Holistic Education by breaking the binaries beyond the boundaries

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Abstract: The educational system currently prevailing across the globe is of divergent genre. Education has become the prime focus among all the intelligentsia and educationalists. The efforts of the regime in nurturing the system, the cartel of government and private Institutions are the issues that keep bouncing back. And now the Pandemic crisis has been an extreme threat that signifies the importance on social distancing. So, with the shut off of the knowledge sharing, with direct contact has ignited the quest for seemingly establishing a virtual environment to feed the thirst for intellectual wisdom. Irrespective of infrastructure, accessibility to the external virtual environment has been a strong fervent desire of the current days of each one. It is beyond boundaries through online webinars, virtual classrooms, Learning Management Systems, video lecture uploaded anywhere and everywhere. This has provided a hustle free environment for all students except for the economically conducive regional folks to reach the remote Education. Various methodologies pertaining to remote education and the simplified approaches are discussed in this paper. And the concern to reach the unreached has been a visionary of discussion in this research through simple messaging service through mobile phones.

Keywords: Education, Teaching Learning Process, Inadequacies, Poverty, Cloud

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1. Introduction

An extravagant resource in all spans of directions that ranges from every individual to a great mass, that is explicitly available round the globe is Education. In majority nations, some base level of education is made mandatory, as it is not only considered as a right, but as the responsibility of the governing heads, while by law the societal growth demands education up to a certain level of basic knowledge. Focusing from the eagle's eye onto the ancient perspective, the sector went through a splendid growth in education over the last centuries. This had been be visible throughout all amount measures. Global literacy graph has been a great leap over the path of the recent centuries, specially elevates though growing frames of enrolment in educative sessions. But still the count of enrolment is actually greater compared to the attendance ratio to that of the enrolled people. Despite these types of global improvements, a few nations were lagging behind, specifically in sub-saharan Africa, wherein there are nonetheless nations which have literacy quotes underneath 50% a number of the youth. On discussing about the results of educative intelligence, a developing group of observation recommends that better training yields higher individual salary and lays a foundation towards the development of social capital and prolonged monetary development. Proficiency rates are dictated by education inquiries in an enumeration or test study of a populace, in government sanctioned trial of education, or through analyzing the statistics about school admission and instructive achievement. Insights of educational rates in the past few decades are brought in light by the statistical corporates. For prior periods, students of history need to recreate information from different sources. The simple strategy is to just figure out, the portion of those individuals who could sign authority records. (for example, court archives). All the nations outside Africa and except for Afghanistan, have proficiency rates above 50%.

Although the progress moves positively over the long lug, in any case, still enormous disparities remain unsolved, prominently between sub-Saharan Africa and the other parts of our earth. In Burkina Faso, Niger and South Sudan – the African nations at the base of the position – education rates are still beneath 30%. A presentation on the remedial factors are discussed along with the enormous leap onto the bountiful reach of the education on the other side and this proceeds with the reaching the unreached with certain ideology to break through the binaries of unethical myths, leading towards educative society of all the zones, where internet remains a bleak awaited dawn.

The Section 2 deals with the literature survey of the existing technologies towards grabbing educational servers existing geographically separated but virtual connected. Section 3 deals with the currently existing features and methodologies in various hi-tech universities of the world. Section 4 discusses a possibly implementable case study using SMS (Short Messaging Service) and Section 5 deals with a conclusion.

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2. Literature Survey

Albeit a lot of heterogeneity is observed among almost all nations, the information on the manifestation of educational instruction shows that tutoring will in general be, to a great extent financed with open assets over the globe. The national expense on the literary input, does not clarify the contrasts in cross country learning outcomes, the information proposes that nonexclusive approaches that considerate growth in expense on standard data sources, to say a few, the quantity of educators, are probably not going to be powerful to raise the bars on educational grounds. The educated nations are revealing their intellectual strands in the focus of their technical outcome. Even in this knowledge crisis time, they have never left any stones unturned to educate their upcoming generation. They have been great up-bringers with the focus to shed knowledge through enormous means. Starting from the top-notch ranking country Canada, the list goes on to Japan, Israel, Korea, The UK, The US, Australia, Finland, Norway, Luxembourg. [1]

