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Literature search essentials

Version francophone

Mars 2021

Pourquoi la littérature scientifique?

- ▶ Les résultats scientifiques sont principalement consignés et transmis sous forme de textes.
- ▶ La littérature scientifique montre – dans son ensemble – l'évolution progressive des connaissances humaines.
- ▶ En examinant la littérature scientifique existante sur votre sujet, vous vous appuyez sur l'état actuel de la recherche.
- ▶ Dans l'idéal, votre propre travail scientifique contribue au développement des connaissances.
- ▶ Un travail scientifique consiste en grande partie à travailler avec de la littérature scientifique.
- ▶ Les textes qui ne se réfèrent pas à la littérature scientifique ne sont pas des textes scientifiques.

Pourquoi la recherche documentaire?

- ▶ Pour établir l'état actuel de la recherche, vous devez consulter la littérature scientifique pertinente (= la plus proche de votre sujet ou la plus citée).
- ▶ Pour trouver la littérature scientifique pertinente, il est conseillé d'effectuer une recherche documentaire systématique:
 - ▶ Utilisez les outils de recherche spécialisés qui permettent de trouver la littérature pertinente indépendamment de la langue et de la maison d'édition.
 - ▶ Réfléchissez à votre procédé et documentez-le.
 - ▶ Évaluez de façon critique vos résultats.
- ▶ Si la littérature scientifique sur laquelle vous vous appuyez est lacunaire, vous risquez de passer à côté d'informations et de résultats importants.

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Dynamic forecasting of individual cow milk yield in automatic milking systems

By: Jensen, DB (Jensen, Dan B)^[1]; van der Voort, M (van der Voort, Mariska)^[1]; Hogeveen, H (Hogeveen, Henk)^[1]

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Abstract

Accurate forecasting of dairy cow milk yield is useful to dairy farmers, both in relation to financial planning and for detection of deviating yield patterns, which can be an indicator of mastitis and other diseases. In this study we developed a dynamic linear model (DLM) designed to forecast milk yields of individual cows per milking, as they are milked in milking robots. The DLM implements a Wood's function to account for the expected total daily milk yield. It further implements a second-degree polynomial function to account for the effect of the time intervals between milkings on the proportion of the expected total daily milk yield. By combining these 2 functions in a dynamic framework, the DLM was able to continuously forecast the amount of milk to be produced in a given milking. Data from 169,774 milkings on 5 different farms in 2 different countries were used in this study. A separate farm-specific implementation of the DLM was made for each of the 5 farms. To determine which factors would influence the forecast accuracy, the standardized forecast errors of the DLM were described with a linear mixed effects model (lme). This lme included lactation stage (early, middle, or late), somatic cell count (SCC) level (nonelevated or elevated), and whether or not the proper farm-specific version of the DLM was used. The standardized forecast errors of the DLM were only affected by SCC level and interactions between SCC level and lactation stage. Therefore, we concluded that the implementation of Wood's function combined with a second-degree polynomial is useful for dynamic modeling of milk yield in milking robots, and that this model has potential to be used as part of a mastitis detection system.

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Dynamic forecasting of individual cow milk yield in automatic milking systems

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ABSTRACT

Accurate forecasting of dairy cow milk yield is useful to dairy farmers, both in relation to financial planning and for detection of deviating yield patterns, which can be an indicator of mastitis and other diseases. In this study we developed a dynamic linear model (DLM) designed to forecast milk yields of individual cows per milking, as they are milked in milking robots. The DLM implements a Wood's function to account for the expected total daily milk yield. It further implements a second-degree polynomial function to account for the effect of the time intervals between milkings on the proportion of the expected total daily milk yield. By combining these 2 functions in a dynamic framework, the DLM was able to continuously forecast the amount of milk to be produced in a given milking. Data from 169,774 milkings on 5 different farms in 2 different countries were used in this study. A separate farm-specific implementation of the DLM was made for each of the 5 farms. To determine which factors would influence the forecast accuracy, the standardized forecast errors of the DLM were described with a linear mixed effects model (lme). This lme included lactation stage (early, middle, or late), somatic cell count (SCC) level (nonelevated or elevated), and whether or not the proper farm-specific version of the DLM was used. The standardized forecast errors of the DLM were only affected by SCC level and interactions between SCC level and lactation stage. Therefore, we concluded that the implementation of Wood's function combined with a second-degree polynomial is useful for dynamic modeling of milk yield in milking robots, and that this model has potential to be used as part of a mastitis detection system.

