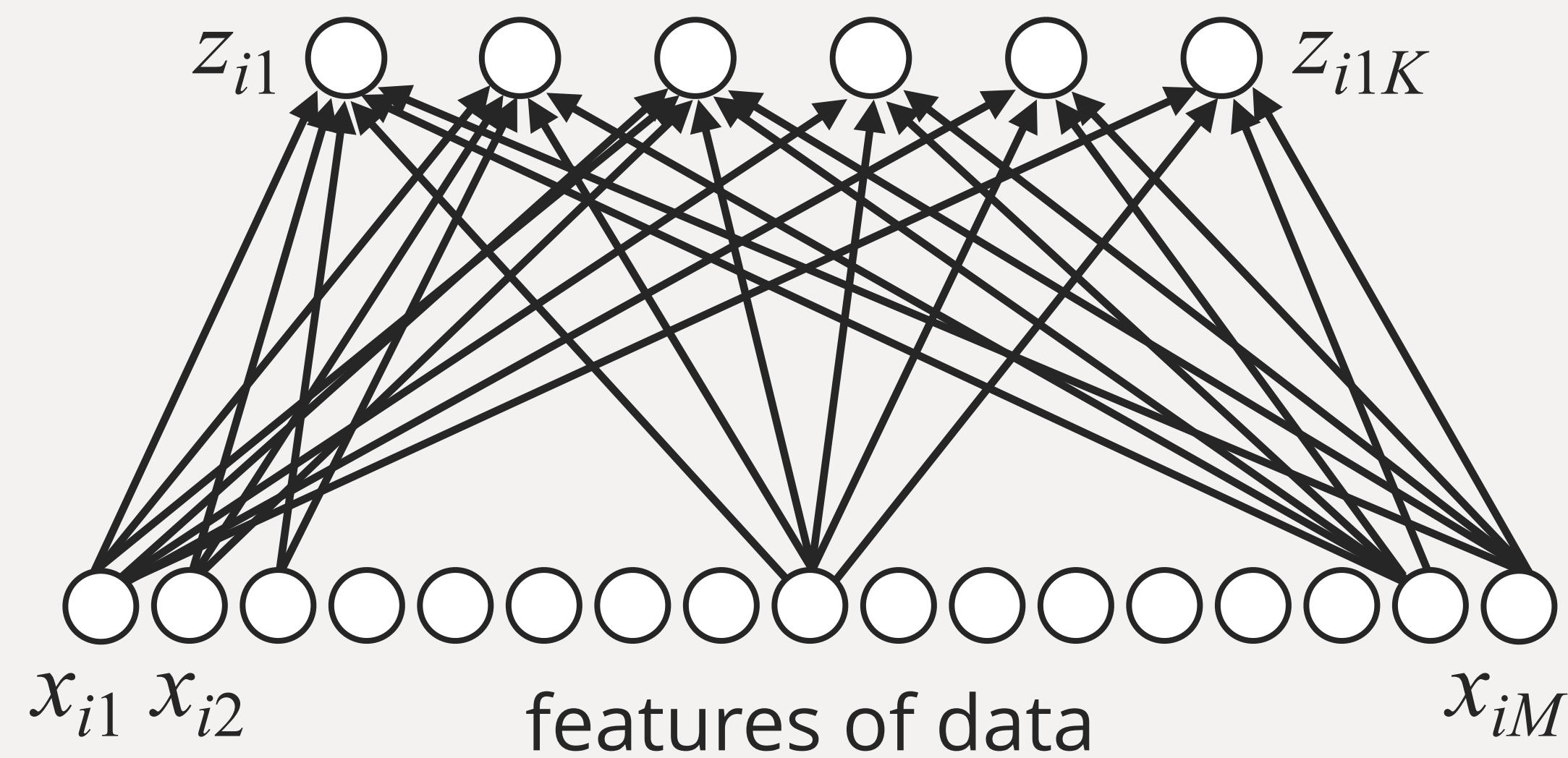




Multilayer Perceptron Math Model



$$z_{i1} = b_{01} + x_i \odot b_1$$

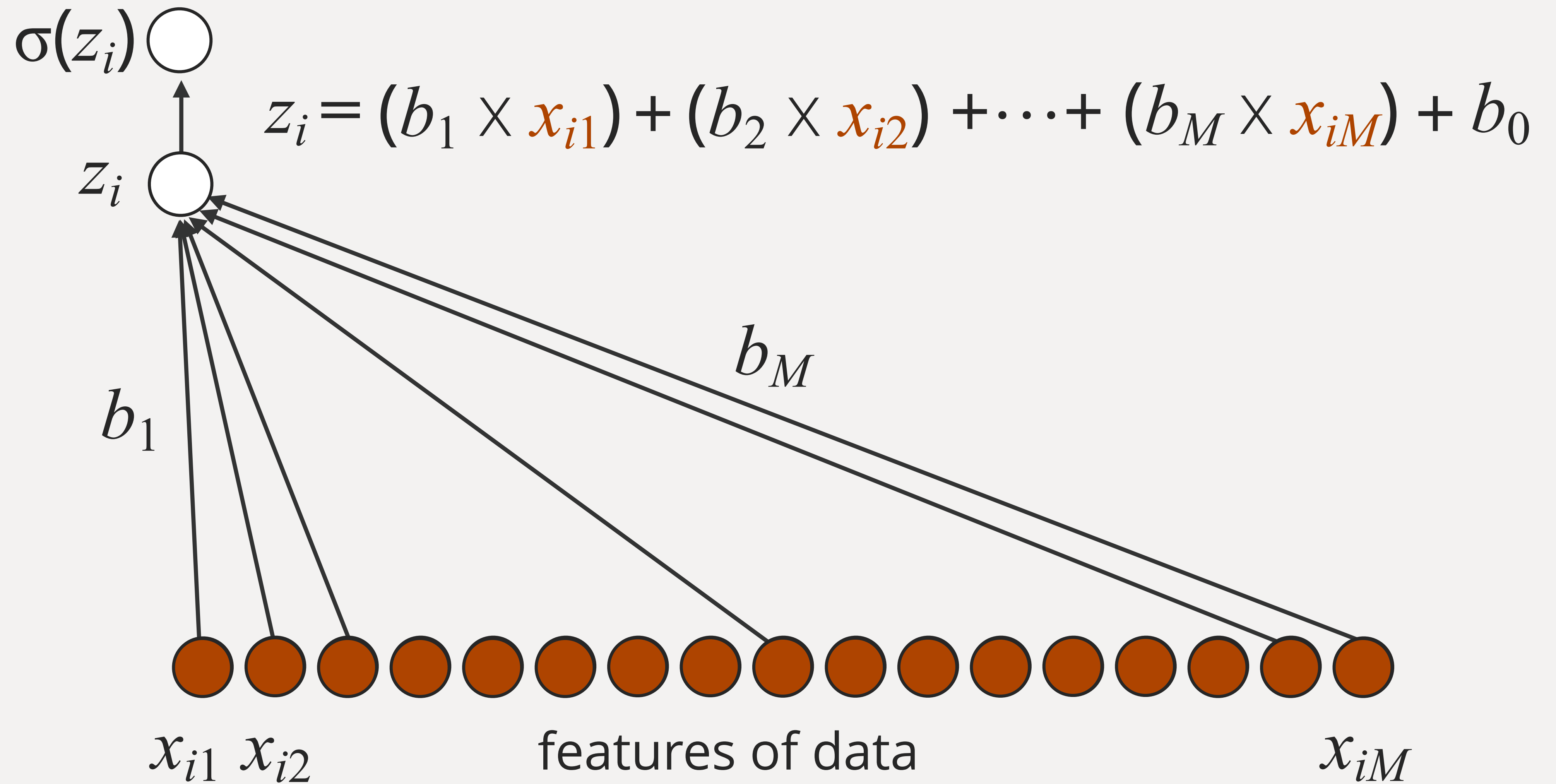
$$z_{i2} = b_{02} + x_i \odot b_2$$

