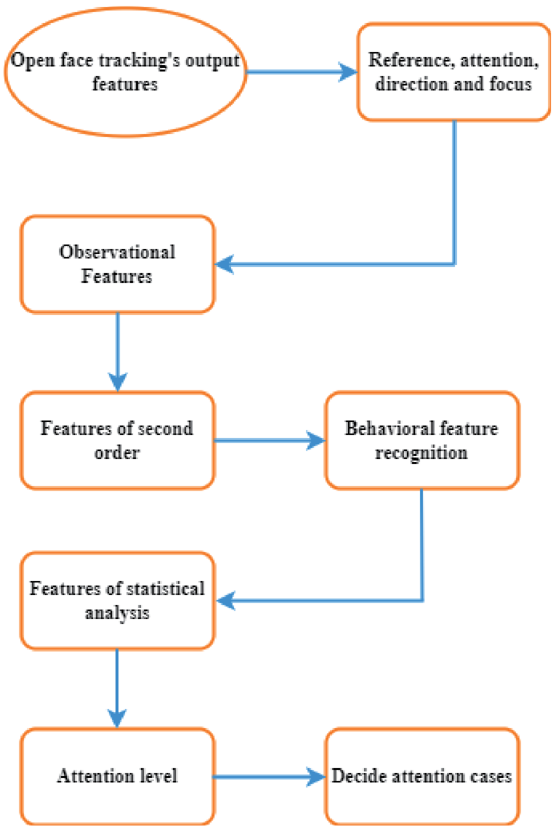

Figure 6. Flowchart to detect decrease in attention

The above Figure 6 presents a flowchart to detect the level of attention reduced by the proposed model. According to cognitive psychology attention theory, learners' attention levels can be estimated based on their physical characteristics by watching a video. Because of this, attention decrease cases such as drowsiness, tiredness, fatigue, diversion, and shift can be identified in real-time. Unusual circumstances could be discovered and forewarned of ahead of time.

$$E = E_1, E_2, E_3, E_4, E_5, \ldots, E_n. \quad \textbf{(6)}$$

Referring to Equation (6), E is the final emotion label, the relationship between emotional relevance and degree of concentration is modeled.

$$F = e_0 + e_1 E_1 + e_2 E_2 + \ldots + e_n E_n. \quad \textbf{(7)}$$

The above Equation (7) gives the feel of student attention in class, and the accuracy of the entire students in the class is found using this equation.

$$G_{emotion} = \frac{e^F}{1} + e^F. \quad \textbf{(8)}$$

As indicated by Equation (8), the value of $G_{emotion}$ is the attention degree based on emotion, and it helps to calculate the efficiency.

$$E_{score} = \varphi_{11} E_{11} + \varphi_{12} E_{12} + \varphi_{13} E_{13} + \ldots + \varphi_{33} E_{33}. \quad \textbf{(9)}$$

where φ_{ij} is the weight allotted to each label. Equation (9) indicates the score of emotion and the system's efficiency. It is possible to obtain the attention label for all three models after training using the attention evaluation and emotion data models. E_{11}, E_{12}, and E_{13} are presumed to be the culprits. Then there are E_{21}, E_{22}, and E_{23}. Finally, multiple regression analysis can be used to model and obtain the final focus label after receiving the Signals, face picture, eye gaze, and emotion data.

2.6 Blockchain as a Service Architecture

To gain a clear view, extractions are carried out manually or mechanically to remove the clogged or compacted pore. This helps to discover the student's behaviors. The primary goal of a face recognition system is to verify a person's identity by comparing their face to one in a predetermined training database. To train the recognition system, a huge number of training samples must be stored in any storage center; nonetheless, intruders can access and change that information when it is recorded and stored. Hackers are kept out of the data using the blockchain as a service architecture. Figure 7 shows blockchain architecture as a service in students' facial extraction. Students' data while engaging in e-learning are collected to analyze their behavioral analysis may get hacked by intruders. Blockchain will be taken care of as a service application by stopping intrusions.

