

平成 17 年 2 月

各 位

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計測自動制御学会中国支部  
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### 記

日 時 2005年3月22日(火) 14:00～15:30

場 所 岡山大学工学部情報工学科共同研究室(2F)

題 目 「Non-rigid Structure from Motion (動画像からの非剛体の3次元復元)」

講 師 Dr. Lourdes Agapito, Department of Computer Science,  
Queen Mary, University of London, U.K.

概 要 In this talk I will address the problem of estimating the 3D structure and motion of a deformable object given a set of image features tracked throughout an uncalibrated video sequence. It has been recently shown that if the 3D deformations of an object can be modelled as a linear combination of shape bases then both its motion and shape may be recovered using an extension of Tomasi and Kanade's factorization algorithm for affine cameras. Crucially, these new factorization methods are model free and work purely from video in an unconstrained case: a single uncalibrated camera viewing an arbitrary 3D surface which is moving and articulating.

The main drawback of existing methods is that they do not provide correct structure and motion estimates: the motion matrix has a repetitive structure which is not respected by the factorization algorithm. In this talk I will describe a non-linear optimization method to refine the motion and shape estimates which minimizes image reprojection error and imposes the correct structure onto the motion matrix by choosing an appropriate parameterization. Our experiments with synthetic and real data show that improved reconstructions can be achieved using this method.

Finally I will also present our extension of existing non-rigid factorization algorithms to the stereo camera case and will describe an algorithm to decompose the measurement matrix into the motion of the left and right cameras and the 3D shape. The added constraints in the stereo camera case are that both cameras are viewing the same structure and that the relative orientation between both cameras is fixed.

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