Genuinely speaking, free essential schooling still remains the exemption while it is expected to be implicated as a rule, says the report. On the accolade style, Chile [2] renders free education for a duration of 15 years of a child. Almost seven important nations like Belgium, Germany, Italy and Norway provides free obligatory training for the children throughout their schooling. Nations like Britain and New Zealand have made education essential for kids for a duration of 11 years without any expense. Canada, Spain, Norway and France are among the nations where training is devoid of expense for a span of 10 years, from the age of five to fifteen years. There are 34 nations, including Japan, Finland, Russia and Sweden where a child gets nine years of necessary instruction, says the report. In India, the Right to Education law, giving free and necessary education to youngsters in the 6 to 14 years age section, came into power. The flowering list goes on and on. United Arab Emirates, Saudi Arabia, Iraq and eight other nations have the policy of five years of free education for the children. But on the other side, there are more than 50 nations, including the United States, South Africa, Malaysia and a central fragment of Sub-Saharan African nations different from the rest of the countries which have predefined arrangement to provide sufficient free and mandatory training to the young generation.

Amidst all these high run zones of educating everyone strategy in the developed nations, as mentioned in the previous section, the developing nations are facing an important issue which reports as, the net enlistment rates are higher than the participation rates. This depicts the way that numerous youngsters who are formally enlisted, don't routinely go to class. Today, the ideal method to incorporate diversely abled understudies in standard classrooms is as yet being explored and under discussion. "Inclusion" is a technique that includes total submersion in a standard study hall, though "mainstreaming" balances time in a unique need homeroom with standard study hall support. There keeps on being social discussion encompassing how to execute the perfect of general access to education in times of lockdown. So, the technological support was growing in line with the developed countries with its preparatory role to formulate when the normalcy gets affected and routine classroom physical environment pulls off the notch sometime. And it has happened now.

Obviously, this pandemic season has changed the centurion old, chalk–talk teaching model to one driven by innovation. This interruption in the conveyance of training is pushing policymakers to make sense of how to drive commitment at scale while guaranteeing comprehensive E-learning arrangements and handling the computerized digital gadgets. A multi-pronged procedure is important to deal with the emergency and assemble strong training framework in the long haul. Traditional learning happens through teacher driven learning, where an instructor goes to the class and collaborate straight forwardly with the instructor and educator additionally can get to know the level of comprehension by interacting with them (review discussions, recap of previous class, perception of the students' practices and so on.) This prompts the way for utilizing learning the executive's framework as Learning Management Systems (LMS) in a domain where educating learning happens in absentia, the LMS ought to use comparative systems of human instructors. To improve the methodology used in LMS, specialists recommended insightful mentoring framework as Intelligent Tutoring System (ITS) to be installed in LMS to give prompt and user-friendly guidance and shed in appropriate input to the learners. Figure 1 Levels of understandability of every learner.
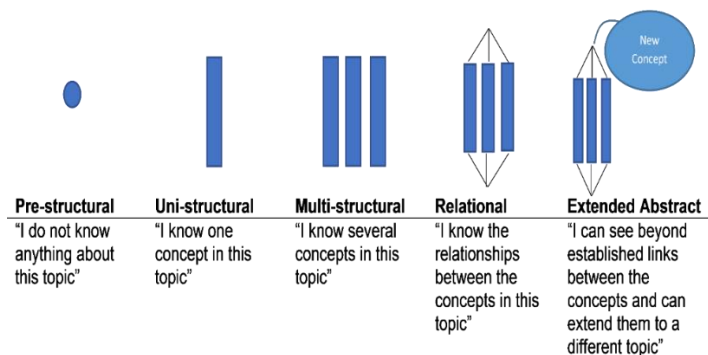
Fig.1. Levels of understandability of every learner

ITS has been given with specific subject tutorials (like C++ Tutor, SQL Tutor) or ITS with a conversation agent [3, 4] or ITS with AI implementations [5]. With the necessary understanding of cognitive mind of individual learner while the session is going on, the system accounts for cost effectiveness, flexibility to implement the ITS are encountered. Bloom [6] demonstrated that the individual dissemination (one instructor to one student) process is more successful than that with one instructor and numerous students. In genuine situation, it is preposterous to expect to give an individual instructor to an individual student as it would require inordinate preparing spending plan. A comprehensive alternate way is the Computer/web based education. Other researchers have reported in substantiation with the discussion on broad perception by the article Shikshak by Chakraborty et al. [7], Sleeman and Brown [8] was on 'learning-by-doing'. The researchers discussed about the advantageous outcome of computer based training (CBT) and web based training (WBT) and proclaimed that using these types of technologies the efficiency of 'trained novice' would be increased and system support problems would be decreased.

