ITU Kaleidoscope 2015
Trust in the Information Society

Smart Doorbell: an ICT Solution to Enhance Inclusion of Disabled People

Alvarez Hamann, Lucas
National Technological University - Argentina
lukashamann@gmail.com

Lezcano Airaldi, Luis
National Technological University - Argentina
luislezcair@gmail.com

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What will we talk about

- Presentation.
- Social inclusion & IoT.
- Proposed model.
- Discussion about related standards.
- Model simulations and validation.
- Conclusion

Introduction

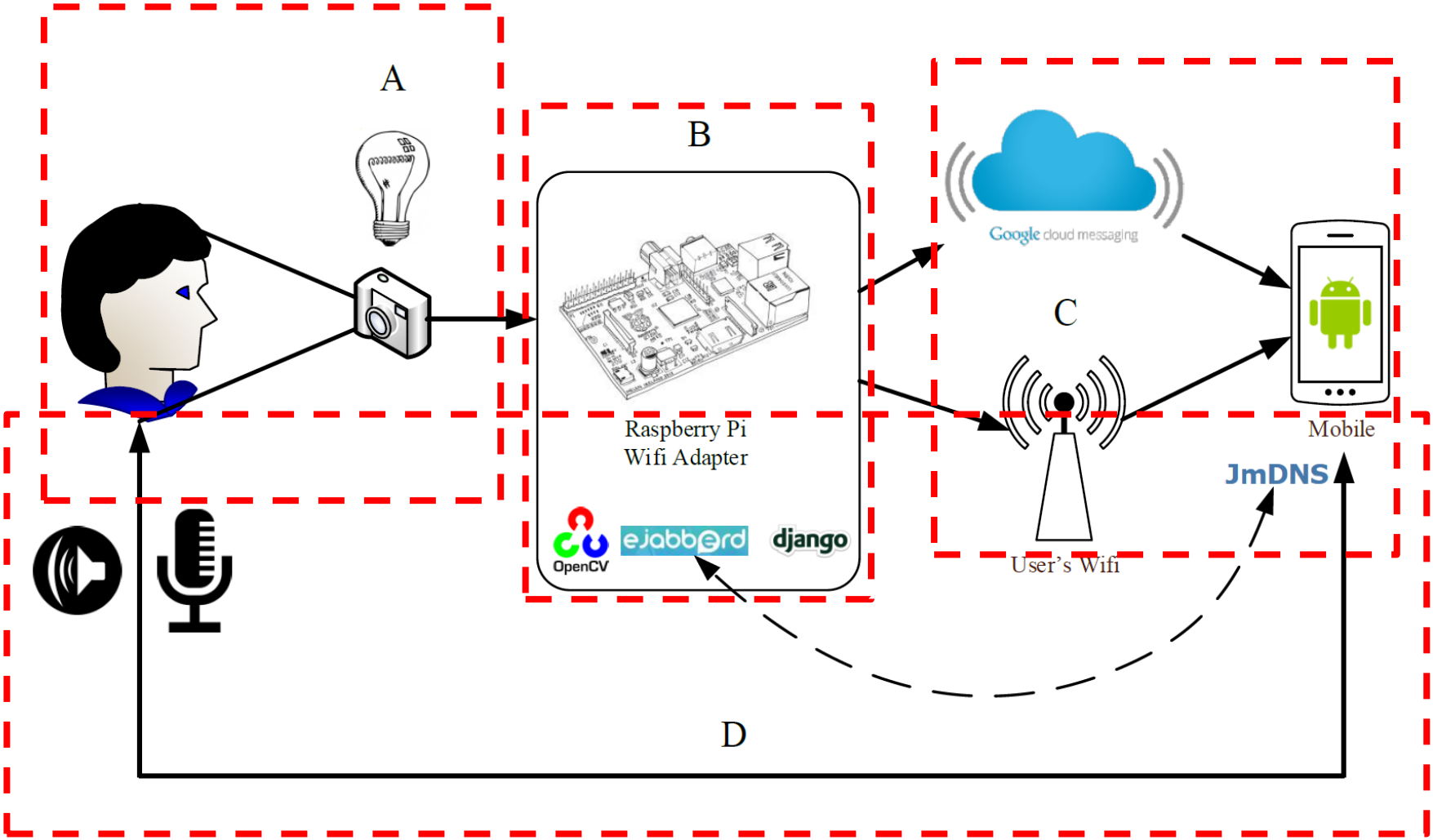
- World population: 7 Billion.
- Disabled population: 1 Billion[1].
- Innovative technologies can be used to assist individuals.
- Smart Doorbell model.
- Things-to-Humans collaboration.

[1] World Health Organization. Disability and Health, Fact Sheet N° 352.

Inclusion & Internet of Things

- Provide intelligence and interconnectivity to daily things.
- Obtain social or economic benefits.
- Borgia's domain classification.
  - Industrial
  - Health well-being.
  - Smart City.
- Home automation IoT application for the elderly and disabled.

Model's Activity Flow



Standards

- Two critical factors to achieve confidence.
  - Reliability of notifications.
  - Safety of information.
- The success of the model is subject to trust.
- ITU-T Recommendations:
  - Y.2060
  - Y.2066
  - F.748.0
- IoT potential depends in achieving trust.
- The challenge of upcoming standards is to focus on:
  - Security
  - Privacy

Simulations

- To test the model 3 experiments were made.
- AT&T Database of Faces:
  - 40 different subjects.
  - 10 facial images per each subject.
  - Different lighting conditions, facial expressions and facial details.
- In each experiment 3 different houses were simulated.
- Every house has a different amount of people stored.
- In every experiment 1 of 2 parameters was changed:
  - The amount of people in every house.
  - The amount of images used for training the model.

Experience 1

- Stored people per house:
  - House A: 5 individuals.
  - House B: 10 individuals.
  - House C: 15 individuals.
- Training: 6 images of each person.
- Testing: 4 images per individual.

	Experience 1		
	House A	House B	House C
True Known Positive (%)	80.00	95.00	90.00
True Unknown Positive (%)	100.00	71.43	80.00
Overall True Positive (%)	83.33	91.49	88.57

Experience 2

- Stored people per house:
  - House A: 7 individuals.
  - House B: 14 individuals.
  - House C: 21 individuals.
- Training: 6 images of each person.
- Testing: 4 images per individual.

	Experience 2		
	House A	House B	House C
True Known Positive (%)	85.71	96.43	88.10
True Unknown Positive (%)	100.00	71.43	80.00
Overall True Positive (%)	87.50	93.65	87.23

Experience 3

- Stored people per house:
  - House A: 7 individuals.
  - House B: 14 individuals.
  - House C: 21 individuals.
- Training: 3 images of each person.
- Testing: 4 images per individual.

	Experience 3		
	House A	House B	House C
True Known Positive (%)	82.14	85.71	72.62
True Unknown Positive (%)	100.00	71.43	80.00
Overall True Positive (%)	84.38	84.13	73.40

Conclusion

- Fingerprint recognition to improve the model.
- Future standards needs to guarantee security and privacy.
- The model promotes social inclusion.
- ICT are means to technological and social progress.