

# GANs and Poses: An Interactive Generative Music Installation Controlled by Dance Moves

JKU

JOHANNES KEPLER  
UNIVERSITY LINZ

Institute of  
Computational  
Perception

TU WIEN FAKULTÄT FÜR INFORMATIK  
Faculty of Informatics

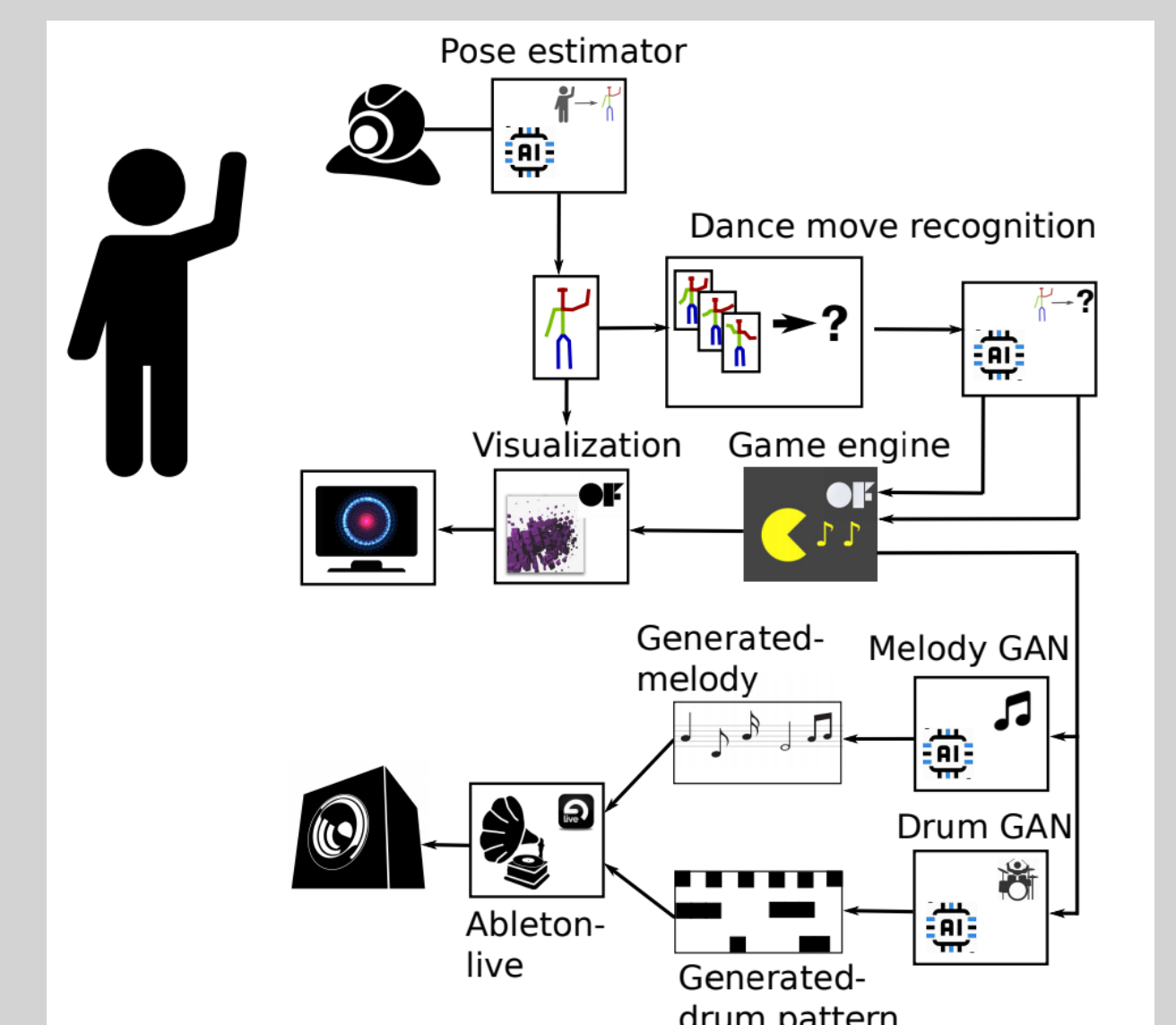
Richard Vogl<sup>\*,1,2</sup>, Hamid Eghbal-zadeh<sup>\*,1</sup>, Gerhard Widmer<sup>1</sup>, Peter Knees<sup>2</sup>

