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Machine Learning Driven Accurate Lifespan Prediction from Electronic Health Records

Stanford researchers have found a way to predict an individual's remaining lifespan directly from routinely collected longitudinal electronic health records, enabling faster and more accurate decision-making for life insurance underwriting, reinsurance, and clinical planning. Traditional underwriting relies on medical exams, lab panels, attending physician statements, and coarse risk classes, which are slow, costly, and only modestly predictive. This invention replaces that fragmented workflow with an automated, API-delivered model that analyzes a person's full EHR timeline and returns three outputs: predicted time-to-death in months, deviation from age-matched peers, and an interpretable attribution map showing which recorded health events most influenced the prediction. In validation on a large nationwide EHR dataset, the model substantially improved accuracy versus common actuarial baselines and demonstrated consistent performance across demographic and socioeconomic subgroups. For carriers and reinsurers, this approach can accelerate underwriting decisions from weeks to minutes, reduce acquisition costs, improve risk segmentation for long-duration products, and narrow uncertainty that drives excess reserves and conservative treaty terms.

Applications

- Faster, better life insurance decisions
- Improved long-term risk planning for insurers and reinsurers
- Support for medical care planning
- Better forecasting for pensions and annuities

Advantages

- Uses existing health records with less extra paperwork
- More accurate than simple averages or basic scores
- Faster, lower-cost decisions
- Designed to work consistently across different groups

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