

iNEMO Design Contest 2013 Organized by STMicroelectronics

Integrated Smart Sensor Based Application for Lifestyle Enhancement

By Pong Xiang Ming Benjamin and Ye Zhu'En Joel

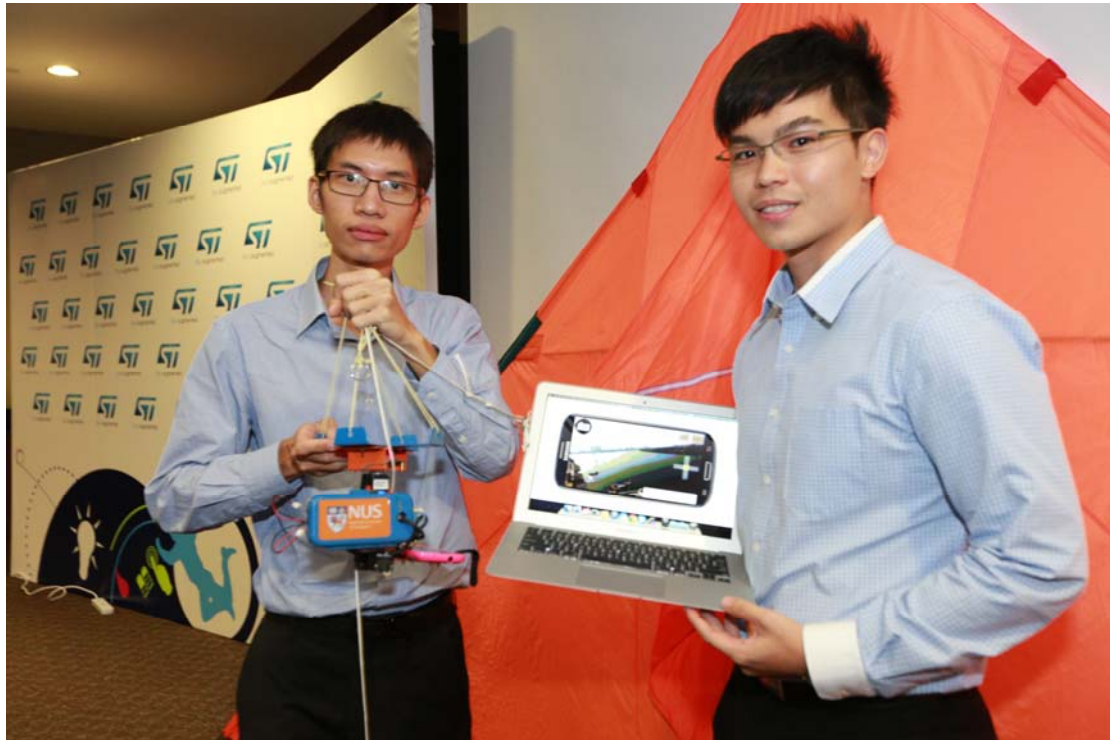


Figure 1: Ye Zhu'En Joel (Left) and Pong Xiang Ming Benjamin (Right)

On 17th May 2013, a number of teams from the National University of Singapore (NUS) and Nanyang Technological University (NTU) participated in the iNEMO Design Contest 2013, sponsored by STMicroelectronics. Participating teams had to use the iNEMO solution to develop application ideas in areas of health, entertainment or lifestyle enhancement, and build a demonstrable prototype. STMicroelectronics had provided a budget of SGD1000 to each team of two students, as well as technical support from their engineers.

The team from NUS, comprising **Pong Xiang Ming Benjamin** and **Ye Zhu'En Joel**, both final year students from the Department of Electrical and Computer Engineering, under the supervision of **Associate Professor Vivian Ng** and **Assistant Professor Koen Mouthaan**, received the first prize for developing a camera stabilizing system for Kite Aerial Photography. The first prize consists of a cash prize of SGD 10,000 sponsored by STMicroelectronics.

The objective of their system was to capture scenic aerial images from a camera mounted on a stabilized platform, which is attached to a kite string. The iNEMO sensor was used to detect orientation changes experienced by the camera, which could be compensated by servo motors, so that the camera maintains its field of view on a specific target. A Kalman filter was employed to remove sensor noise, and rotational transforms were used for the mapping of orientation angles. A mobile application for the Android system was also developed so that an Android smart phone could serve as both the controller and the camera for the system. The system was field-tested over the duration of about one and a half months, and incremental improvements were made after each trial. A video showing the development process, lab performance, and field testing can be found here:

<https://www.youtube.com/watch?v=zjJaLPRRDDw>

The system has several possible industrial applications, such as the stabilization of cameras in UAVs for surveillance, or maintaining the orientation of a satellite receiver.