find two parallel edges using hashing. for an edge pq, use its slope and the y-coordinate of the intersection point between the lines pq' and $x = 0$ during hashing, where pq' is perpendicular to pq. easy to find the minimum area one. $O(n^2)$.

remark. some algorithms in the discussion forum use hashing to find two diagonals that have equal length and share the same middle point, then they enumerate all possible rectangles to find the one with minimum area, but the total number of rectangles is only known to be $\Omega(n^2)$ and $O(n^{5/2})$ [1].

References

[1] Marc J Van Kreveld and Mark T De Berg. Finding squares and rectangles in sets of points. *BIT Numerical Mathematics*, 31(2):202–219, 1991.