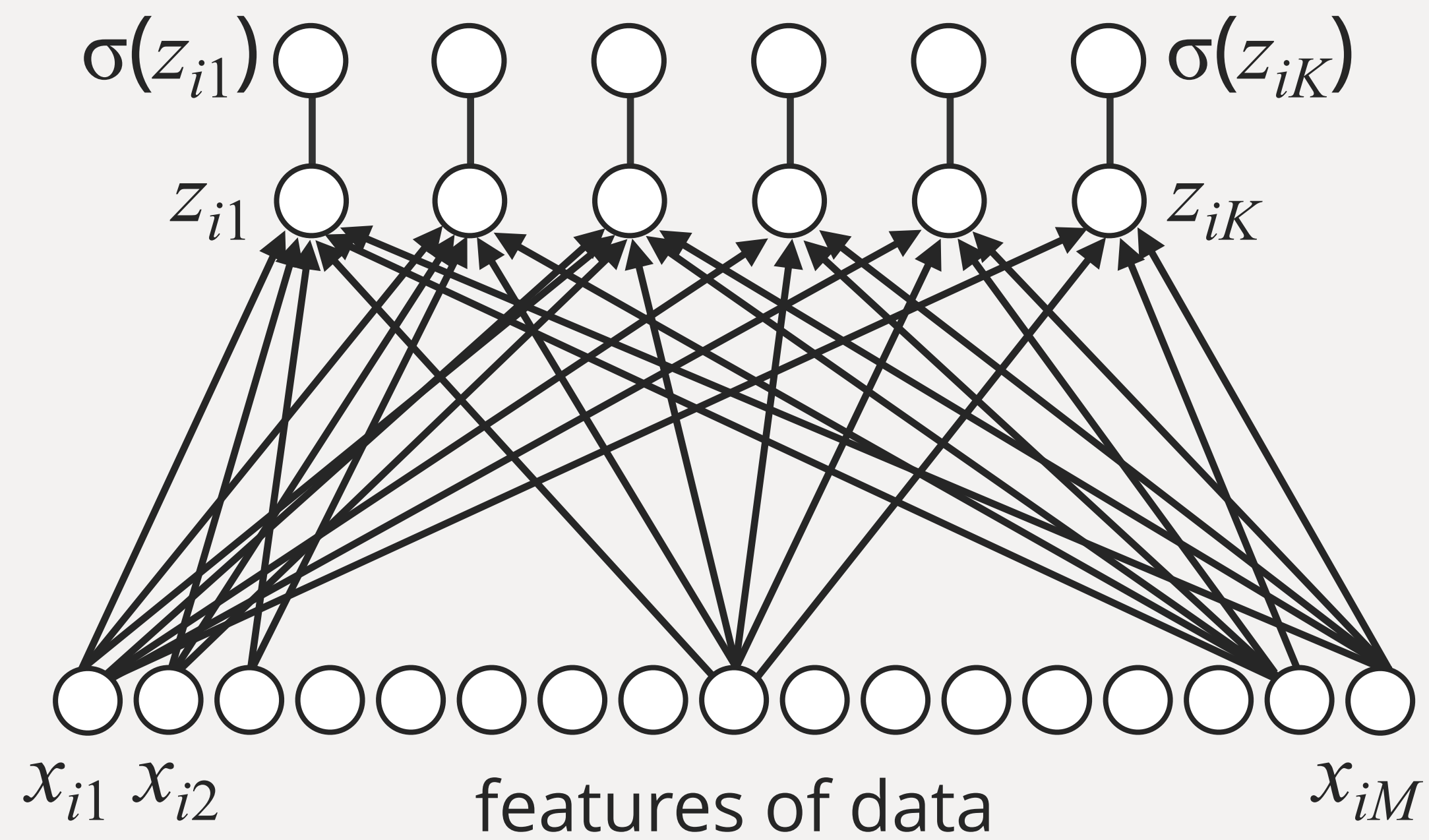
$$\vdots$$

$$z_{iK} = b_{0K} + x_i \odot b_K$$

project data x_i onto
 K filters: b_1, \dots, b_K

Logistic Regression



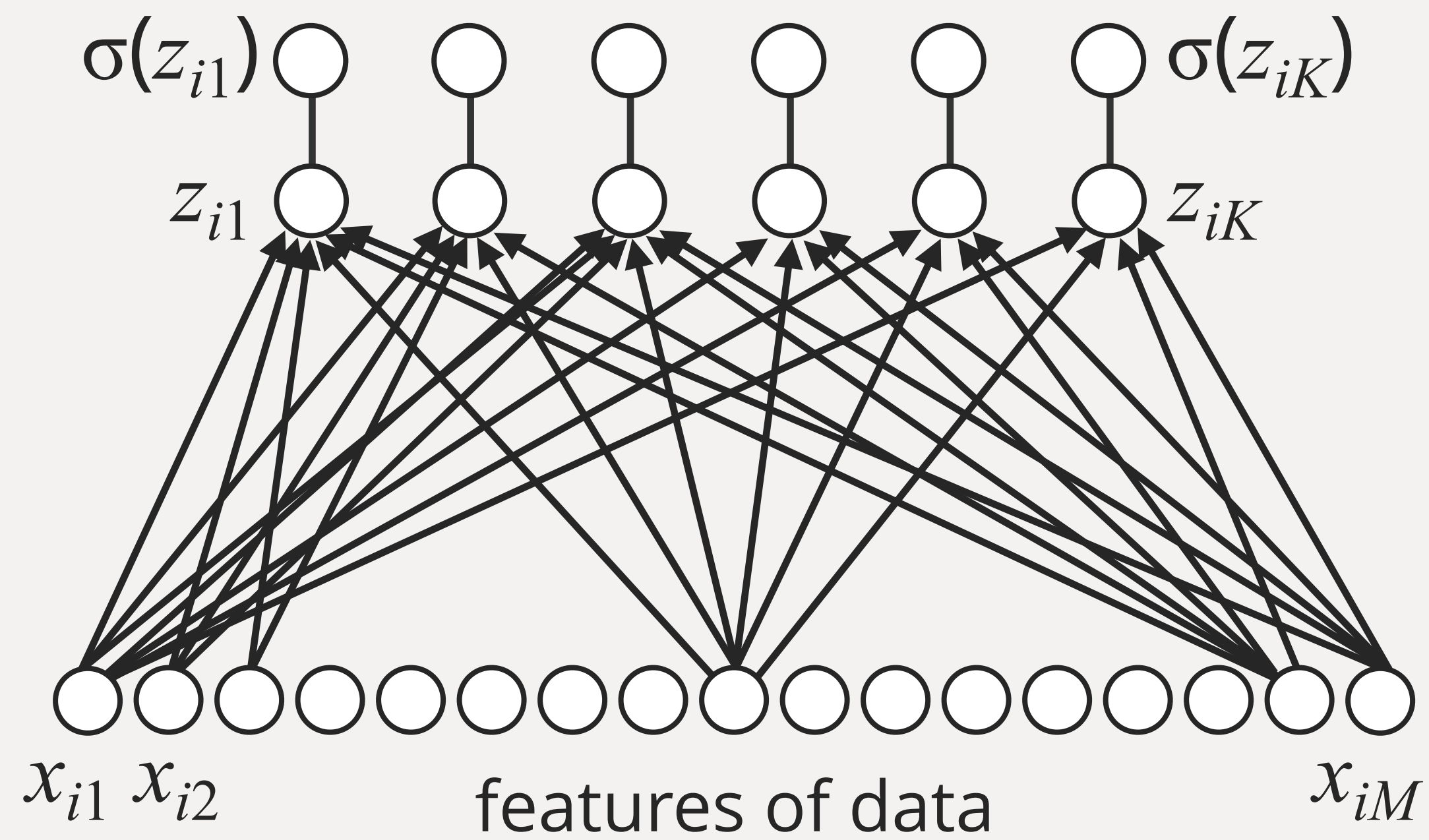


$$z_{i1} = b_{01} + x_i \odot b_1$$

