Section: Research Paper

Current and Future Trends of Artificial Intelligence in Oral Medicine and Radiology- A Review

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Abstract: AI or, Artificial Intelligence refers to a technology that advances quickly and captivates the researcher's mind globally. AI acquisition in the field of medical is extremely changing the healthcare system's face. There found a marked increase in the growth of AI in the decennium, which has shown enormous improvement in the medical field. AI has an importance in in dentistry, particularly in Radiology and Oral Medicine. This review is conducted to know the application of AI in OMR, by a web hunt was initiated using PubMed/Medline database for articles from the time 2016 to 2022, which were written in English using the MeSH terms "Artificial Intelligence", "Machine learning", "Deep Learning", "Convolutional neural network", "Oral Medicine", and "Oral Radiology". AI has shown promising results in the storage of patient data, disease diagnosis and assessment of radiographic information in a short time which will provide improved patients care. AI

becomes to the teething stage despite several different advances, though it has immense capacity. This technology is employed tremendously for its early and easy diagnosis; hike in techniques for image recognition, for oral lesions of proper treatment, for malignant oral lesions, and suspicious premalignant of screening. A careful understanding related to the AIB technology assists it better in patient care precisely and also reduce the burden of work for the clinicians. .

Keywords: Machine learning, deep learning, Artificial Intelligence, neural network, Conventional Oral Medicine and Oral Radiology.

Key message: Artificial Intelligence models used for diagnostic purposes and treatment planning cover a wide range of clinical applications in Oral Medicine and Radiology. Which will help in better and more precise patient care and also reduce the work burden for the clinician.

Introduction

Artificial Intelligence (AI) is a branch of computer science customized to develop computer algorithms to manage the tasks which are traditionally associated with human intelligence, such as the ability to learn and solve problems. AI has importance in dentistry, especially in Oral Medicine and Radiology(OMR), including thestorage of patient data tillpatient diagnosis and the assessment of radiographic information.Without a doubt, AI is a 'game-changing' device. This review is taken to know the clinical implementation and diagnostic performances of AI, which can help clinician who is at the forefront to lead the application of AI to OMR.

Methods

To get till date information, a web hunt was initiated using PubMed/Medline database for searching articlesfromthe time 2016 to 2022, which were written in English. Peer-reviewed articles were targeted using the MeSH terms "Artificial Intelligence", "Machine learning", "Deep Learning", "Convolutional neural network", "Oral Medicine", and "Oral Radiology" to determine the compass of content by well-documented articles. The various sites of specialized scientific journals in the field of Oral Medicine and Radiology, Artificial Intelligence, and other relevant journals were also screened. Available full-text articles were read, and related articles were also scrutinized.

Artificial Intelligence

AI is constructed with two words where the artificial refers to the word "man-made" along with the Intelligence that become "thinking power"**.** AI belongs to the computer science branch that is concerned with designing an algorithm in intelligent computer that reveals characteristics associated with the human behavior intelligence such as leaning, problem solving, reasoning, understanding language, and so on[1]

Machine Learning(ML) is a subgroup of AIthat is substantially concerned with the development of algorithms that enable a computer to learn on its own from the data and from its past experiences.ML enables a machine to learn automatically from data, improve its performance from experiences, and predict things without being explicitly programmed (Fig 1). ML is broadly categorized into supervised, unsupervised, and reinforcement learning (Fig 2).Supervised learning is a type of MLsystemin which we provide a sample of labeled data to the machine learning system in order to train it, and on that basis, it predicts the output.Unsupervised learning is a learning system in which a machine learns without any supervision. Reinforcement learning is a feedback-based learning system, in which a learning agent gets a reward for each right action and gets a penalty for each wrong action. The agent learns automatically with this feedback and improves its performance.[2]

Deep Learning(DL) is a subgroup of ML or it can refer as a special learning machine. Technically it works as the way as ML with various approaches and capabilities. Getting inspiration from the brain cells of human, which are called neurons, and led to the concept of artificial neural networks. Different layers of models in deep learning utilized to discover and learn insights from the data (Fig 3).[3]Convolutional Neural Networks(CNN) is a special type of feed-forward artificial neural network in which the connectivity pattern between its neuron is inspired by the visual cortex. Basically, it consists of an extra layer, which is called convolutional. This gives an eye to the Deep Learning model with which it can easily take a 3D frame or image that was not achieved by theprevious artificial neural networks.[4]

Application of Artificial Intelligence in Oral Medicine and Radiology

AI or, Artificial intelligence can be exceptionally helpful modality to diagnose diseases along with oral lesion's treatment. Oral mucosa that is altered undergoes malignant and premalignant changes can also be classified and screened utilizing the technology that is advanced.

