Kudryavtsev O. E., Rodochenko V. V. (Rostov-on-Don, Russia) — **On non-parametric calibration scheme for CGMY model on cryptocurrency markets by means of a Gaussian process regression.**

Consider a set of cryptocurrency market data observations $(X, y) = \{(x_i, y_i), i = 1, .., n\}$, where each x_i is an input vector (BTC/USD rate history and commonly use features described e.g. in [1], and probabilities of crossing a set of barriers by rate log returns), and y_i is the corresponding output (CGMY model parameters, which are calibrated using x_i (see e.g. [2])). To find the relation between inputs and outputs we use a Gaussian process regression approach described in [3] and assume $y_i = f(x_i) + \varepsilon_i$, where $f(x)$ is Gaussian process, and i.i.d. $\varepsilon_i \sim N(0, \sigma^2)$, $\sigma^2 \geq 0$, represents the noise in the data. Putting $f \sim N(0, K(X, X))$ we can use an initial guess about f to generate $(X, f) = \{(x_i, f_i), i = 1, .., n\}$ and derive a covariance matrix $K(X, X)$ from x_i (we use squared exponential kernel with 2 hyperparameters as a covariance function). To learn the algorithm, we inverse $K(X, X)$ and iteratively calculate aposterior $f(x)$ to reduce σ^2 on a training set using a scheme presented in [3]. The trained algorithm allows to calibrate CGMY model parameters significantly faster than using a scheme from [2], with only a slight reduction of accuracy.

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