$$z_{i2} = b_{02} + x_i \odot b_2$$

$$\vdots$$

$$z_{iK} = b_{0K} + x_i \odot b_K$$

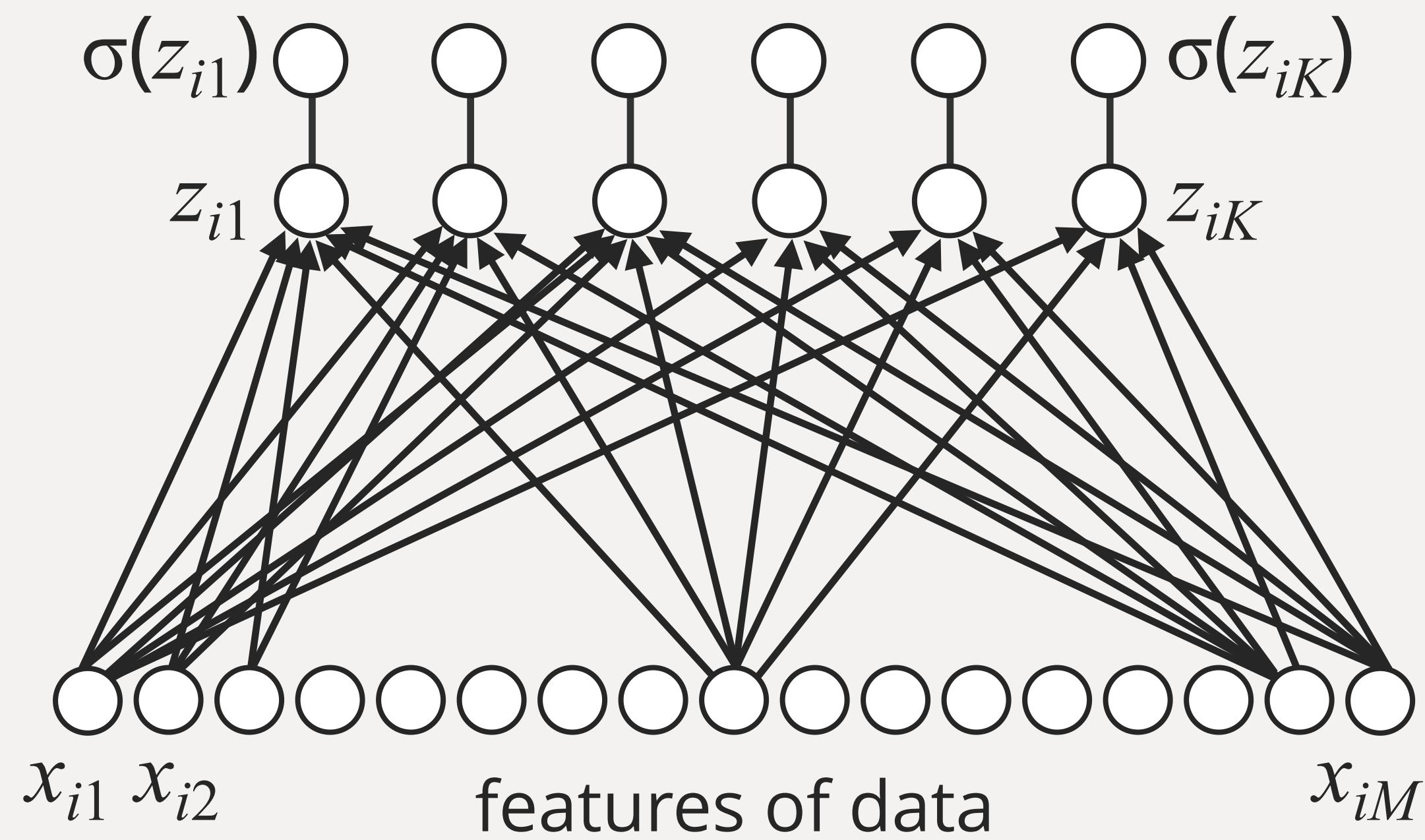


$$z_{i1} = b_{01} + x_i \odot b_1$$

$$z_{i2} = b_{02} + x_i \odot b_2$$

