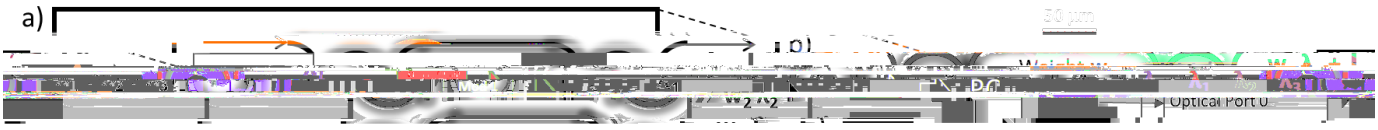

Fig. 1. Architecture and result of our Photonic Integrated Circuit. (a) Structure of a PTC module, (b) its integration on the PIC and setup, and (c) the photo of the PIC. (d) Optical transfer function, with the selected wavelengths. (e) Power map of one module with 2 inputs varying the weights, measure in current of the integrated photodiode. (f-i) Image edge detection: from the original BW figure, we obtain the ideal one (using MATLAB) and the Experimental one, before and after threshold filtering. The result shows an error rate of 3:41%.

II. Result and Discussion

Our architecture uses coupled add-drop microring resonators linked with attenuator to perform the dot-product for the MVM task. In particular, as shown in figure 1a-c), the first column of microrings acts as WDM de-mux, while the second one acts as WDM combiner. The weights are implemented by attenuator, that can either be high-speed MZI, VOA, or P-RAM element. In this case, we use large ER slow-speed MZI. We realize the Photonic Integrated Circuit (PIC) using active AMF Silicon Photonic platform.

From the measured spectrum in figure 1d, we experimentally obtain the power map from the integrated photodiode using 2 input wavelengths and varying their weights. We then use our PTC to compute the edge detection from the George