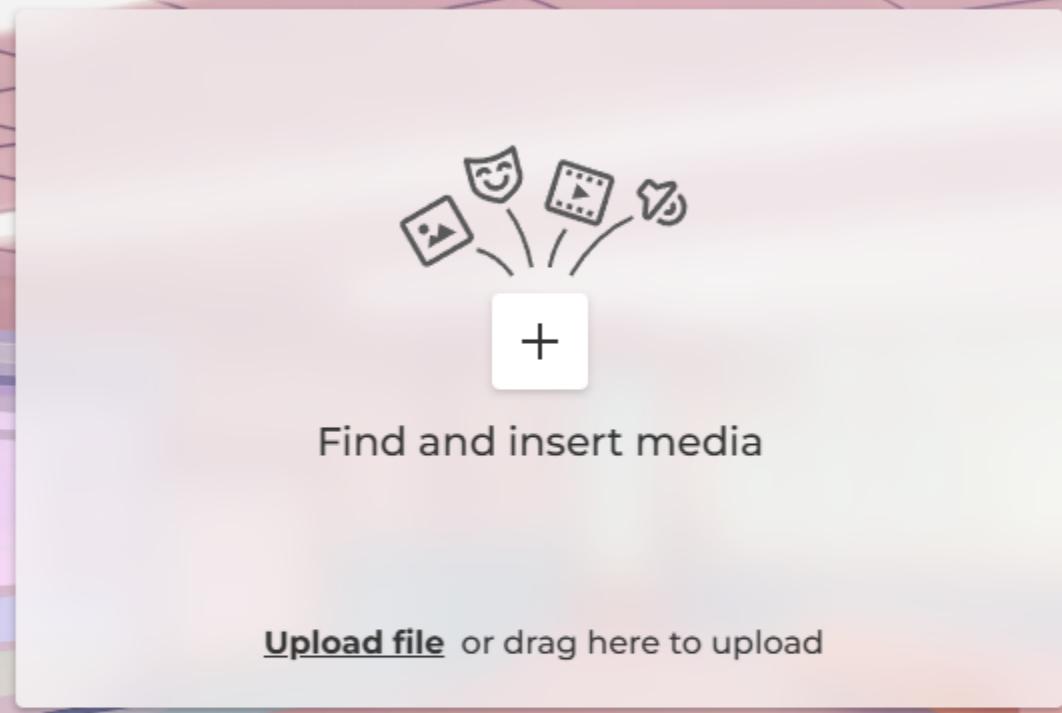


What does flow matching produce?



▲ a vector field



◆ an image



● a latent space



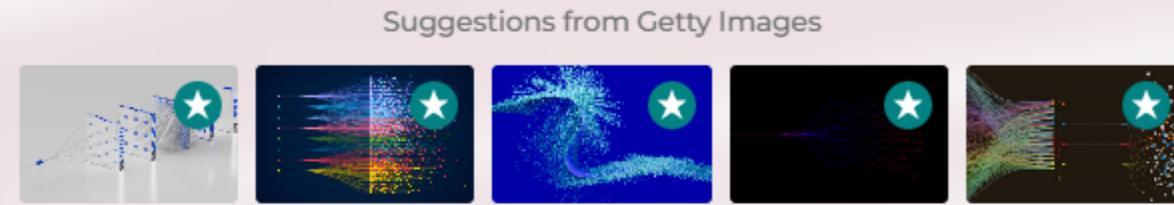
■ a model



Flow matching generalizes the denoising process of diffusion models



$$\begin{aligned} V_2 &= U_m \cdot R_{PF} \\ f_a &= \frac{1}{2\pi} \int_{-\infty}^{\infty} Y_m - 2L \sin \theta d\theta \\ \beta &= B_d \delta - \mu \cdot \delta \cdot \log S = \\ C(t) &= \int_{m_0}^{m_f} \frac{dt}{m} = \int_{M_0}^{M_f} \frac{dt}{M} = \int_{E_0}^{E_f} \frac{dt}{E} = \\ \tau &= \frac{\ln 2}{\beta} \quad F_h = S \cdot \rho \cdot g \\ \left(\frac{E_c}{E_{c0}} \right) &= \frac{2 \cos \theta \cos \theta_0}{\cos(\theta - \theta_0) \sin(\theta + \theta_0)} \end{aligned}$$