$$\vdots$$

$$z_{iK} = b_{0K} + x_i \odot b_K$$



$$z_{i1} = b_{01} + x_i \odot b_1$$

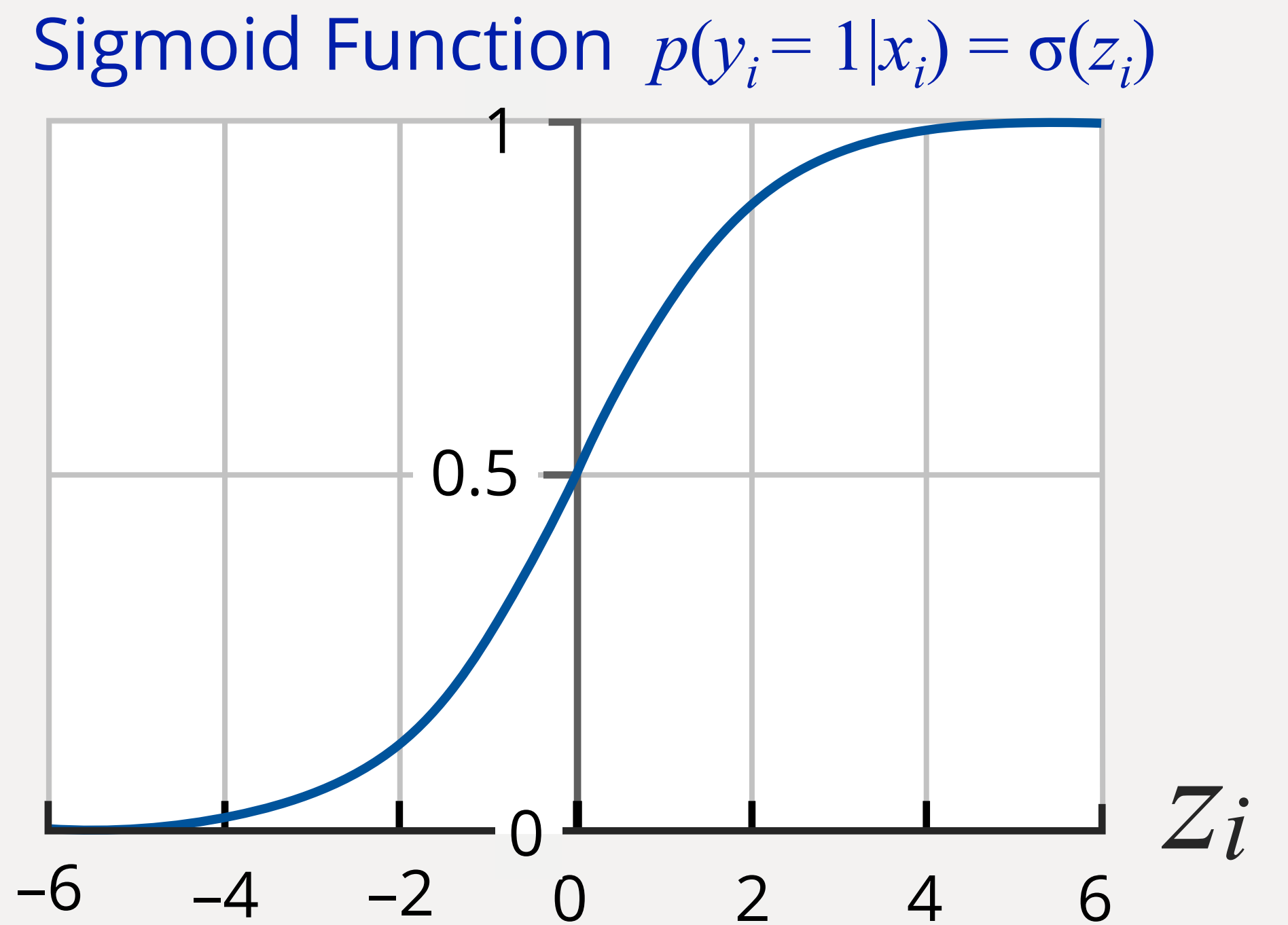
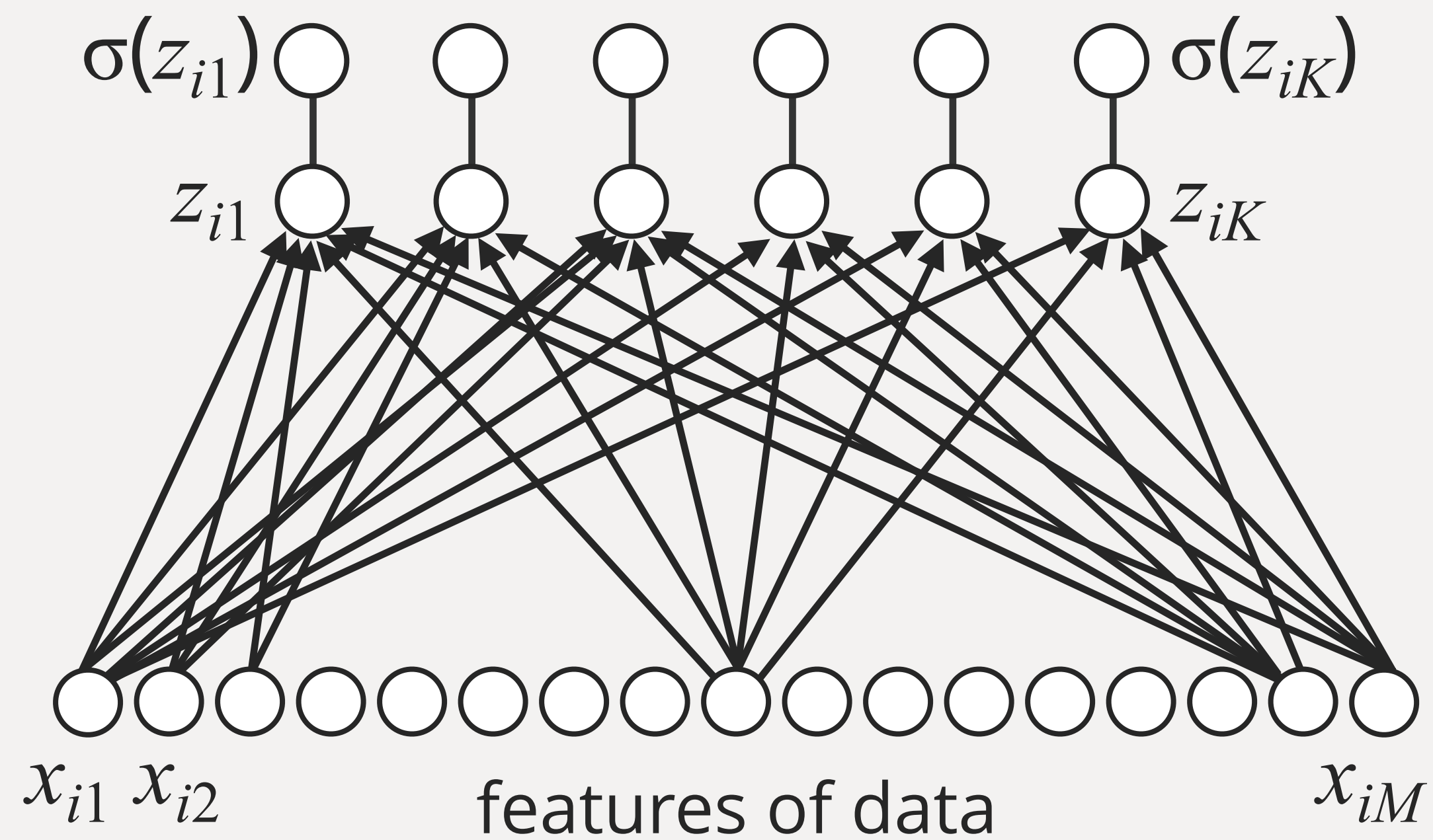
$$z_{i2} = b_{02} + x_i \odot b_2$$

