Supplementary Table 1 | Mean execution times between successive pick attempts and key substeps of the tracking and picking process.

Task	Execution time (s) (mean ± s.d.)
Image analysis for fly localization	0.037 ± 0.0012 ($n = 16$)
Image analysis for fly segmentation	0.026 ± 0.0033 ($n = 38$)
Image analysis for ring detection	0.059 ± 0.017 ($n = 33$)
Robotic motion for tracking fly between image acquisitions	0.18 ± 0.0072 ($n = 36$)
Robotic motion for picking fly	0.39 ± 0.0085 ($n = 13$)

Supplementary Table 2 | Picking and gender sorting performance measures.

Application	Yield
Fly picking[‡]	84 ± 5% (n = 169 flies)
Fly sex sorting[§]	99 ± 1% (n = 108 flies)

s.d. were estimated using binomial counting errors.

[‡] For picking experiments, we visually scored the picked flies. All flies that were picked by the thorax were counted as successful outcomes, whereas all flies that were picked by other body parts like the wing and head were counted as failures.

[§] For sex sorting experiments, we visually inspected the flies and compared our sex determinations to those of the automated algorithm. All flies for which the assignments matched were counted as successful outcomes, whereas flies for which the assignments did not match were deemed failures.