UNDERSTANDING FELINE PRURITIS FROM THE PET OWNERS' PERSPECTIVE: CAN SOCIAL MEDIA LISTENING IDENTIFY & DESCRIBE A PET'S JOURNEY THROUGH A DISEASE PROCESS IN VETERINARY MEDICINE?

MSR87

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BACKGROUND

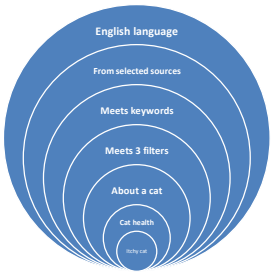
User-generated social media content is seldom explored in the animal health industry despite the potential for observing pet owners' perceptions before accessing veterinary care and relevant online information [1]. Analysing voluntary owner-reported events within selected internet domains can generate valuable insights into disease, pet owner attitudes and behaviours. A study of Feline Pruritis was conducted using a proof-of-concept social listening (SL) platform to investigate feline allergic skin disease from the pet owners' perspective [2]. This reflects the trend in human medicine to gain the patients insights into health issues [3].

OBJECTIVES

- To create a unique dataset concerning pet owner thoughts on feline pruritis and information-seeking behaviours online.
- To create a methodology that can be used to build further animal health datasets for other disease areas.

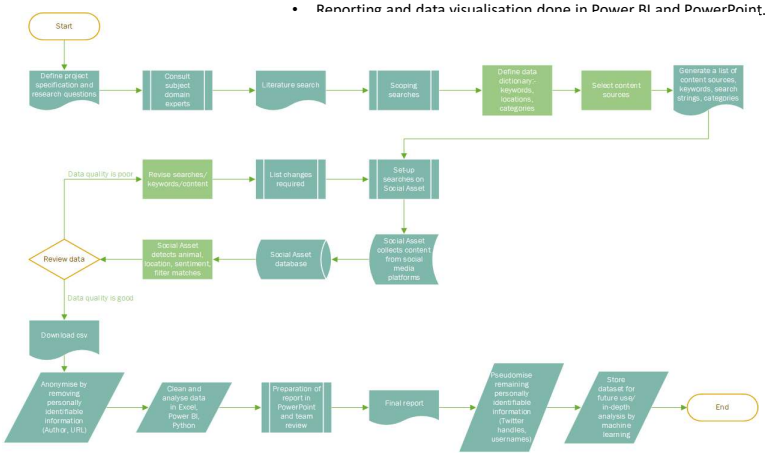
METHODS

Figure 1. Relevance criteria



- Fifty dynamic (frequently updated) content sources applicable to cats and feline pruritis were chosen.
- Keywords were defined by a veterinary expert panel and organised into topics.
- Keywords were augmented by reference to academic literature, a baseline survey of 1000 cat owners in the United States, the addition of synonyms and further iterations using Google Trends analytics keywords and sources.
- Content from the selected sources was collected using a social intelligence solution developed by ATC and tagged using the keywords and topic filters. Keyword stemming was used to increase the number of matches.
- The data was aggregated, exact duplicates were removed, and sentiment was calculated by an algorithm into positive, negative or neutral.
- Content matching topic(s) in the body areas, behaviours and symptoms filters were reviewed manually and relevancy criteria developed.
- Posts were marked relevant if they were: posted by a pet owner, identified an itchy cat and were not a duplicate e.g. previous versions of a post, similar or cross posting to different sources.
- Six filters were developed and counts for mentions of body areas, behaviours, symptoms, disease diagnosis, solutions and treatments were generated using Python version 3.71 and Anaconda3 Prompt.
- Analysis was conducted in Microsoft Excel and Power BI.
- Reporting and data visualisation done in Power BI and PowerPoint.

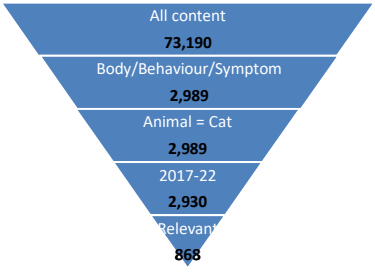
Figure 2. Study methodology



RESULTS

- 73,190 cat posts | 72,930 published from 2017- 2022 were filtered | 2930 unique items were reviewed and 868 marked relevant **(Figure 3)**.
- Internet forums (2036/2930) and Twitter streams (803/2930) were the most likely sources of relevant posts: Reddit (486/868), Catsite (158/868), Twitter (150/868) and Quora (54/868) (**Figure 4**).
- Relevant posts were from the United States (28%, 238/868), United Kingdom (2%, 20/868), Greece (2%, 18/868), Canada (1%, 8/868) and Australia (0%, 3/868) while 65% (563/868) had no location **(Figure 4)**.
- Qualitative thematic analysis was conducted on 493 relevant posts collected up to 30th May 2022 producing six top level themes: allergy, pruritis, non-pruritis conditions, unusual or undesirable behaviours, diagnosis and quality of life. The analytical method used the most recent 'reflexive thematic analysis' approach developed by Braun and Clarke [4] and adapted from [5].

