國立台灣海洋大學資訊工程學系

專題報告

Sign Language Interaction Tutorial System - Openpose

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ABSTRACT

Keywords - Lorem Ipsum , Lorem Ipsum

Lorem Ipsum is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry's standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen book. It has survived not only five centuries, but also the leap into electronic typesetting, remaining essentially unchanged. It was popularised in the 1960s with the release of Letraset sheets containing Lorem Ipsum passages, and more recently with desktop publishing software like Aldus PageMaker including versions of Lorem Ipsum.

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Chapter 1

緒論

1.1 關鍵詞

手語、機器學習、深度學習、Openpose、Transformer、CNN、LSTM、Grad-cam

1.2 研究背景與目標

手語是聾啞人士很重要的溝通方式，生活中難免碰到一些聾啞人士，想要與他們交流需先學習手語，但網路上現有的資源幾乎都是用影片學習的方式，沒有可以自我檢視的系統，因此本專題設計一套主要提供手語教學、測驗、偵錯的功能的系統，提供給想要入門手語的初學者一個學習的平台。

1.3 現有相關研究概況

對於手語辨認技術，早期採用Dynamic time warping(DTW)的方式來辨識手語，其方法是比對兩個時間序列的最小距離與利用K-Nearest Neighbors演算法判斷辨識結果，缺點是時間複雜度爲兩個時間序列的

長度的乘積——O(mn)，當時間序列長度越長所需時間越長，而在現今的手語辨認技術上，已經可以利用深度學習辨識出動態的手語片段，但無偵測錯誤的功能。

1.4 章節概述

Chapter 2

架構與方法設計

2.1 系統概述與流程圖

本系統將架構分爲三部分:

1. Openpose
2. 神經網路
3. Grad-Cam

2.2 資料前處理

2.3 特徵擷取

2.4 方法設計

本專題利用三種神經網路架構(Transformer、CNN、LSTM)實踐辨識手語，並分別應用Grad-Cam演算法於時間序列資料達到錯誤偵測的功能。探討這三種不同的神經網路模型對於二維時間序列資料分類的準確度，與分析對於三種模型結合Grad-Cam的效果，研究出最適合本專題應用的神經網路架構。

2.5 神經網路

Figure 2.1: Sample Image

Table 2.1: Sample Table

Units in Hidden Layers	Accuracy	Precision	Recall	F1-score
100,20,20	0	0	0	0
100,20,20	0	0	0	0
100,20,20	0	0	0	0
100,20,20	0	0	0	0
100,20,20	0	0	0	0

Chapter 3

系統實驗

3.1 實驗設計

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2. 特徵擷取工具
3. 錯誤偵測精準度判斷

3.2 效能評估與成果

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4.2 函式原型宣告

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Bibliography

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