
Replace with your title

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Abstract

1 Put here a brief summary of the project: what is it about and what are the main
2 results. Consider put a link to your code for reproducibility (if applicable). Be
3 concise and to the point.

4 1 Introduction

5 In this section you are going to present a brief background and motivation of your project. Why is
6 it interesting/significant? Consider summarizing the entire paper in one overarching figure, such as
7 Figure 1.

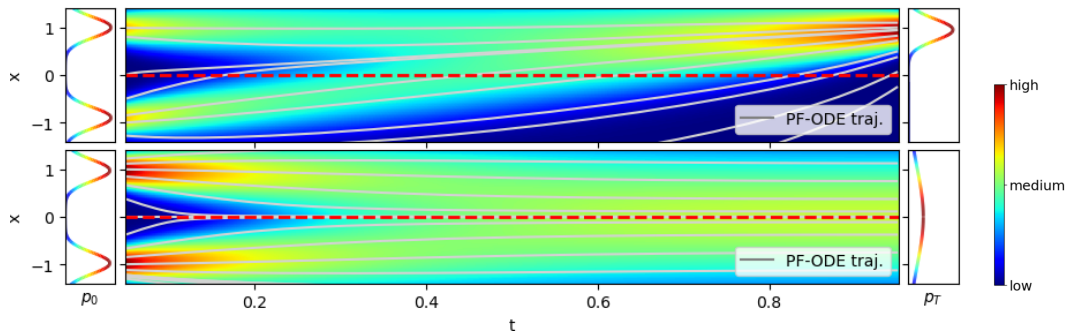


Figure 1: The evolution of p_t driven by diffusion processes where the data distribution p_0 is invariant under flipping with respect to the origin. We also plot the PF-ODE trajectories to visualize the transition direction of $p_t(x)$. The upper plot has $f(x, t) = \frac{1-x}{1-t}$ and $g(t) = 1$. The lower is VP-SDE with $\alpha_t = 1 - t$. For both processes, $T = 0.95$.

8 2 Related Works

9 Perform a reasonably thorough review of relevant literature. Has your problem, or one of similar
10 nature, been considered before? By whom? What are the differences or limitations (if any)?

11 3 Main Results

12 In the following, describe the background of your project, formulate your problem precisely (math-
13 ematically), and present the main findings (often backed up by experiments, proofs, figures and

Table 1: Model Comparison on 28x28x1 Rotated MNIST (Group C4). * indicates author-reported values.

Model	FID↓				Inv-FID↓	$\Delta\hat{x}_0 \downarrow$
	1%	5%	10%	100%	100%	100%
SPDiff	5.97	3.05	3.47	2.81	2.21	0.2997
SPDiff+WT	5.80	3.34	3.57	3.50	2.20	0.0004
SPDiff+OC	6.10	3.09	3.45	2.82	2.12	0.0002
SPDiff+Reg	5.42	3.69	2.83	2.75	2.09	0.1806
SPDiff+Reg+OC	5.64	3.67	2.86	2.64	2.07	0.0002
SP-GAN	149*	99*	88*	81*	—	—
SP-GAN (Reprod.)	16.59	11.28	9.02	10.95	19.92	—

tables). If need be, consider having a separate background section, experiment section or discussion section.

Please always give proper citations to prior work or results. Be precise and concise. Pay some attention to the organization and layout of the entire paper: the smoother it reads and the more visually appealing and neat it is, the better (sounds superficial but remember: we are selling our work to very busy and impatient peers). Add variety (table, curves, bar graph, scatter plot, violin plot, pseudocode, etc.) and report statistical deviation (over at least 3~5 runs).

I expect the proposal to be less than ($\leq$) **3 pages** and the report to be less than **8 pages** (references excluded).

Algorithm 1: Stochastic variance reduced proximal gradient

Input: $\mathbf{w}_0 \in \text{dom } f$

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1 for  $k = 0, 1, 2, \dots$  do
2    $\mathbf{g}_k \leftarrow \frac{1}{n} \sum_{i=1}^n \nabla \ell_i(\mathbf{w}_k)$  // compute full gradient at epoch  $k$ 
3    $\mathbf{w}_{k,0} \leftarrow \mathbf{w}_k$ 
23 4   for  $t = 0, \dots, m-1$  do
5     randomly draw  $i_t = i$  with probability  $p_i$ 
6      $\mathbf{g}_{k,t} \leftarrow \mathbf{g}_k - \frac{1}{np_{i_t}} \nabla \ell_{i_t}(\mathbf{w}_k) + \frac{1}{np_{i_t}} \nabla \ell_{i_t}(\mathbf{w}_{k,t})$  // amortized gradient
7      $\mathbf{w}_{k,t+1} \leftarrow \text{P}_r^{\eta_k}(\mathbf{w}_{k,t} - \eta_k \mathbf{g}_{k,t})$  // stochastic proximal gradient
8    $\mathbf{w}_{k+1} \leftarrow \frac{1}{m} \sum_{t=1}^m \mathbf{w}_{k,t}$  // in practice, can also do  $\mathbf{w}_{k+1} \leftarrow \mathbf{w}_{k,m}$ 

```

4 Conclusion

What have we learned? What limitations or directions do you think are worth exploring in the future?

27 **Acknowledgement**

28 Thank people who have helped or influenced this project. **Declare any use of AI tools. You are**
29 **solely responsible for everything in the report.**

30 **References**

- 31 LeCun, Y. (2022). “A Path Towards Autonomous Intelligence”.
- 32 Minsky, M. L. and S. A. Papert (1988, originally published in 1969). “Perceptron”. second expanded.
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- 36 Rosenblatt, F. (1958). “The perceptron: A probabilistic model for information storage and organiza-
37 tion in the brain”. *Psychological Review*, vol. 65, no. 6, pp. 386–408.