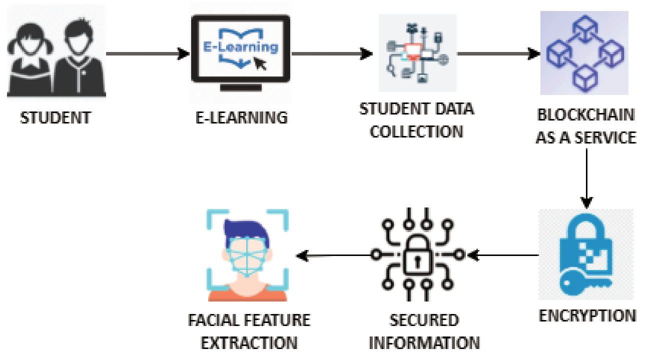

Figure 7. The architecture of blockchain as a service for facial extraction

A person's emotional identity is measured by their capacity to control their feelings rather than relying on others. Screaming and squalling are common ways for young children to "play out" their emotions, whereas dancing and spinning are common ways to express their joy. Efficiency when managing one's feelings, such as anger and joy, can be characterized as a person's belief that they are capable of doing so when confronted with hardship or when presented with stressful circumstances.

$$E_{cap} = \frac{p}{(1+t)} + \frac{p}{(1+t)^2} + \ldots + \frac{p}{(1+t)^m} + \frac{p}{(1+t)^{m+1}}. \quad \textbf{(10)}$$

It is important to ensure that your performance is at the desired level throughout each process stage. The performance must meet or surpass the standards they have already specified to be considered valid. The Corporate interface is used to plan and operate verification operations, which are then used to track and manage a release test plan and outcomes. An example of a validation activity in a Spring release is shown in the figure below. Proper validation is defined by the tests that users select.

$$E_{11} = q_a v_a + y_b d_b (q_b - v_b) + y_a d_a (q_a - v_a). \quad \textbf{(11)}$$

As shown in Equations 10 and 11, the emotional capability ratio E_{cap} is addition of the value for expression p, and interest throughout each period $(1+t) \ldots (1+t)^{m+1}$. Emotion label route E_{11} is the calculation of quality characteristics q_a, q_b of time to fulfillment a, b, added and subtracted by the valuable attention v_a, v_b based time to fulfillment a, b, emotional valance coefficients y_a, y_b, and student's creativity d_a, d_b.

In this paper and the DFFE algorithm based on Deep network learning, the extraction of facial features helps to improve the prediction of attention, emotion, and behavior and performance, accuracy, and efficiency in this online mode of education evaluated.

3 Results & Discussion

This simulation analysis evaluates and addresses the proposed deep facial feature extraction system (DFFE) attention, emotion, behavior, performance, accuracy, and efficiency by implementing blockchain as a service. Section responses are represented graphically below.

3.1 Attention Analysis

In this attention, analysis can be seen from Figure 8. By paying attention, now can foresee or preview our thoughts and actions and then regulate them. The ability to pay attention is a prerequisite for learning anything new that does not attend to first, which cannot be understood, learned, or remembered. Despite some psychologists' claims to the contrary, most high school classes last 50 to 90 minutes. This attention of students is achieved from Equation (3).

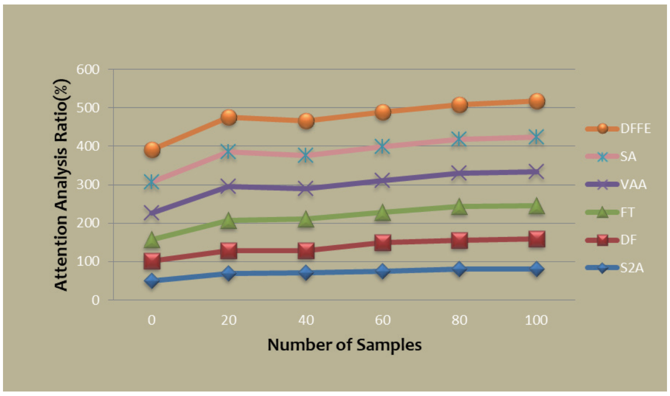

Figure 8. Attention analysis

3.2 Emotion Analysis

The below Figure 9 represents the emotion analysis of a student. An emotion is a three-part psychological state: in behaviorism, Emotions like love and joy can be subdivided into secondary emotions like fear and sadness. Affection and longing are examples of secondary emotions found in love. Those tertiary emotions can then be further subdivided into secondary ones. This emotion is achieved through Equation (5).

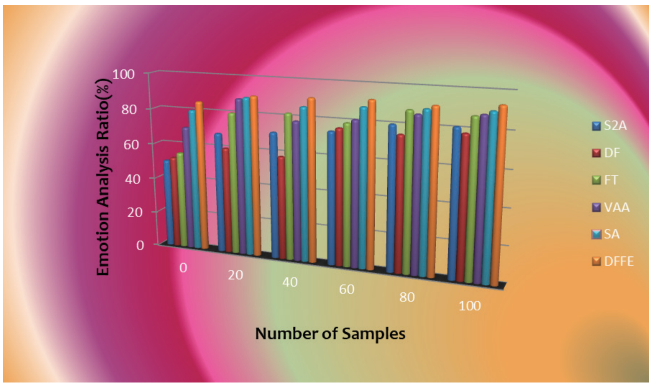

Figure 9. Emotion analysis

To determine the ratio of eyes, one counts the number of blinks. Each blink represents a different value for several variables: amplitude, the time between blinks, average blink rate, cetera. These terms are used to analyze the emotion ratio.

