International Journal of Aquatic Science
ISSN: 2008-8019
Vol 12, Issue 02, 2021

Machine Learning As A Key Element In The Prospective Of Academic Performance In Peruvian Universities

Frank Escobedo-Bailon[1], Antonio Arqque-Pantigozo[2], Blanca Pasco-Barriga[3], Carlos Alzamora-Aragon[4], Ana Nomberto-Luperdi[5], Katherin Rodriguez-Zevallos[6]

[1,2]National Technological University of South Lima, Lima, Perú
[3,4,5]Private University of the North, Lima, Perú
[6]National University of Huancavelica, Huancavelica, Perú

[1]fescobedo@untels.edu.pe, https://orcid.org/0000-0002-2058-0976
[2]aarqque@untels.edu.pe, https://orcid.org/0000-0003-1107-434X
[3]blanca.pasco@upn.edu.pe, https://orcid.org/0000-0001-7264-2393
[4] carlos.alzamora@upn.pe, https://orcid.org/0000-0003-0335-259X
[5]ana.nomberto@upn.edu.pe, https://orcid.org/0000-0002-7174-0984
[6]katherin.rodriguez@unh.edu.pe, https://orcid.org/0000-0001-8350-720X

Abstract : Academic performance is related to academic success, postponement and desertion, the latter two are problems that have increased in Peru due to the history of the pandemic, which has made it notorious. The digital transformation offers educational institutions opportunities to integrate their members with technological and cultural changes through participation in accordance with their educational role, and become the engine of educational reforms, in this case, the technological system that constitutes the ecosystem. Data forms information, knowledge and actions. In this sense, the use of data mining methods such as CRISP-DM and the application of machine learning algorithms provide the opportunity to design adjustable work models according to each institution to predict academic performance and determine the reasons for delays and dropouts. academics. Therefore, by applying a development and feedback cycle, you can improve the certainty of the university's intellectual capital and machine learning technology to optimize academic predictions and contribute to the development of students, society and institutions of social education. Finally, we conclude that the academic performance of universities can be satisfactorily predicted, and machine learning methods are being implemented in different regions of the world to improve intellectual capital and institutional performance.

Keywords: Academic performance, school dropout, machine learning, educational data mining.

1. INTRODUCTION

Knowing the result of the reflective diploma teaching search partially the effectiveness of the faculty's role in the academic planning process, Morales (2014) mentions that students make up the faculty and are the target literary good to be literate, knowing learning according to the United Nations organization for learning (UNESCO), as the resource of humanization and with the indicators of entry, follow-up and term for a ralea training. However, the poor academic

benefit and the lack of economic assets, hinder the educational counterbalance, the purchase of tools that promote the diploma learning and the academic continuity. A study confirmed by the universal mandate (2017) mentions that the figure of students in prominent learning increased by 20 million in the last term, being 45% poor and only half achieved diploma, likewise considering equanimity as an interesting element that influences solemn education in Latin America, proposing to produce university programs that take into account that the limit to the faculty does not guarantee its coronation and lineage, due to universalism is not academically prepared, generating flight or increase of up to 36%, with respect to the common scope, in finishing their education. According to Burbules (2020), species education is one of the pillars of the 2030 agenda for the United Nations Sustainable process, which aims to ensure inclusive and equitable race training and compose immortal education opportunities for all. This popular indifferent may disappear with some general trends affecting instruction in the age of documentation, because training is strategic to the future species of human vitality and sustainability of the world. The academic issue is not just of America Larina, due to according to Hassan (2020), the average tax of wandering in the countries of the organization for contribution and economic change (OECD) is around 45%.

In 2020, the health emergency caused by the COVID-19 pandemic increased student flight, with an emphasis on university students. This is confirmed by a TV Peru interview (2020) with Jorge Mori, current dean of solemn learning of MINEDU, in which he reported that 174,544 students had to put aside their studies in the faculty, which corresponds to 9% of students in public universities and 22% in private universities, representing an increase of 6% compared to 2019. The COVID-19 gave more honor to the problematic of desertion and teaching tardiness, because there was a growth of lack in our country and so manifests the ecumenical mandate and UNICEF (2020), where they mention that deprivation in children and adolescents would grow to 39.9% and in adults to 30.3%. close to exaggerate that according to Burbules (2020), one of the main challenges related to the quality of thrust in possibility is instruction, because it is a way to improve the vitality caste for a sustainable perspective.