Radiology is considered to be thefront door for AI to enter medicine as digitally coded diagnostic images are more effortlessly translated into computer language. Thus, diagnostic images are seen as one of the foremost sources of data that are used for the development of AI algorithms for the purpose of an automated prophecy of disease risk, detection of pathologies and for diagnosis of diseases.[5]

Artificial Intelligence in Patient Management

Virtual assistants of dental based on AI can fulfil various dentistry related tasks with great rigor, less manpower and minimum errors compared to humans. It may utilize for different purposes ranging from managing paper works, insurance, and scheduling appointments, till assisting in treatment planning, and clinical diagnosis. Dentists get the alert about the medical history of the patient along with the habits such as the smoking and alcoholism. The patient has the emergency option in dental emergencies to give Tele assistance especially during the unavailability of the practitioner. Virtual database thus given for the patient go a long way and create better opportunities of treatment for the patient.[6]

Artificial Intelligence in the Detection of Dental Caries

Dental caries is considered as one of the most common dental diseases globally, and AI mainly DL and neural ML networks are increasingly utilized in this field. Many studies are conducted using clinical photographs and radiologic images to build AI algorithms which that as given superior results. Table 1 gives an overview of studies conducted using artificial intelligence in the detection of dental caries.

Artificial Intelligence in the Early Detection of Oral Cancer

Earlydetection of oral cancer is the key to successful treatment. In OMR, a routine should be established which is a full mouth examination to identify changes in the oral cavity that lead to early detection of oral lesions. There is research stating that professionals and students are not confident enough in their diagnoses. This led to an opportunity to develop an ancillary device for diagnostic purposes based on AI in identifying early changes in the oral mucosa. AI has the ability to detect changes that the untrained human eye cannot detect, thereby detecting early changes in the oral cavity.[12] Studies using Artificial intelligence algorithms for the early detection of Oral cancer are given in table 2.

Artificial Intelligence in the Diagnosis of Temporomandibular Joint Disorders

Temporomandibular joint (TMJ) disorderis diagnosed by elicitinga medical history, clinical examination and radiographic evaluation. These TMJ disorders clinically show characteristic signs of limited movement of the lower jaw due to pain, crepitus, and local paraspinal tenderness in a joint promotion. These disorders can be confirmed when a radiographic examination shows a structural bone change.[18]The various AI algorithms have been applied to image and non-image data for TMDs diagnosis and are shown in Table 3.

Artificial Intelligence in the Diagnosis of Cysts and Tumors.

Tumours and cysts of the jawbone are generally asymptomatic unless they become large enough to cause expansion leading to pathologic fracture and impinging nerve canals. Although in rare cases a malignant transformation of lesions for benign jaw has also been described. Surgery that is radical in last stage involves reconstruction, and free flaps, and ablation graft of bone, affects the lives drastically causes facial deformity, subsequent emotional and social incompetence. Early diagnosis is the only option to ensure healthy years of life.[26] Along with AI technology, many studies on cysts and tumors of the maxillofacial region are carried out for early detection. Table 4.

Artificial Intelligence in the Diagnosis of Fractures

Fractures are one of the most common injuries seen in the oral and maxillofacial regions. The mandible is the most common site.These fractures occur as a result of an assault, vehicle accident, fall or fight among others. Radiologists mostly diagnose mandibular fractures using CBCT and panoramic radiography. Artificial intelligence and deep learning are progressing and expanding rapidly in this field, and have shown promising applications for the detection of fractures in recent years.[32] Some of the studies are given in table 5.

