

## ProSocial AI in oral health and imaging: advancing humanity and health care

Integrating artificial intelligence (AI) into dentistry marks a transformative era, redefining how we approach oral health and patient care. Amid this technological evolution, a new paradigm emerges: ProSocial AI. This concept embodies AI systems that are tailored, trained, tested, and targeted to bring out the best for people and the planet. In the realm of oral health and imaging, ProSocial AI offers unprecedented opportunities to enhance clinical outcomes while fostering equity, sustainability, and humanity in health care.

At its core, ProSocial AI is not merely about technological advancement; it is about aligning AI's capabilities with individuals' holistic needs and society's collective well-being. A multi-dimensional perspective guides this alignment based on a comprehensive framework encompassing the full spectrum of human experience and societal context.

ProSocial AI considers four dimensions at the individual level: aspirations (recognizing and supporting individuals' goals and desires for their oral health and well-being), emotions (acknowledging patients' feelings, anxieties, and psychological states during dental care), thoughts (understanding patients' beliefs, perceptions, and cognitive responses to treatment options and health information), and sensations (attending to patients' physical experiences, comfort, and pain management during procedures). By integrating these dimensions, it can be ensured that AI applications in dentistry are technologically sophisticated and deeply attuned to the multifaceted nature of human beings and their environments.

At the collective level, the following are considered: communities (how the oral health of individuals influences their social relationships, whilst being in turn influenced by their social groups and community dynamics), countries (the role of national health policies, cultural norms, and economic factors in shaping access to dental care), and the planet (environmental sustainability, resource conservation, and the ecological footprint of dental practices). By embracing this holistic perspective, ProSocial AI becomes a catalyst for positive change for individuals, communities, countries, and the planet.<sup>1</sup>

### *Enhancing patient care through ProSocial AI*

- **Personalized diagnostics and treatment planning:** ProSocial AI empowers clinicians to provide personalized care that aligns with patients' aspirations and addresses their unique needs. Advanced imaging technologies, augmented by AI algorithms, enable early detection of dental caries or periodontal disease that might remain unnoticed. For instance, AI can analyze radiographs with heightened precision, identifying initial signs of caries, periapical or periodontal disease, thus facilitating timely interventions.<sup>2,3</sup> By considering patients' emotions and thoughts, AI-driven platforms enhance communication, helping clinicians effectively explain diagnoses and treatment options. This fosters trust, reduces anxiety, and encourages active patient participation in their own care journey.
- **Improving access and equity in oral health:** Access to quality dental care remains a significant challenge, particularly in underserved communities. ProSocial AI can bridge this gap by supporting tele-dentistry services and remote diagnostics. AI-powered mobile clinics with portable imaging devices can reach remote areas, offering essential dental services and integrating individuals into broader health care systems. By addressing the needs of communities and aligning with national health objectives, ProSocial AI contributes to reducing disparities in oral health outcomes. This approach not only benefits individuals but also strengthens societal health and cohesion.
- **Promoting sustainable practices:** Environmental sustainability is an increasingly critical consideration in health care. ProSocial AI encourages the adoption of eco-friendly technologies and practices, such as digital workflows, that minimize the use of physical materials and reduce waste. By integrating sustainability into dental practices, this contributes to the planet's health, aligning our professional responsibilities with global environmental efforts.



## Holistic approaches to health care with ethical and moral values

The deployment of AI in dentistry must be guided by ethical principles that respect patient autonomy, privacy, and diversity. ProSocial AI emphasizes data privacy and security by safeguarding patient information through robust encryption and compliance with privacy regulations. Transparency in data usage builds trust and upholds ethical standards. It helps bias mitigation by actively identifying and reducing biases in AI algorithms to ensure equitable care across diverse populations. This involves using inclusive data sets and continuous monitoring to provide fair patient assessments. Eventually, it enhances the human touch. AI should augment, not replace, the clinician–patient relationship. By automating routine tasks, AI allows clinicians to focus more on empathetic communication and personalized care, addressing patients' emotions and sensations.

For ProSocial AI to reach its full potential, education is paramount. Dental professionals must be equipped with both technical skills and a deep understanding of the holistic approach that ProSocial AI embodies. This can be done by incorporating ProSocial AI into dental curricula that prepares future practitioners to navigate the complexities of modern health care with empathy and innovation. Current practitioners benefit from ongoing education through workshops, seminars, and courses that explore AI technologies and their ethical applications. This fosters a culture of lifelong learning and adaptability.

Engaging technology developers, health care providers, policymakers, and community organizations ensure that AI solutions are scalable, sustainable, and aligned with societal needs. ProSocial AI has the potential to reduce oral health disparities worldwide significantly. By developing adaptable tools and focusing on low- and middle-income countries, we move closer to achieving universal access to quality dental care. Integrating ProSocial AI in oral health and imaging represents a profound opportunity to enhance patient care while addressing broader societal and environmental challenges.

## References

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