In spite of the raised problematic, university educational institutions have documentation systems that record economic or college pleasure capital, academic results and psychological qualities, which are documented in computer systems of schoolboy partiality in the college collectivity and its proper use with automatic education techniques influences scholastic gain by means of vaticination and pursuit of the pupil, in this way it is intended to encircle the affected assets, to diminish the university abandonment and enlargement of the cultured time, in this way to take care of what is raised by the UNESCO, since, not to assemble the harassment to university students we reduce the social income and the union conclusion known as prosecution; In this context, copulating with an omen instrument of cultured performance is useful for the licensed field and discounting the principles shared in society. According to (Christensen. alluded to in ArtiSiddhpura, 2020), these disruptive technologies are not explicitly designed to recline instruction and education in sublime instruction, nevertheless they have a genial formative. This is demonstrated by research conducted in national and international universities, which identified the determining circumstances in university profit, due to according to ArtiSiddhpura (2020), the affordable engine of any district is cemented in the formative system and, by bazaar, it is cloudy to study the circumstances that influence the role of higher education. It is likewise intended to assemble the basis for improving the university academic administration, fostering one of the purposes of the faculty according to the University Law No. 30220, which is, to subordinate to the community and the general process.

2. PREVIOUS CONCEPTS

2.1. Academic performance

From the wise optic, the purist performance is a change through which information, attitudes, skills and abilities acquired throughout the training-instruction development are externalized. (Foresta, 2015)

- Personal determinants: those factors of an individual nature are included, whose interrelationships can be dug according to subjective, social and institutional variables. (Garbanzo, 2018)

- Social determinants: These are those factors groups to the university profit of social nature that interact with the academic vitality of the schoolboy, whose interrelationships can be reputed among themselves and between personal and institutional variables. (Garbanzo, 2018)

- Institutional determinants: in this class is defined as non-personal components that intervene in the formative change and interactions with personal components can impact the school benefit achieved. (Carrión, 2002, as cited in Garbanzo, 2018).

2.2. Educational data mining

Educational data mining (EDM) is the prospecting of various types of educational data by using Machine Learning and Data Mining statistical algorithms. (Romero, 2010, as cited in Xieling, 2020).

It focuses on generating methods to examine unique educational data to understand how students learn and determine the situation in which educational outcomes and educational phenomena are performed. (Baepler, 2010, as cited in Xieling, 2020).

The hierarchical cold of the EDM line is to better capture educational phenósalvo by uncovering hidden patterns. The difficulty of exploration in flattening is to foreshadow the school profit, because in other words very useful to find out the training activities of students and improve the result. (Czibulaa, 2019)

2.3. CRISP-DM

According to (International Business Machines [IBM], n.d.) CRISP-DM, which stands for Cross Industry Typical Process for term Mining or unified manufacturing process for data mining, is a certain rationale for guiding data mining work. As a methodology, it includes descriptions of the normal phases of a program, the tasks required at each stage, and a communication of the trade-off between tasks. As a process archetype, CRISP-DM provides an overview of the biological data mining cycle.

Phase I - Business Compression

This authentic degree focuses on opening the program objectives. later this notion of the data is redeemed in the definition of a data mining problem and a prologue plan designed to present the objectives. (Villena, 2016)

Phase II - Understanding the data

The data motif step begins with the authentic data repertoire and continues with activities that allow familiarizing with the data, identifying the rale problems, manifesting head concept about the data, and/or communicating interesting subsets to form hypotheses as to hidden documentation. (Villena, 2016)

Phase III - Data preparation

The data utility degree covers all activities necessary to populate the final data clan (the data to be served in the modeling tools) from the initial ignorable data. Tasks include tabulation, record, and attribute voting, as well as data growth and weeding for the modeling tools. (Villena, 2016)

Phase IV - Modeling

In this stage, modeling techniques that are relevant to the problem are selected and applied (the more the better), and their parameters are calibrated to optimal values. Generally, there are several techniques for the same segment of data mining distress. Some techniques have specific requirements on the manner of the data. Therefore, almost always in any project, one ends up returning to the data compositing phase. (Villena, 2016)

