The Polynomial Kernel

The Polynomial Kernel in the previous sleep vs. happiness example

$$K(a,b) = (a \cdot b + r)^d$$
 where r is the coefficients and d the degree



we set
$$r = \frac{1}{2}$$
 and $d = 2$:

$$(a \cdot b + \frac{1}{2})^2 = (a \cdot b + \frac{1}{2})(a \cdot b + \frac{1}{2})$$

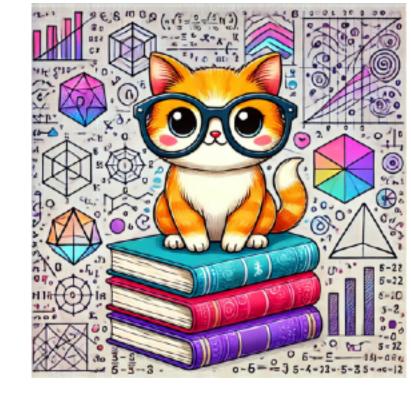
$$+a^2b^2 + \frac{1}{2}ab + \frac{1}{2}ab + \frac{1}{4}$$

$$= ab + a^2b^2 + \frac{1}{4}$$

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$$= ab + a^2b^2 + \frac{1}{4} = (a, a^2, \frac{1}{2}) \cdot (b, b^2, \frac{1}{2})$$

dot product