

User-friendly image-activated microfluidic cell sorting technique using an optimized, fast deep learning algorithm

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Other Supplementary Material for this manuscript includes:

- Video S1. Real-time sorting of 15 μ m and 10 μ m fluorescent polystyrene beads.
- Video S2. Real-time sorting of HL-60 and Jurkat cells.
- Video S3. Real-time sorting of HL-60 and K562 cells.
- Video S4. Real-time sorting of 15 μ m and 10 μ m fluorescent polystyrene beads (Photron camera).
- Video S5. Real-time sorting of HL-60 and Jurkat cells (Photron camera).
- Video S6. Real-time sorting of HL-60 and K562 cells. (Photron camera).
- bead_and_cell_counting_results.xlsx
- fluorescence_microscopy_images.zip

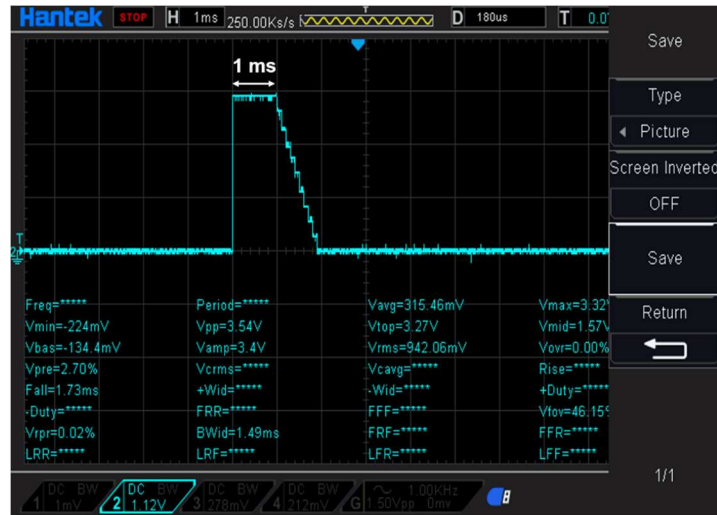


Fig. S1 The proposed sorter generates an asymmetric trapezoidal pulse to minimize the fluctuation issue in the PDMS-based sorting chip. The pulse's amplitude was optimized to 0.75-0.85 V for the sorting chip that was 31 μ m high.

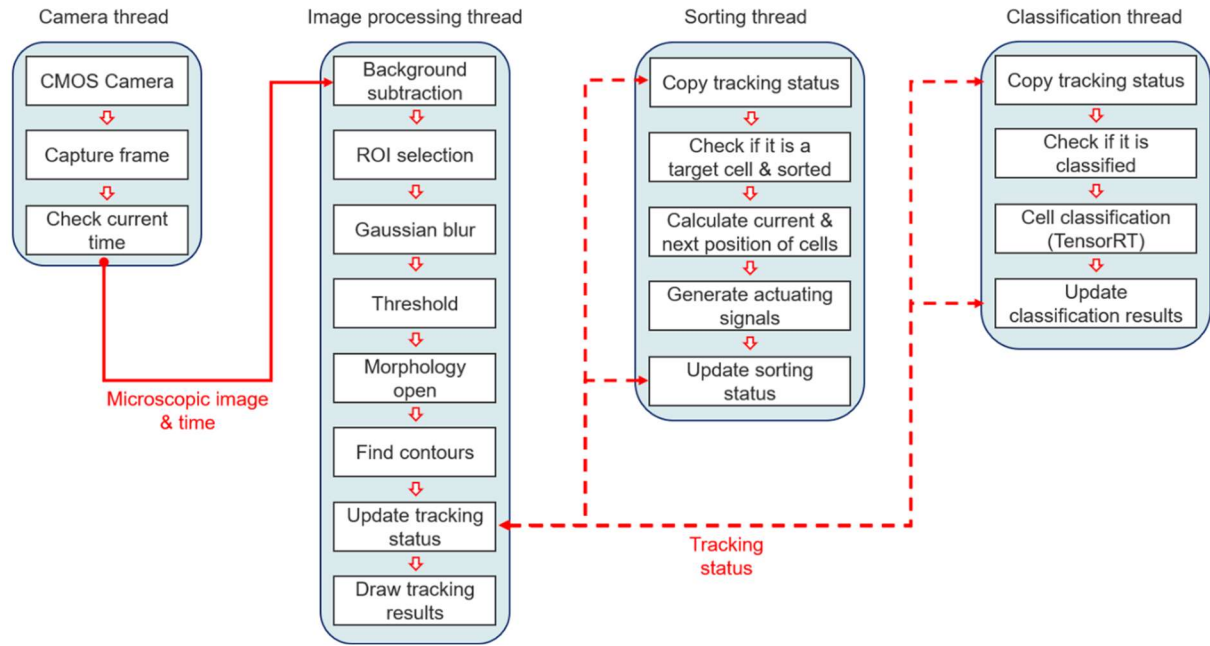


Fig. S2 Four threads for real-time cell sorting. The camera thread captures 720 x 112 x 3-pixel images at 2000 fps. The image processing thread detects and tracks flowing cells captured on video frames, and the classification thread classifies the cropped cell images. The sorting thread updates the current locations of cells continuously and makes sorting decisions to sort target cells.

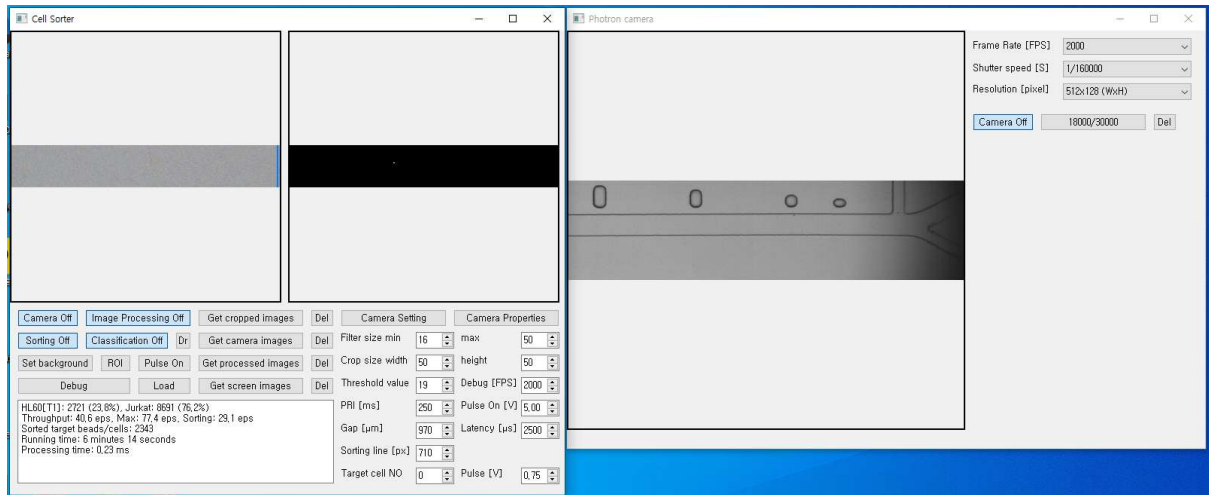


Fig. S3 Cell sorting program (left) and monitoring program (right). To simplify control of the proposed imaging-activated cell sorter, we developed a custom-written C++ GUI program on Window 10 Education. The cell sorting program enables the monitoring of cell sorting progress, including cell tracking and classification results. Users can record experimental images and acquire single-cell images. The monitoring program helps us to monitor if cell sorting is going well.