

$$k(a, a') = \text{tr}[\rho(a') \rho(a)] \quad \text{Pure states} \quad |\langle \phi | \phi' \rangle|^2$$

$$\rho(a) = |\phi \times \phi| \quad \forall \text{ feature maps } \phi$$

Angle  
Encoded

$$\text{If } n \rightarrow \otimes R_n(n)$$

$$|\phi(n)\rangle = \cos\left(\frac{n}{2}\right) |0\rangle + i \sin\left(\frac{n}{2}\right) |1\rangle$$

$$\Rightarrow \rho(n) = |\phi \times \phi\rangle\langle n| = C^2\left(\frac{x}{2}\right) |0\rangle\langle 0| + S^2\left(\frac{x}{2}\right) |1\rangle\langle 1| \\ - i C\left(\frac{x}{2}\right) S\left(\frac{x}{2}\right) |0\rangle\langle 1| + i S\left(\frac{x}{2}\right) C\left(\frac{x}{2}\right) |1\rangle\langle 0|$$

$$= \begin{bmatrix} C^2\left(\frac{x}{2}\right) & -i C\left(\frac{x}{2}\right) S\left(\frac{x}{2}\right) \\ i C\left(\frac{x}{2}\right) S\left(\frac{x}{2}\right) & S^2\left(\frac{x}{2}\right) \end{bmatrix}$$

$$\Rightarrow k(a, a') = \cos\left(\frac{x-x'}{2}\right) \text{ from } \left[ 2C^2\left(\frac{\theta}{2}\right) = 1 + \cos(\theta) \right]$$

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