How to Use Functional Data Analysis Tools when Investigating the Feeding Behavior of Animals

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We observe a group of pigs over a period of about 100 days. Using High Frequency Radio Frequency Identification (HF RFID), it is recorded when each pig is feeding, leading to very dense sequences of binary observations for each pig and day. One aim of the data analysis is to find pig-specific feeding profiles showing us the typical feeding pattern of each pig. For modeling the data, we adapt a marginal functional logistic regression approach allowing us to model the densely observed binary measurements by assuming latent, smooth and cyclic subject-specific profiles. The method also allows to incorporate additional covariates such as temperature and humidity that may influence the pigs' behavior. To account for correlation of measurements, we use robust standard errors and corresponding pointwise confidence intervals. Furthermore, it is shown how the profiles obtained can be used in subsequent (functional) data analyses, such as cluster analysis or scalar-on-function regression.