Artificial Intelligence in Forensic Odontology

Forensic odontology involvesthe evaluation, examination, management and dental evidence presentation for civil and criminal proceedings, all in favour of justice interest. This field has the ability to bring justice where dental remains are the only available evidence. Technology of Artificial intelligence has proven to become breakthrough for providing information that is reliable in in forensic sciences for decision-making.[36] Some studies are given in table 6.

Challenges of AI

The sharing and managing of clinical data creates major disadvantages which led them to implement systems of AI related to health care. Data of patient become necessary for the training of AI algorithms that are conducted initially. It is also essential for the validation, ongoing training, and improvement. AI development will prompt the sharing of data among various institutions, and sometime beyond the national boundaries. To merge AI into clinical practice, systems must be adapted to safeguard patient confidentiality and privacy. Therefore, before considering broader distribution, patient personal data will have to be anonymized.

The transparency of AI algorithms is another fundamental issue. The quality of prophecy performed by AI systems depend heavily on the accuracy of annotations and labelingof the dataset used in training. Inadequatelylabeled data can lead to poor results, thus limiting the efficacy of the resultant AI systems.[43]

Advantages of Artificial Intelligence

- ❖ Management ofAbundance Data:

  Huge data is generated when the patient encounters each stepof a treatment cycle. Data like booking an appointment, patient medical and habit history, impression taking of patient's teeth, or taking the routine IOPA X-rays. And it is not just during the patient's treatment-cycle data can be generated outside the dental setup. Exemplifications include, marketing dentist practice, monitoring reviews of patients on social media sites etc. When there is a large complex of datasets available, there is always an occasionfor AI to carry out tasks. These data can be given to generate AI Algorithms in numerous formats example: natural text, tables, digital images/videos, and audio. AI can not only perform data analytics but can also carry out routine tasks and functions to help dentists reduce their overall workload.
- ❖ Diagnostic accuracy:

  Exploration in the field of AI in Radiology has found that duly trained AI models can clearly read an x-ray better and identify conditions that were frequently misread or missed through the human eye. The accuracy of AI in diagnosis can save time, and wealth and lead to better dental health among patients.
- ❖ Time-saving tool:

  With the use of AI technology, there are numerous administrative tasks in dentistry that can be sped up and made further cost-effective. Using AI technology will free up further time to concentrate on more important matters and ameliorate job performance as well. One primary use of AI is virtual consultations. This saves patients time when they come in as the clinician formerly knows what the next steps in their treatment will be.[44]

Disadvantages of Artificial Intelligence

- ❖ Distributional shift:

Due to a change in terrain or circumstances, there can be a mismatch in data which can lead to incorrect prognostications. As per example, patterns of disease can change leads to a discrepancy between the data set's testing and training.

Insensitivity to impact:

Still AI hasn't the capacity to take the positive or, false negative into the account.

- ❖ Decision-making of Black box:

Prognostication isn't unlocked to interpretation or, examination with the use of AI. As per example, training data problem can produce X-ray analysis that is inaccurate and the system of AI unable to factor it.

- ❖ Unsafe failure mode:

Diagnosis of cases can occurred through the models of AI, dissimilar to a doctor without having prognostication confidence, particularly during the work with data that is inadequate.

- ❖ Automation complacency:

AI tools may blindly trust by the clinicians assuming that every prognostications are collected and they fail to consider alternatives or, to cross check it.

- ❖ Reinforcement of outmoded practice:

Acclimatization cannot perform by AI during the changes or, developments of enforced medical polices with the utilization of historical data in the trained system.

❖ Self-fulfilling prediction:

In order to identify particular illness, an AI model is trained that is designed to get better outcome for identification.

❖ Reward hacking:

Intended objectives related to the proxies are served as the rewards for AI and these models are able to find loopholes an hacks to receive rewards that are unearned, without fulfilling objective actually.