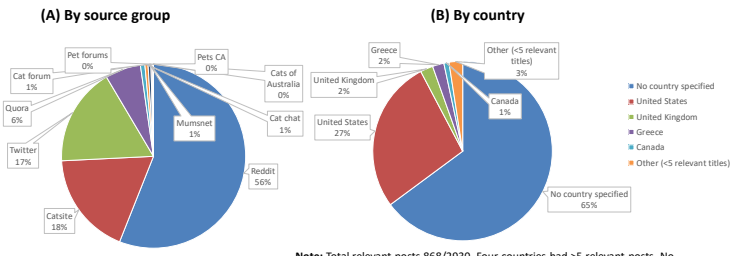
Figure 3. Content collection funnel



Note: A total of 1955/2930 posts were marked irrelevant and 107/2930 were manually marked as duplicates. Exact duplicates are automatically removed in the platform.

- The newly developed reflexive thematic analysis approach is not bound to one specific theoretical framework but allows for the flexibility to return to a previous phase, as the analysis develops, guiding the research based on the researcher's level of interpretation and design of the study.
- *Labelf.ai*, a cloud-based no-code artificial intelligence tool, was trialled to create machine learning models using natural language processing (NLP). Transformer-based classification models, a type of deep learning model, were trained using 3128 ground-truth labels (title and text combined) and tested with 112 unlabelled posts provided by the team to identify relevant posts. A second model was trained to apply thematic analysis labels based on 881 ground-truth labels and 147 test labels. A third model has been trialled to find mentions of a diagnosis in posts matching the disease diagnosis filter.

Figure 4. Percentage split of posts for source groups with relevant posts and for countries with <5 relevant posts



Note: Total relevant posts 868/2930. Ten source groups out of 20 with content had relevant posts.

Note: Total relevant posts 868/2930. Four countries had >5 relevant posts. No country specified was created as a separate category. "Other (<5 relevant titles)" comprised Australia (3), Italy (2), Singapore (2), Japan (2), Saudi Arabia (1), New Zealand (1), Ireland (1), Germany (1), Russia (1), Spain (1), India (1), Switzerland (1), Morocco (1), Bulgaria (1), Jersey (1), and the Netherlands (1).

Figure 5. Sentiment analysis

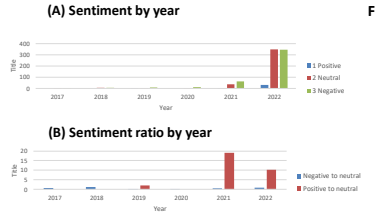
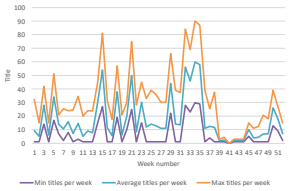
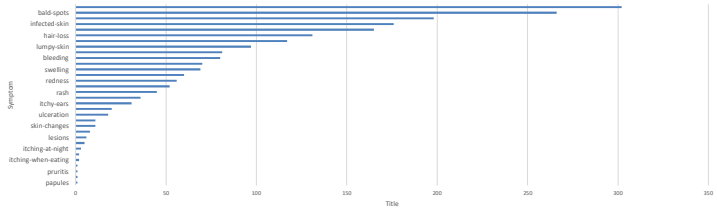


Figure 6. Relevant posts per week 2017-2022



- Sentiment, as applied by the software platform, was mostly negative or neutral suggesting that pet owners post to social media when there is an issue (**Figure 5**). The ratio of positive to neutral and negative to neutral was consistent with negative being the most common regardless of the number of posts (**Figure 5**).
- The majority of posts were published during the data collection period as could be expected for dynamic, frequently updated social media content. The number of posts published was surprisingly consistent when averaged across the period from 2017-2022. Early results appeared to show a seasonal trend but this was not seen once more data had been collected. The drop seen from week 36-45 reflects the remaining period of the 12 month data collection that had yet to be completed (**Figure 6**).
- A variety of symptoms were discussed by pet owners online and of these anxiety (60/868 single mentions, 302/868 in total when symptom combinations were included), bald spots (32 single, 266 total), scaling (25 single, 198 total) and infected skin (23 single, 176 total) were the most frequent (**Figure 7**).

Figure 7. Mentions of feline pruritis symptoms



CONCLUSIONS

- SL provides unique insights into owner perceptions on health and veterinary care including the incidence of anxiety in both cats and pet owners - a potentially new behaviour not found in the literature or identified by veterinary experts.
- The dataset could be strengthened by increasing keyword specificity, including and translating non-English language content and reducing "noise" using machine learning (ML), NLP or Deep Learning (DL) to enhance the semantic understanding of posts where a mentioned behaviour is negated e.g. "no scratching" matches the scratching filter.
- One individual marked content for 11 months thereby introducing bias and extending the data processing time, in future two reviewers will mark posts and an NLP algorithm will be trained using the data.
- Relevancy criteria were tight with only posts matching body areas, behaviours and symptoms filters being reviewed. An exploration into whether potentially relevant posts are being missed would be desirable.
- Other sources may have more relevant content than those chosen for the study e.g. Amazon product reviews, Facebook or other online communities and popular image or video sharing sites with comments like YouTube, Pinterest and TikTok.
- The data could enable data-driven decisions such as assessing demand for veterinary services by location, investigating disease risk factors and impact on quality of life. These findings will be validated by comparison with a direct pet owner survey and potentially veterinary practice data.

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