The lay summary is a brief summary intended to facilitate knowledge transfer and enhance accessibility, therefore the language used should be non-technical and suitable for a general audience. (See the Degree Regulations and Programmes of Study, General Postgraduate Degree Programme Regulations. These regulations are available via: <http://www.drps.ed.ac.uk/>.)

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| Title of thesis: | Wind Flow Sampling Using an Autonomous UAV | | | |

Insert the lay summary text here - the space will expand as you type.

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| In this paper I present the development of an unmanned aerial vehicle (UAV) equipped with two machine learning algorithms and data filtering and the subsequent field tests for the purpose of creating comprehensive wind maps of an area for proof-of-concept use in wind farm infrastructure and potential weather prediction.  The incentive behind the project is that while UAVs have become very popular, relatively little has been done in the way of turning them into intelligent machines, that is, machines that can create models of their environment or make decisions based on their environment. Most of the use for UAVs has instead been in the realm of monitoring for oil and agriculture groups. However, this research seeks to instead use the UAV as a measuring device.  In the thesis I cover a certain amount of related work, from pollution tracking to a phenomenon known as dynamic soaring, to a group trying to analyze not necessarily the wind itself, but the turbulence associated with that wind.  I go on to describe the algorithms employed by the system for the purposes of interpolating data and going on to create a temporal, or time-based, model of the data. As well, a separate algorithm is used to attempt to discover features in the area based on the wind patterns. The latter turns out to only work well when the winds are fairly high speed as they then separate from the feature and produce rather unique patterns.  From there go into the method of data collection which took place over a period of seven days and was carefully chosen based on incoming weather patterns for, what I had hoped, would be interesting data. I then go on to describe the resulting graphs and data, as well as showing some pictures of the flight paths and my small camp. |
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