Mark Scheme

Section	Question	Mark Breakdown	Marks Got	Marks Max	Marker Comments	Question Statement
1 - VAE	1.1a	Module - Layers - MLP	6	6	Less satisfactory function naming style in the VAE construction code (e.g. without looking at self.decode(), unclear what the intended functionality is for self.fcld1)	Implement a VAE - fill the blanks of nn.Module class + specify sensible hyp.param
		Module - Layers - CNN (subsume mlp)	3	3		
		Module - Layers - BatchNorm / Dropout etc.	1	1		
		Module - Encode - Basics	3	3		
		Module - Encode - LogVar instead of Var	1	1		
		Module - Reparam - Correctly Sampling	1	2		
		Module - Forward	2	2		
		HypParam - Sensible (beta in next part)	2	2		
		Qualitative	4	5		
	1.1b	Loss with Reco and correct KL	0	1	The code returns the KL term as beta * KL instead of KL itself. This also explains the KL loss plot in 1.2a. Changing beta alone is not the only reason for encouraging disentanglement -- need to assume factorised prior.	Choose a suitable loss and describe your choice of RECO term
		Loss with correct Reco and beta	1	1		
		Discussion of reco term - need to mention rescaling inputs/outputs appropriately	2	3		
	1.2a	Plots showing train and test lost terms	2	3	strictly speaking the KL loss plots were plotting beta * KL	Results - Plot losses, investigate effect of beta
	1.2b	Reconstructions of test set images and a few samples	1	1	no description on how poster collapse affects the reconstructed/generated samples. Also it is not the case that as beta increases, generation quality will become better (consider beta goes to inifinity).	Show reconstructions of test set, and samples Discuss (inc. posterior collapse), visulize reconstructions
		Each bullet point addressed	1	3		
		Qualitative	2	2		
	1.3a	Explain presence / absence of clusters	2	2	How the box plot supported the outlier analysis is unclear. No explanation on the changes of T-SNE when beta changes. Also your explanation implies T-SNE is sensitive to hyper-parameter selection (so this is reliable?).	Perform T-SNE on learned representations. Discuss the results - effects of beta, clustering, outliers, boundaries, relability of T-SNE
		Explain effect of KL and Beta on Disentangling clusters	2	3		
		Explain outliers / boundaries between clusters	1	1		
		Reflect on reliability of conclusions from T-SNE; second mark for additional plots	0	1		
	1.3b	Perform at least one interpolation	2	2	Refer to your T-SNE plot and discuss the path from cluster 1 to cluster 6: what's in between and how does that explain the interpolation results?	Interpolate between classes in latent space. Discuss: qualitative character of interp, relevance to T-SNE plot
		Discuss obervation from interpolation	1	1		
		Relate interpolation to T-SNE	0	1		

Part Total   40 /50

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	2.1a	HypParam - Sensible	2	2		Implement a GAN starting with the DCGAN architecture.
		Module - Generator-constructor + forward	3	3		
		Module - Discriminator-constructor + forward	3	3		
	2.1b	Train - Discriminator	5	6	Could have tried tricks such as data augmentation.	
		Train - Generator	5	6		
	2.1c	note: please feel free to interpolate scores	10	10		Visualise the generated images
	2.1d	Detail 3 engineering features introduced. e.g. batchnorm, label smoothing, ReLU, #layers	4	4	Explained tricks and highlighted tricks (e.g. label flipping) that were most helpful. No discussion on why any of those tricks are useful.	Discuss your final architecture along with the experiments which led to it.
		Qualitative	3	6		
		G and D loss plot - remove mark if no legend	1	1	As your GAN loss contains the real/fake classification and image class	

See Ref Samples

2 - GAN	**2.2**	Comparision between plots and theoretical optimum/zero sum game	2	4	label prediction, which part of the loss was dominating? how does that reflect the easy training of the generator at the begining?	Plot the generator and discriminator loss curves - discuss whether sensible/expected		
		Description of mode collapse	1	1	ACGAN is a good trick to encourge generation of images in different classes, but within the same class mode collapse can still happen.	Provide a discussion on whether you noticed any mode collapse, what this behaviour may have been attributed to and explain what you did in order to combat it if it was a problem. If you didn't experience mode collapse still detail methods to combat it.		
	2.3	Qualitative. note: If the students states that mode collapse was not a problem check the generated images to make sure that this is the case. If mode collapse was an issue yet nothiing was done to combat it remove 2 marks	4	4			**Part Total**	**43 /50**
	Penalty Marks	Transformations etc. not provided below		-1				
		Models do not load properly		-1				
		Model provided is poor compared to claimed results (VAE and GAN)		-1				
Student ID: td20		GAN Exceeds maximum parameter count		-1			**CW Total**	**83 /100**