

# A Smartwatch-Based Assistance System for the Elderly Performing Fall Detection, Unusual Inactivity Recognition and Medication Reminding



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# Medication



# Elderly people tend to fall



## 30-40%

of people aged 65 or older fall at least once a year

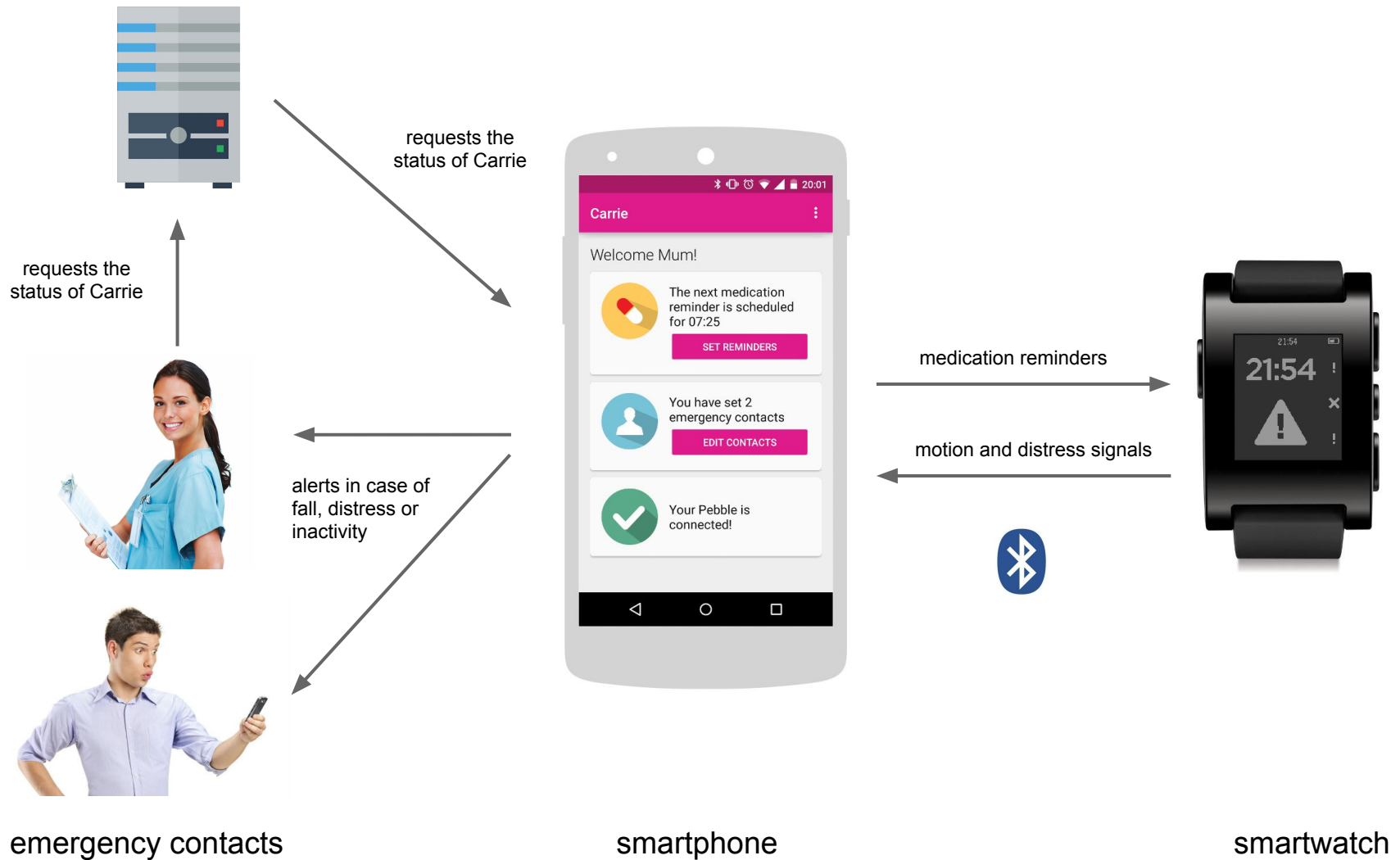
## 10-20%

of those get seriously injured

# Pebble smartwatch

- 3D acceleration sensor
- Bluetooth
- battery performance
- water resistant





# Fall Detection

- Machine learning-based approach
- Multilayer perceptron is trained with pre-recorded data of falls and non-fall situations
- Sensitivity: 98.4%  
Specificity: 99.4% (on staged falls)

