

regObs - public database for submitting and sharing observations

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ABSTRACT: regObs is a tool for submitting and sharing observations needed by The Norwegian Avalanche Center. We have developed regObs as a public tool supporting crowd sourcing. We do this through use of the public licence Creative Commons. Also, regObs is publically available as a website and an app and through a web-service on api.nve.no enabling a 3rd party to both read and write data directly. A benchmark for evaluating regObs is to reduce the time it takes from something is observed until it is registered in regObs and thus available to other users. Some experiences so far: (1) by developing regObs as a public tool we have an easy way to begin cooperation with users of an avalanche forecast. "You contribute with data - we make more accurate forecasts"; (2) Sharing the data used to make a forecast can strengthen its credibility. Data from regObs is published alongside the forecast giving the reader the possibility to make their own opinion. (3) Forecasts were made every second day and published at 17:00hrs. Observations are submitted continuously, thus enabling a more continuous status on the avalanche conditions. (4) We had a total of 11000 observations submitted during the winter 2012/2013, 50% of all data is submitted within 1h and 40% is initially been registered with help of the app.

KEYWORDS: regObs, Norwegian Avalanche Center, database, observations, open source, public licence policy

1 INTRODUCTION

regObs (short for register observations) is a tool for submitting and sharing observations needed by The Norwegian Avalanche Center (Engeset, 2013 and Müller et al, 2013). regObs was made to manage field data from the professional observers contracted to the Norwegian Avalanche Center. But, in the hope to reach a larger audience, we designed regObs as a public tool supporting crowd sourcing. That is, if hundred people contribute with one piece of information each, hundred people should have hundred pieces of information available. One important part of enabling this is the use of Creative Commons (CC), a license policy securing the data being public. In addition, regObs is publically available as a website and an app.

The database is also accessible through a web-service on api.nve.no, enabling 3rd party systems to both read and write data directly.

Another goal of regObs design has been to minimize the time span between the actual observation and the registration and availability in regObs. The app is an important part of this. We use technology commercially available in smart phones (ie. camera, GPS, internet, data storage) to do large parts of a registration immediately and we then enable the user to later access the registration through the website to add more information.

2 HOW IT STARTED AND WHERE WE ARE

regObs was started in 2010 to aid getting observations from the field to the avalanche forecaster. The first version of regObs was a series of Google spreadsheets. It was low tech, took 8 hours to set up and approximately 1300 observations was collected during the winter 2010/2011. But, the Google solution was difficult to use, had no validation of input or any way to connect to other more user-friendly applications.

Thus a database was made and the OData application programming interface (API) was set up around it (see www.odata.org). In short OData gives a user access through the URL submitted and the results are returned as XML or Jason. Again, a fairly simple, though flexible and powerful, setup.

Using this setup we made a simple application for submitting and retrieving data by a web browser. This was first deployed December 2011.

In December 2012 we added maps, an app, more user control and third party applications also connected to the API.

The demand for a simpler and more robust API will be answered by developing a custom fit Web API where data is transferred using less operations between users and database. This is part of the development plan for autumn 2013.

Development of regObs has applied an agile development method, deploying unfinished but working tools at a rate of 1-2 week intervals. We have used feedback, user statistics and obser-

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vation statistics to make a priority for the next development stages.

Note that regObs is currently only available in Norwegian.

3 THE SETUP

Figure 1 shows the basic idea of regObs. Note that the database and data model is the core of regObs. Outside it we have service and business layers (API's) through which the database is accessed. Third party applications have the same accessibility as the regObs application and other applications of the Varsom-family.

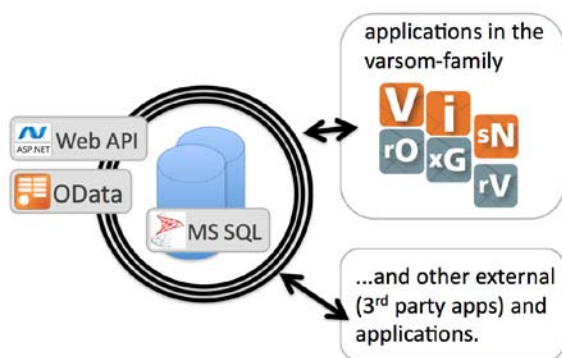


Figure 1: System sketch of regObs. Note that the regObs application itself uses the public API for access.

4 THE APP

The app is coded in a cross platform mobile development framework called PhoneGap. In short: 95% of the application is HTML/JavaScript which is common ground for most mobile phones. This code is compiled for different operating systems and in our case we get an app for both iOS and Android for the price of a little over one.