⋮

$$z_{iK} = b_{0K} + x_i \odot b_K$$

project data x_i onto
 K filters: b_1, \dots, b_K

K features output
 from layer 1



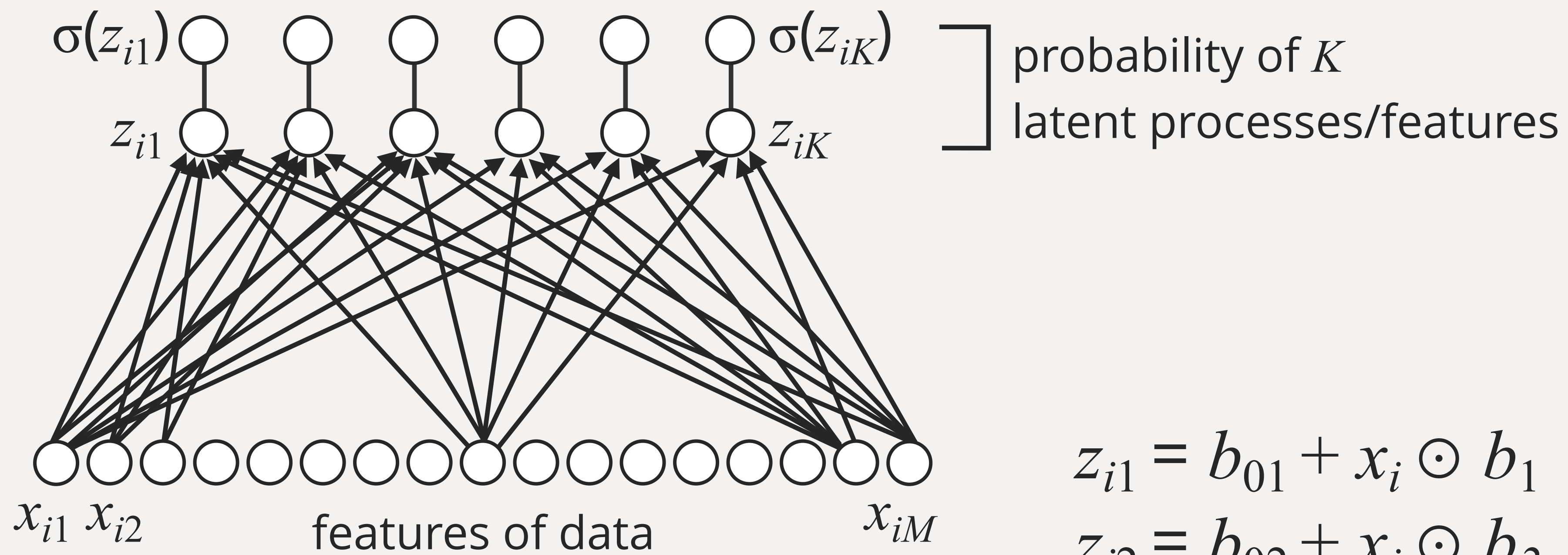
$$z_{i1} = b_{01} + x_i \odot b_1$$

$$z_{i2} = b_{02} + x_i \odot b_2$$

$$\vdots$$

$$z_{iK} = b_{0K} + x_i \odot b_K$$

project data x_i onto
 K filters: b_1, \dots, b_K



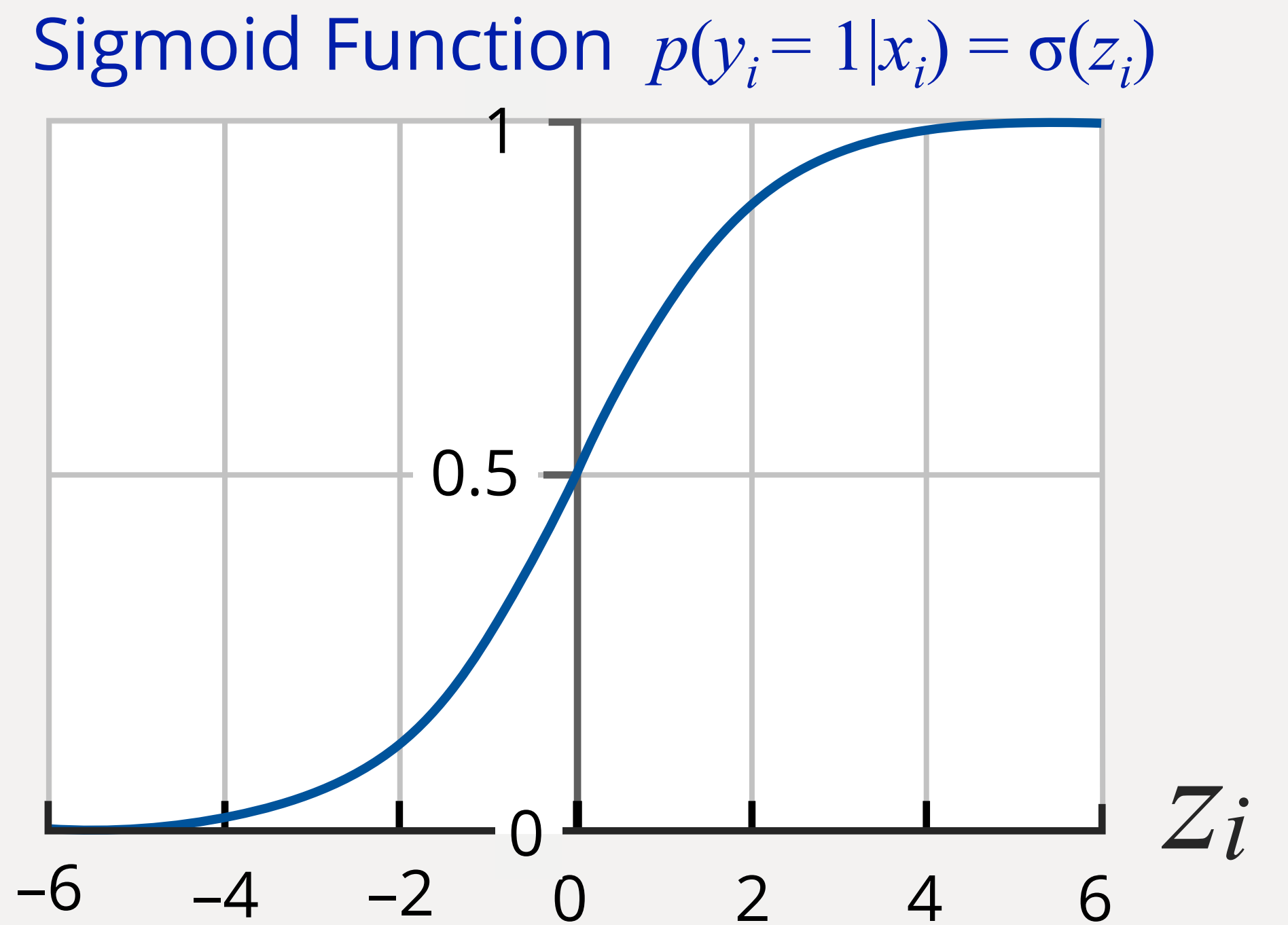
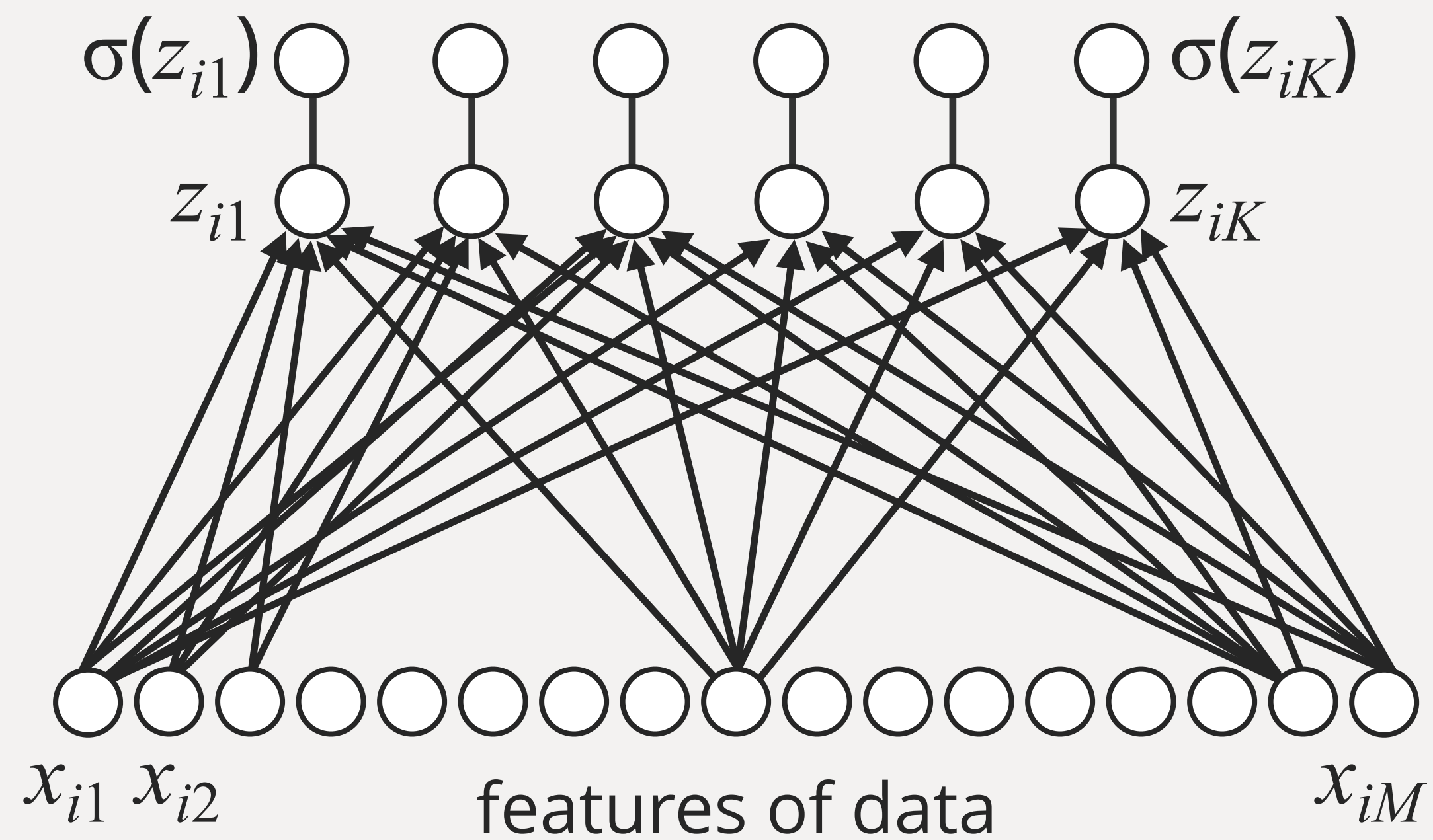
$$z_{i1} = b_{01} + x_i \odot b_1$$