Phase V - Evaluation

At this stage in the project, one or more models have been built that seem to assist caste sufficient from a data analysis standpoint. before proceeding to the final deployment of the paragon, it is notable to evaluate it to cooperation and effect the steps executed to create it, approximate the cliché gained with the operation objectives. A fundamental undefined is to gauge if there are any outstanding import issues that have not been sufficiently considered. At the end of this phase, it would be committed to gain a possibility on the persistence of the results of the data study development. (Villena, 2016)

2.4. Machine Learning

Automatic instruction is a sphere belonging to computer science, it deals with the work of algorithms, which are based on a repertoire of examples of certain marvel, coming from nature, race by pillar or generated by another algorithm, for that reason, it is even defined as the process of judgment of a practical conflict by compendium of a team of data and algorithmic block of a statistical model based on that clan of data, which is used to order greedy unrest. (Burkov, 2017)

Unsupervised learning: involves modeling the characteristics of a data set without performing data to labels, and is generally described as "abandoning that the data set explains everything." (VanderPlas, 2019)

Supervised learning: involves modeling the affinity between measured data features and certain associated labels. Once this luck is determined, it can be applied to new and unknown data. It is bifurcated into partitioning tasks and regression tasks. (VanderPlas, 2019)

A. Classification algorithms

A classification cliché is That which is capable of prophesying which variety a novelty request is going to allude to, based on what is known in previous instances. (Recuero, 2018)

a. Logistic regression

The first thing to larn is that provision regression is not a regression, luck a segmentation training calculation. The notoriety comes from statistics and is due to the completion that the mathematical formulation of transport regression is comparable to that of straight regression. (Burkov, 2017)

b. K - Nearest Neighbors (KNN).
The KNN algorithm is one of the simplest segmentation algorithms and yet it can favor extremely competitive results. It belongs to the field of supervised instruction and can be used for pattern recognition, data mining and intrusion detection. (AprendeIA, 2018)

c. Support Vector Machine (SVM).
It is a small discriminative file formally by a separation hyperplane. i.e., given labeled training data, the computation generates an optimal hyperplane that classifies new examples into two dimensional spaces, this hyperplane is a line that divides a plain into two parts where in each class is on each side. (AprendeIA, 2018)

d. Decision trees classification
A decision tree is an acyclic expressive that can be used to make decisions. At each branching node in the manifest, a specific trace of the feature vector is examined. If the intrepidity of the plume is below a particular step, the left toza is followed; of the antonymous, the starboard traverse is followed. To metropolitan that the leaf node is reached, the option on the segment to which the topic belongs is taken. (Burkov, 2017)

e. Classification random forests.
This is a set-education deduction in which a path of weak models is combined to beat a blissful example. Run multiple decision tree algorithms, not just one. To pigeonhole new objects in representation of attributes, each option tree is ranked and the possibility concluded with the highest "votes" is the computation prediction. (LearnIA, 2018)

3. STATE OF THE ART.

By means of division algorithms, teaching has been confirmed where you demonstrate how personal, social and institutional university gain determinants are the main omen factors.

Thus Méndez and López (2019), through the CRISP-DM methodology and efficient learning process techniques, mention that socioeconomic circumstances, oppression or lack of possible technical and lack of guidance, affect teaching performance, and that the constancy of these techniques promotes a core of great learning.

Some applications to understand the internal and external factors that influence point-blank in the prediction of university profit, opt for supervised models of specific categorization in universities, where they demonstrate a conspicuous charge of truth, according to the pact to their data drinking fountain. At the Bío Bío faculty in bell pepper, selva (2015), demonstrates that the insistence of the supervised K - Nearest Neighbors division algorithm achieved a valid degree of success in the cultivation of guessing the pupil's educated profit, at best a 60% success tax and a mean square neglect weight of 0.4.

Also, there are cases where perseverance goes hand in hand with data mining methodologies and multiple models, to select the most correct one according to the licensed atmosphere and data source, similarly, Valle (2019), using CRISP-DM methodology for benchmark mining and Artificial Neural Networks (ANN) algorithms for modeling, Gradient Boosting Machine (GBM) and XGBoosting, manage to finalize that the XGBoosting model is the most effective for the oracle of students' cultured performance in the courses of the basic studies project of the Ricardo Palma university in Peru, thus decreasing its loss forecast due to student dropout by at least 50%. In this way, by attributing multiple models, they are able to classify by the one with the best truth according to their university data gap conditions.