Find and insert media

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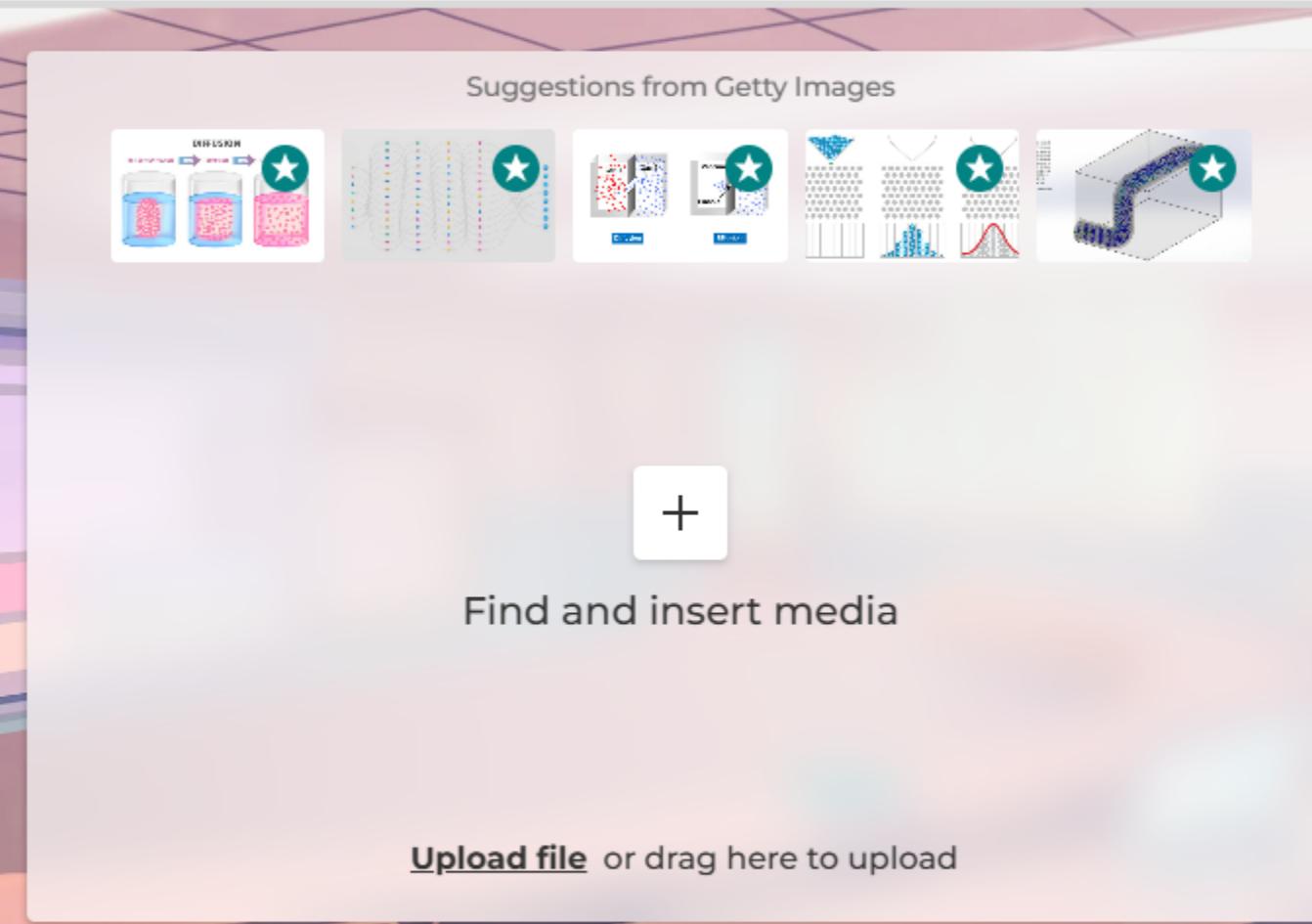
True



False



Diffusion models and flow matching models can both be used to map gaussian distributions to target distributions