Key words: dairy cow, dynamic linear model, milk yield, somatic cell count

INTRODUCTION

In the past, many automatic mastitis detection systems and models have been developed and tested to improve the detection of (sub)clinical mastitis in dairy cows (Hogeveen et al., 2010; Dominkak and Kristensen, 2017). Most studies have focused on assessing the sensors' ability to detect clinical mastitis, and were mostly based on the electrical conductivity measures of milk. Electrical conductivity measures can be combined with other sensor data, for example with milk yield measures, potentially resulting in better detection performance (Kamphuis et al., 2008a; Mollenhorst et al., 2010). Also, nonsensor data, such as lactation stage and mastitis history, can improve the detection performance of sensor-based systems (Steenveld et al., 2008). Even though changes in animal health can be detected with milk yield measures (Hybretsis et al., 2014; Jensen et al., 2017), not a lot is known about how milk yield, affected by the interval between milkings and milk production curves, can improve mastitis detection at the individual cow level.

When milking robots are used, milking intervals are not fixed. Milking cows at an optimal milking interval has the potential to increase milk yield and improve udder health (Hogeveen et al., 2001; Hale et al., 2003; Dahl et al., 2004; Hevonen and Pyörälä, 2011). André et al. (2010) created a static linear model to describe the herd-level milk yield per milking given the time interval since the last milking. The study showed a significant quadratic effect of the interval, which is in accordance with the findings of Hogeveen et al. (2001). This means that the milk yield for a given milking is expected to peak at a certain interval of time since the last milking, after which the yield will decrease, resulting in the total daily milk yield being below the individual cow's potential. The effect of the interval on milk yield varies between herds as well as between individual cows (André et al., 2010).

Knowing the deviation between expected and observed milk yields of individual cows is important in dairy cow management (Grzesiak et al., 2006; Grzesiak et al., 2016). To know the deviation between expected