The code to the app is shared under the GNU General Public Licence 3 and can be downloaded from github.com (figure 2). That is, if someone wishes to make contributions or simply download the app and modify it for other purposes they are free to do so.



Figure 2: The app is shared under the GPL3 licence and can be downloaded on github.com.

5 USERS AND CONTRIBUTORS

Anyone can create a user in regObs. We try to encourage anyone who might need a good and up to date avalanche forecast to contribute with observations.

The Norwegian Public Roads Administration (NPRA) rose to this occasion (Farestveit, 2013) by establishing their own observation corps and connecting their internal roads maintenance and development software (ELRAPP) to the regObs API for automatic transfer of data relevant for avalanche forecasting. Also the Norwegian National Rail Administration (NNRA) started building an observation corps in their own ranks and published observations on regObs.

Experience from the previous winter showed that a little over half of the observations are from the Norwegian Avalanche Forecast Centres professional observers (OBSKORPS). Approx 30% are from the Roads or Railway administrators or from active NVE users outside the contracted OBSKORPS. 20% are from other or unknown users. Details can be seen in figure 3.

regObs had over 600 registered users by June 2013. 165 have contributed with observations. 82 users contributed with more than 10 observations this winter and 30 users with more than 50 observations this winter.

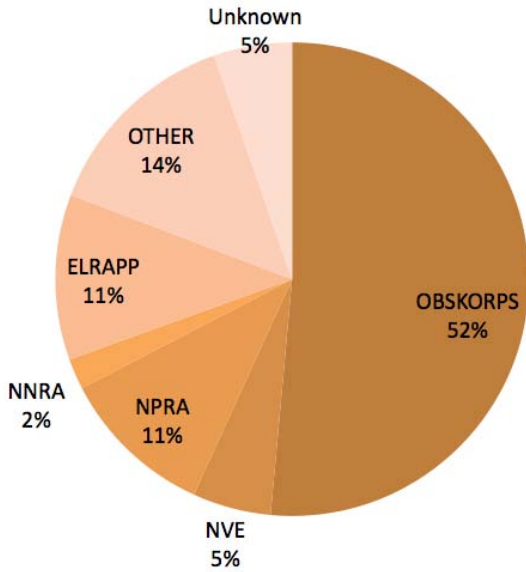


Figure 3: Contributors to regObs by submitter. OBSKORPS are the observers who are connected to the Norwegian Avalanche Forecast Centre, NVE is the Norwegian Energy and Water Resources Directorate, NPRA is the Norwegian Public Roads Administration, NNRA is Norwegian National Rail Administration and ELRAPP is a tool for entrepreneurs maintaining the Norwegian roads.

On the web application we have enabled Google analytics for logging user behaviour. Figure 4 shows which browsers are most commonly used. Total unique visits from January to June are 55000. Note that 30% of all users of the website are mobile users, 10% are tablet users and 60% from regular desktop users.

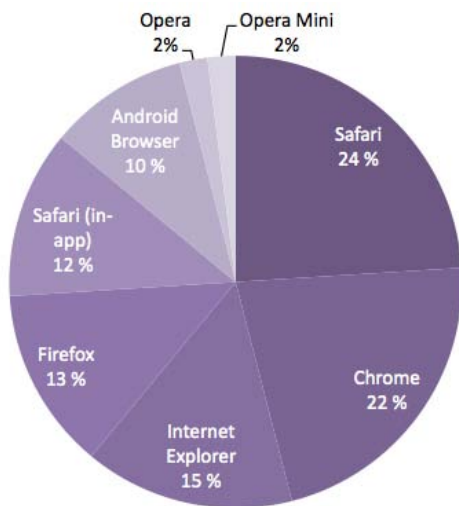


Figure 4: Web users by technology. Total visits from January to June are 55000. Note that 30% of all users of the website are mobile users, 10% are tablet users and 60% from regular desktop browsers.

The regObs app is available for iOS and Android. We only have data from Google analytics for April, May and June due to late implementation of this service. We have statistics from 1700 active users in 4900 visits. Figure 5 shows which phones are used with the app. The iPhone dominates clearly. A different report reveals that approximately 40% of the users are Android.

