

先端科学技術研究科 修士論文要旨

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要旨			
Although social skills are essential for our daily communication, some people lack them due to mental and developmental disabilities such as Schizophrenia or Autism Spectrum Disorder (ASD). Daily life is quite tricky without social skills since most normal situations require us to integrate and apply several different social skills. One solution to this difficulty is a process called Social Skills Training (SST). Although SST is a well-known rehabilitation program frequently used in the medical field, access to it is limited for several reasons. To overcome this problem, the automation of SST has been proposed. In this series of research, I focused on evaluation and feedback in SST. Since SST feedback is based on the evaluation of the user's social skills in an SST session, feedback and evaluation should be considered seamlessly. Therefore, I investigated the possibility of automation of those processes with several machine learning approaches and statistical analyses. From the result of the training of 2nd edition of Social Responsiveness Score estimation model in human-agent SST dataset, I confirmed that the standard deviation of F0, vocabulary size, and content word-level BERT-based sequential similarity had relatively high importance scores. This was consistent with the results of previous medical researches. Furthermore, from the correlation analysis with subjective scores, feature variants of BERT-based sequential similarity were highly correlated with those scores, which indicated its usefulness as an evaluation metric to measure how appropriate the speech content is. Based on this result, I extended the method to the human-human SST which is more difficult to measure. I newly collected a dataset of human-human SST including participants with Schizophrenia and ASD. After the data curation and other preprocessing, I trained Schizophrenia classification models to show the effectiveness of the computational feature-set to capture social skills-related behaviors in human-human SST. The models achieved 0.868 as the highest accuracy. Furthermore, the model's importance scores indicated the effectiveness of F3 bandwidth, which corresponds to Schizophrenia's vocal characteristic reported in previous researches. With the enhanced version of this feature-set, towards the automated feedback generation, I trained regression models of skill-specific subjective scores rated by experienced trainers. Although not all models could achieve significantly correlated prediction performance, some showed around 0.5 Pearson correlation coefficient. I also analyzed experienced trainers' feedback content in the human-human SST, the result revealed the frequency of feedback types. For example, appropriate facial expression was the highest. By comparing the frequent feedback contents and the models with high performance, I confirmed that there were correspondence between them, which indicated possibilities of further improvement. Based on these results, I plan to develop and evaluate automated feedback model for SST system.			