True



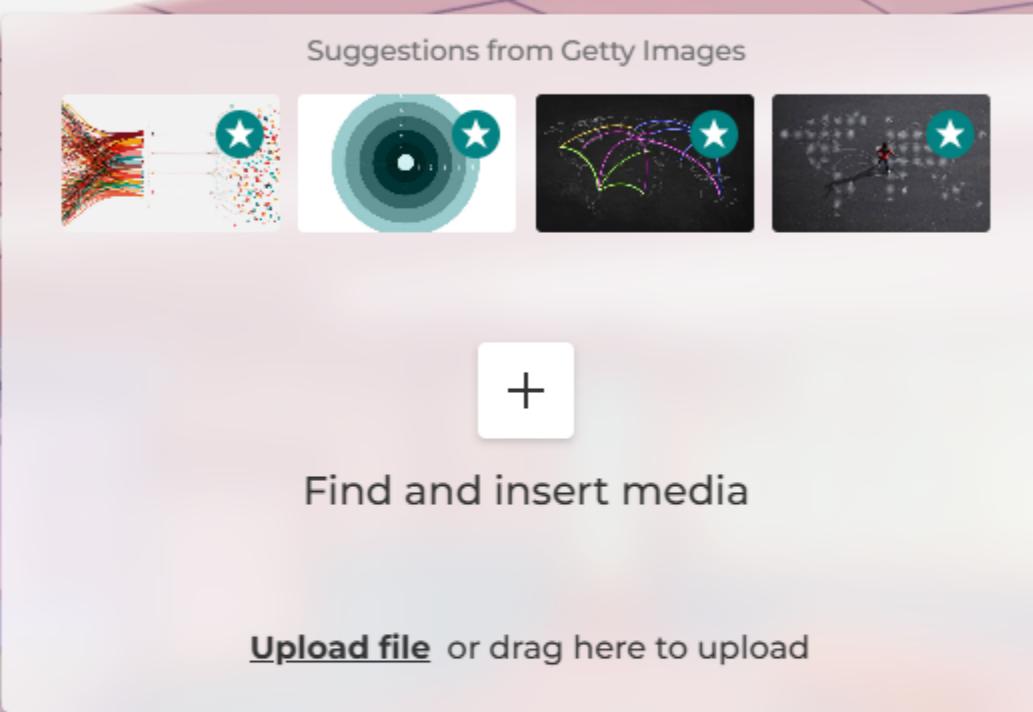
False



Flow Matching maps a Gaussian distribution to a target one by learning _____



$$\begin{aligned} V_2 &= U_m R_p e \\ f_0 &= \frac{1}{2\pi} \sqrt{\frac{R_p}{E}} Y_{00} = \frac{1}{2\pi} \sin \frac{\pi}{2} \\ \beta &= \frac{B_0 E}{\mu_0 I_0} = \frac{B_0 I_0}{M_m} = \frac{B_0 I_0 T}{M_m T} = E \\ C(t) &= \frac{1}{2} \frac{m^2}{m_0} = \frac{1}{2} \frac{M_m^2 T^2}{M_m T} = \frac{1}{2} M_m T \\ K_m &= \frac{1}{2} \frac{m^2}{m_0} = \frac{1}{2} \frac{M_m^2 T^2}{M_m T} = \frac{1}{2} M_m T \\ \tau &= \frac{\ln 2}{T} F_h = S h p g \\ \left(\frac{E_c}{E_{c0}} \right) &= \frac{2 \cos \theta \cos \phi}{\cos(\theta - \phi) \sin(2\phi)} \end{aligned}$$



▲ how to move each individual sample in discrete time steps



◆ how to classify points from the sample distribution



● to regress on the sample data, regressing on the error, and repeating this



■ a time-dependent vector field that corresponds to probability density path



Flow Matching works by approximating the _____ that transports the source to the target distribution.