$$z_{i2} = b_{02} + x_i \odot b_2$$

$$\vdots$$

$$z_{iK} = b_{0K} + x_i \odot b_K$$

project data x_i onto
 K filters: b_1, \dots, b_K



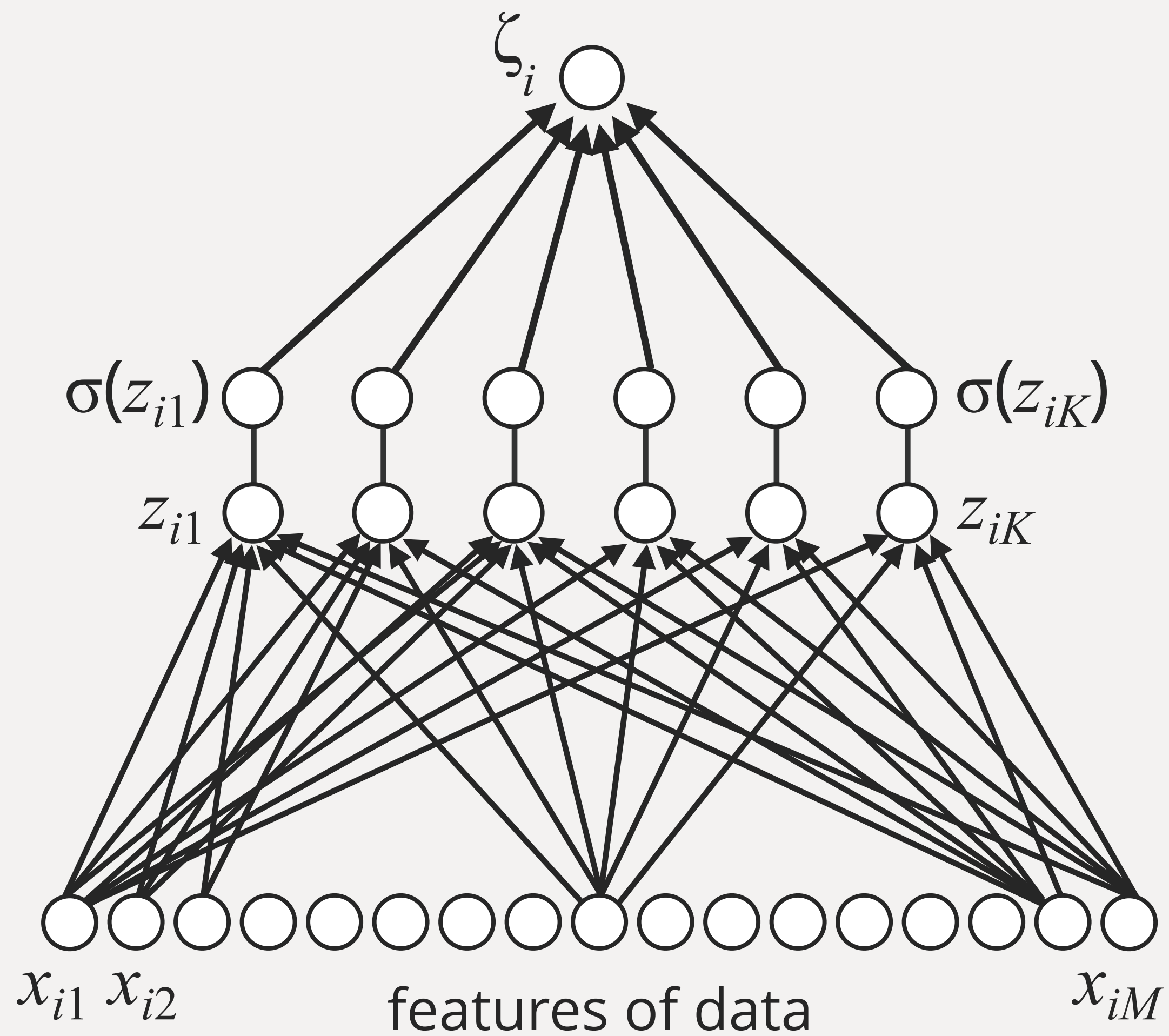
$$z_{i1} = b_{01} + x_i \odot b_1$$

$$z_{i2} = b_{02} + x_i \odot b_2$$

$$\vdots$$

$$z_{iK} = b_{0K} + x_i \odot b_K$$

project data x_i onto
 K filters: b_1, \dots, b_K



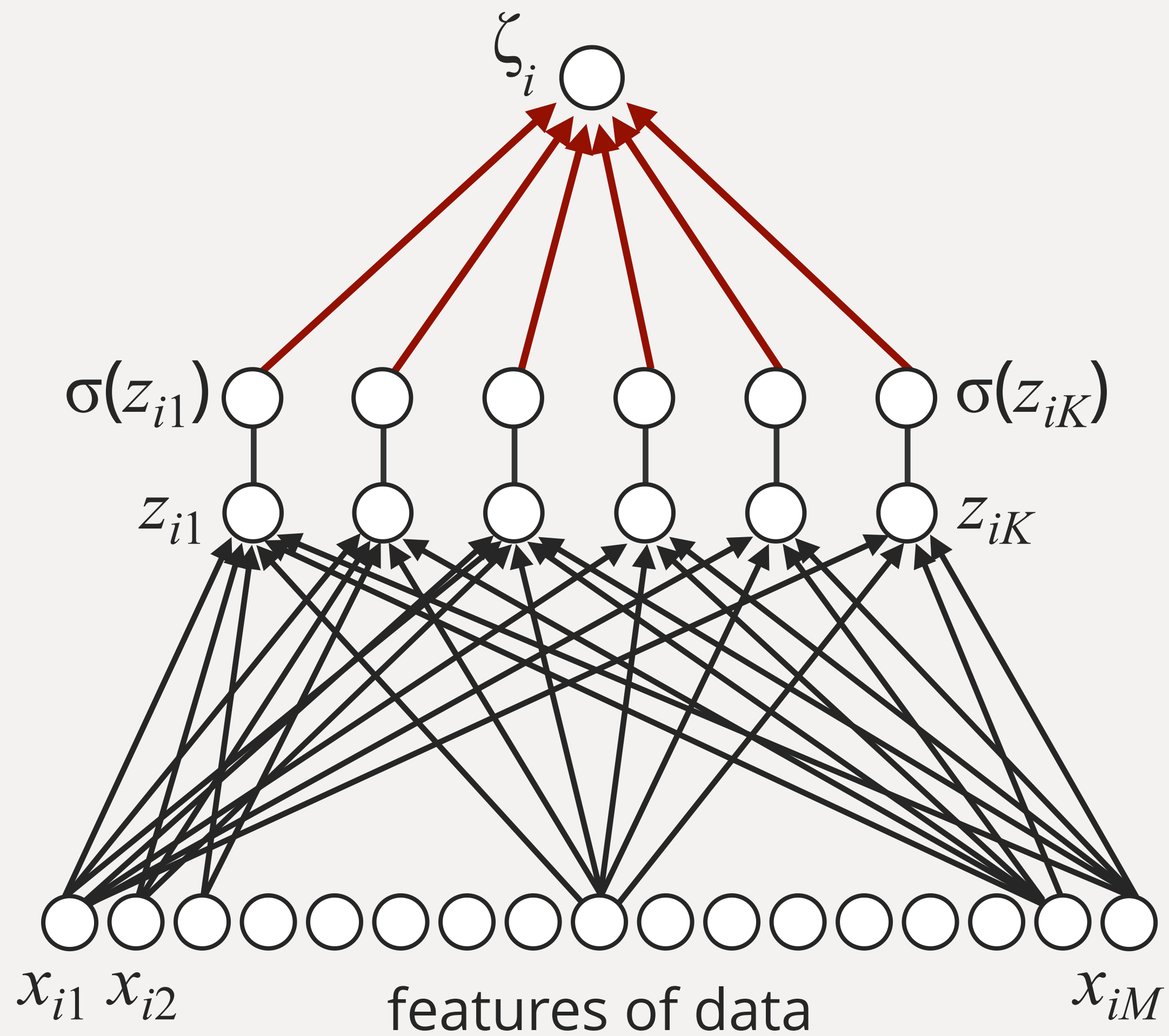
$$z_{i1} = b_{01} + x_i \odot b_1$$

$$z_{i2} = b_{02} + x_i \odot b_2$$

$$\vdots$$

$$z_{iK} = b_{0K} + x_i \odot b_K$$

project data x_i onto
