DeepCut: Joint Subset Partition and Labeling for Multi Person Pose Estimation

Leonid Pishchulin\textsuperscript{1}, Eldar Insafutdinov\textsuperscript{1}, Siyu Tang\textsuperscript{1}, Bjoern Andres\textsuperscript{1}, Mykhaylo Andriluka\textsuperscript{1,3}, Peter Gehler\textsuperscript{2} and Bernt Schiele\textsuperscript{1}

\textsuperscript{1}Max Planck Institute for Informatics, Saarbrücken, Germany \textsuperscript{2}Max Planck Institute for Intelligent Systems, Tübingen, Germany \textsuperscript{3}Stanford University, Stanford, USA

\textbf{Goal}

- Multi-person pose estimation in monocular RGB images

\textbf{State of the Art}

- single person + occl. reasoning [Chen&Yuille, CVPR'15] – no true multi-person reasoning
- two-stage approaches [Eichner&Ferrari, ECCV'10]
  - reliable people detector required
  - feed-forward approach prone to errors

\textbf{Contributions}

- Novel joint formulation
- two-stage approaches [Eichner&Ferrari, ECCV'10]
- single person + occl. reasoning [Chen&Yuille, CVPR'15]

\textbf{DeepCut (contd.)}

III. Integer Linear Program (ILP)

- Substitute $x_{d,c} = x_d x_c + y_d$ to convert objective to ILP
- NP-Hard problem solved via branch-and-cut (1% gap)
- Linear constraints on 0/1 labelings: plausible poses
  - uniqueness
  - consistency
  - transitivity


I. Unary probabilities
- fully-convolutional CNN architecture based on VGG [7]

II. Pairwise probabilities
- Proximity
- Kinematic relations
- Capture part relationships within/across people

\begin{itemize}
  \item \textbf{Single person pose estimation}
  - MPI Multi-Person dataset [1]
    - \textbf{Mean Average Precision (mAP) metric}

\end{itemize}

\begin{itemize}
  \item \textbf{Results}
  \textbf{Multi-person pose estimation}
    - \textbf{MPI Multi-Person dataset [1]}
      - \textbf{Average Precision (mAP) metric}

\end{itemize}

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  \item \textbf{Single person pose estimation}
    - \textbf{MPI Multi-Person dataset [1]}

\end{itemize}

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  \item \textbf{References}

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