$$\begin{aligned} V_2 e U_m &= R \cdot P_E \\ f_0 = \frac{1}{2\pi} \int_{-\infty}^{\infty} Y_0(\theta) d\theta &= 2L \sin \frac{\theta_0}{L} \\ \beta \cdot E_d L - \mu \sigma \cdot f_0 \cdot I_0 \cdot \beta &= \beta \cdot C_0 \\ C_0 &= \left(\frac{S_0 T}{m_e} \right)^{1/2} = \left(\frac{2 \pi k T_0}{m_e} \right)^{1/2} = \left(\frac{2 \pi k T_0}{M_e} \right)^{1/2} \cdot E_d \\ 2 = \ln 2 \cdot F_h &= S \cdot h \cdot g \\ \left(\frac{E_s}{E_{s0}} \right) = \frac{2 \cos \theta_0 \cos \theta_0}{\cos^2(\theta_0 - \theta_0) \sin^2(\theta_0)} &= \end{aligned}$$

▲ Probabilistic Differentiable Equation (PDE)

◆ Stochastic Differentiable Equation (SDE)

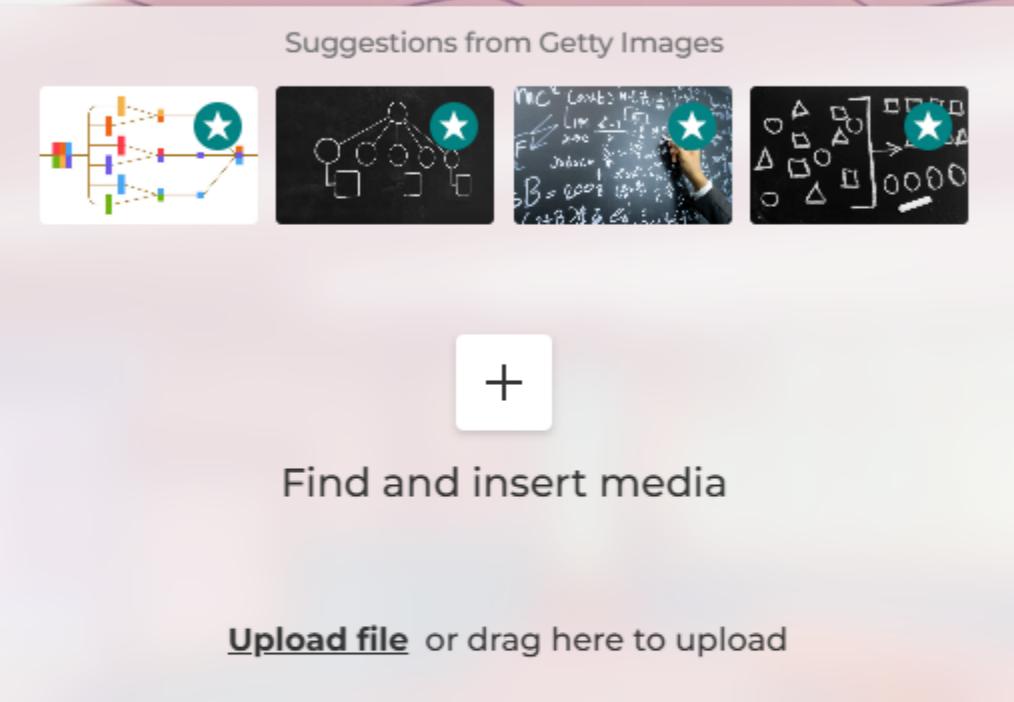
● Ordinary Differentiable Equation (ODE)

■ Equation (E)

Which of these requires class information for constructing probability paths?



$$\begin{aligned} V_2 &= \frac{1}{2\pi} \int_{-\infty}^{\infty} |Y(\omega)|^2 d\omega = \frac{1}{2L} \int_0^{2L} |Y(x)|^2 dx \\ \beta &= \text{Beta-prime distribution} \quad S = \text{S} \\ E &= \frac{1}{2\pi} \int_{-\infty}^{\infty} |F(\omega)|^2 d\omega = \frac{1}{2L} \int_0^{2L} |F(x)|^2 dx \\ F_h &= \text{Shop} \\ \left(\frac{E_c}{E_0} \right)_h &= \frac{2 \cos \theta \cos \phi}{\sin(\theta - \phi) \sin(\phi)} \end{aligned}$$



