別表６
（３）

Keio University

Thesis Abstract

No.

Registration Number	■ “KOU” □ “OTSU” No. *Office use only	Name	SUMALI, Brian

Thesis Title

Multimodal Feature Extraction for Psychiatric Disorder Screening

Mental health examinations or screenings are commonly performed by licensed psychiatrists in a health care location, but the advances in technology enable the development of clinical decision support systems. In the beginning, the features inputted to the machine include the answers from the examination conducted by the psychiatrist. However, recently the focus shifted into predicting a person’s mental health without the need of conducting extensive tests.

Two most common psychiatric disorders include depression and dementia. Depression is a mood disorder traditionally associated with persistent feeling of sadness whilst dementia is a collection of symptoms commonly caused by progressive neurological disorders. Both are popular research objectives of many automated psychiatric disorder screening studies. Unfortunately, most conventional studies did not consider the existence of “pseudodementia”. Although the symptoms of depression and dementia are different, sometimes dementia-like symptoms might be observed in a depression patient, which is termed “pseudodementia”. Distinguishing pseudodementia is hard even for expert psychiatrists and feature analysis may help solve the classification problem. The focus of this dissertation is the similarities, differences, and characteristics of the two psychiatric disorders: depression and dementia. Feature extraction and analysis are performed to a audiovisual database of clinical psychiatric patients. Automated psychiatric disorders using machine learning is also proposed.

Chapter 1 introduces the background of psychiatric illness and automatic psychiatric disorder screening. Short review of conventional automatic psychiatric disorder diagnosis algorithms is described along with the limitations and significance of this study.

Chapter 2 reviews of automatic psychiatric disorder screening in detail. The background of automatic screening and telemedicine in addition with common features and algorithms utilized are described in this chapter.

In chapter 3 the facial feature analysis of both depression patients and dementia patients was performed. Conventional facial landmarks were extracted and analyzed. The visualizations of features correspond to depression, dementia, and features most important to distinguish depression and dementia is described in this chapter.

In chapter 4 proposes an improvement of the facial landmark extraction for real-time tracking. Conventional facial landmark extraction techniques are notoriously inaccurate for non-forward-facing pose and it is pointless to instruct a psychiatric patient to be facing the camera at all times. In this chapter, an improvement for facial landmark extraction was proposed. The proposed facial landmark extraction algorithm is based on Cascaded Compositional Learning and is robust even for random facial poses.

Chapter 5 and 6, are similar to chapter 3. In chapter 5, the focus was the speech features from the psychiatric patients, while in chapter 6, both facial features and speech features were utilized. Additionally, the similarities of facial landmarks and speech features are examined in chapter 6.

Finally, this dissertation is summarized and concluded in chapter 7.