A Forecasting System Developed under R, Dedicated to Temperature-Controlled Goods Hauling

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Temperature-controlled hauling consists in transporting goods requiring a temperature defined as being between -25 °C and +15 °C. The goods are primarily perishable foodstuffs, meat products, seafood, fruit and vegetables, dairy products, frozen foods, as well as plants or medical supplies. Refrigerated transport is a vital link of the Supply Chain [1], as it is required for the handling of goods from production or manufacturing to distribution and retailing. It is subject to a great many legal constraints (maintaining the cold chain, organizing the working schedule of drivers, obtaining circulating permits, etc.). A haulier who wishes to control his operating costs must, among other constraints, master the management of human and material resources. To gain in productivity, he needs a window on the upcoming flow of goods to be transported between the various stakeholders.

Instead of remaining passive, the haulier TFE [1] has chosen to implement a forecasting system. This system must enable the company to anticipate the quantities of goods to transport and the number of bills of lading [2] to honour. A 21-day forecast of these two key points make it possible to forecast the manpower, dock equipment, and number of trucks to be made available. To achieve homogeneity in all handling and processing operations, the haulier is going for a forecasting system that is adaptable to the specific requirements of its 57 European agencies. The forecasts must be easy to consult, user-friendly, and accessible by a web interface on the intranet [2]. Finally, the company's objectives are to achieve a daily forecasting error margin lower than 5%.

The mathematical forecasting model [3] was thought out in collaboration with the Lab-STICC Laboratory team from the University of Southern Brittany. It was then developed under the R Statistics software. This software was chosen for its open source licence, its speed, its wide variety of functions, its procedure language, and for the fact that it can be executed in batch mode as well as under Windows or Linux. Moreover, after writing the forecasting algorithm, it was extended as a R-library. R gives the posibility to perform an accurate and quicky forcast for satisfying specific different needs of the haulier.

The forecasting system was broken down into workflow [figure 1], to enable various applications to work together. Today, without human intervention, real data is updated on a daily basis, and new forecasts are calculated every week, all from a central server.

Figure 1: Forecasting System Workflow

References

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[1]Subsidiary of the STEF-TFE group

[2]Document setting out the transport contract between the transporter and the sender