▲ General flow matching



◆ Conditional flow matching



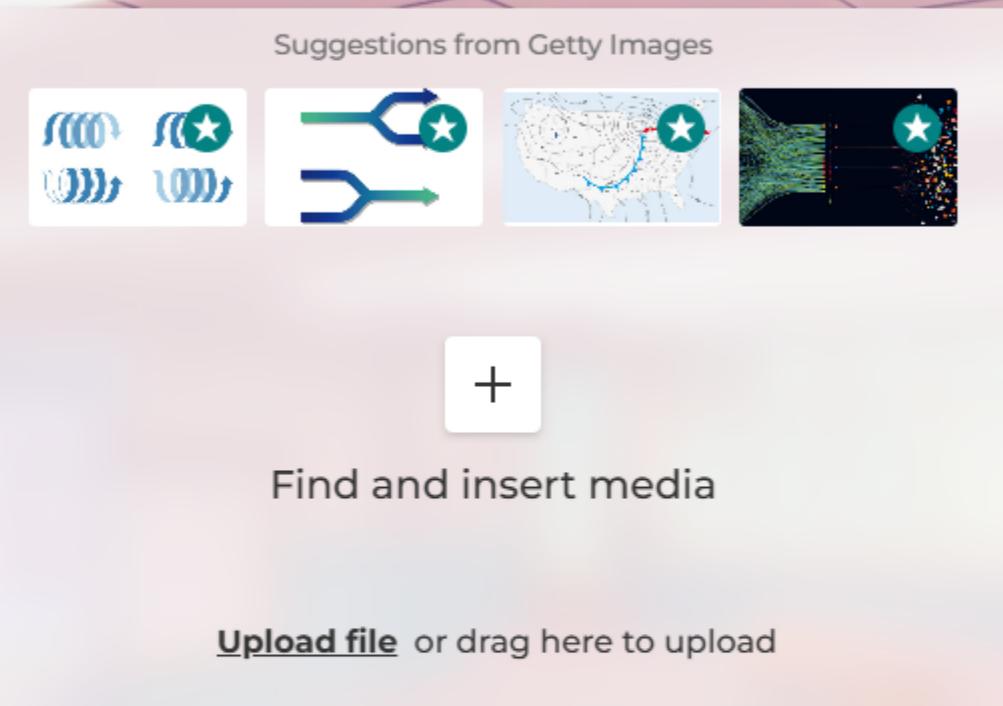
● Diffusion



■ K-Means



What does the vector field approximated by flow matching do?



"Transports" points from a target distribution to a source distribution



"Moves" points away from the center of a given distribution



"Transports" points from a source distribution to a target distribution



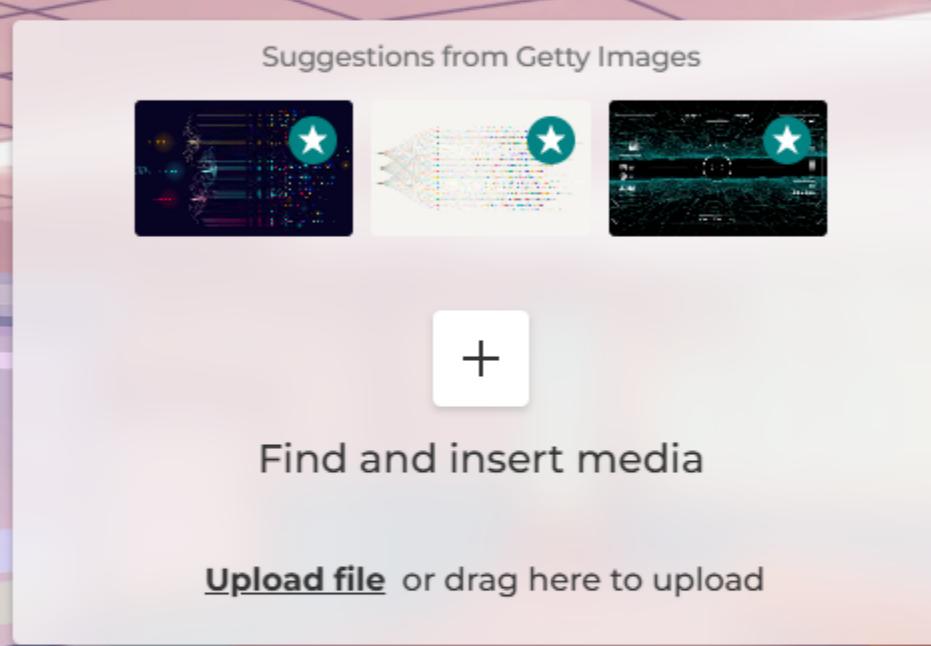
"Edges" points towards a dataset's center of mass