❖ Unsafe exploration:

A system of AI may start to learn new strategies for getting end result in a way that is unsafe.[44]

Artificial Intelligence Future in Radiology and Oral Medicine

In Oral Medicine and Radiology, AI is being used for various applications. Some examples are already given above. AI models to perform various tasks it need to be trained with enormous sets of data to identify the correct patterns. For that AI models should be provided with an abundance of data in written text form or, spoken language form or images with appropriate context. Eventually, it should be suitable for making some decisions related to data information that is new and also learn from some mistakes to make better decision process.

Scrutinize ability of huge data related to diagnostic data images namely MRIs, CT scans, CBCT scans, OPG, bitewing, dental IOPA, and systems related to this can point clinicians and radiologists to increasing both the probability speed of detection, and the most probable concerning areas. Presently FDA creates regulatory pathways to give encouragement to the investors for supporting the software in medical decision. It has been predicted by the researchers that the utilization of AI in the healthcare Researchers predict that the use of AI in healthcare will grow denary in the upcoming 5 years. Tool of caries-detection has commercial availability based on deep learning that appears in coming 6 months to 1 year. In order to detect bone loss and periodontal disease tools are needed that accompanies. Interpreting images belongs to another area for continuous CBCT adaptation and in this area the productivity of AI gets boosted. Images of interpreting cone beam require a specific expertise and training and this consumes time and involve in sifting of hundred slices of image. The whole interpretation process can be automated through AI for obtaining the image to detect pathologies of dental more accurately and rapidly. The platform it clearly set for evolution of AI rapidly in Radiology and Oral Medicine for about the next two years. Utilization of technologies based on AI for 10-15 years will be practiced extensively and in commonplace for imaging system and practice management.[45]

Conclusion

In Oral Medicine and Radiology, AI or, Artificial Intelligence the field become quickly progressing for filling a niche that is ever-expanding. It has found that maximum research of AI is under the stage of budding. Availability of increasing patient data are responsible for hasten the deep learning, machine learning, and artificial intelligence. It has found from the research that the AI of driven data is reliable as well as tr5ansparent. In particular cases it has seen that during diagnosis AI performs better that human. Reasoning of human functions can reproduce by AI, along with problem solving

and planning ability. Tremendous time can be saved by using this application. It reduces manpower, save data abundance, and eliminates errors done by human during diagnosis.

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Author	**Year**	**Objective of study**	**Algorithm**	**Outcome**
Sarah Mertenset al.[7]	2021	To assess the impact of artificial intelligence (AI)-based diagnostic-support software for proximal caries detection on bitewing radiographs.	Convolutional Neural networks	Dentists with AI showed a significantly higher mean (95% CI) area under the Receiver-Operating-Characteristics curve than those without AI
Liwen Zheng et al.[8]	2021	To accurately diagnose the deep caries and pulpitis on periapical radiographs is a clinical challenge	Convolutional Neural networks	The CNN of ResNet18 demonstrated the best performance with accuracy =0.82, 95% confidence interval, compared with VGG19 and Inception V3
F.	2021	To compared the cost-	Convolutional	AI showed an accuracy of

Schwendicke et al.[9]		effectiveness of proximal caries detection on bitewing radiographs with versus without AI.	Neural networks	0.80; dentist's mean accuracy was significantly lower at 0.71
Shinae Lee et al.[10]	2021	To develop a CNN model using a U-shaped deep CNN (U-Net) for caries detection on bitewing radiographs and investigated whether this model can improve clinicians' performance.	Convolutional Neural networks	The diagnostic performance of the CNN model on the total test dataset showed precision, 63.29%; recall, 65.02%; and F1-score, 64.14%, showing quite accurate performance.
J. Kuhnisch.[11]	2022	To develop a deep learning approach with convolutional neural networks (CNNs) for caries detection and categorization and to compare the diagnostic performance with respect to expert standards.	Convolutional Neural networks	The CNN was able to correctly detect caries in 92.5% of cases.

Table no 1:Studies showing Artificial intelligence in the detection of Dental caries.

