

# Workplan

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2018-04-17

## 1 Interest Statement

I am interested in whether technology can be used to aid the early diagnosis of dementia specifically by analysing speech and language in a natural environment. As part of this, I am exploring the use of technologies such as the Amazon Echo or Google Home kit to capture speech and language. I am using Natural Language Processing to generate features from the captured speech such that we can categorise people into specific categories and/or predict test results on scores using machine learning.

## 2 Literature Review

### 2.1 Dementia - Context

What is the Problem? Why is this important? What is the potential impact?

### 2.2 How do Psychologists assess dementia

What tools do psychologists use to diagnose dementia? Mini mental state examination (MMSE), Addenbrooke's Cognitive Examination(ACE-III) Wechsler Adult Intelligence Scale(WAIS) The Free and Cued Selective Reminding Test (FCSRT)

### 2.3 How do Psychologists understand how language is affected by dementia

What language deficits are there and how are they characterised? What speech deficits are there and how are they characterised?

- 2.4 How is Natural Language Processing best positioned to help in this area?**
- 2.5 Are there any other technologies that can be used to help diagnosis?**
- 2.6 What Research has been done in the area so far?**
- 2.7 Conclusion**

## **3 Training needs analysis**

### **3.1 Psychology**

Training in delivering the WAIS or psychological tools that might be needed

### **3.2 Programming**

- Online courses in Python Programming
- Online courses in Machine Learning

### **3.3 Natural Language Processing**

Online courses in Natural Language Processing

- Jurafsky and Martin - Speech and Language Processing
- Manning and Schutze - Statistical NLP
- Manning and Raghavan - Intro to IR

### **3.4 Signal Processing**

MATLAB? Speech processing?

### **3.5 Alexa Skills Kit and Amazon Web Services**

- Training in Alexa Skills Kit - Booked
- Training in Amazon Web Services

## **4 Data collection**

### **4.1 DementiaBank and AphasiaBank**

Application to be submitted.

## **4.2 Three Authors, P.D. James, Iris Murdoch and Agatha Christie**

Data to be downloaded

## **4.3 Presidents Speeches**

Data to be downloaded

## **4.4 Experimental Design**

Battery of tests to differentiate between Controls, those with MCI, those with AD.

- FCSRDT - As most effective

# **5 Proposed Timeline, Key Dates and Deliverables**

## **5.1 April 2018**

Wednesday, 18th April - Workplan (First Draft Agreed)

## **5.2 May 2018**

Wednesday, 9th May - Alexa Skills Training (All Day)

## **5.3 June 2018**

Friday 15th June - First Draft of Literature Review to be handed in.  
Monday 18th June - Monday 25th June - Annual Leave

## **5.4 July 2018**

## **5.5 August 2018**

## **5.6 September 2018**

## **5.7 October 2018**

## **5.8 November 2018**

## **5.9 December 2018**

## **5.10 January 2019**

Friday 11th January - Rough Draft of Qualifying Due Friday 18th January - Complete first rough pass of capturing and processing speech.

### **5.11 February 2019**

Friday, 1st February - Qualifying Report Due

### **5.12 March 2018**

### **5.13 April 2018**

Monday, 1st April - Viva Due by this point.