

Supporting Children with Language-Related Disorder with AI

An Impact Case by Dr. YUEN Man-Ching, Connie

Dr. Connie YUEN from the Department of Applied Data Science received over HKD2.5 million from the Research Grant Council, HKSAR to support her work in supporting children with language-related disorders. Her Faculty Development Scheme (FDS) project started in 2020 and will include the design, development, and verification of an intelligent dyslexia assessment system in the Cloud to identify dyslexia. Detection is the first step towards clinical or teaching interventions for children with dyslexia. In suspected cases, referrals are given to children to undertake dyslexia assessment at assessment centers. Dyslexia where the Chinese language is concerned is much more difficult to detect, compared to dyslexia involving the English language. This project will involve the collection of work samples from children with and without dyslexia to serve as training data. When a fully trained model has been established, it will be developed into the proposed assessment system and deployed as an integrated system on Cloud infrastructure. This will enable online assessment and the research team will provide seminars and workshops for potential users at school.

Dr. Yuen's project, which started in 2021, is focused on developing an AI-based mobile app to provide treatment to children with developmental speech sound disorders. Developmental speech sound disorder (SSD) is a common communication disorder. Children with developmental SSD do not have other symptoms, and they can improve their speech intelligibility with regular training. The proposed AI mobile app will act as a speech language pathology robot to provide training at home to children with SSD.



Online seminar with professional practitioners from Yan Chai Hospital – Over 160 teachers and parents attended and shared their views and experiences with the team members

Early identification and treatment the children's development

The diagnosis and treatment for children with language-related disorders usually have a long service waiting period. The use of AI-based identification and treatment enables timely intervention. The development of the AI system will also provide new research findings related to the pathology of these disorders. In order to raise the awareness of teachers and parents about children's dyslexia, two online seminars were held in June 2022. Clinical Psychologist and Occupational Therapist from Yan Chai Hospital described how to improve children's reading and writing ability. The seminars attracted 120 teachers and parents from 41 childcare centers and kindergartens. The audience and speakers also had a real-time discussion at the end of the seminar. Moreover, to explore how to use new technology and open data to improve well-being, the project was invited to demonstrate in a showcase of data-driven solutions at Hong Kong Science and Technology Park in November 2022.



Showcase of data-driven solutions at Hong Kong Science and Technology Park – PI: Dr. YUEN, Man-Ching Connie (left)

Selected Related Publications

Yuen, M. C., Ng, K. F., Yung, C. W., Muppala, J. K., Lok, C. H., Zhou, S., & Lau, H. C. (2023, January). Web-based Training Platform with AR Games for Dyslexic Children. In *2023 15th International Conference on COMMunication Systems & NETWORKS (COMSNETS)* (pp. 1-6). IEEE.

Yuen M. C., Ng K. F., Lau K. M., Lam C. W., Ng K. Y., (2022 July) Design an Intelligence System for Early Identification on Developmental Dyslexia of Chinese Language, *Proceedings of 19th International Conference on Wireless Networks and Mobile Systems (WINSYS 2022)*, SCITEPRESS.

Yuen, M. C., Chu, S. Y., Wong, C. H., & Ng, K. F. (2021, January). Development and pilot test for stuttering self-monitoring solution using telehealth. In *2021 International Conference on COMMunication Systems & NETWORKS (COMSNETS)* (pp. 650-655). IEEE.

An onsite demonstration of the App