A Multi-view Architecture for the SHL Challenge

Massinissa HAMIDI [1] and Aomar OSMANI [1] and Pegah ALIZADEH [2]
[1] LIPN-UMR CNRS 7030, Univ. Sorbonne Paris Nord
[2] DeVinci Research Center, Pôle Universitaire De Vinci

Université Sorbonne Paris Nord   DE VINCI

Multiple sources (positions in the case of the SHL challenge) have different levels of informativeness with regard to the concept (the transportation mode) that we want to learn.

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Learning a joint representation, as a first step, helps the model compensate for the potential lack of informativeness of some sources (e.g. a unique target position remains during model deployment).
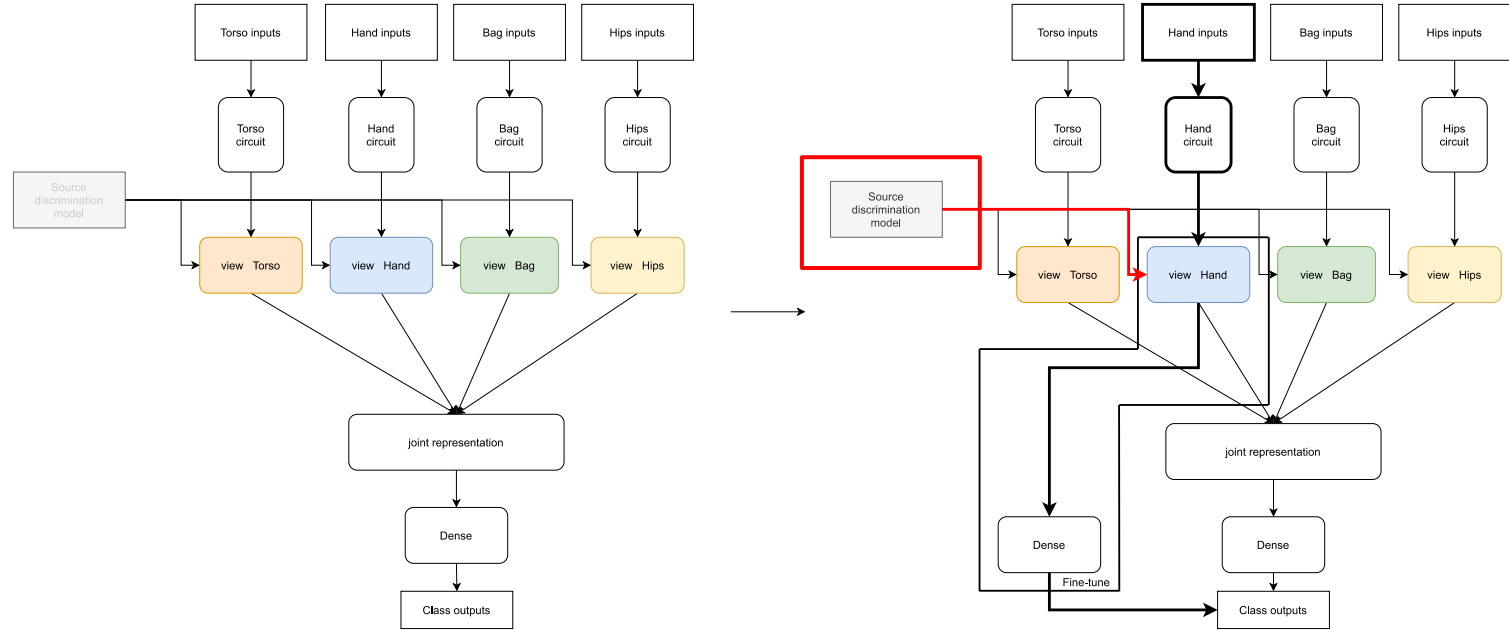
Global Architecture
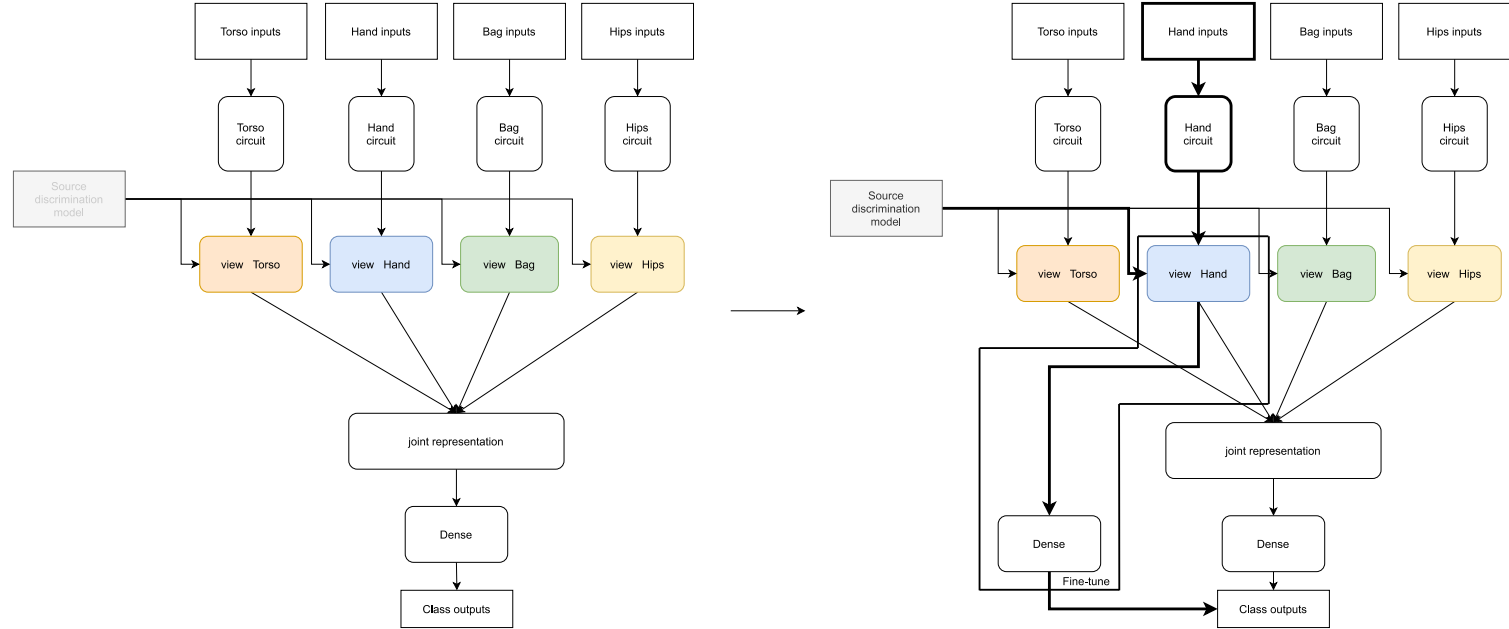
We consider the phones located in different positions as multiple views of the same concept.
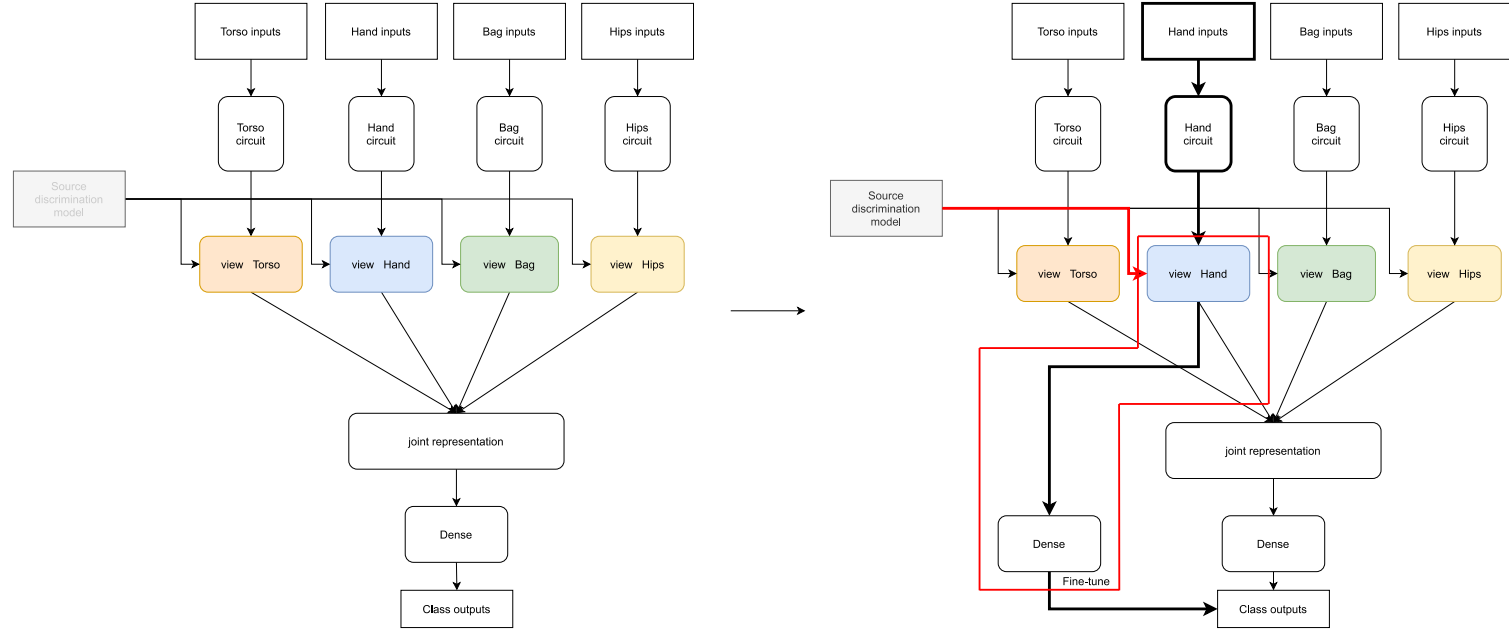
Global Architecture
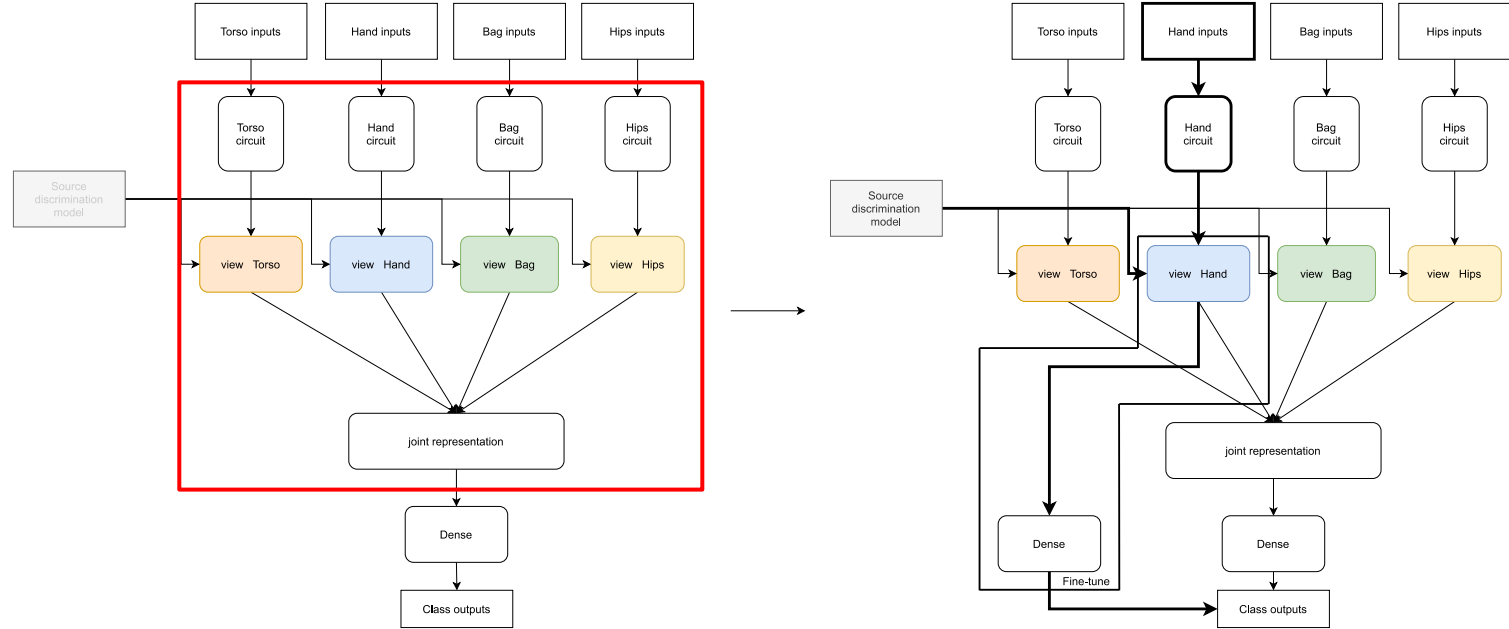