With the Architectural depiction, [9] addressed the architecture of ITS over the traditional three-model architecture, classical four-model architecture or new generation architecture. The three-model architecture comprises of domain expertise, student knowledge and skill and tutoring expertise. On the other end, Ghosh Et Al.,[10] had formulated a six model system's working is done by the different six models such as rule-based model, domain model, assessment model, student model, pedagogy model and user interface (learner interface, faculty interface, system administrator interface).

3. Sound Utilization of Technology

The University of Oxford UK, [11] utilizes the important strategies like Lecture capture (Replay) where the system is automated, so that a department or lecturer can initiate and manage recordings without the need for any AV personnel to be physically present during the lecture. The software captures slides, audio and video and automatically sends the lecture recordings to a server for processing. After an hour or two the recordings are viewable by the students who take the class. The key features and benefits of this approach are simple to use, no AV personnel required, recordings automatically uploaded to a student course area, opportunity to edit and review prior to release, access controlled in Web Learn or Canvas and easy scheduling of recordings. It provides a virtual learning environment - new (Canvas). Canvas supports the University's specialized applications including Panopto (Replay), ORLO (Oxford Reading Lists Online), Cabinet and Turnitin (the plagiarism awareness tool) and Application support for Canvas is provided by Instructure. Another virtual learning environment (WebLearn) provides Legacy web-based virtual learning environment, includes specialised applications and tools such as lecture capture (Replay), plagiarism awareness (Turnitin), information about researcher training (Researcher Training Tool) and past exam papers (OXAM) and assistance in designing WebLearn sites is available. Further, it takes worthy usage of connect and communicate using the collaboration Suite (Nexus365), which meticulously uses email & calendar, download Office applications - downloads on up to 5 PCs/Macs and mobile devices (smartphones or tablets) - Word, Excel, PowerPoint, etc., online Office Suite - Access to online versions of Office applications - Word, Excel, PowerPoint, etc., oneDrive for Business, Skype for Business, Planning & Productivity Tools (Teams, Groups & Planner, Forms etc.) Also it includes within our email provision are: Mailing Lists, Under-pinning mail components, identity and access management, supports current University of Oxford students, members of Congregation, staff (including retired staff) and visitors, also the web service, large File Exchange (OxFile) supports the exchange of large files with pupil and knowledge sharers who are inside and outside the University. It is assured to be modest and swift to use, and the member of the University can establish a connectivity to exchange file for instantaneous use. Unified communications (Chorus) uses Telephony and integrated communications features such

as chat, video conferencing, online presence and web collaboration. Sharepoint (Nexus) is a document repository and collaboration service focused on serving four distinct types of activities: they are given as My Sites which has personal intranet sites to facilitate enormous sharing of materials and other grades of association; then with Committees, they are to support typical committee workflows, including prompting, scheduling of meeting and sharing of discussion material and other reports; Research sector helps to support collaborative research activities, including formal and informal collaboration; then Clubs and Societies are implemented to support the internal management of student clubs and other approved University societies; finally Devolved site provisioning and quota allocation to Site Collections to enable the efficient creation, management and deletion of sites within each of the core site collections.

Stanford University, US [12] has strongly provided Virtual Learning Opportunities for learning in different forms such as Grab your lunch and join - Quick Bytes virtual workshops: This session is very interesting and covers a variety of topics, relevant to the students in their associated phase of their study program. Peer Learning Consultants: undergraduate and graduate students who work with community centers, residences, and academic departments across campus to help other students develop effective learning strategies. Also they arrange Study Halls that provide a conducive, quiet working space - complete with peer motivation, coffee, and academic consulting (on-demand) - to help you make progress on your academic work. The sector of teaching is facilitated with review - Teach Anywhere, an online guide to help you shift quickly from teaching in a classroom to teaching anywhere. Nanyang Technological University Singapore, provide learning using 3D Environment eg: Virtual campus creation that consists of ease of access to materials and other 3d stuffs. It provides HIVE – Centre for peer group interactive learning. Figure 2 shows a sample of SOLO Taxonomy in student assessment.

