

EP18.04 Unsupervised machine learning for partogram analysis: A novel framework

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Objectives:

To explore the feasibility of using unsupervised machine learning to develop personalized labor curves by analyzing complex intrapartum data without relying on predefined outcomes, to help differentiate physiological from pathological labor patterns.

Methods:

Retrospective EMR-based study of singleton term deliveries excluding antepartum fetal deaths, fetal anomalies, multiples, and planned Caesareans. Maternal demographics, fetal characteristics including sonographic head circumference and EFW, and labor data (e.g., cervical dilation, effacement) were gathered. Using clustering algorithms, unsupervised machine learning identified probable labor curve patterns for each parturient without inputting obstetrical outcomes.

Results:

A dataset of 100,474 labors, 26% primiparas, was analyzed. For each parturient, unsupervised machine learning algorithm created a dynamic probability map of several partograms. The figure shows a the time elapsed from reaching 3 cm dilation (X-axis), the Y-axis shows the cervical dilation. The colored trend lines represent different clusters, with the probability that each progression will occur for the individual patient, while the black trend line depicts the individual results.

Conclusions:

Personalized labor curves derived from unsupervised machine learning are feasible and represent a shift from time-based labor stratifications to data-driven, individualized assessments to provide probabilistic labor trajectories, facilitating more nuanced clinical assessments, potentially enhancing labor management. Future research should leverage large-scale data and advanced analytics to associate labor curves with obstetric outcomes, to establish quantitative thresholds for defining pathological labor.

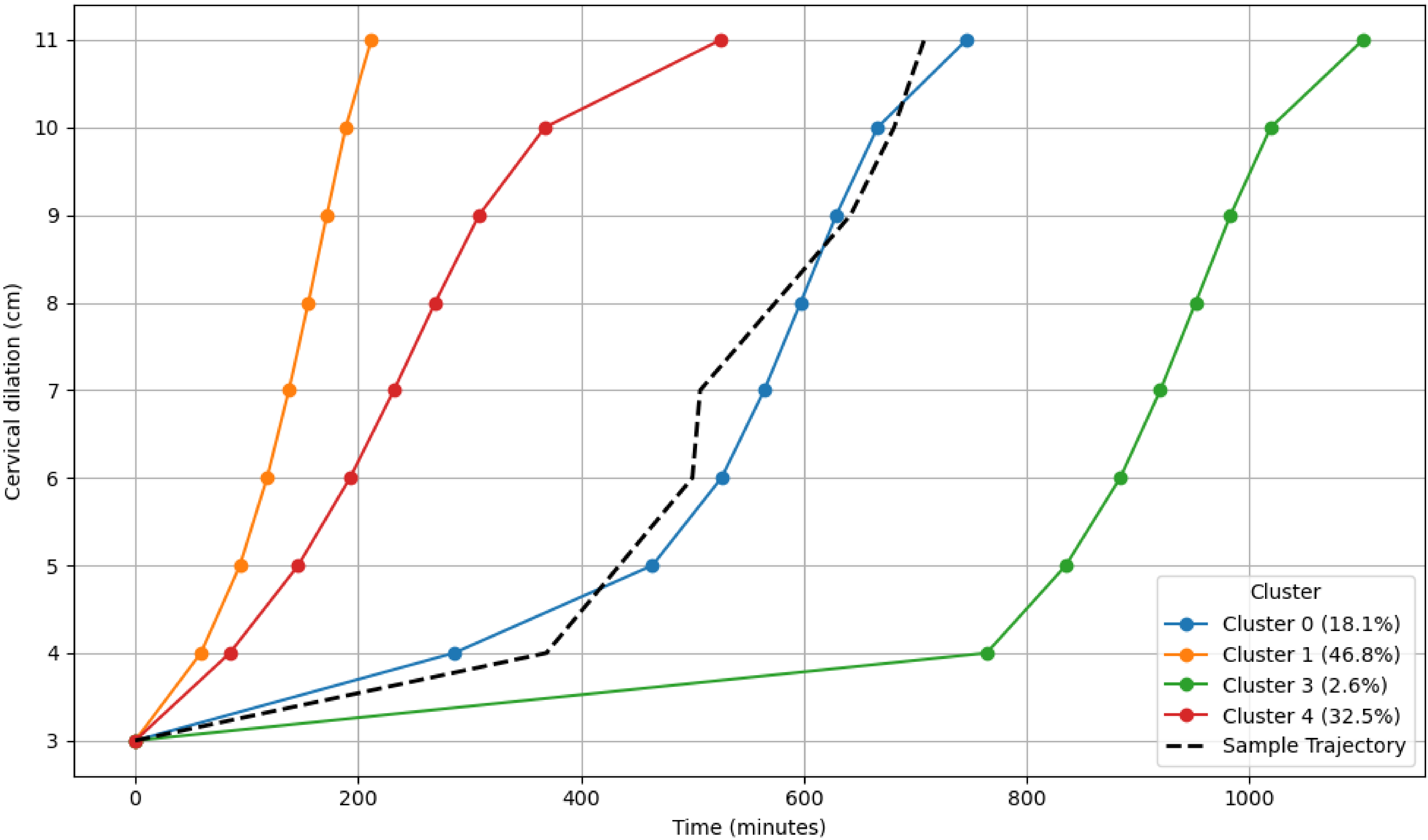


Figure 1: The X-axis shows the time elapsed from reaching 3 cm dilation, Y-axis shows the cervical dilation. The colored trend lines represent different clusters, with the probability that each progression will occur for the individual patient, while the black trend line depicts the individual results.