

<b>Patent title:</b>	<b>Self-adaptive matrix completion for heart rate estimation from face videos under realistic conditions</b>
<b>FBK center:</b>	ICT - Information and Communication Technology
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<b>Application(s):</b>	Heart rate estimation, Surveillance
<b>Keyword(s):</b>	Video analysis, Heart rate estimation
<b>Abstract:</b>	Recent studies in computer vision have shown that, while practically invisible to a human observer, skin color changes due to blood flow can be captured on face videos and, surprisingly, be used to estimate the heart rate (HR). While considerable progress has been made in the last few years, still many issues remain open. In particular, state-of-the-art approaches are not robust enough to operate in natural conditions (e.g. in case of spontaneous movements, facial expressions, or illumination changes). Opposite to previous approaches that estimate the HR by processing all the skin pixels inside a fixed region of interest, we introduce a strategy to dynamically select face regions useful for robust HR estimation. The present approach, inspired by recent advances on matrix completion theory, allows us to predict the HR while simultaneously discover the best regions of the face to be used for estimation. Thorough experimental evaluation conducted on public benchmarks suggests that the proposed approach significantly outperforms state-of-the-art HR estimation methods in naturalistic conditions.