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AREA QUANTIFICATION IN NATURAL IMAGES FOR ANALYSIS OF DENTAL CALCULUS REDUCTION IN SMALL ANIMALS

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Summary: The digital processing of natural images is a great challenge because it deals with inconsistent images, with a lot of noise and false edges. The problem intensifies when a large database of non-standardized images needs to be processed, and specific points must be identified. This work presents an approach to this kind of scenario that allows images to be processed with a higher level of precision. The context of this study is related to the automated estimation of the area affected by dental calculus in small animals, based on photographic images of the teeth produced during a treatment cycle with tartar removal gel. The study involved a total of 120 dogs at a 90-day treatment, with the images captured at 7-day intervals to measure the percentage of tartar removal at each stage. Visual measurement is not feasible because of the large volume of data, and the difficulty in dealing with animals because manipulation can cause pain. Thus, the photographic registration of the region of the teeth of the animals was performed for automated analysis and quantification. Among the used techniques are the active contour for segmentation, and the gradient analysis to support a process of image reduction to the area of interest. The developed technique shows itself as an advance under manual measurement, solving previous problems, and can generate numeric data that can be analyzed in detail. The results obtained were validated by a qualified veterinarian, and the technique presented was considered capable of successfully quantifying the condition.