In some cases as Chilca (2017) argues, in the university of engineering of the Technological faculty of Peru, according to the academic records, in the class of Basic Mathematics I of the semester 2016, about half of the students (47.8%) obtained a flunking news, a similar event is presented in the faculty Distrital of Colombia, where an analysis was conducted for the educational problems of student dropout, poor classical performance and aims to solve them through the solutions of predictive models that indicate the students who will succeed or fail in the purist stage, as observed by Contreras et al., 2020), commenting that the perceptron pattern shows that the scholastic gain can be timed with a hygiene of 66.4%, and the amilanado variables that more affect the educated performance of the engineering students are the moment, gender, score for mathematical aptitude, popular score, matriculation value, score for mathematical condition and battalion.

Close to exaggerate that some authors consider the data of gain to the university as nascent superior to augur the normative benefit in the first cycles, which lays the foundation for later periods, it is in the same way that, Candia (2019), in the Franco faculty of San Antonio Superior del Cuzco in Peru, mentions that one can presage the university benefit with the data of entrance or receipt to the faculty, being the most relevant the benefit scores, the union college that is studied, the semester, the condition, and the modality of benefit. For this purpose, the Random Forest algorithm of possibility trees is recommended, since it reaches 69% effectiveness.

In turn, personal, social, and institutional determinants as Garbanzo (2018) argues, are direct critical in collegiate performance and several authors who arrive at that theory with their results by omen with Machine Learning models in universities, which specify the main ones, in this afflicted Orihuela (2019), argues that the data processing of socioeconomic and educational circumstances of students, applying efficient process education models in the domestic university of central Peru achieves 80% explanation of instruction data stereotype and 76% of acometivity data stereotype. likewise, Menacho (2017), argues that when prophesying teaching profit at the Agraria la Molina university in Peru, the Naive Bayes network has the greatest delimitation, with a correct division charge of 71.0% and that variables affecting layer results include judicious average, course scope, advising squeezing students' socioeconomic information to improve the stereotype of foreshadowing.

It is worth to emphasize that one of the purposes of guessing the university profit is to improve it, allowing the university administration to accept the movement of the university administration after having previously recorded the protagonists and influential factors. It is in the same way diverse authors of applying similar solutions based on models of Machine Learning, arrive at similar conclusions, with the equitable one to improve the collegiate performance, to reduce the university abandonment and to foment the students that conform their universities.

Enlivening the principle and augury capabilities of college ecosystem players forms smart educational organizations, which according to Garbanzo (2016), invest responsibly in training and comprehend that it is crumb plausible for organizations that can't know of a systematic and permanent method to maintain their attitude in the circumstance they create. Therefore, making full use of the entire concept of its constituents is the key; management must take responsibility for the obligation to win the indifferent, transfigure the knowledge possessed by all, and then shed light on the entire concept of its constituents, and thus win through the resource of rarity the necessary measures to achieve the sustainability of the genius organism and learn to respond efficiently to contextual needs. Because when one-person learning increases, the literary capital of the entity also increases, and the leadership needs to metamorphose these principles into actions with the competence to act and transform itself.

In the event of not costing an adequate data gateway, owning academic modules with a particular system and integrated to the surplus, having stores in different format, generate a mistake of integration and consequently the problem of locating commitment and documentation between the departments that compose the university, also of obstructing the third step of the CRISP-DM methodology, preparation of the data, seen that in the analysis of Orihuela (2019), the pantomime of attainment and provisions of the data carries between 60 and 70 percent of the whole mission, because these are obtained from different sources come in certain formats that have to be treated so that they can be digested by the Machine Learning models. Thus, the beginning of a tactical data capture system is tactical to integrate and accelerate the development of prospecting according to the variety of stereotypes to enjoy, which can be more complex, including hidden learning fields, in that sense, is when it is necessary to prescribe a data harvesting building of the teaching system that allows to align strategies with technology, a comparable uneasiness was presented in the Technical faculty of thick Leona of Ecuador, in adonde Garcia (2019), explains that first raised the definitive modeling of the knowledge of the academic ecosystem of eminent instruction; implemented a network of ontologies to integrate the information generated in different areas of the school environment to solve the problems of representativeness, interoperability and integration, seeing the possibility of taking full advantage of the potential of neural networks; it is so, students and depending on their socioeconomic characteristics, would allow accrediting plan strategies to project models based on genetic algorithms, recline the formation of collaborative compulsory groups that improve the results of education.