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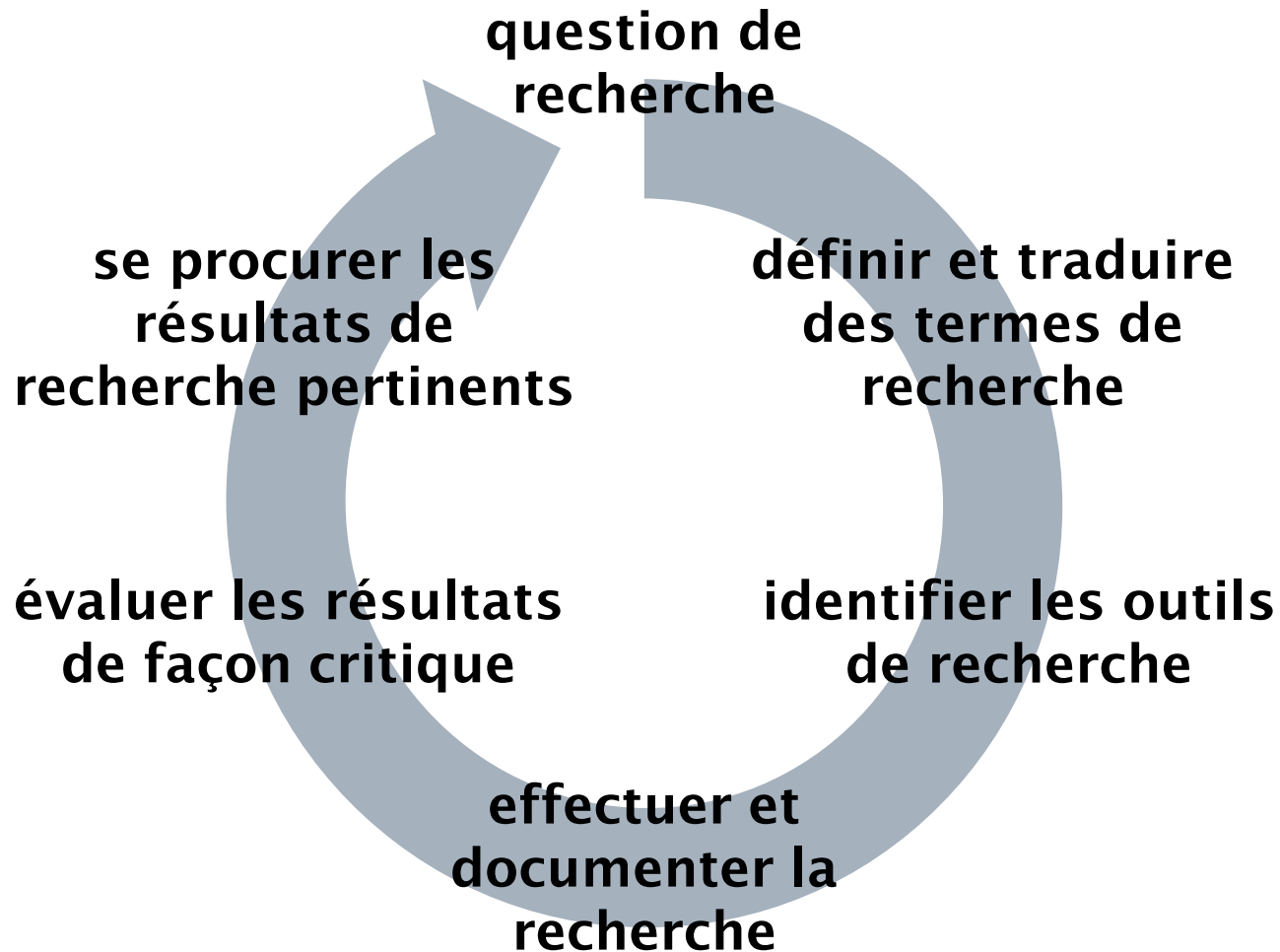


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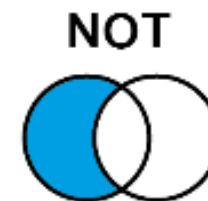
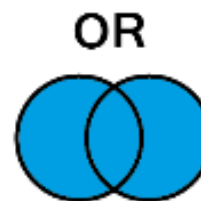
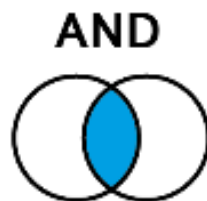
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- ▶ Le nombre de résultats est presque infini: souvent dix mille, cent mille ou même des millions, dont seuls les premiers de la liste sont consultés
→ confiance discutable envers le *relevance ranking* du moteur de recherche
- ▶ En règle générale, seuls apparaissent les résultats dans la langue des termes utilisés pour la recherche
→ la littérature scientifique pertinente dans d'autres langues peut manquer
- ▶ La littérature grise est presque introuvable
- ▶ Possibilités limitées de recherche, de filtrage et de tri
- ▶ Convient pour les premières recherches ou en complément à la recherche documentaire systématique
- ▶ Malgré tout, toujours mieux que google.ch/google.com

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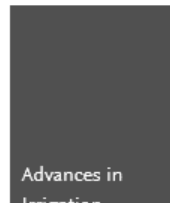
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