

▼ MA5851 A3 Document Number 1 Hugh McMullan

Task 1 - An overview of the issue to be investigated and how the WebCrawler and NLP tasks align to the issue

The issue

CASA manages drone usage in Australia - but how well does CASA relate to the drone users community (both commercial and private)?

▼ Rise of the drones

The number of small [non-military] drones have grown rapidly throughout the world in the last decade. According to the US *Federal Aviation Administration* ['FAA'], there are now more than 900,000 drones registered in the US, and 250,000 drone pilots ([FAA, 2021](#)). The corresponding numbers in Australia are [unfortunately] not published, but are likely to be of the order of 100,000 drones, and tens of thousands of pilots.

Drones are used by both private/hobbyist persons; and by commercial entities too. An industry intelligence source [*Drone Industry Insights*] shows commercial use now tops \$US28billion in revenue worldwide (around \$US1bn of that in Australia) - see Figure 1 below:

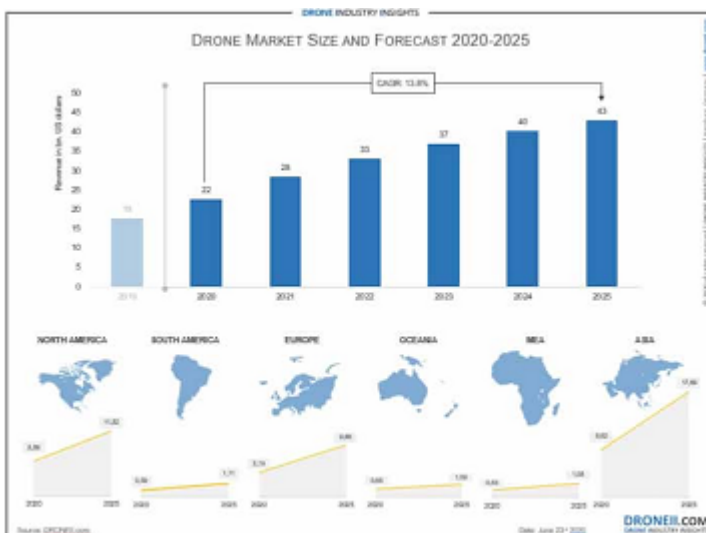


Figure 1: Drone Market Size and Forecast
[2020-2025, Drone Industry Insights](#)

CASA

In Australia, drone use is regulated by the *Civil Aviation Safety Authority* '[CASA](#)', the sole Australian aviation authority since Federation in 1901. When drone usage took off in Australia, CASA naturally assumed control of that domain as well. Crucially, CASA comes from a

traditional aviation-centred background and culture - not necessarily well-matched to the different operational, safety and usage characteristics of drones.

This assessment addresses how well CASA relates to drone users in Australia, both commercial and private.

Commercial and Private drone users - segmented via *DJI* product usage

DJI, a Chinese drone manufacturer, has built a 70% market share dominance [source *DJI*](#).

Users of *DJI* drones frequent a suite of forum websites focused on various *DJI* product groups (some for commercial drone users, others for private users).

This assessment scrapes and analyses text posts from those sites, specifically relating to 'CASA'. From the text data obtained (and 'cleaned'), the assessment does 2 things:

(1) applies *topic modeling* techniques to identify the key issues identified by commercial and private drone users, pertaining to CASA;

(2) applies *sentiment analysis* techniques to obtain indicators of how commercial and private users, separately, view the impact of CASA on their drone usage interests.

The extracted posts are *not* themselves pre-labelled as *positive* or *negative*, hence both NLP approaches are unsupervised activities. As such there are limited performance metrics available [stopping short of extended further research and train/test segmenting and cross-matching of users to *sentiment*(not done here).

▼ Topic Modelling

Subjective review of the patterns extracted suggests that the approach provides a reasonable assessment of the 'key issues'. Figure 2 below shows the 'Top 1' topic identified, for each of the Commercial and Private drone user groups:



Figure 2: Top

topic for Commercial and Private drone users

Figure 3 below illustrates separation of the derived 'Top 5 Topics', for each of the Commercial

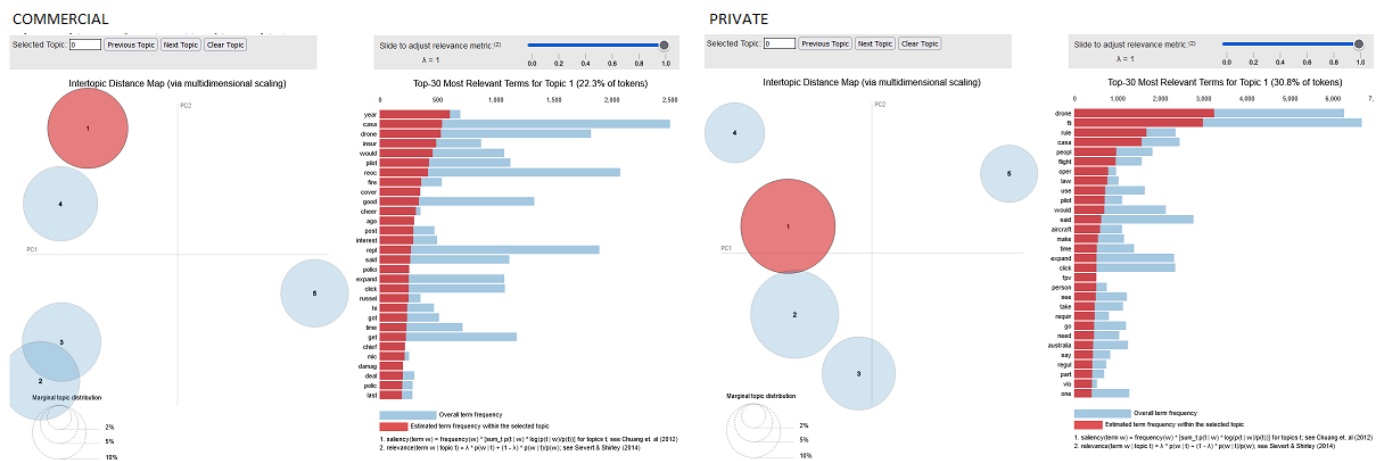


Figure 3: Top 5 Topics for Commercial and Private drone users - viewed using *pyLDavis*

