REPORT

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SUBJECT Modernisation Program - Innovation Project – Historical image Analysis

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Background

The aim of the project is to assess technology viability and conduct proof of concepts in order to assist the Library in providing increased discovery and description of collection material without requiring additional resources.

The project has identified 1 outcome, namely:

- A web service prototype for image description and labelling

The National Library's goal is to make historic images available to the public in engaging and useful ways. A web service application with cloud image recognition capabilities allows us to:

- create computer generated metadata for historical images to increase their level of discoverability
- reduce resources on human labelling

The web service prototype aimed to provide a proof of concept to stakeholders demonstrating enhancements to the image captioning abilities through cloud recognition services. To also maintain or increase collection description activities while reducing resources required through community engagement.

This paper outlines the work done to date regarding the development of the web service prototype.

What was Done

Web service prototype

The web service prototype is to be added as a job step in Digital Library Collection (DLC) to access image recognition services. It allows internal users via DLC interface to:

- create computer generated labels and descriptions as additional metadata.
- evaluate the performances of cloud recognition services

Key findings

The web service prototype can generate image labels and descriptions at an average rate of 1 second per image and an average cost of $0.002 per image per service.

The performance of cloud image recognition services varies on types of images. For example, some cloud services are good at recognising faces but not good at recognising landscape.

Some labels generated by the cloud image recognition services are too general to be useful for the search algorithm to discover the image.

Risks

- The computer-generated labels may not be accurate
- The third-party image recognition services may get hold of the images that are sensitive to copy right issues
- The software developed by interim student cause future cost for software maintenance

Considerations

The tests on the prototype have shown good performances on some image labelling tasks. In most tests, relevant labels and irrelevant labels were found. It is suggested that further improvement could be made by adding some filters to filter out irrelevant labels.

The project explored the performance of the commercial pre-trained machine learning models on image recognition. The pre-trained models are designed to do well on general tasks but less well on specific tasks. For historical image recognition, a locally trained model has the potential to do better than general pre-trained models. The library could do some more exploration on the proof of concept on an image recognition model powered by a deep learning neural network. The deep learning neural network could use a convolution neural network (CNN) and a long-term short-term memory network (LSTM).