As for the prediction of collegial profit in the context of pandemic, a new educational normal has appeared, which has caused the sudden loneliness of teaching activities in many countries and the competition to locate new ways to expose, is so they have rethinking their instructional plans viewer as virtual or mixed, in these cases, the data suggestion is made up of face-to-face and online environments, so they can be merged or studied independently to see the results that most resemble the purist situation different. In this way, educational data mining can be adjudicated to express and improve processes using efficient process education tools.

In a COVID-19 parallel normative benefit premonition study of first stratum electrical engineering students at the faculty of Cordoba (UCO-Spain), done by Chango (2021), they used multi-source data from eye and half-straight training environments, from the first year and from theory classes, practical sessions, scratch visits, and final quiz. They used four experiments in the data union, the first one was the fusion of all attributes, in the instant one they made a choice of the best attributes, in the third one they made the use of sets and in the last one they made the use of sets and selection of the best attributes, a team of categorization algorithms was applied to each test. Being the use of sets and the approach of choosing the best attributes to section from summarized data, which produced the highest results in innocence utility and the REPTree classification calculation obtained the best results in this framing to separate from discretized summarized data, in terms of circumstances, the level of hope in the argument, the scores in the questionnaires and the level of action in the forums are the best set of attributes to predict the concluded performance of the students in our courses.

Likewise, educational centers all over society are applying it, still in public high schools in the European Union, Portugal, as is the event (Lomo et al., 2020), where to section data from the beginning of the school period and of continuous follower, those obtained at the end of the year; the models of solution trees, fortuitous fruition and extremely probabilistic tree, it was obtained that, of all the variables considered, the environment number of unit courses attended in the current academic year, contest, as the most relevant for the concern under examination.

In another exploration completed in academic institutions in the United Arab Emirates, through student records from the receipt, tape and student service offices, it was achieved to agorate the benefit of students using the data formerly from the beginning, arriving an ordinary accuracy of 75.9%, then that the setback prediction of freshmen can come to 83%, advising that future learning use academic data and psychological statistics to desire models. (Hanssan, 2020)
In this way we see how there are applications of normative profit premonition in all parts of society, in order to avoid abandonment, backwardness and to compose an inclusive education, taking advantage of the information systems that universities have and applications of data mining and automatic training. Thus, the new educational normality caused by COVID-19, generates the need and point of contributing to the academic administration in the development of planning through disruptive technologies, which refine the educational field with rectification purposes through foreshadowing and fields of industrial maturity in training. furthermore, highlight that, according to (Heffernan, 2006, as cited in Xieling, 2020), fabricated sensible meditation in learning continues to be enormously fresher for about 25 years, through different channels and in different forms. These technological innovations according to ArtiSiddhpura (2020), and efforts to integrate them into superb instructional systems lead to disruptive technologies that are one of the many factors that have great adversity in the higher education system.

It is worth mentioning that the aforementioned applications can be extended to research and contributions in areas such as knowledge management in universities, where, according to Perez (2005), it is necessary to aim at the design of a healthy entity equipped with a documentation system at the service of managers, teachers, researchers and employees. Also, that there is a set of interdisciplinary management where policies of principles can be formulated taking into account the epistemological, pedagogical, organizational and social aspects of the scientific and academic programs that the corporation proposes. then, to throw that these points are promoted by the tenacity of automatic training models, hand in the requirements of the system, structures of data sources, integration of systems and aid to the formulation of university administration strategies.

4. CONCLUSIONS

The prospective and importance of Machine Learning, would allow to follow up students and have a better institutional performance.

The boom of documentation and foreshadowing techniques should be taken advantage of to learn objectively to its members.

When assigning Machine Learning methods, the category of data repository and the method to be used should be taken into account, so that the result is more special.

Knowing our circumstance and hunting, generates students with better performance, reduces defection and normative backwardness.

To achieve better results, the data extraction property must be restructured, according to the purpose of the corporation.

