

# Automating PLORAS - 30/10/2015 Bi-Weekly Report 2

Team 32

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# **1 Overview of last two weeks**

Over the last two weeks we have managed to get a lot of work done. With regards to the team website, everything has been set up so that all we need to do as the project progresses is to add the text in to the sections that have been created. From the previous bi-weekly report, we were tasked by the clients to automate several processes in MATLAB. The procedure consisted of processing a number of raw images from an fMRI brain scan into a usable, normalised overview with damaged regions indicated. This was successfully completed and presented to the clients who were satisfied with the work. We have now been allocated a new, follow-up task which is to produce a spreadsheet showing percentage extend of damage in some given areas of the brain. Fortunately the main script has been provided to us and we only have to adapt it to work with our previous scripts.

## **2 Summary of meetings**

### **2.1 Meeting 1: 20/10/15**

This meeting was set up due to the trouble we were having in understanding the instructions received. We all attended this meeting which roughly lasted one hour. During this time we have managed to work together, whilst comparing our notes, to go through the whole process of producing an image with damaged areas of the brain indicated. The meeting was rather successful since we have fulfilled our agenda: creation of the mentioned image from the raw files provided.

### **2.2 Meeting 2: 22/10/15**

During this meeting we shared our own ideas in regards to how we could possibly automate the process of generating the overview of damaged brain regions. Jedrzej seemed to make the most progress with this and was confident he could create a few MATLAB scripts to do the job. We have also decided on more of the key roles each of us would have. This included Daniel being the main speaker and note taker during meetings and Farbas producing the write ups, such as the website and bi weekly reports.

### **2.3 Meeting 3: 27/10/15**

This meeting was held with the clients present. During this meeting we presented the MATLAB scripts that we managed to produce. The clients

were satisfied with them suggesting only small adjustments in regards to the folder structure during intermediate file creation. Furthermore, they have showed us the script that uses the created images to create a spreadsheet showing the percentage damage of given areas of the brain. We now have to automate the spreadsheet creation.

## **2.4 Meeting 4: 29/10/15**

Since the PLORAS team member for our current tasks is about to go on leave for November, we focused on the project structure side of things. We discussed the structure of our project website as well as any necessary changes to it. Also, we have started research on the language in which we are going to write our wrapper application. Currently we are considering C++ with a framework for UI creation, Python or creating a web-based application. We are in the process of identifying advantages and disadvantages of each of the possibilities. What is also important is that we have discussed the ways of undertaking the spreadsheet task.

## **3 Tasks completed**

Our first task was to convert the raw images produced by the fMRI brain scan into a usable, normalised overview with damaged regions indicated. This required several different steps and complex procedures and for some, the instructions were not completely clear for us. This meant we had to meet up and work together in order to figure out the purpose of each of the processes and how to get from the raw files to the final image. We eventually managed to get through every step and hence were able to see which areas of the brain were damaged. The next step was to automate these tedious steps that, if performed manually, take more than 20 minutes to complete. We have successfully created MATLAB scripts to automate this and the whole process now takes from 5-10 minutes, depending on the machine. We demonstrated the scripts to our clients who were very satisfied with the progress we had made and assigned us a follow-up task. Outside of programming, we have also made good progress on the project website. We have got an appropriate layout and design which has been uploaded to the UCL server. The required sections and pages with placeholders have been inserted into the page, which we are going to fill as the project progresses.

## **4 Problems that need to be resolved**

The only problem we encountered during this period was connected with some lack of understanding of the instructions provided. However, we have managed to overcome the issue during the first meeting described earlier.

## **5 Plan for next two weeks**

Over the next two weeks we plan to complete the new task we have been assigned regarding the spreadsheet with the percentage value of damage of given areas of the brain. We also expect to have a significant amount of content added to our project website, primarily in the requirements section as well as information in the development section regarding what we have completed so far. Currently, we have been working very closely with two members of the PLORAS team who have assigned us the already discussed tasks. This means that we shall be moving on to work with different members of the team within the next two weeks. It is expected that we will be working with Cathy Price, the team leader, on producing automated predictions for the recovery chances of stroke victims. We will continue research into which solution we will provide for the front end; currently there are 2 potentials: either web based, or a cross platform application.

## **6 Individual tasks completed**

### **6.1 Daniel Blackwell**

At the start of this bi-weekly period I was analysing the requirements of the system as we discussed with the client. We had established that a large proportion of the initial batch of work would need to be done within MATLAB using the SPM toolbox that provides the functionality that the neuroscientists use. Andrew looked into this during his free time and got the hang of it very quickly. I have been looking into solutions for the front end of the system, initially considering different ways to make a cross platform application. If we were to go down this route I feel that using C++ with a GUI library such as wxWidgets would provide most compatibility. Other alternatives include Java or Python although these both have dependencies which would make the install harder. Our TA had an alternative solution for us to consider which consists of a web hosted service. This would eliminate dependencies altogether; I am going to research into this area over the next week.

## **6.2   Jedrzej Stuczynski**

As for me I have completed the discussed scripts for processing raw fMRI scans into useful overlays that indicate which regions of the brain are damaged. For each step I have created a separate .m file which are being used by one master file. Fortunately the task was relatively easy due to SPMs (the toolbox that is used) batch system that allows to export a job with its parameters. This allowed me to plug certain variables into the parameters and force it to run with those. Each process is run after each other and if it fails after any of them, the whole thing is terminated with an appropriate exception thrown.

## **6.3   Farbas Miah**

Early on I was primarily doing some research on how to script the automation task as well as working together with the group on how to carry out each of the steps. After this I moved on to focus on the team website which I produced a template for as well as each of the key sections on the website. These all have sub sections for us to fill in such as the About page which contains sub sections on the team, client and project. A great deal of the About page has already been completed whilst the other key sections have been set up so that they only require filling in. I have also been the team member to write up the bi-weekly report.