Digital Communication System on Gaussion Noise using QPSK modulation and LDPC

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November 31, 2022

Overview

Overview

Communication Age

- of businesses primarily use email to communicate with their clients, as opposed to online tools (16%) phone calls (9%) and face-to-face (5%). Co (2020)

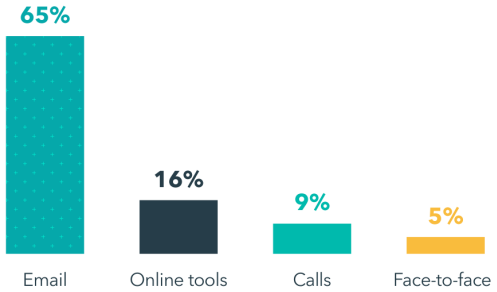

Figure 1: Ways of Communication Statistics

SOTA Solution

- Justified text item with reference Goodfellow et al. (2014)
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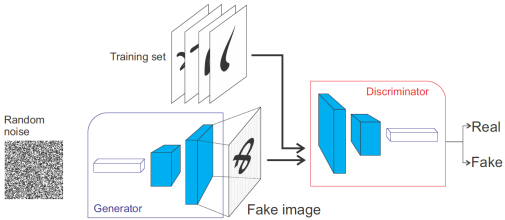

Figure 2: GAN structure

Overview

Another section

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Subsection with math

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- Example formula:

$$d^2 = ||\mu_1 - \mu_2||^2 + Tr(C_1 + C_2 - 2\sqrt{C_1 * C_2})$$

Overview

Subsection with table

Table 1: default

Dataset	No. Classes	Image Size	No.Images S_t	No.Images S_v
MNIST	10	28×28	60k	10k
CIFAR10	10	32×32	50k	10k
CIFAR100	100	32×32	50k	10k
ImageNet1k	1000	$64\times64/128\times128$	1.3M	50k

Subsection with minipages

model	IS	FID-5K	FID	GAN-train	GAN-test	SWD 16	SWD 32
real images	11.33	9.4	2.1	92.8	-	2.8	2.0
SNGAN	8.43	18.8	11.8	82.2	87.3	3.9	24.4
WGAN-GP (10M)	8.21	21.5	14.1	79.5	85.0	3.8	6.2
WGAN-GP (2.5M)	8.29	22.1	15.0	76.1	80.7	3.4	6.9
DCGAN	6.69	42.5	35.6	65.0	58.2	6.5	24.7
PixelCNN++	5.36	121.3	119.5	34.0	47.1	14.9	56.6

Figure 3: Results on CIFAR10

model	IS	FID-5K	FID	GAN-train	GAN-test	SWD 16	SWD 32
real images	14.9	10.8	2.4	69.4	-	2.7	2.0
SNGAN	9.30	23.8	15.6	45.0	59.4	4.0	15.6
WGAN-GP (10M)	9.10	23.5	15.6	26.7	40.4	6.0	9.1
WGAN-GP (2.5M)	8.22	28.8	20.6	5.4	4.3	3.7	7.7
DCGAN	6.20	49.7	41.8	3.5	2.4	9.9	20.8
PixelCNN++	6.27	143.4	141.9	4.8	27.5	8.5	25.9

Figure 4: Results on CIFAR100

res	model	IS	FID-5K	FID	GAN-train top-1	GAN-train top-5	GAN-test top-1	GAN-test top-5
64px	real images	63.8	15.6	2.9	55.0	78.8	-	-
	SNGAN	12.3	44.5	34.4	3	8.4	12.9	28.9
	WGAN-GP	11.3	46.7	35.8	0.1	0.7	0.1	0.5
128px	real images	203.2	17.4	3.0	59.1	81.9	-	-
	SNGAN*	35.3	44.9	33.2	9.3	21.9	39.5	63.4
	WGAN-GP	11.6	91.6	79.5	0.1	0.5	0.1	0.5

Figure 5: Results on ImageNet 1k

References I

Project. Co. Communications statistics 2020. In *Communications statistics 2020*, page 9, 2020.

Ian Goodfellow, Jean Pouget-Abadie, Mehdi Mirza, Bing Xu, David Warde-Farley, Sherjil Ozair, Aaron Courville, and Yoshua Bengio. Generative adversarial nets. *Advances in neural information processing systems*, 27, 2014.