

CORRECTION

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# Correction: Motif clustering and digital biomarker extraction for free-living physical activity analysis

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The original article can be found online at <https://doi.org/10.1186/s13040-025-00424-1>.

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Following publication of the original article [1], the authors identified two errors.

In formula 4, we used incorrect symbols to describe the calculation of phase distance. This issue stems from referencing Dr. Srivastava's work on elastic shape analysis without initially noticing that symbol usage and definitions varied across different papers in his series. We inadvertently used symbols in Equation (4) consistent with one subset, leading to a notational clash within our paper compared to the surrounding text and established conventions. We will correct the symbols in Equation (4) to resolve this inconsistency. This correction is purely related to the mathematical notation and does not affect our paper's research findings, methodology, or conclusions. The underlying calculations and results remain the same.

The incorrect formula 4 is given below:

$$d_{phs}(f_1, f_2) = \arccos(\langle q_l, q_\gamma \rangle)$$

The correct formula 4 is given below:

$$d_{phs}(f_1, f_2) = \cos^{-1} \left( \int_0^1 \sqrt{l(t)} \sqrt{\gamma(t)} dt \right) = \cos^{-1} \left( \int_0^1 \sqrt{1} \sqrt{\gamma(t)} dt \right) = \cos^{-1} \left( \int_0^1 \sqrt{\gamma(t)} dt \right)$$

In the Motif clustering algorithm, step 3, the mathematical formula,  $d_{phs}(x_{ij}(t), c^{(k)}(t))$ , is based on the Equation (4), thus it needs to be corrected along with it.

The incorrect algorithm is given below:

$$d_{phs}(x_{ij}(t), c^{(k)}(t)) = \arccos(\langle q_{c^{(k)}(t) \circ l}, q_{x_{ij}(t) \circ \gamma} \rangle)$$

The correct algorithm is given below:



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$$d_{phs}(x_{ij}(t), c^{(k)}(t)) = \cos^{-1}(\int_0^1 \sqrt{\gamma'(t)} dt)$$

The original article [1] has been corrected.

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#### Reference

1. Liang YT, Wang C. Motif clustering and digital biomarker extraction for free-living physical activity analysis. *BioData Mining*. 2025;18:8. <https://doi.org/10.1186/s13040-025-00424-1>.