Contribution to Augmented Reality Applications and Interfaces for Mobile Devices

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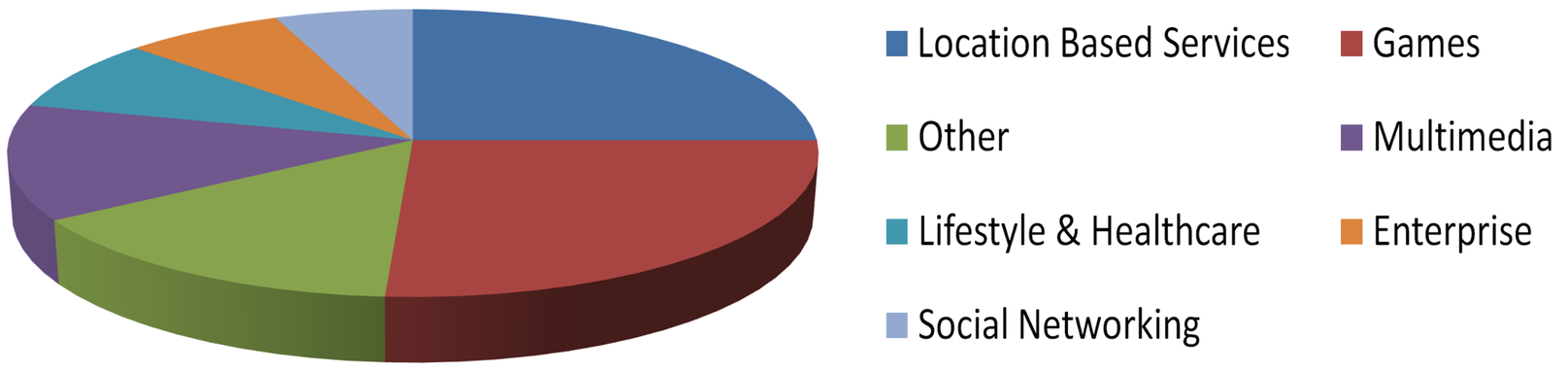
Motivation of the work

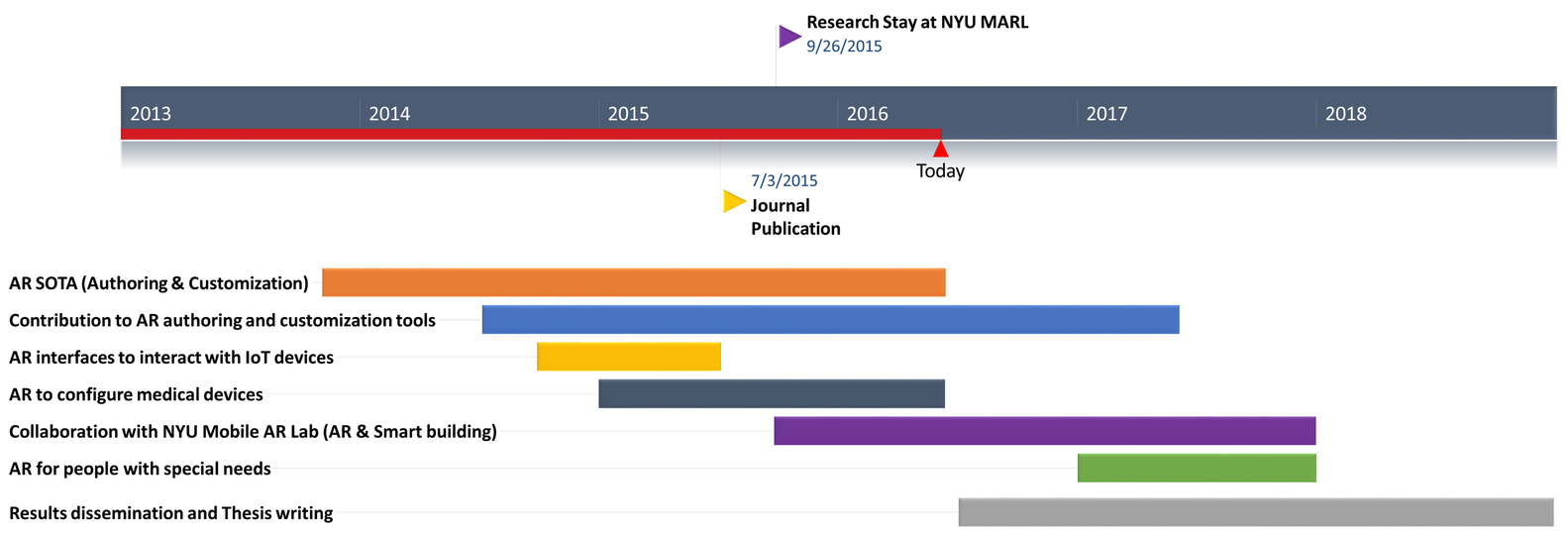
- **Augmented Reality** (AR) combines both real and virtual worlds, providing a **unique user experience**.
- **Ideal tool for many fields**, such as education, training, tourism, etc.
- **Produce innovative research results** to spread AR beyond **entertainment** [1].
- Several unresolved challenges: i.e. **organization** of the augmented **information** [2].