Fig.2 Student Assessment based on SOLO Taxonomy

Massachusetts Institute of Technology, Cambridge address many approaches such as microaggressions in discussion boards, chats and other places where students interact. It uses the "polling" option in Zoom, or other software such as: Formative, Socrative,or Pollevery where, to allow anonymous responses to multiple-choice questions throughout the class period. The learning activities happen as Think-Pair-Share: First, students individually think for a few minutes about a question posed by the instructor, then get together for a short period in groups of two (pair) to four students to discuss their thoughts, and one or more groups share the results of their discussion with the class. Send-A-Problem which uses student teams participate in a series of problem-solving rounds, and then evaluate alternative solutions offered by the different groups. They can be as groups of two to four students working on different problems during the same period of time. All the groups receive a problem statement, discusses the arising issues, and offers feasibly suitable solutions. These problems must predict all possible day to day disruptions in the normal flow that questions in a variety of ways, and seldom presents a single accurate answer. Further, Problem-Based Learning engages students in the process of solving problem in higher order thinking, how to think about the problem and to find possible solutions. The emphasis is on improving the ability of each student to excel in critical thinking, creatively and productively about an issue, which also nurtures the team skills.

Yet another set up proceeds with Just-In-Time Teaching as, students respond to a Web-based set of questions, usually open-ended thought questions or exercises, about new material before it is covered in class. After reviewing student submissions, the instructor adjusts teaching activities to meaningfully address student shortcomings and misconceptions – just in time in the learning process. Guided Discovery Problems discovery encourages students' natural curiosity and inquisitiveness. Various puzzles, problem statements, and queries push learners to raise their bars of intellect, to see beyond facts to unearth the plethora of principles in problem solving. An Instructional technique based on inquiry, is an important sector of discovery learning, where the students are educated with 'learn by doing' strategy. Western University of Canada utilizes an added technical twister as Gamification, which is the

process of applying game mechanics in non-game contexts. This process can be used in education to teach concepts in an engaging and original manner. The purpose of gamification is to engage students by incorporating mechanics of game design, such as immediate feedback, achievements, narratives, and gaining mastery through a level system. The student outcome is based on critical thinking remarked using Lucid Chart, ED puzzle.

4. Case study on education through SMS

Accentuating towards the leveraging of technological leap which twirls onto the other side of the coin. The other side pours on the dreadful pathetic situation where education is always been a strong thirsty zone for the under developed nations [13] and moreover onto the deprived areas of many nations. In their zone internet has been a twilight and an awaited dawn for all. Under such circumstances, the facilitation of education among the uneducated is a great expectation. The basic mobile usage has been the highest technical outburst of those region human race. There exists occasional existence of 1G, on its glance. The education of these race of people regionally separated from the technology is a threat, as intellects feel to be physically available at their reach and update them with knowledge. But none is willing enough to travel and reach those areas. So, it is under exploration with a case study to materialize, the usage of messaging service in the normal button mobile. The Fig.3 shows the simple cloud connectivity on information in different gadgets.

Fig.3 Information dissemination through Cloud Connectivity

The message has to be sent with the appropriate code followed by terminology to the predefined toll free number and the entire virtual cloud zone responds with ten messages with the maximum utility of the available length of the simple text message.

<EDUMSG> ARTIFICIAL INTELLIGENCE to xxxxx

Reply Messages from Cloud with the available content[14]:

Artificial Intelligence:

Artificial intelligence (AI) refers to the activation of man minded intelligence in machines that are curated and developed to think and mimic like humans in their actions. The term may also be applied to any machinery that exhibits individualities associated with a human mind such as learning and problem-solving.

Artificial intelligence is based on the principle that human intelligence can be defined in a way that a machine can easily mimic it and execute tasks, from the simplest to those that are even more complex. The goals of artificial intelligence include learning, reasoning, and perception.

The applications for artificial intelligence are limitless. The technology can be applied to many different sectors and industries. AI is being tested and used in the healthcare industry for dosing drugs and different treatment in patients, and for surgical procedures in the operating room.