We propose to (1) leverage these views entirely in order to learn a joint representation via position-specific convolution-based circuits.
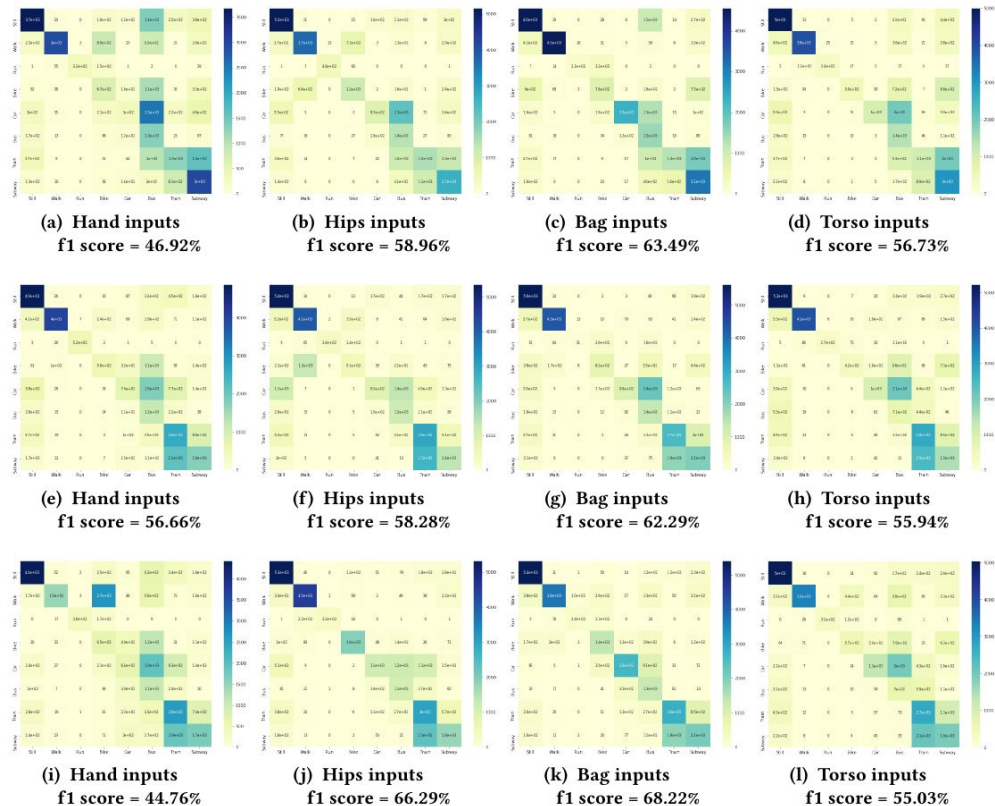
Global Architecture

We then (2) determine the target position using a simple model based on the energy of signals,

Global Architecture

and finally, we (3) fine-tune the corresponding circuit so as to increase the circuit's robustness.

(a) **Hand inputs**
f1 score = 46.92%

(b) **Hips inputs**
f1 score = 58.96%

(c) **Bag inputs**
f1 score = 63.49%

(d) **Torso inputs**
f1 score = 56.73%

(e) **Hand inputs**
f1 score = 56.66%

(f) **Hips inputs**
f1 score = 58.28%

(g) **Bag inputs**
f1 score = 62.29%

(h) **Torso inputs**
f1 score = 55.94%

(i) **Hand inputs**
f1 score = 44.76%

(j) **Hips inputs**
f1 score = 66.29%

(k) **Bag inputs**
f1 score = 68.22%

(l) **Torso inputs**
f1 score = 55.03%

We tested different configurations of the proposed approach. The recognition performances vary between ~44% and ~68% measured by the f1 score.

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