\* Equal contributions

1. Institute of Computational Perception, Johannes Kepler University of Linz (JKU)
2. Faculty of Informatics, TU Wien

## Architecture

- The user interacts with the system by performing dance moves
- The system detects user's dance moves and reacts to it
- The more dance-moves the system detects, the more rewards is given to the user
- The rewards are given to the user by progressing in a musical game
- The system generates musical patterns that are conditioned on user's movements
- The more use progresses through the musical game, the more complex the generated music becomes



## Pose Estimation

- We use OpenPose [1] for pose estimation
- Models are trained on MSCOCO dataset
- For real-time inference, a MobileNet architecture is used

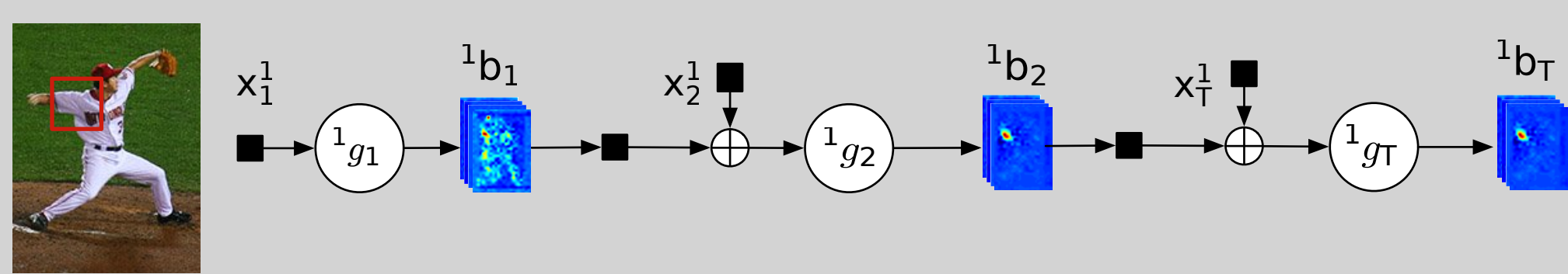


Diagram of open-pose pose machine.



Webcam image overlaid with the output of the pose estimation system along with the estimated probabilities for different dance moves.

## Music Generation

- We generate the musical patterns using GANs [2]
- The music is conditioned on complexity and loudness of the patterns
- We use a recurrent conditional GAN [3] for musical pattern generations trained on midi files

## Dance Recognition

- The output of pose estimation are used as features
- A bidirectional LSTM is used to model the dance moves
- Training data was collected from YouTube videos of dance-moves of Fortnite video-game
- Demo available at: <http://tiny.cc/gansandposes>