What is NOT an INITIAL input to the learned vector field (the trained model) during inference?



$$\begin{aligned} V_2 &= U_m R_p E \\ f_0 &= \frac{1}{2\pi} \sqrt{\frac{R_p}{L}} Y_{00} = 2\pi L \sin \frac{\pi}{L} \\ \beta &= \frac{1}{2} \ln \left(\frac{R_p}{L} \right) = \frac{1}{2} \ln \left(\frac{2\pi L}{L} \right) = \frac{1}{2} \ln 2\pi \\ C(t) &= \int_0^t \frac{d\beta}{dt} dt = \int_0^t \frac{1}{2} \ln \left(\frac{R_p}{L} \right) dt = \frac{1}{2} \ln \left(\frac{R_p}{L} \right) t \\ \theta &= \ln \left(\frac{R_p}{L} \right) F_n = \ln \left(\frac{R_p}{L} \right) \end{aligned}$$



Sample point from the target distribution



Class information



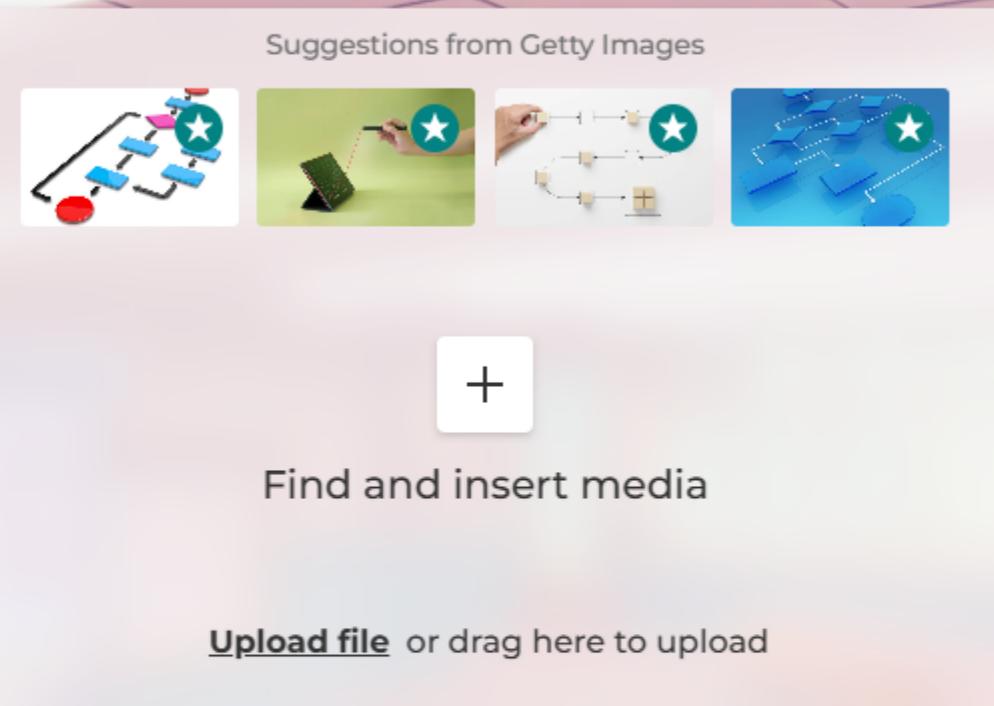
Current time



Intermediate point



What is a (current) use case of flow matching?



▲ Image generation



◆ Text generation



● Image classification



■ Speech generation



Flow Matching is cooler than Diffusion

Suggestions from Getty Images



Find and insert media

Upload file or drag here to upload

◆ True



▲ False