Every day a maximum of 20 messages with the Code can be fled from every single mobile number. The amount to be paid is nominal.
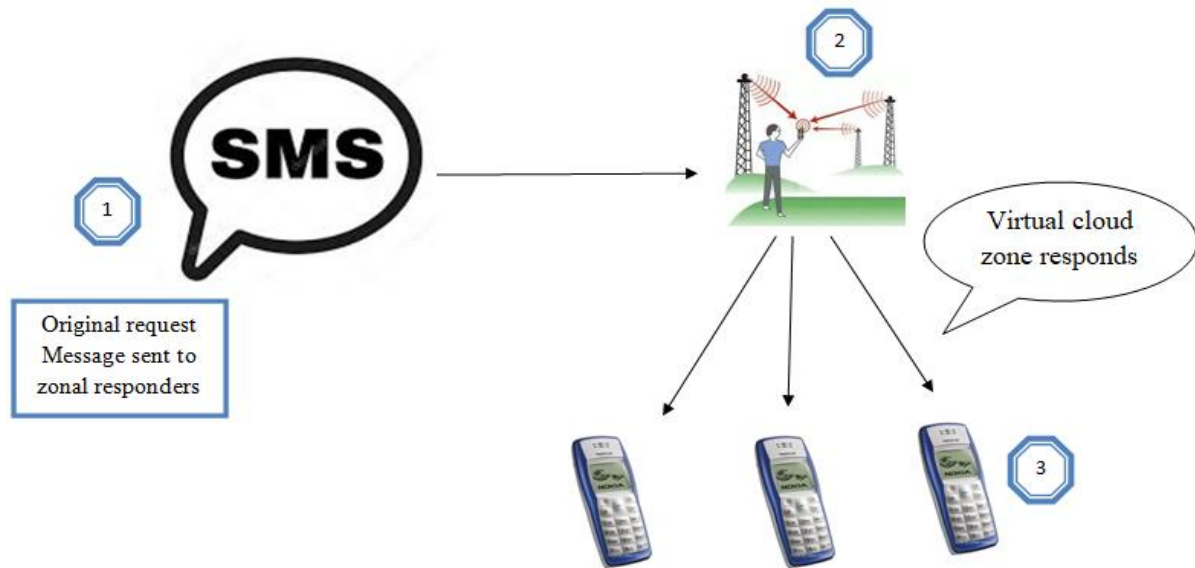
Fig.4 Working principle of Knowledge dissemination process

Figure 4 describes about the information transaction between the responders and original request zone. In each phase a virtual data transaction is been processed to reach the end user. The sub-urban regions of the world's beneficial outbreak can be magnified based on the telephonic network on the telecommunication facilitators.

5. Case Study on Healthcare

In this case study an important field of human health care is consider for doing task in online mode. Though the process is a big challenge in doing investigation of critical diseases in different parts of human organs using hi-tech technically sound aspects with accurate diagnostics [15,16,17,18] that surges to surgery through online, instructions are given via web platform is also a challenging task for the person handling critical or emergency cases. This web platform systems are acting as an intermediate processing for doing the task. To manage all this challenges a proper channel is maintained as we discuss in our chapter cloud information system is used for data transfer and while this is going to work on remote location our idea is implemented through one channel while others are not in consideration. This kind of data processing is done in our educational system where as this case study is new and a through put is maintained on examining the model. The diagrammatic representation is examined in the following flow diagram.

The case study gives a clear picture on how the flow is maintained on each data transfer and module to transmit other processing unit in a single phase of data share. Each data flow is shared secure and in a time complex impact on the data sharing.
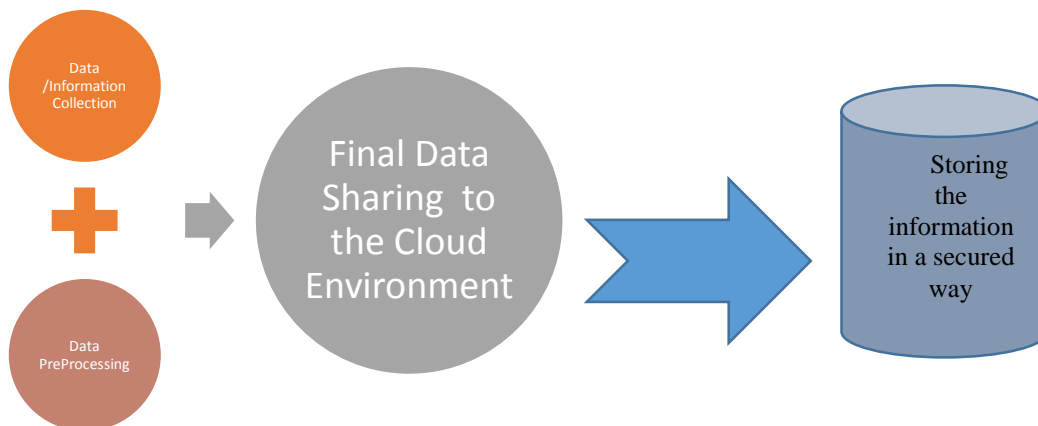

Fig 5 Data processing flow to share it with cloud environment

Fig 6 Sample data for preprocessing and classification techniques are applied.

