Report on Hackathon for rehabilitation of severely disabled young adults

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Persons with severe speech and motor impairment (SSMI) belong to an isolated part of the disability spectrum. The complexity of their physical conditions renders them unable to have natural interactions with their environments even for activities of daily living (ADL). Advances in robotics and technology have provided opportunities to design systems to enable and support persons with disabilities in everyday activities, communication, education, and fun. This hackathon proposes an inclusive and safe eye-gaze-controlled human-robot interaction (HRI) system for persons with SSMI. Details on the research behind the system can be found at the following two papers

- VK Sharma, LRD Murthy, and P Biswas, Comparing two safe distance maintenance algorithms for a gaze controlled HRI involving users with SSMI, ACM Transactions on Accessible Computing 2022
- VK Sharma, LRD Murthy and P Biswas, Enabling Learning through Play for Persons with speech and motor impairment: Inclusive and Eye-Gaze Controlled Human-Robot Interface for interaction with Joystick operated generic Toys, International Conference on Social Robotics (ICSR) 2022

The hackathon happened at Vidyasagar, Spastic Society of India, Tamil Nadu on 24th and 25th November 2022. About 20 participants with SSMI along with their teachers and care takers took part in the event. They were provided with computer, eye gaze tracking hardware and software and desktop robot to undertake an online quiz and block printing task (figure 1).

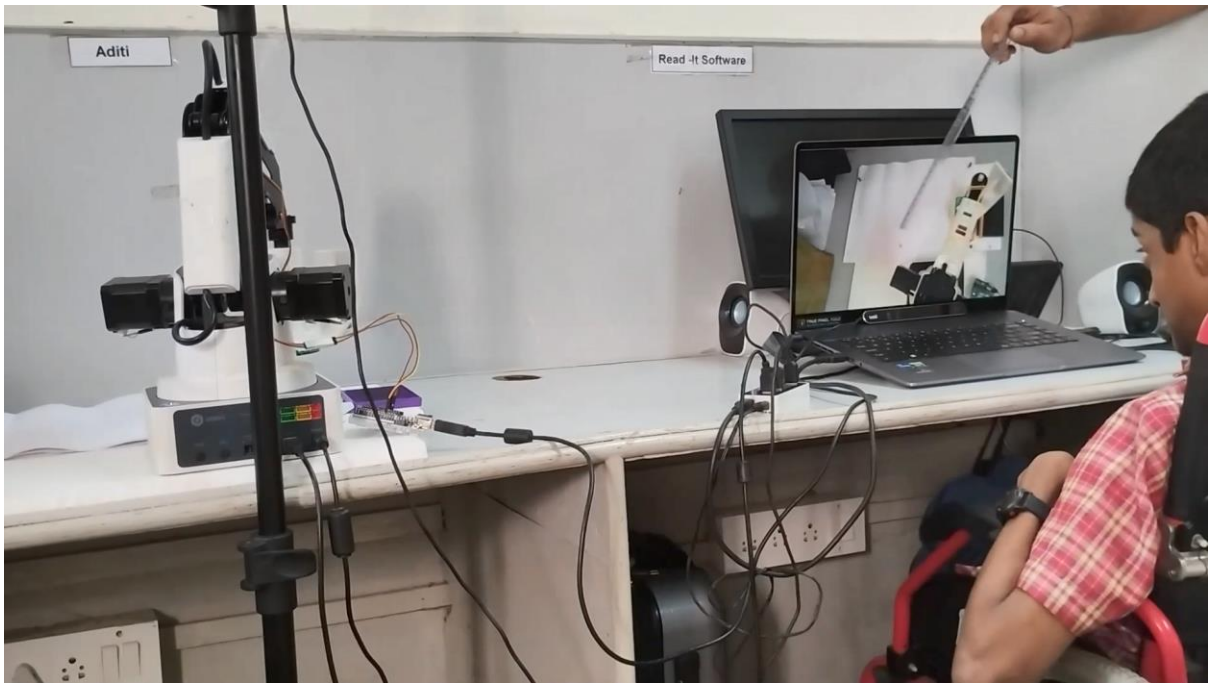

Figure 1. A person with SSMI operating a desktop robot

Students with SSMI undertook both tasks. No winners were announced but videos were recorded of 4 students, who could undertake the task better than others. A representative video of the hackathon is attached with this report.

EU Visitor: Prof Pilar Orero from the Autonomous University of Barcelona, could not visit in person as her visa was rejected but attended the event online.

Schedule: Before start of the hackathon, IISc team visited Vidyasagar on 24th November and briefed and demonstrated technical systems to staff and teachers there. The hackathon started with a keynote address by Dr. Jongbong Park, Director, Project Development, APT Foundation on 25th November IST 1000. Between 100- and 1030, all equipment were set up and students started to participate from 1030 onwards. Prof Orero joined online at 1130 am and videos were recorded from the best performers after lunch break. The event ended at 1530.

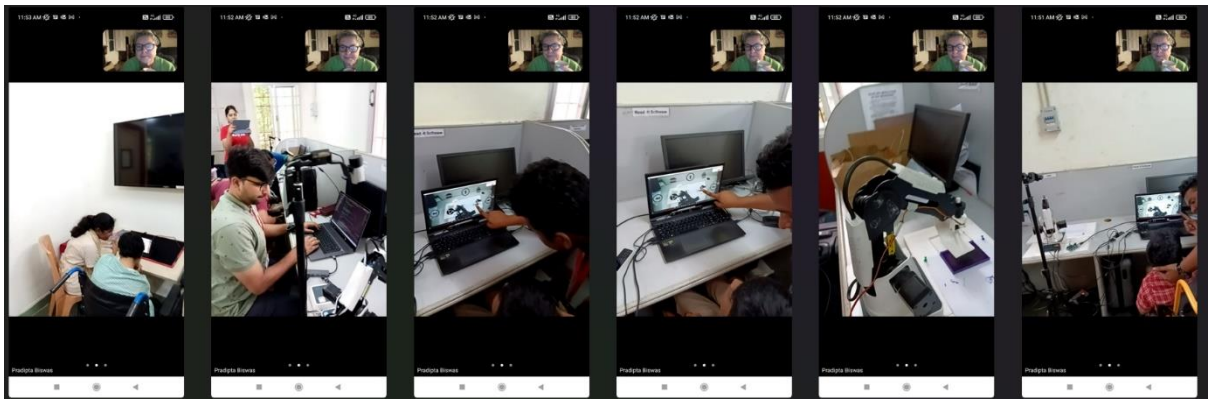

Figure 2. Prof Orero attending the hackathon through MS Teams meeting