3.3 Behavior Analysis

Figure 10 depicts an analysis of a student's behavior. When students are at school or home, feedback and consequences teach them how to act in certain situations. Negative behavior can be unintentionally reinforced by feedback or consequences. As an illustration, a teacher may give a student who commonly interrupts class more attention because that is what the student wants. As well as the learning environment for other students, a child's display can impact how well she learns. Students who bully or talk during lectures or force the instructor to disturb lessons to deal with their disruptive behavior can harm the entire classroom. It is identified using the algorithm used (EFFF).

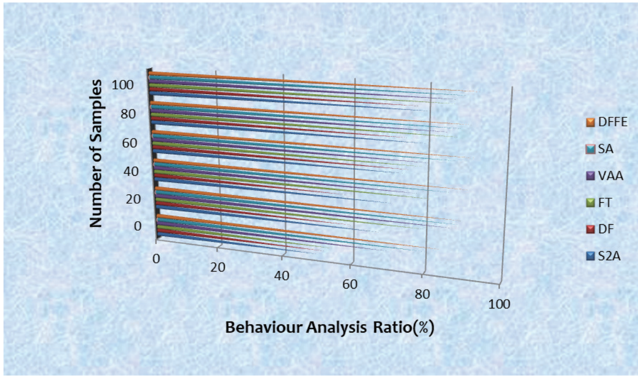

Figure 10. Behavior analysis

3.4 Performance Analysis

Figure 11 shows the results of evaluating students' work done by a graph plotting against the existing proposed algorithms and other methods with many data sets. For example, the DFFE approach has a better performance rating in the suggested model, compared to different ways, with a lower performance rating with the help of the algorithm used.

When a real face appears in a digitized camera shot, face tracking technology recognizes it and keeps track of it. Internet and cellular applications, as well as automation, can all benefit from this technology. Offline and internet Face Tracking can be used with the same technologies.

Face-recognition systems can achieve close reliability in ideal circumstances. On facial recognition vendor tests, confirmation systems that match people to clear reference photos can get performance ratings as high.

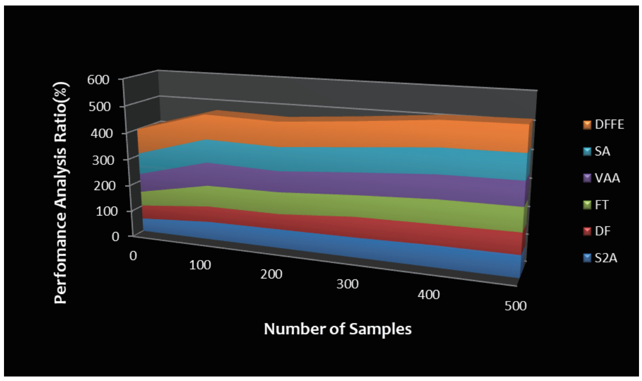

Figure 11. Performance analysis

3.5 Accuracy Analysis

As a sample, Figure 12 reveals the accuracy analysis for the model proposed. Accuracy refers to how close a quantification is to a standard or ideal quantity, and it is a measure of honesty, and the reverse is true, observed from Equation (7). This term describes how closely an observed or calculated amount corresponds to a valid (actual) quantity.

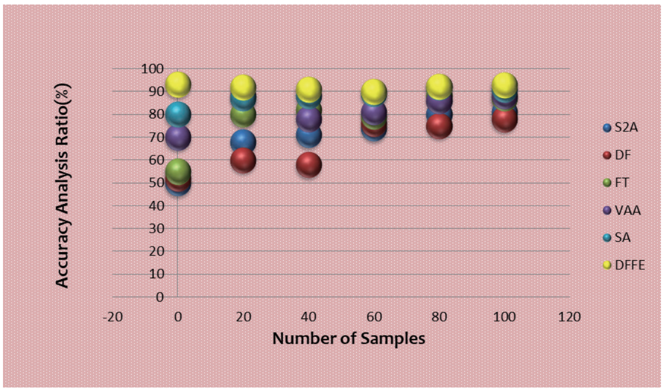

Figure 12. Accuracy analysis

3.6 Efficiency Analysis

On the other hand, efficiency means using as many resources as possible while still producing as much as possible. When it comes to efficiency, using fewer resources, like individual time and energy, achieves a specific result. Often, the quickest and most convenient method of completing the procedure is chosen instead, and the highest levels of efficiency are achieved using (8), (9). Figure 13 depicts the efficiency test results and shows it achieves 93.2 %.