6. Case study on Agriculture Field

Though the processing flow is heavy in field of agriculture, the proposed method is maintained on different data form. For a farmer if any pesticides are used in his/her field the maintaining each individual crop [19] is difficult. To reduce the difficulty of handling wastes [20] and these problems, the machine learning model is generated. To share those data to particular person in a small remote village is a big challenge. Such challenges are reduced by our study through different manipulation technique. Each step essential to increase the growth of crop, an important phase in processing all the field like paddy, wheat, etc... The Manipulation process is described in the following figure,
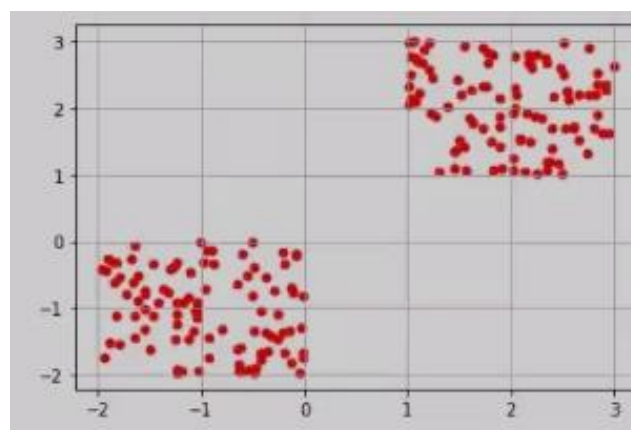
Fig 7 Classification and regression on the paddy field.

The above fig 7 says about the classification done on the entire data and clusters are formed for data sharing to identify the best crop.
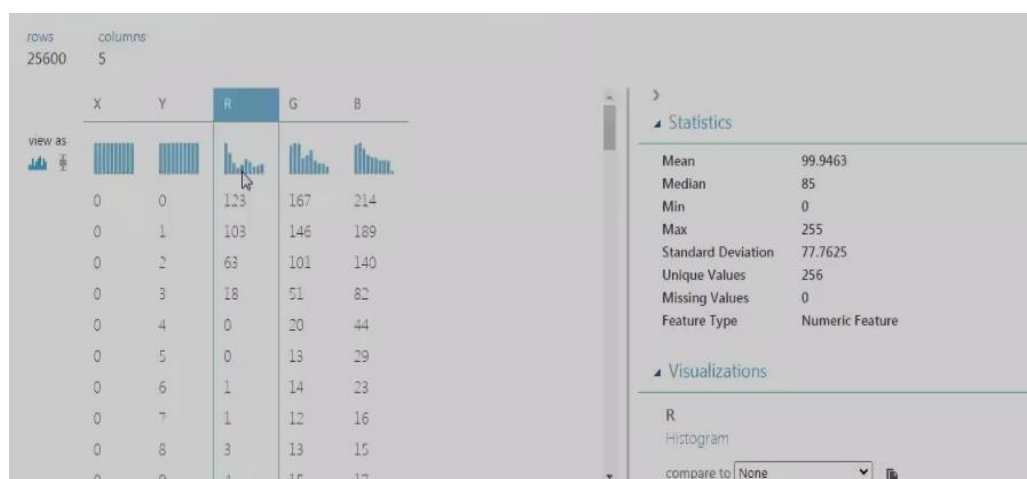

Fig 8 identifying imbalance problem in the given data and new model is designed.

After solving imbalance problem each datagram is identified for processing the data and to share the data on reduced time and secured form.

4. Conclusion

The access to Education in remote zones around the globe has enormous methods of unique distinctions, however certain basic provisions are demanded. Such demanding variables include Network availability and connectivity which influence each instructive framework. This has been the global solution for the issues in instructive dissemination in numerous countries. Still the sub-urban and underdeveloped countries, where internet technology could not be facilitated, also have the right to be educated and a simple source is the educative forum through cloud computing, under the grounds of simple SMS usage. The discussed case methodology seems to be a promising educative source. The entire range of usage and facilitated information to be disseminated on request are considerately explored. Widespread access to education is an overall concern.