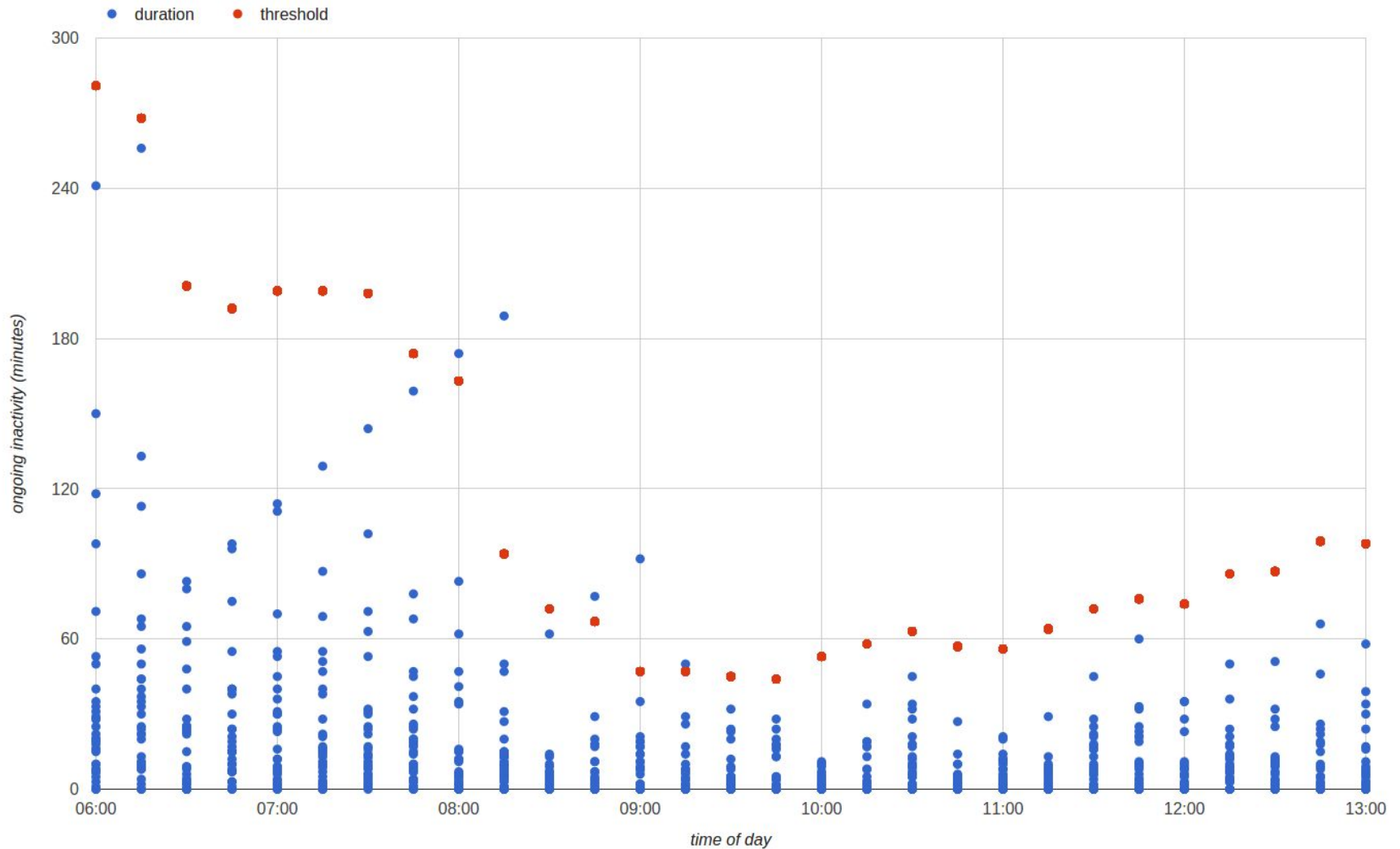


# Inactivity Recognition

- Threshold-based approach
- Adapts itself to the user's daily routines
- Respects weekly recurring patterns
- Calculates "usual" inactivity for any given time of day