 K filters: b_1, \dots, b_K



$$\zeta_i = c_0 + \sigma(z_i) \odot c$$

single layer 2 filter

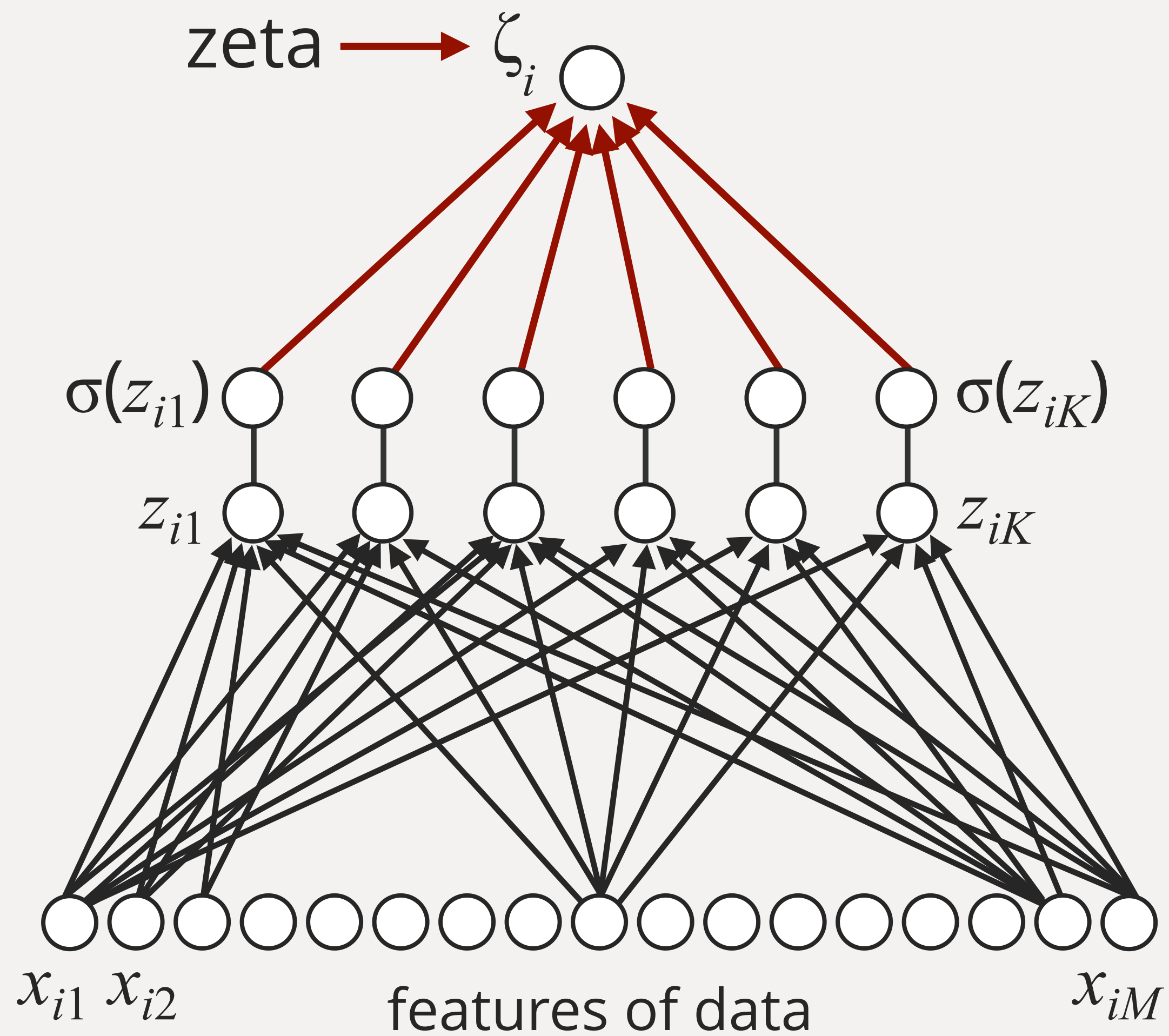
$$z_{i1} = b_{01} + x_i \odot b_1$$

$$z_{i2} = b_{02} + x_i \odot b_2$$

\vdots

$$z_{iK} = b_{0K} + x_i \odot b_K$$

project data x_i onto
 K filters: b_1, \dots, b_K



$$\zeta_i = c_0 + \sigma(z_i) \odot c$$

single layer 2 filter

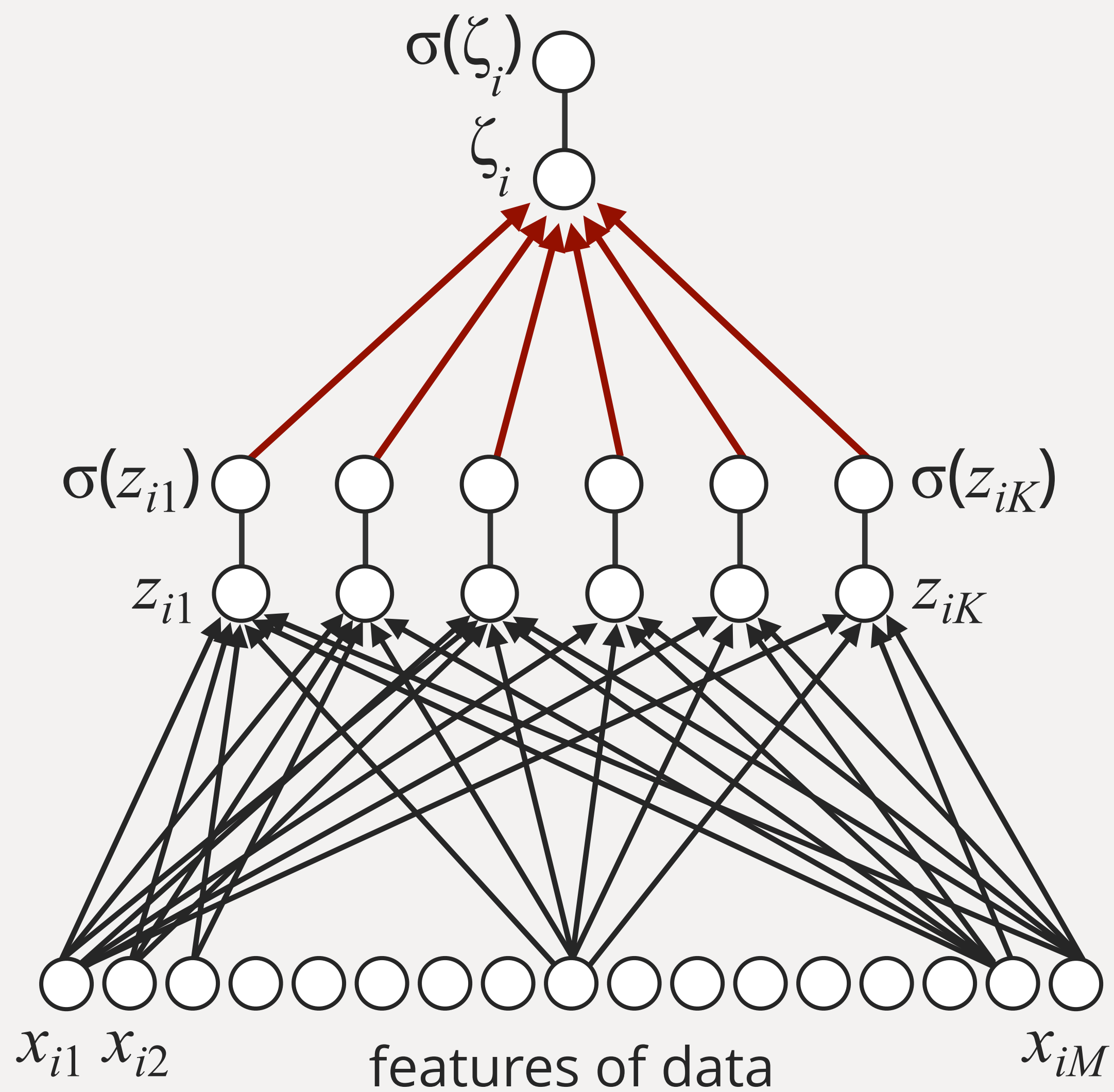
$$z_{i1} = b_{01} + x_i \odot b_1$$

$$z_{i2} = b_{02} + x_i \odot b_2$$

\vdots

$$z_{iK} = b_{0K} + x_i \odot b_K$$