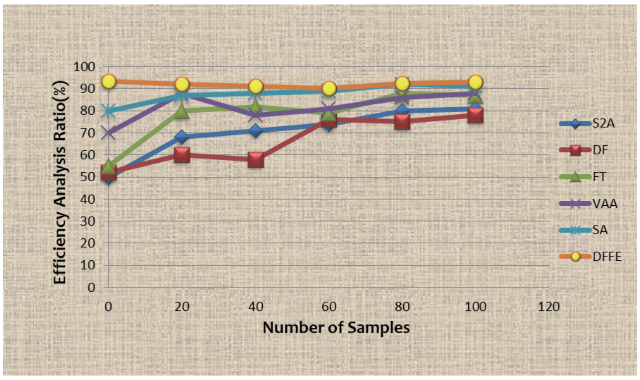

Figure 13. Efficiency analysis

3.7 Emotional Capability Analysis

An institution's emotional capability is defined as its ability to notice, recognize, monitor, distinguish, and attend to the emotions of its members, and it is represented in the norms and routines of the organization connected to feeling. Emotional capability at the organizational level EQ (emotional quotient) measures an individual's ability to recognize, comprehend and control their own emotions to reduce stress, improve communication, develop empathy for others, deal with problems, and reduce confrontation. Emotional regulation abilities allow controlling both the emotions experienced and expressing those feelings. In the end, it is about being able to properly control our emotions in various ways. The ability to manage one's emotions varies greatly among persons. Figure 14 illustrates how Equation 10 might be utilized to improve the study of emotional capability ratio.

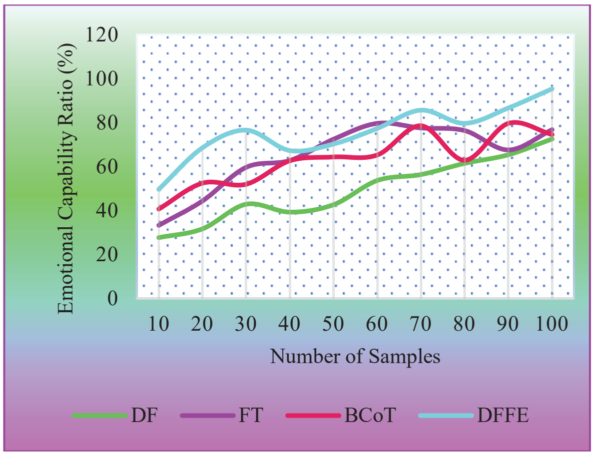

Figure 14. Emotional capability analysis

Existing models like S2A, DF, FT, VAA, and SA pale compared to the proposed DFFE model, excelling in all of these areas. According to the paper, this advanced innovation is created to address the previously mentioned competing issues.

4 End Notes

Because network bandwidth is constantly improving and reliable online services are readily available, the right conditions have been created for promoting distance learning as a viable alternative to traditional classroom instruction. As of now, the issue of securing information has been resolved. Students' facial features are extracted using blockchain as a service architecture in this study. Attendees can reap numerous advantages from correspondence courses. Due to its adaptability and ability to manage time on a custom basis through offline attendance can provide a comprehensive communication method and expand educational opportunities to a wider audience. This research proposed a new method, DFFE, for assessing students' flow states in an online course. The module analyzes the student's attention by watching their facial expressions, eye blinks, and yawns, and tracking their gaze to determine where their attention is focused and how far it travels across the slide. The results of the experiments demonstrate that the proposed method DFFE is capable of accurately determining each student's level of learning attention. In addition, to increase the algorithm's generality, the number and variety of innovative objects and samples should be increased. Itis made possible by using action visualizations to measure student interaction in an e-learning platform accurately. Time, mouse interactions, and grades all play a role in this method. It is not specific to any one course or field.

Further research is required to determine whether or not this system can be used on various e-learning platforms. The proposed method of evaluation will be used to provide students with tailored feedback. In the future, could look into the impact of a specific spot on learning by giving students feedback regularly after each lecture based on objective measurements. Students and educators need automated and valid feedback in an era where education rapidly adapts to online courses and e-learning environments. The current study aims to contribute in this direction hence achieving an efficiency of 93.2% by considering feelings and emotions.

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