The CRISP-DM methodology can be synchronized according to each institution, in the same way as the prediction models, so that they are more precise and specific in the results they seek.

It is possible to predict in a satisfactory way the cultured profit in any university and the level of truth will depend on the kind of data collected, that is why it is advisable to specify well what data would be recorded in order to perform a better data analysis.

It is possible to predict the normative benefit with virtual classrooms data trough, either merging data sources or working them separately, in order to obtain predictive results for both modalities.

Universities in different countries are implementing Machine Learning methods to improve the educated workforce that makes up their universities, this gives them a competitive benefit by demonstrating expectation for students, which increases the degree of academic certainty and student sanctity.

Machine Learning applications generate shear opportunities by applying various artificial brain techniques in training, due to the education of data limit structures, previous experience, greater openness of the educator system and the entity's purposes.

The tenacity of Machine Learning leads to improve documentation systems, through its integration and load areas such as the management of the notion diplomaed.

5. REFERENCES

[1] LearnIA. (May 17, 2018). Confusion Matrix. https://aprendeia.com
[2] ArtiSiddhpura I., MilindSiddhpura (2020). Current state of research in application of disruptive technologies in engineering education. ScienceDirect: 9th World Engineering Education Forum, WEEF 2019.
[3] World Bank. (2017, May 17). Graduating: only half make it in Latin America.
[4] https://www.bancomundial.org/es/news/feature/2017/05/17/graduating-only-half-of-latinamerican-students-manage-to-do-so
[5] Burkov, A. (2017). The Hundred-Page Machine Learning. Machine Learning Book.
[6] Burbules N., Fan G., Repp P. (2020). Five trends of education and technology in a sustainable future. Geography and Sustainability.
[7] Candia, D. (2019). Predicting unsaac students' academic performance from their entrance data using machine learning algorithms.
[8] Chango W., Cerezo R., Romero C. (2021). Multi-source and multimodal data fusion for predicting academic performance in blended learning university courses. Computers and Electrical Engineering
[9] Chilca M. (2017). Self-esteem, study habits and academic performance in university students.
[10] Contreras, L., Fuentes, H., & Rodríguez, J. (2020). Prediction of academic performance as a success / failure indicator for engineering students , by machine learning Academic performance prediction by machine learning as a success / failure indicator for engineering students. 13(5), 233-246.
[11] Cruz J., Castelli M., Oliveira T., Mendes R., Nunes C., Sa-Velho M. & Rosa L. (2020). Using artificial intelligence methods to assess academic achievement in public high schools of a European Union country.
[12] Czibulaa G., Mihaia A., Criveia L. (2019). S PRAR: A novel relational association rule mining classification model applied for academic performance prediction. 23rd International Conference on Knowledge-Based and Intelligent Information & Engineering Systems.
[13] Garbanzo, G. (2016). Organizational development and change processes in educational institutions, a challenge of educational management. Epilepsies, 15(2), 99-100.
[14] Garbanzo, G. (2018). Factors associated with academic performance in university students. 1-25.
[15] Garcia, R. (2019). Contributions to knowledge management in Higher Education using

