Predicting Milk Composition from the Entire Day using a Milk Sample from Just the Morning or Evening

Farmers are paid on the fat and protein in their dairy cow's milk which are used by milk processors to produce butter and cheese, respectively. Fat and protein concentration in milk vary widely among cows [1] with a coefficient of variation of 20%. Therefore, over half of Irish farmers measure the yield of cows and take a milk sample from each cow approximately four times per year. Cows are milked twice daily in Ireland, meaning that this measurement has to be undertaken twice in the one day during a time that the farmer is already under pressure. Farmers, therefore, would prefer to only have to measure the milk of their cows in either the morning or the evening milking and predict the 24-hour value from that data.

Many factors affect milk yield and milk composition [2]. Furthermore, the yield and composition of milk in the morning differs to that in the evening and can change throughout the year, as well as by the age of the cow and days since she actually gave birth (the concentration of fat and protein is highest when the cow has given birth many months previously).

The data set for this project contains >20,000 records where morning and evening milking details are both available. The objective of this project is to investigate if 24-hour yield and milk composition can be predicted from either the morning or evening milking, where data on time since last milking (hours), age of the cow, month of the year and days since giving birth are available. Research on predicting milk yield and/or milk composition based on part day-yield have used traditional modelling methods such as linear regression [3][4][5]. Others studies have classified and predicted milk yield level based on artificial neural networks [6]. This project will suit students interested in applying statistical methods to data. The project will be a joint collaboration with Teagasc in Moorepark.

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