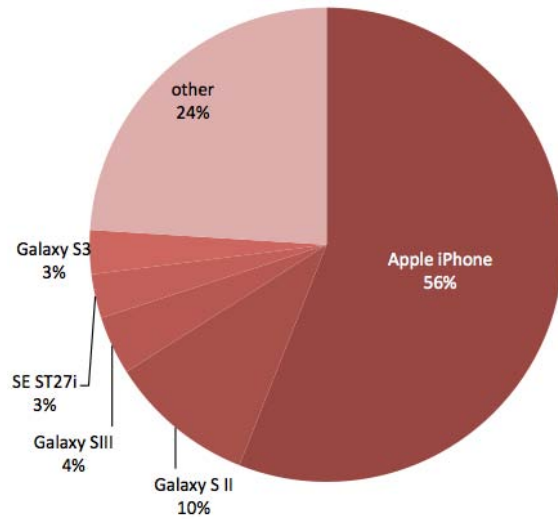


Figure 5: App users grouped by technology. User data gathered from April to June 2013.

6 WHAT IS SUBMITTED AND HOW SOON IS AN OBSERVATION SHARED

Figure 6 shows the frequency of different types of snow related observations registered in regObs during the previous winter. It is not part of this paper to discuss the different observations, but make a note that images make up for 26% of all observations, probably due to availability of a camera in the phone. Also simple observations such as danger signs and avalanche activity are easy to add in the app and are thus frequently registered.

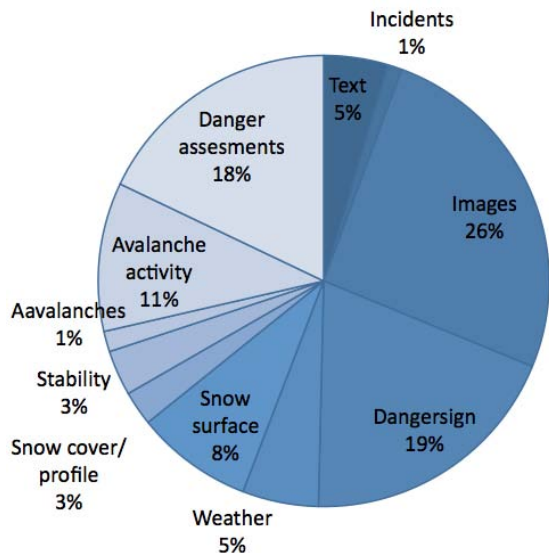


Figure 6: The distribution of 11000 snow related observations this winter.

A benchmark for evaluating regObs is to reduce the time it takes from something is observed until it is registered in regObs and thus available to other users. Figure 7 illustrates this distribution. Nearly half of all the observations submitted this winter were available to other users within one hour. This is mostly because we have the app working in the field.

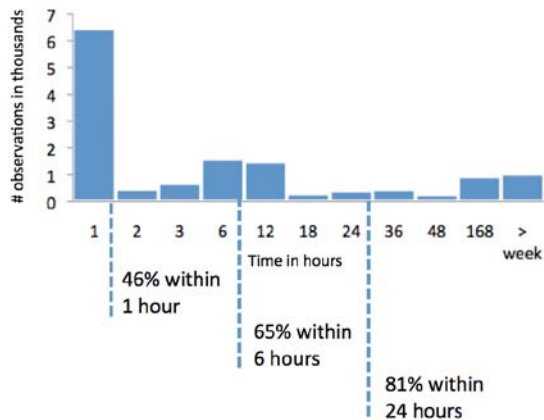


Figure 7: Last season's observations sorted by the time it took to register the observation.

7 SOME EXPERIENCES SO FAR

regObs has come a long way from the google spreadsheets in 2010. This is not the kind of work where conclusions are drawn, but rather a case of experiences being made. Some experiences we have done this far in development of regObs:

- By developing regObs as a public tool we have an easy way to begin cooperation with

users of an avalanche forecast. "You contribute with data - we make more accurate forecasts".

- Sharing the data used to make a forecast can strengthen its credibility. Data from regObs is published alongside the forecast giving the reader the possibility to make their own opinion (Johnsen, 2013).
- Forecasts were made every second day and published at 17:00hrs. Observations are submitted continuously, thus enabling a more continuous status on the avalanche conditions.
- We had a total of 11000 observations submitted during the winter 2012/2013, 50% of all data is submitted within 1h and 40% is initially been registered with help of the app.

8 FUTURE WORK

We have planned several improvements to regObs during the autumn of 2013. Some of the major tasks on this autumn's development plan are:

- We have issues regarding stability of the app especially when working offline or under poor reception conditions. Making a separate API for the app might help this issue.
- We wish to improve the pages for searching up and getting an overview of available data. This involves both improving maps and setting up tables for viewing data. It involves both the web application and the app.
- There will be new registration forms for new observations. If possible, we deactivate some old forms (available only for viewing) thus keeping the number of possibilities down.
- We will work on making the regObs API more available through improving documentation and producing working examples for others to follow.

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