Overview:
Product in current market:
1. Real time surveillance
2. Apps for Android or iOS
3. Easy installation: Plug in the LAN cable or connect by WiFi
Digital door lock
1. Password entering by keypad
2. Fingerprint recognition
Our project:
Guardroid
For the product in the current market, starting price of a IP camera is $200HKD while it is $100HKD for a Webcam. Also, computer owning is very common in the city but the usage is low if the owner go to work. In the same point, the recognition module such as keypad on the digital door lock have low rate of using. From above, it will cause wastes of components. Furthermore, computer can handle more than one camera with processing of motion detection and falling detection while the above product in the market cannot. Thus, we decided to develop the Guardroid for cheaper, greener and more efficient as a better solution.

Features of the Guardroid
• PC in home as central unit
• Android apps for clients
• Monitoring Service
  - Temperature and Humidity references
  - USB Webcam supported with servo motor for adjusting monitoring view
  - Falling detection and notification to Android
• Security Service
  - LCD display for door lock
  - Electric door lock controlled by MCU
  - Password recognition input by Android devices

Methodology:
Android apps
• UDP, SFTP fram/to PC
• Interrupt from PC as notification
PC
• Face recognition: Using Principle Component Analysis(PCA)
• Falling detection: GMG background subtraction
• Motion detection: Frames subtraction, noise filtering, signal amplifying
• Video processing: Record as .jpeg frames and UDP to Android
Arduino(hardware)
• Octocoupler for isolating between MCU and 12V@1.5A lock
• PWM signal generating for servo motor
• I2C protocol for Temperature and Humidity sensor
• USB serial communication from/to PC

Results:
Android apps GUI
• Choice of camera(s)
• Large view for camera

PC server
Image processing on PC, noise filtering and detection

MCU
Arduino board controls the door lock and servo motor, and shows door status