## Training

Pictures are needed to train the software. So at the beginning of this internship pictures of three types of orchid tubers (round, oblong and with spurs) are taken at the Sylvius lab. These pictures are uploaded to a shared Flickr account. To download these pictures, and their meta data, using the command line, a python script written by Hugo Haas, Offlickr, is modified and used [\*] (see appendix x).

The orientation for the tubers is unregulated. It is only required that it is the same for all pictures. For instance, if the first pictures of a hand-like tuber have the spurs on the right, all the other pictures of these tubers must have the spurs on the right. It is also required that the users use the same orientation as the trainer of the software. The orientation used by the trainer can be found in the user guide. At last it is required that there is only one tuber per picture.

To train the software as much as possible, pictures of well known look-a-likes are also used. This is to check if the application can see the difference between an orchid and a non-orchid. The look-a-likes that are used are *Arum maculatum*, *Asparagus officinalis, Polygonatum verticillatum, Tulipa greigii,* and *Tulipa sp.* [18]. Appendix x contains pictures of these tubers.

After downloading the pictures they need to be prepared for training.

The pictures are downloaded as jpgs. Because the trainings software can only handle pngs, they first need to be converted. After converting the pictures they are placed in the correct directory, using the tags from the meta data. This is required for training the neural network. The last step before training the network is splitting the pictures. This means that the tuber is cutting out of the picture and the background is normalized. This step used the Perl script splitter.pl, written by Rutger Vos, which can be found in appendix x. All these preparation steps are automated during this internship. The Python and bash scripts with these steps can be found in appendices x-y.