Author	**Year**	**Objective of study**	**Algorithm**	**Outcome**
Uthoff RD et al.[13]	2018	To describe dual-modality, dual-view, point-of-care oral cancer screening device, developed for high-risk populations in remote regions with limited infrastructure, implements autofluorescence imaging (AFI) and white light imaging (WLI) on a smartphone platform, enabling early detection of pre-cancerous and cancerous lesions.	Convolutional Neural network	To classify 170 image pairs into 'suspicious' and 'not suspicious' with sensitivities, specificities, positive predictive values, and negative predictive values ranging from 81.25% to 94.94%.
T. Morikawa et al.[14]	2019	To determine the usefulness of optical instruments in oral screening.	Fluorescence visualization	Objective evaluations showed sensitivity and specificity were 61.9% and 62.7% for mean luminance, 90.3% and 55.7% for luminance ratio, 56.5% and 67.7% for standard

				deviation of luminance, and 72.5% and 85.4% for coefficient of variation of luminance.
Mohammed Zubair et.al.[15]	2020	To evaluated the efficacy of six deep convolutional neural network (DCNN) models using transfer learning, for identifying pre-cancerous tongue lesions directly using a small dataset of clinically annotated photographic images to diagnose early signs of Oral Cancer	Deep Convolutional Neural network	Mean Classification accuracy of 0.98, sensitivity 0.89 and specificity 0.97. ResNet50 DCNN Mean classification accuracy of 0.97.
B. Ilhan et al.[16]	2020	It provides an overview of emerging optical imaging modalities and novel artificial intelligence-based approaches, as well as evaluates their individual and combined utility and implications for improving oral cancer detection and outcomes.	Deep learning algorithm	Combined imaging and artificial intelligence approaches can improve oral cancer outcomes through improved detection and diagnosis.
Qiuyun Fu et al.[17]	2020	To develop a rapid, non-invasive, cost-effective, and easy-to-use deep learning approach for identifying oral cavity squamous cell carcinoma (OCSCC) patients using photographic images.	Deep learning algorithm	The deep learning algorithm achieved an AUC of 0.983, sensitivity of 94.9%, and specificity of 88.7% on the internal validation dataset (n = 401), and an AUC of 0.935.

Table no 2: Studies showing Artificial intelligence in the early detection of Oral cancer

Author	Year	Objective of study	Algorithm	Outcome
Haghnegahdar et al.[19]	2016	Local binary patterns for assessment of TMDs	Random forest, Naïve Bayes, SVM, KNN,	**KNN** a) Accuracy: 92% b) Sensitivity: 94%

			Local binary pattern, Histogram of oriented gradients	c) Specificity: 90% **SVM** a) Accuracy: 84% b) Sensitivity: 84% c) Specificity: 85% **Naïve Bayes** a) Accuracy: 75% b) Sensitivity: 78% c)Specificity:73% **Random forest** a) Accuracy: 73% b) Sensitivity: 75% c) Specificity: 73%
De Dumast et al.[20]	2018	The deep neural network to assess shape changes in TMJO	CNN	Accuracy Training data: 93% Testing data: 95%
Nam et al.[21]	2018	NLP to differentiate TMD and TMD mimicking conditions	NLP	**The goodness-of-fit of the model: 0.643** a) Accuracy: 96.6% b) Sensitivity: 69.0% c) Specificity: 99.3% d) Positive-predictive value: 90.9% e) Negative-predictive value: 97.0%
Ribera et al.[22]	2019	Deep neural network to assess bony changes in TMJOA	CNN	Accuracy 47% of exact classification (91% for an error of +/–one group)
K S Lee et al.[23]	2020	To develop a diagnostic tool to automatically detect TMJOA from CBCT images with artificial intelligence.	ANN	Accuracy:0.85 Precision:0.84
Kim D et al.[24]	2020	To develop an algorithm that can extract the condylar region and determine its abnormality by using CNNs and Faster region-based CNNs	CNN	Sensitivity:0.54 Specificity:0.94 Accuracy:0.84
Choi, E., Kim, D., Lee, JY. et al.[25]	2021	To develop an artificial intelligence model and compare its TMJOA diagnostic performance with OPGs	Confusion matrix	Accuracy:0.78, Sensitivity:0.73 Specificity: 0.82

Table no 3: Studies showing Artificial intelligence in the diagnosis of TMJ Disorders.