Declarations

Conflicts of interest/Competing interests

The authors declare no conflict of interest.

Funding

No funding received from any external agency for this research.

References

http://www.usfunds.com/slideshows/here-are-the-10-most-educated-countries-in-the-world/#.Xy7vrygzY2w

https://www.thehindu.com/news/national/India-joins-list-of-135-countries-in-making-education-a-right/article13666115.ece

L. Yu-Feng, A study on learning effect among different learning styles and using instant messaging in programming design course, Virtual Environments, Human-Computer Interfaces and Measurements Systems, 2009. VECIMS '09. Hong Kong, China, IEEE, 266–270, 11–13, May 2009.

A.M. Latham, et al., Oscar: an intelligent conversational agent tutor to estimate learning styles, Fuzzy Systems (FUZZ), 2010 IEEE International Conference on Barcelona, IEEE, 1–8, doi: 10.1109/FUZZY.2010.5584064, 18–23, July 2010

Adesanya, et al., Examining artificial intelligence techniques for the design and implementation of a generally acceptable intelligent educational tutoring system (IETS), Proceedings of the World Congress on Engineering and Computer Science, I, WCECS 2012, San Francisco, USA, 24–26 Oct 2012

B. S. Bloom, The 2 sigma problem: the search for methods of group instruction as effective as one-to-one tutoring, Educational Researcher, 13(6), 4–16, http://links.jstor.org/sici?sici=0013189X%28198406%2F07%2913%3A6%3C4%3AT2SPTS%3E2.0.CO%3B2-3, Jun–Jul, 1984

S. Chakraborty et al., Shikshak: An architecture for an intelligent tutoring system, international workshop of cognitive aspects in intelligent and adaptive web-based educational systems (CIAWES, 2008) held in conjunction with international conference on computers in education, ICCE, Taipei, Taiwan, 24–31, 2008

D. Sleeman, J.S. Brown, Introduction: intelligent tutoring systems, intelligent tutoring systems, ed. Academic Press, 1–11, 1982

Padayachee, Intelligent tutoring systems: architecture and characteristics, Computing Review Categories: K.3.1, K.3.2, University of Natal, Durban, Information Systems and Technology.

Ghosh, An Approach to Building a Learning Management System that Emphasizes on Incorporating Individualized Dissemination with Intelligent Tutoring, J. Inst. Eng. India Ser. B DOI 10.1007/s40031-016-0221-0

https://www.timeshighereducation.com/world-university-rankings/university-oxford

https://www.timeshighereducation.com/world-university-rankings/university-cambridge

https://www.un.org/africarenewal/magazine/december-2017-march-2018/africa-grapples-huge-disparities-education

https://www.igi-global.com/dictionary/artificial-intelligence-ai/1512

Ignisha Rajathi G, Wiselin Jiji, G., "A Novel Automatic Liver Segmentation by Level Set Method Over Real-Time Sensory Computed Tomography", Wireless Personal Communications, 109, 1987–2010 (2019). https://doi.org/10.1007/s11277-019-06664-9

Ignisha Rajathi G, Wiselin Jiji, G., "Chronic Liver Disease Classification Using Hybrid Whale Optimization with Simulated Annealing and Ensemble Classifier", Symmetry 2019, 11, 33. https://doi.org/10.3390/sym11010033.

Vedhapriyavadhana R, Sneha C , Shalini A, Subashinikrishna S, "Myocardial analysis using Deep Learning Neural Network", Journal of Interdisciplinary cycle research 12 (3), 594-603.

Niranjana R, Ravi A, Vedhapriyavadhana R, Francy Inrudaya Rani E, Narayana Prasanth N, "Breast Cancer Detection using Deep Learning Neural Network with Image Processing Techniques", Solid State Technology 63 (5), 4947-4955.

G. Ignisha Rajathi, R. VedhaPriyaVadhana, L. R. Priya, 'Robotic Dustbin on Wheels', International Journal of Innovative Technology and Exploring Engineering, ISSN No. 2278-3075, November 2019, Volume 9, Issue 1

L. R. Priya, G. Ignisha Rajathi, R. Vedhapriyavadhana 'Crop Disease Detection and Monitoring System', International Journal of Recent Technology and Engineering, ISSN No. 2277-3878, November 2019, Volume 8, Issue 4.