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India's Dental Professional Community

Dental AI Glossary

30 essential AI terms explained in plain language for dental professionals

For dental students, practitioners & clinic owners navigating AI tools. No engineering degree required.
Terms marked with ★ are especially important when evaluating AI vendors.

Algorithm

A step-by-step set of rules a computer follows to solve a problem. In dental AI, algorithms process X-ray pixels to detect cavities, bone loss, or other pathologies.

Artificial Intelligence (AI)

The simulation of human intelligence by computers. In dentistry, AI is used for image analysis, diagnosis support, patient communication, and treatment planning.

Machine Learning (ML)

A type of AI where systems learn patterns from large datasets without being explicitly programmed. Dental ML models 'learn' what caries look like from thousands of labelled X-rays.

Deep Learning

A advanced ML technique using multi-layered neural networks. Most modern dental imaging AI (caries detection, periapical analysis) uses deep learning.

Neural Network

A computing system loosely inspired by the human brain, made of interconnected 'nodes' that process information in layers. The backbone of most dental AI imaging tools.

DICOM ★

Digital Imaging and Communications in Medicine — the universal standard format for medical and dental images (X-rays, CBCT scans). All AI tools must be DICOM-compatible.

CBCT ★

Cone Beam Computed Tomography — a 3D X-ray technology used in dentistry for implant planning, orthodontics, and endodontics. AI is increasingly used to auto-segment CBCT data.

Computer Vision

The field of AI focused on interpreting visual data (images/video). Dental AI uses computer vision to detect lesions, measure bone levels, and identify anatomical landmarks.

Training Data ★

The large dataset of labelled examples used to teach an AI model. In dentistry: thousands of annotated X-rays showing caries, periapical lesions, bone levels, etc.

Validation Data

A separate dataset used to test the AI model's performance AFTER training, to ensure it generalises to new cases it hasn't seen before.

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Sensitivity ★

The ability of an AI tool to correctly identify POSITIVE cases (e.g., correctly flagging a caries as caries). High sensitivity = fewer missed diagnoses. Also called 'recall'.

Specificity ★

The ability of an AI tool to correctly identify NEGATIVE cases (e.g., not flagging healthy enamel as caries). High specificity = fewer false alarms.

False Positive ★

When AI flags a problem that doesn't exist. Example: AI marks a normal tooth as having a cavity. Leads to unnecessary treatment if accepted without clinical verification.

False Negative ★

When AI misses a real problem. Example: AI fails to detect an early caries lesion. More clinically dangerous than false positives.

AUC-ROC

Area Under the Curve — Receiver Operating Characteristic. A statistical measure of an AI model's overall diagnostic performance. Score of 1.0 = perfect; 0.5 = random guess.

Confidence Score

A percentage or probability the AI assigns to its prediction. E.g., '87% probability of periapical lesion.' Higher scores = more certain prediction.

Segmentation

AI technique that identifies and outlines specific structures in an image — e.g., automatically drawing the boundary of each tooth, root, or alveolar bone in a CBCT scan.

Object Detection

AI locating and boxing specific items within an image. In dental X-rays: detecting and marking all teeth, caries spots, or calculus deposits simultaneously.

Decision Support System (DSS) ★

AI tools designed to assist, not replace, clinical decision-making. Legally important: most dental AI is approved as DSS, not autonomous diagnostic devices.

Natural Language Processing (NLP)

AI that understands and generates human language. Used in dental AI for voice-to-text clinical notes, chatbot-based patient triage, and treatment plan generation.

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Large Language Model (LLM)
A type of NLP AI trained on massive text datasets. GPT-4, Claude, Gemini are LLMs. Used in dental chatbots, report generation, and patient education.

Overfitting
When an AI model performs brilliantly on training data but poorly on new data. A sign that the model 'memorised' rather than 'learned.' Ask vendors how they prevent this.

Bias (AI Bias) ★
Systematic errors in AI because training data doesn't represent all patients. Dental AI trained only on Western patients may perform poorly on Indian/Asian dentition.

API (Application Programming Interface)
A connection bridge allowing two software systems to communicate. Dental AI connects to your practice management software via API.

SaaS (Software as a Service)
Software delivered over the internet via subscription, not installed locally. Most dental AI tools today are SaaS — your data goes to their cloud servers.

Cloud Computing
Using remote servers (the internet) to store, process, and manage data. Important for dentists to understand where their patient data is stored (India vs. overseas).

Data Encryption
Converting data into a coded form to prevent unauthorised access. Look for 'AES-256 encryption at rest and TLS in transit' in any AI vendor's security documentation.

CDSCO ★
Central Drugs Standard Control Organisation — India's national regulatory body for medical devices, including AI diagnostic tools. Vendor should clarify if their tool requires CDSCO registration.

Interoperability
The ability of different dental software systems to work together and share data. AI tools with high interoperability integrate with multiple PMS and DICOM viewers seamlessly.

Explainability (XAI) ★
The ability of an AI to explain WHY it made a prediction, not just WHAT it predicted. A heatmap showing which pixels drove the caries detection is an example of XAI.

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