Author	Year	Objective of study	Algorithm	Outcome
Lee JH et al.[27]	2020	To evaluate the detection and diagnosis of three types of odontogenic cystic lesions, odontogenic keratocysts, dentigerous cysts, and periapical cysts-using OPG and CBCT images based on a deep convolutional neural network.	CNN	**CBCT images** Sensitivity: 96.1% Specificity: 77.1% **OPG images** Sensitivity: 88.2% Specificity: 77.0%
Hyunwoo Yang et al.[28]	2020	To evaluate the diagnostic performance of the real-time object detecting deep convolutional neural network You Only Look Once (YOLO) v2—a deep learning algorithm that can both detect and classify an object at the same time—on panoramic radiographs.	DNN	Accuracy: 0.663 F1 score: 0.693 Precision: 0.707 Recall: 0.680
Kwon O et al.[29]	2020	To automatically diagnose odontogenic cysts and tumors of both jaws on panoramic radiographs using deep learning.	DCNN	**Dentigerous cysts** sensitivity: 91.4% specificity: 99.2% accuracy: 97.8% AUC: 0.96 **OKC** sensitivity: 98.4% specificity: 92.3% accuracy: 94.0% AUC: 0.97 **Periapical cysts** sensitivity: 82.8% specificity: 99.2% accuracy: 96.2% AUC: 0.92
Roopa S. Rao et al.[30]	2021	To create a histopathology image classification automation system that could identify odontogenic	DLT	VGG16 DenseNet-169 Accuracy: 93%

		keratocysts in hematoxylin and eosin-stained jaw cyst sections.		
Yu, D., Hu, J., Feng, Z. et al.[31]	2022	To develop an explainable and reliable method to diagnose cysts and tumors of the jaw with massive panoramic radiographs of healthy peoples based on deep learning	DNN	Accuracy: 88.72% Precision: 65.81% Sensitivity: 66.56% Specificity: 92.66% F1 Score: 66.14%

Table no 4: Studies showing Artificial intelligence in the diagnosis of cysts and tumors.

Author	Year	Objective of study	Algorithm	Outcome
Lee J et al.[33]	2020	To evaluate the detection and diagnosis of three types of odontogenic cystic lesions using OPG and cone CBCT images based on a deep convolutional neural network	CNN	CBCT images showed good diagnostic performance of AUC = 0.914, sensitivity = 96.1%, specificity = 77.1%. OPG images showed AUC = 0.847, sensitivity = 88.2%, specificity = 77.0%.
Hyunwoo Yang et al.[34]	2020	To evaluate the diagnostic performance of deep convolutional neural network YOLO that can both detect and classify an object at the same time—on OPG.	CNN	YOLO ranked highest among (YOLO, oral and maxillofacial surgeons, and general practitioners) the three groups precision= 0.707, recall = 0.680
Dan Yu et al.[35]	2022	To develop an explainable and reliable method to diagnose cysts and tumors of the jaw with OPG radiographs of healthy peoples based on deep learning		average accuracy: 88.72%. precision: 65.81% sensitivity: 66.56% specificity: 92.66% F1 score: 66.14%

Table no 5: Studies showing Artificial intelligence in the diagnosis of Fractures.

Author	Year	Objective of study	Algorithm	Outcome
Fidya, F., &Priyambadha, B.[37]	2017	This study aimed to quantify the respective accuracy of the Naive Bayes, decision tree,	Naive Bayes, Decision tree and Multi-layer	Accuracy rate of the Naive Bayes method was 82%. Accuracy rate of the