▼ Sentiment Analysis

Figure 4 below illustrates the numbers of positive (in green) and negative (in dark blue) posts, over time, by the Commercial and Private drone user groups. [Note that there were many more posts by the private users, than by the commercial users].

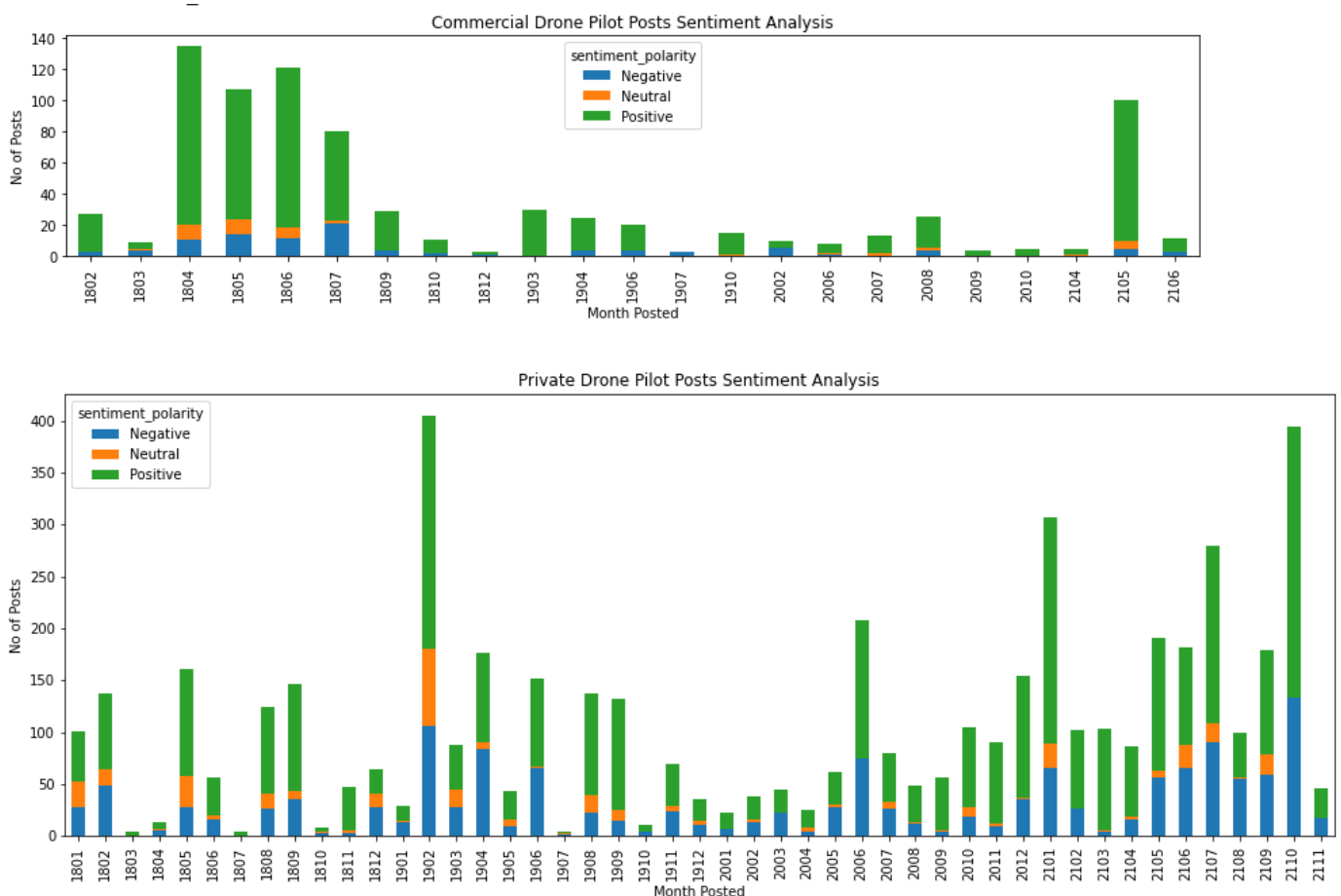


Figure 4: Positive and negative posts by Commercial and Private drone users over time

References

Civil Aviation Authority. (n.d.). Civil Aviation Authority. Retrieved from Civil Aviation Authority: <https://www.casa.gov.au/>

Drone Industry Insights. (2021). Drone Manufacturers Ranking. Retrieved from Drone Industry Insights: <https://droneii.com/product/drone-manufacturers-ranking>

Drone Industry Insights. (2021). the-drone-market-size-2020-2025-5-key-takeaways. Retrieved from Drone Industry Insights: <https://droneii.com/the-drone-market-size-2020-2025-5-key-takeaways>

pyLDavis. (2018). pyLDavis Readme. Retrieved from pyLDavis: <https://pyldavis.readthedocs.io/en/latest/readme.html>