Examples of training data

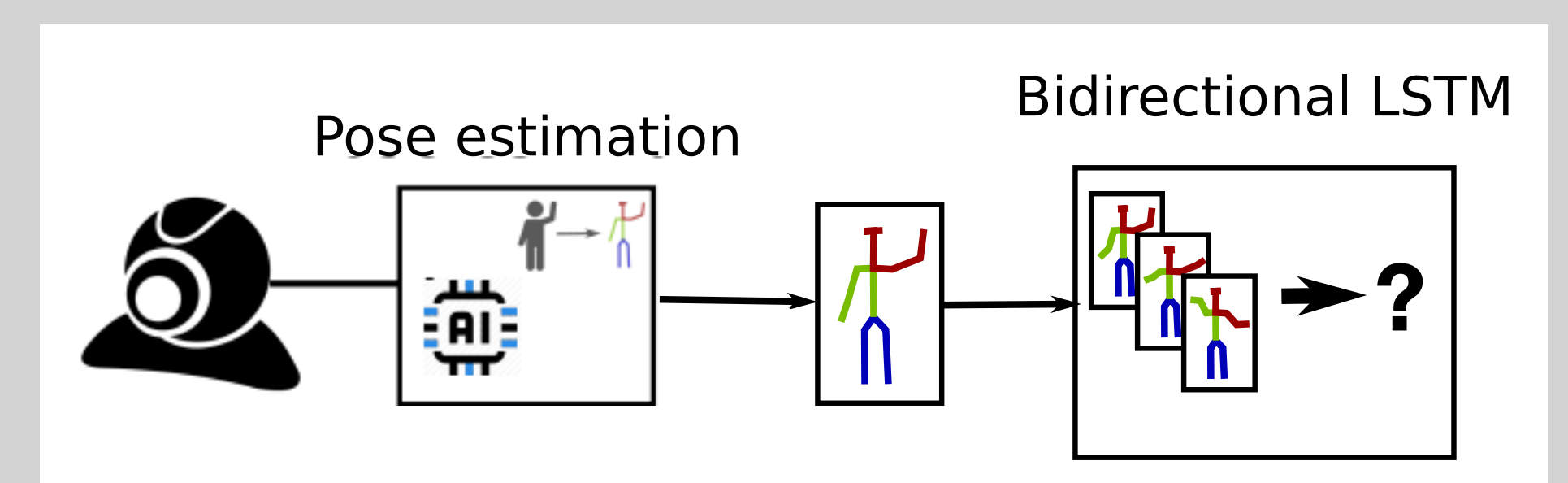
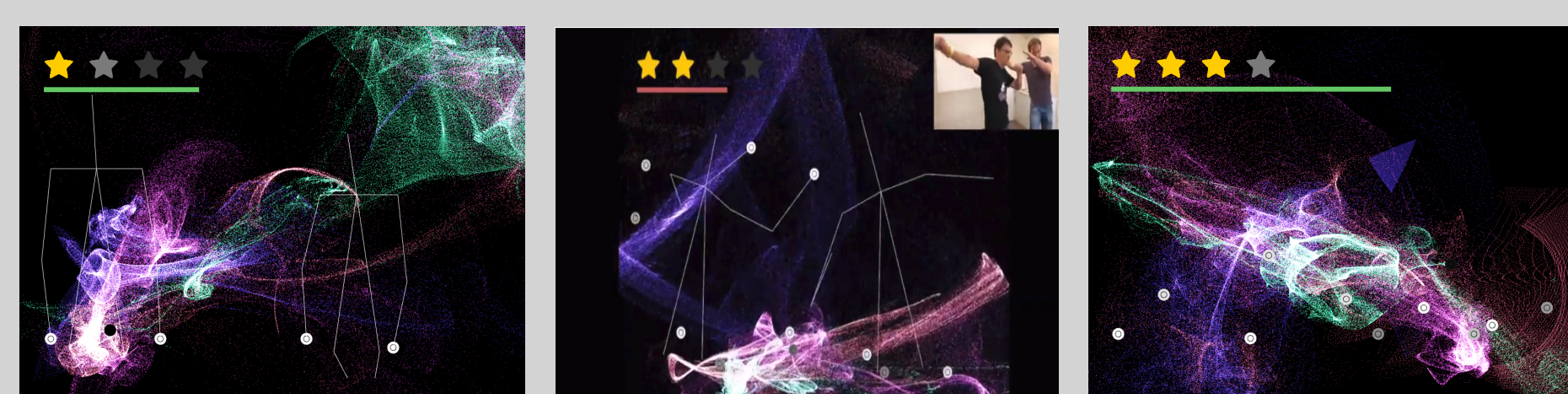


Diagram of our dance recognition.

## The Musical Game

- We classify the dance, and whenever the dance changes, we aggregate "points"
- After a certain point value is reached, the "song" or "arrangement" progresses, or levels up
- Along with the progress of the arrangement we increase/change the level of complexity and loudness (conditions).

Level 1 completed    Level 2 in progress    Level 3 completed



Progression of the musical game

## Acknowledgments

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References:

- [1] Cao, Zhe, et al. "Realtime multi-person 2d pose estimation using part affinity fields." CVPR (2017).
- [2] Goodfellow, Ian, et al. "Generative adversarial nets." NIPS (2014)
- [3] Eghbal-zadeh, H, Vogl, R, et al. "A GAN based Drum Pattern Generation UI Prototype", ISMIR, 2018