		and multi-layer perceptron (MLP) methods in identifying sexual dimorphism in canines	perceptron.	decision tree and MLP amounted to 84%.
Tobel et al.[38]	2017	An automated technique for staging the development of lower third molar	Deep Learning Convolutional Neural Network	Mean accuracy 0.51, mean absolute difference was 0.6 stages and mean linearly weighted kappa was 0.82.
Patil et al.[39]	2020	ANN for gender determination DANet (Dental Age Net) &DASNet (Dental Age and Sex Net), to estimate the chronological age of a subject from the OPG image.	ANN	An overall accuracy of 69.1%, logistic regression showed an accuracy of 69.9% and ANN exhibited a higher accuracy of 75%
Matsuda S and Yoshimura H.[40]	2020	The aim of this study was to verify the usefulness of personal identification with paired OPG obtained in a relatively short period using convolutional neural network (CNN) technologies	CNN architectures: VGG16, ResNet50, Inception-v3, InceptionResNet-v2, Xception, and MobileNet-v2.	The VGG16 model achieved the highest accuracy (100.0%) with pretraining and with fine-tuning.
A Thurzo et al.[41]	2021	To introduces a novel workflow of 3D CNN analysis of full-head CBCT scans. 1. sex determination, 2. biological age estimation, 3.3D cephalometric landmark annotation, 4. growth vectors prediction, 5.facial soft-tissue estimation from the skull.	CNN	3D CNN application in forensic medicine, leading to unprecedented improvement of forensic analysis workflows.
Seunghyeon Kim et al.[42]	2022	To provide AI-based diagnostic system for age-group estimation by incorporating a convolutional neural network (CNN) using first molars extracted via panoramic radiography.	CNN	The accuracy of the tooth-wise estimation was 89.05 to 90.27%. The AUC scores ranged from 0.94 to 0.98 for all age groups.

Table no 6: Studies showing Artificial intelligence in Forensic Odontology.

Figures:

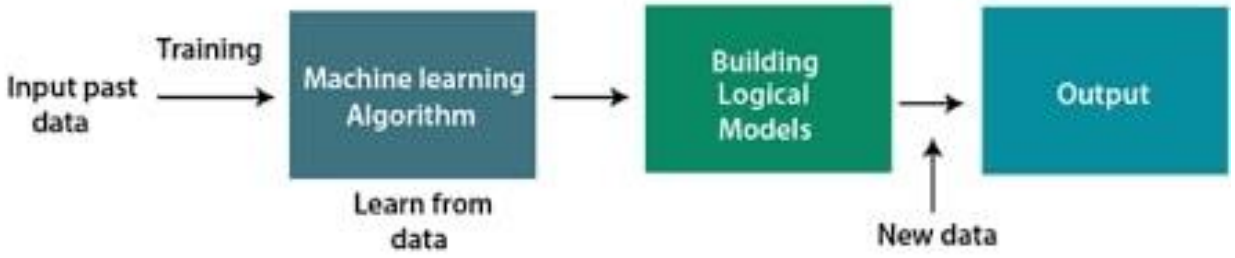

Figure 1: Workflow of Machine Learning

Figure 2: Classification of Machine Learning

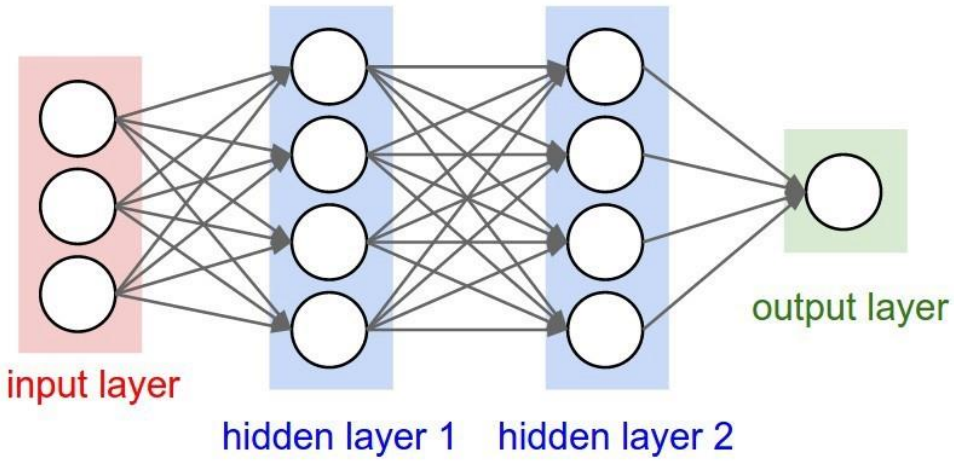

Figure 3: Different Layers of Deep Learning