Review of G. Jarry et al.,"GVCCS: A Dataset for Contrail Identification and Tracking on Visible Whole Sky Camera Sequences"

The paper deals with an important task: The setup of an observational database of contrail properties suitable for checking the validity of contrail model results.

The paper describes the dataset "GVCCS: Ground Visible Camera Contrail Sequences repository" which one (including me) could download from https://doi.org/10.5281/zenodo.16419651.

The dataset contains video pictures with very many whole-sky camera figures showing all kinds of clouds including contrails and a set of parquet files which I cannot read because I have no Python knowledge (which tool could one use to open these files and to look at these data???).

The paper gives a technical description of how the files are produced and handled. Also, the paper describes 1. the goals, 2. some of the background knowledge, 3. the state of the art, 4. the datasets, 5. the segmentation models, 6. the results, and 7. the conclusions. - This structure obviously contains some overlaps (e.g., background and state of the art).

The method provides a "segmentation" which means a list of segment elements with their basic properties, such as representing a contrail.

The method identifies boxes containing contrails and "Instance segmentation" which I learned here that this means the pixels containing contrail cloud elements and allows for "panoptic segmentation" which assigns each pixel to a unique contrail. (I must say, I am not quite sure that I have understood this correctly; these terms are new for me).

For me the paper was hard to read and I did by far not understand all details.

I can say that the paper is worth to have and it should be published.

However, I recommend that the authors go through the paper together with somebody who has no or only little experiences in all the tools and terms used, to make sure that all terms used are well defined and to improve the readability.

Specifically, I miss a discussion of several older papers on this and related topics. For example, the paper misses work of the team around Mannstein (- 2013). You cite one of his papers (Mannstein et al., 1999)

but there are several others: (Meyer et al., 2002; Mannstein, 2005; Mannstein and Schumann, 2005; Minnis et al., 2005; Palikonda et al., 2005; Meyer et al., 2007; Zinner et al., 2008; Graf et al., 2009; Schumann et al., 2009; Mannstein et al., 2010; Mannstein et al., 2012; Ewald et al., 2013; Vázquez-Navarro et al., 2013; Vázquez-Navarro et al., 2015). I recommend to check also the following papers for related work: (Bugliaro et al., 2012; Iwabuchi et al., 2012; Hamann et al., 2014; Kox et al., 2014; Strandgren et al., 2017b; Strandgren et al., 2017a).

Some of these references should be included in the Introduction, for example at line 40/41.

Line 106: Appleman did not explain the process completely. For example, the impact of engine efficiency was not understood by him. Schmidt (1941) was the first who understood that contrails form when the ambient temperature is low enough so that the humidity inside the plume gets high enough to let water condense Schumann (1996) covers the concept more completely, including engine efficiency and practical analysis methods, and introduced the term “Schmidt-Appleman Criterium”.

Line 119, see also Mannstein et al. (2010).

Line 143: here and at many other places in this paper, the authors refer to technical aspects without citing proper literature. Here: Where can I read more about COCO? (see also Line 328).

Line 145: If you say “traditionally”, then there should be lots of examples in the literature. But I miss citations.

Line 151: Instance segmentation was done, e.g. by Mannstein et al. (1999).

How would you classify the methods used by Schumann et al. (2013)?

Line 219: Not only Meijer but others did similar work: E.g., Vázquez-Navarro et al. (2010) firsgt identified contrail segments in high-resolution Low- Earth-Observation data (MODIS) and then followed the contrails in time in a sequence of Meteosat data (with high time resolution). I assume that has been done similarly also by others.

Line 244: what is the meaning of “non-data driven”?

Line 294: what is CLAHE - is there a reference?

Line 333: What is a U-Net?

Line 350: what is a loss-model?

Line 355 : what is a Hungarian algorithm?

Line 376: what are skip connections?

Line 389: what is the HDBSCAN algorithm?

Line 410. I have some general knowledge on Principle Component Analysis, but I do not see how this is applied here.

Fig. 4, caption: When is a label “true”? What is “discriminative embedding”???

Chapter 6 is indigestible, at least for me. It needs careful revision.

Page 23: Where is Fig. 6 mentioned?

Line 619: What is a Dice score and what is mIoU, and what is AP@[0.25:0.75 etc. meaning?

Line 638. One word seems to be too much in ”we are deployed”

Line 665: I have no idea what an ”data-driven ecosystem” could be.

Very minor detail: Line 80: Unnecessary comma after the 5th word.

At the end you might also discuss the idea of using several cameras distributed in sufficient neighborhood such that each contrail is seen by 2 cameras. This would allow for stereographic height analysis.

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