project data x_i onto
 K filters: b_1, \dots, b_K



$$\zeta_i = c_0 + \sigma(z_i) \odot c$$

single layer 2 filter

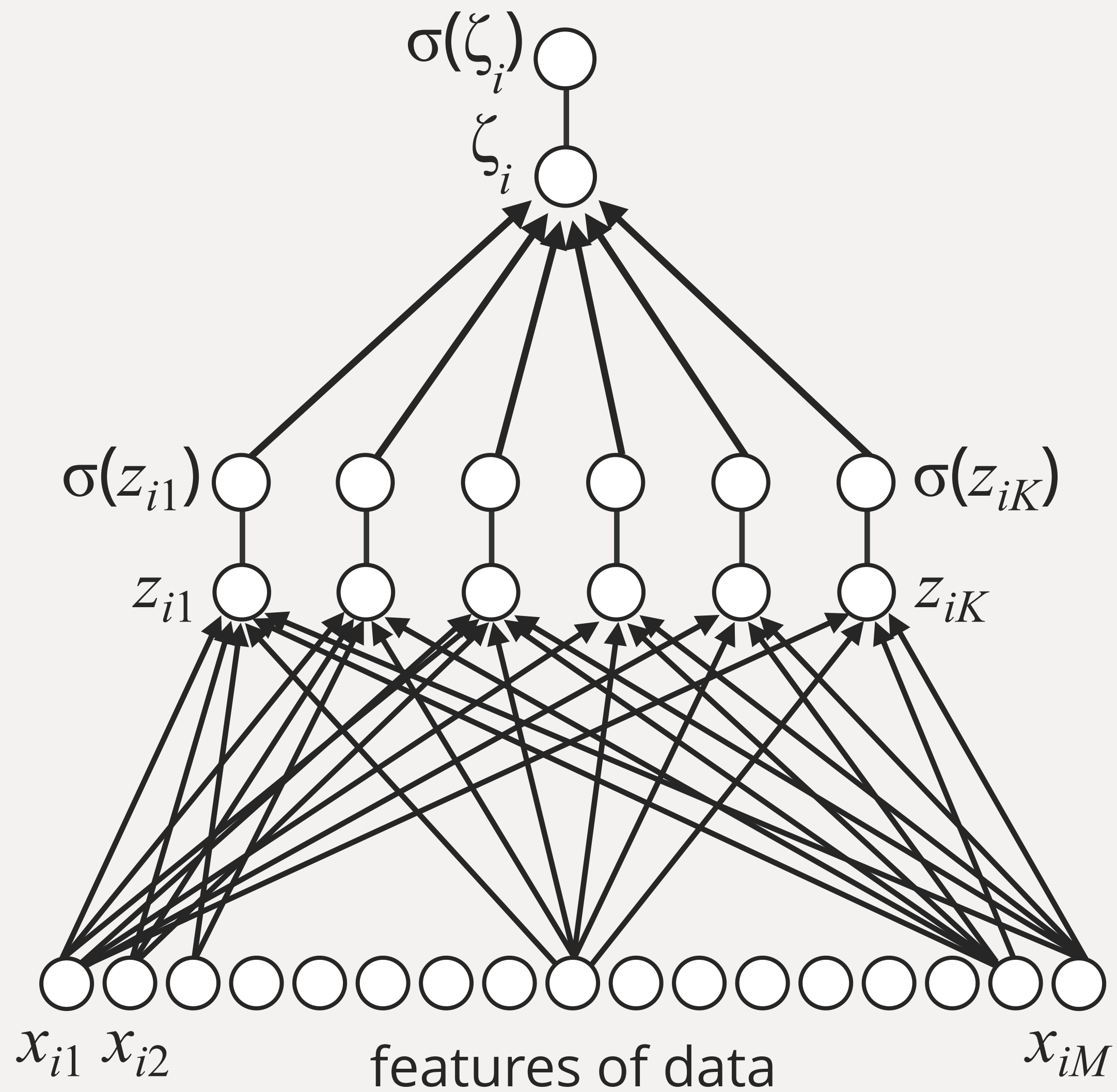
$$z_{i1} = b_{01} + x_i \odot b_1$$

$$z_{i2} = b_{02} + x_i \odot b_2$$

\vdots

$$z_{iK} = b_{0K} + x_i \odot b_K$$

project data x_i onto
 K filters: b_1, \dots, b_K



$$\zeta_i = c_0 + \sigma(z_i) \odot c$$

$$z_{i1} = b_{01} + x_i \odot b_1$$

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⋮

$$z_{iK} = b_{0K} + x_i \odot b_K$$

project data x_i onto
 K filters: b_1, \dots, b_K