Artificial Intelligence techniques.
[16] Gejendhiran S., Arokia S., Vignesh S., Kalaimani M. (2019). Disruptive Technologies - A promising key for Sustainable Future Education. 9th World Engineering Education Forum, WEEF 2019.
[17] Hassan Z., Udo B., Assaad F. (2020). Enhancing prediction of student success: Automated machine learning approach.
[18] Hwang G. (2020). Computers and Education: Artificial Intelligence.
[19] IBM, I. B. M. (2012). IBM SPSS Modeler CRISP-DM manual. IBM Corporation, 56.
[20] León, R., Tejada, E., & Yataco, M. (2003). Las O rganizaciones Inteligentes. 6, 82-87.
[21] Menacho, C. (2017). Predicting academic performance by applying data mining techniques. Anales Científicos, 78(1), 26.
[22] Méndez, Ó., & López, J. (2019). Machine Learning techniques for the prediction of academic performance in the Development of Spatial Thinking projective space. In Nanotechnology (Vol. 27, Issue 9). P. Recuero, "Machine Learning at your fingertips: The confusion matrix", 2018.
[23] Ministry of Education. (2014, July 10). Law 30220. University Law. Diario Oficial 41148.
[24] Morales, J. (2014). From the search for truth to knowledge management: The University of the 21st century. Paradigma, 35(2), 7-27.
[25] Orihuela, G. (2019). Application of Data Science for the Prediction of the Academic Performance of the Students of the Faculty of Systems Engineering of the National University of Central Peru.
[26] Perez A. (2005). University and Knowledge Management.
[27] Rico Páez, A., Gaytán Ramírez, N. D., & Sánchez Guzmán, D. (2019). Construction and implementation of a model to predict the academic performance of university students using the Naïve Bayes algorithm. Diálogos Sobre Educación. Kitchenham, "Systematic literature reviews in software engineering," vol. 51, no. 1, pp. 7-15, 2009.
[28] Romero, C., Zafra, A., Gibaja, E., Luque, M., & Ventura, S. (2012). Prediction of Academic Performance in the New Undergraduate Degrees of the EPS of the University of Cordoba. Jornadas de Enseñanza Universitaria de La Informática (JENUI), 57-64.
[29] Soto, G. (2015). Uso de tecnicas de machine learning para predecir el rendimiento académico de los estudiantes de la carrera de ingenieria civil en informatica de la universidad del bio bio, chillan.
[30] Somasundarama M., Junaidb M., Mangaduc S. (2020). Artificial Intelligence (AI) Enabled Intelligent Quality Management System (IQMS) For Personalized Learning Path. 9th World Engineering Education Forum, WEEF 2019
[31] TvpeNoticias. (2020, September 18). MINEDU: Más de 174 mil estudiantes dejaron la universidad en lo que va que va del 2020. https://tvperu.gob.pe/noticias/nacionales/minedu-mas-de-174-mil-estudiantes-dejaron-la-universidad-en-lo-que-va-del-2020
[32] UNICEF. (2020, October 14). COVID-19 has generated greater poverty and inequality in children and adolescents. https://www.unicef.org/peru/comunicados-prensa/la-covid-19-ha-generado-mayor-pobreza-y-desigualdad-en-la-ni%C3%B1ez-y-adolescencia-Banco-mundial

Authors

Frank Escobedo Bailón,
Bachelor in systems engineering, systems and computer engineer, master in systems engineering, Doctor in education and Doctor in Systems Engineering, Principal Professor at the UNTELS and Associate Professor at the UNMSM, with experience in software architect.

Antonio Arqque Pantigozo
Systems and computer engineer, Bachelor's degree in education with a major in mathematics and computer science, Master's degree in systems engineering with a major in information technology management, Master's degree in strategic business administration and doctorate in systems engineering, with extensive knowledge in project management and information technology in the education sector.

Blanca Pasco Barriga
Teacher with 30 years of experience in university teaching in private and state universities, with a Master's degree in management and administration of education and doctorate in education with thesis to sustain, expert in virtual education in the management of the Moodle platform, blackboard and classroom as well as in the use of various virtual tools and simulators; former scholarship holder of the Israeli government by the Mashav-Israel center in 2013.

Carlos Alzamora Aragon
Chemical Engineer with a Master's Degree in Public Management, I have developed professionally in industrial and service operations, both in management positions that together cover my years of work experience.
The academic and consulting side I have developed in the teaching at university level of Chemistry courses, organic and inorganic, Chemical Analysis and environmental courses.

Ana Nomberto Luperdi
Master in University Teaching and Educational Management, PhD Candidate in Education, with specialties in Religious Sciences and Biochemistry. Second Specialization in Research Methodology from the University of Havana - Cuba and the University of La Rioja - Spain. Expert in Virtual Education with management of the Moodle platform, Classroom and Blackboard.

Katherin Rodriguez Zevallos
Bachelor's Degree in Nursing, with Second Specialty in Nephrological Care, with a Master's Degree in Education Sciences. With professional experience in the Javier Prado Clinic. With a Diploma in: (1) Educational problems and development. (2) Postgraduate Diploma in university didactics, (3) Diploma in Family and Community Health in Nursing, (4) Diploma in Surgical Nursing, (5) Diploma in Nursing Care in Nephrology (6) Diploma in Ethics and Deontology. Currently, he is pursuing his doctoral studies in Public Health at the National University of Callao.