

## E-DOORMAN: AN INTELLIGENT DOOR SURVEILLANCE SYSTEM

### Fields of use

Smart cards and access systems, Artificial Intelligence (AI), Building Automation Software, Smart Appliances, Environmental and Biometrics Sensors, Actuators, Specialized Turnkey Systems, Communications/networking, Artificial intelligence related software, Housewares, Mobile homes

### Current state of technology

The solution prototype has been demonstrated and tested. The technology is ready for joint development of the commercial applications.

### Type of cooperation

Joint development, field testing and commercialization

### Intellectual property

Secret Know-how, Patent applied for but not yet granted

### Developed by

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### Summary

Slovenian researchers have developed an electronic intelligent door security system able to recognize the users, detect unusual entry/exit, break-in and break-in attempts, predict user presence and offers personalized services and remote control using intuitive GUI or virtual assistant that understands natural language. Researchers are looking for companies interested in licensing in the invention and technical cooperation.

### Description of the invention

E-Dorman is an innovative and cost-effective autonomous security and surveillance solution for private homes, apartments and holiday apartments. In addition, it can be effectively used for offices and hotels. Even though the system is stand-alone solution, primarily aimed at integration into existing doors, it can be adjusted and integrated into existing security and surveillance systems, such as access control, anti-burglar systems, smart home applications and other automated home subsystems which need additional level of functionality.

The e-doorman is an intelligent system able to recognize the users, detect unusual entry/exit, break-in and break-in attempts, predict user presence and offers personalized services (customizable notifications and alarms, relevant information, voice messages, greetings and tips) and remote control using intuitive GUI or virtual assistant that understands natural language. e-Dorman is based on a door with electro-mechanic lock, tablet PC, micro-controller and an array of sensors that offers services similar to a human doorman, improves security and increases user comfort. The sensors gather data about events related to the door which are used for context-based reasoning and awareness achieved by artificial intelligence methods running on the tablet.

We developed a minimum mobile e-Doorman version of the system that transforms a tablet PC into a video surveillance device. It uses state-of-the-art machine vision algorithm to detect motion in real-time. When motion is detected, it stores pictures of the moving object to SD card and sends alarms via SMS to desired phone numbers and/or e-mail with attached pictures to desired e-mail addresses. The app can also be controlled remotely via SMS using a free complementary app. When surveillance is turned on the app works in stealth mode, monitors power supply and sends warning when power is lost or low, and automatically accepts incoming calls from selected phone numbers to allow remote listen in function.

Features of the minimum mobile e-Doorman version are:

- State-of-the-art machine vision algorithm for motion detection.
- Send SMS alarm.
- Send e-mail alarm with pictures.
- Store pictures to SD card.
- Remote administration via SMS (free dedicated app).
- Power supply lost warning.
- Remote listen in function.
- Password protected.
- Multiple users.
- Events log.
- Stealth mode.
- Runs in background.
- Automatic restart after system reboot.
- Event list filters.
- Working on android 4.1.
- Gallery of the captured images.
- Password can be reset (e.g., if forgotten).
- Quick set-up wizard.
- Landscape GUI mode.
- Receives SMS in background (runs as service).
- Notification bar added.

The authors of the system are internationally recognized experts in the fields of ambient intelligence, machine learning and data mining, language and speech technologies, computational intelligence and agent and multiagent systems. The authors have experience in a wide range of ambient intelligence tasks, for example:

- Smart home applications focused on energy efficiency, security and ease of use.
- Activity recognition (lying, sitting, standing, walking, running, cycling, etc.).
- Detection of unusual behavior caused by health or security issues.
- Fall detection. ▪ Recognition of diseases.
- Human energy expenditure estimation.
- Detection of unusual environmental events.

The system has been awarded for innovation and has been already promoted in several innovation fairs in Slovenia.

## Advantages

- Automated user recognition.
- Detection of unusual user behavior (entry/exit).
- Detection of break-in attempts.
- Prediction of user presence.
- Personalized services such as customizable notifications and alarms, relevant information, voice messages, greetings and tips.
- Remote control using intuitive GUI or virtual assistant that understands natural language.

## Partner Sought

We are looking for:

- Partners for further joint development, field testing and commercialization of the e-Dorman system.
- Partner able to further commercialize the system, potentially connected with door and locking mechanisms producers interested in integration of the system into their solutions or introduction of the solution as a new independent product on the market.
- Companies with good contacts and business orientation in building construction industry, security system integrators and architecture companies, able to introduce the e-Dorman system as a niche security solution for homes and apartments.