inactivity durations and the calculated thresholds



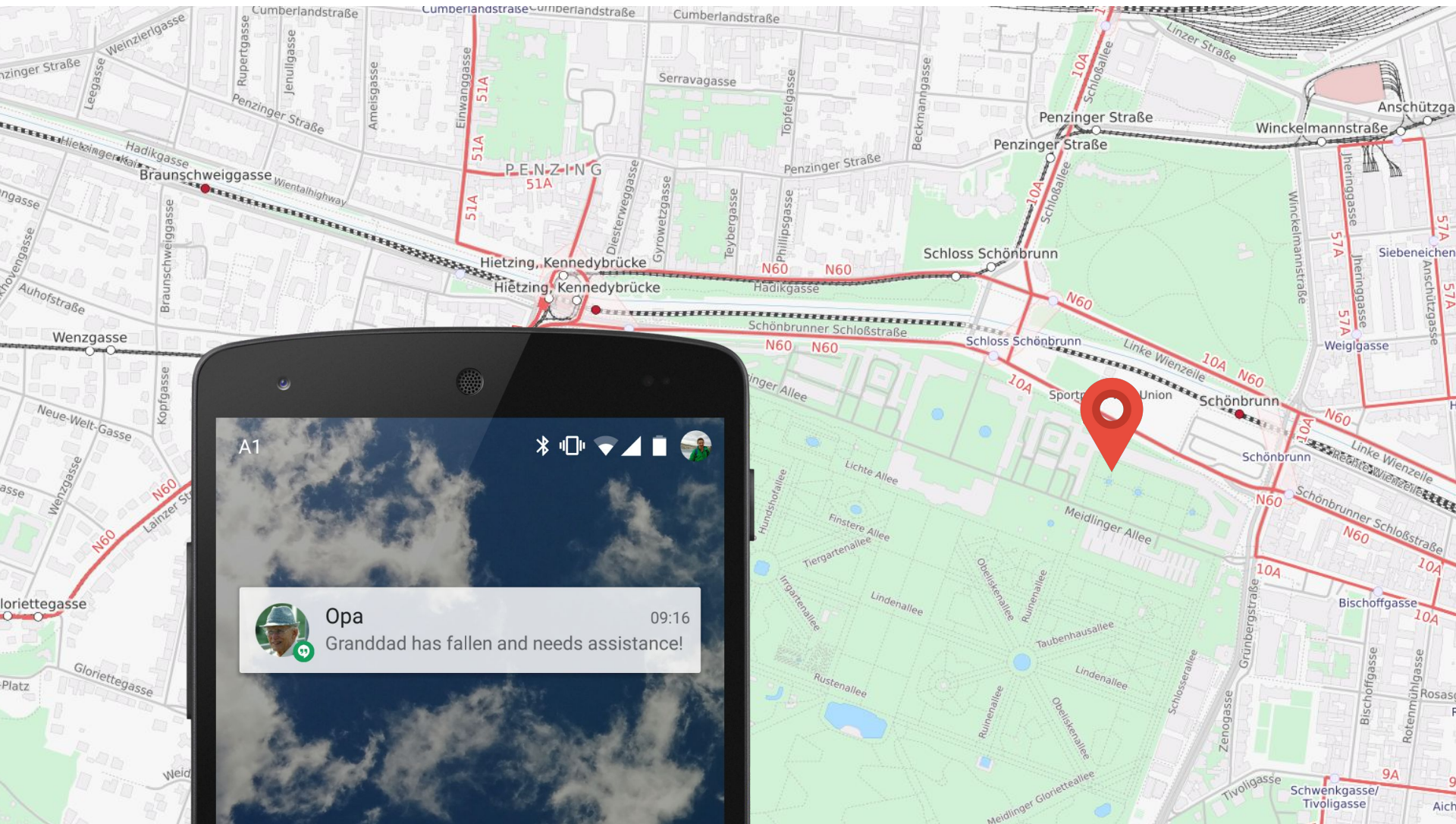


manual help requests & automatic fall detection



inactivity recognition





alerts are texted to emergency contacts



medication reminders



# Future research

- evaluation of performance and acceptance in field tests
- usability tests
- alternative wearables
- improvements to fall detection (online learning, custom network per user)

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