C. QU, W. ZHANG, T. NIU. Design of a wearable airbag system to prevent fall injuries for older adults. Gerontechnology 2018;17(Suppl):194s; https://doi.org/10.4017/gt.2018.17.s.189.00 **Purpose** In order to provide security for the elderly, we designed a wearable airbag system (*Figure 1*) and developed a fall detection algorithm to prevent fall injuries. The sensor acquires body posture data and the CPU processes and analyzes posture data and predicts possible falls. Once a fall is detected the controller sends a signal to inflate the airbag around the body to provide a buffer to prevent injury. Experiments show that the hardware design and algorithm design of the system can meet these requirements and provide great protection. **Methods** Each module will be developed and tested separately, then combined to evaluate the entire fall protection system. The pre-fall recognition module is used to detect the falling action of the human. We collected a large number of human motion and fall data, and we used these data to make a model, then developed a fall detection algorithm. The gas generator receives a fall signal, then produces a large amount of cold gas to fill the pre-folded airbag within 200*ms*, which provides a buffer against fall injuries. The opening device of the gas generator makes little noise and allows for quick air charging speed with no fear of bodily harm. The airbag design should consider gas path and shape. **Results & Discussion** We designed a wearable fall protection airbag system for the elderly, including the fall detection module made up of the STM32 and the MPU6050, and wearable inflatable modules and airbags, that is designed especially for the elderly. With the simulated fall test, the hardware and algorithm of the system ensure the high recognition rate of the fall detection module, and the pre-recognition time is early. With the inflatable module and the airbag capable of rapid inflation and deployment, the entire fall protection airbag system could ensure that the elderly body is protected and the system is fully inflated before landing, cushioning the body, to avoid or reduce the fall caused by the impact of injuries to the elderly. This system has a good fall protection and is extremely important for the health of the elderly.

Keywords: wearable, airbag system, falling, elder people
Address: Engineering Research Center of Hubei Institute of Aerospace Chemotechnology, Hubei XiangYang, China;
E: quchun_168@163.com

Figure 1. The wearable airbag system