Fast Dropout

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1

Staring from q trials we will get q successfull values.

$$p(\eta = q) = \sum_{k=q}^{\infty} p(\eta = q|\xi = k) \cdot p(\xi = k) = \sum_{k=q}^{\infty} \left(\begin{array}{c} k \\ q \end{array} \right) p^q (1-p)^{(k-q)} \frac{\lambda^k}{k!} e^{-\lambda}$$

$$= \frac{p^q \lambda^q}{q!} e^{-\lambda} \sum_{k=q}^{\infty} \frac{(1-p)^{(k-q)} \lambda^{(k-q)}}{(k-q)!} \overset{taylor}{\approx} \frac{p^q \lambda^q}{q!} e^{-\lambda} e^{-\lambda} e^{(1-p)\lambda} = \frac{(p\lambda)^q}{q!} e^{-p\lambda}$$

2

$$p(kind|t=10) = \frac{p(kind) \cdot p\left(t=10, \mu_2, \sigma_2\right)}{p(strict) \cdot p\left(t=10, \mu_1, \sigma_1\right) + p(kind) \cdot p\left(t=10, \mu_2, \sigma_2\right)}$$

$$\mathrm{p}(kind|10 \leq \mathrm{t} < 10+\delta) = \frac{p(10 \leq \mathrm{t} < 10+\delta|kind)\mathrm{p(kind)}}{p(10 \leq t < 10+\delta)}$$

$$\lim_{\delta \to 0} \int_{10}^{10+\delta} f_{t|kind}(\hat{t}) d\hat{t} = f_{t|kind}(10) \cdot \delta$$
$$\lim_{\delta \to 0} \int_{10}^{10+\delta} f_t(\hat{t}) d\hat{t} = f_t(10) \cdot \delta$$

$$\frac{p(kind) \cdot f\left(t=10, \mu_2, \sigma_2\right) \cdot \delta}{p(\mathrm{strict}) \cdot f\left(t=10, \mu_1, \sigma_1\right) \cdot \delta + p(kind) \cdot f\left(t=10, \mu_2, \sigma_2\right) \cdot \delta} == \frac{0.0108}{0.0162} = \frac{2}{3}$$