Thesis Objectives

1. **Contribute** to AR **authoring** applications.
2. **Ease the creation** of new **AR** applications to **non-technical personnel**.
3. **New fields of application** for augmented reality.
4. **Increase** AR presence for people with **special needs**.

Research Plan



Results & Discussions I

Dissemination

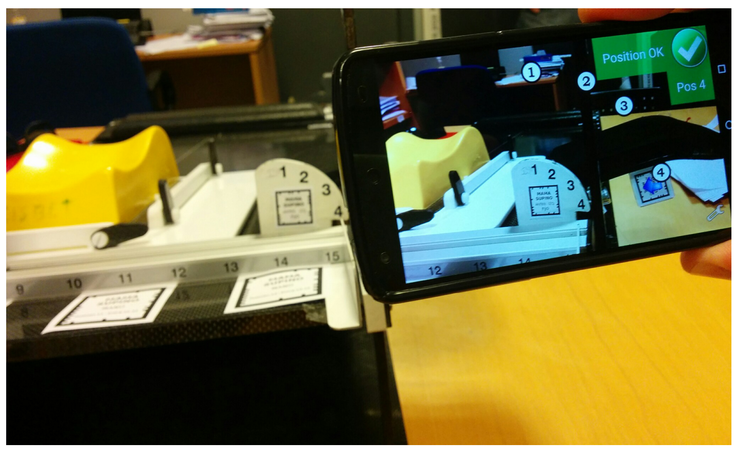
sensors — an open access journal by MDPI — www.mdpi.com — MDPI 20 years — Impact Factor 2.245

- Contribution "Providing IoT Services in Smart Cities through Dynamic Augmented Reality Markers", has been accepted and published by the Sensors journal, in the Special Issue *Sensors and Smart Cities* [5].
  - System to help maintenance staff from Smart Cities.
  - Integrates intuitive AR interfaces, an IoT infrastructure and LED beacon as a dynamic marker.

Results & Discussions II

AR for Radiation Immobilizers

- Smart space in the Radiation Oncology Department of the Meixoeiro Hospital in Vigo.
  - System to reduce the chance of human error with the configuration of RTO immobilizers.
  - Augmented Reality real-time feedback to check or correct the position of the immobilizers[3] for each patient.



Results & Discussions III

Research Stay

NYU mobile ar lab

- Research Stay (2 months) at the New York University Mobile AR Lab.
  - Participation in the Augmented City proyect, focusing on Smart Building data visualization with AR.
  - Using mobile devices with depth sensors and RGB-D cameras to develop improved AR applications.

References

[1] Juniper Research, "Augmented Reality A Market, Primed", White paper http://www.juniperresearch.com/document-library/white-papers/augmented-reality-a-market-primed, 2015.

[2] M. Singh et al., "Augmented Reality Interfaces," Internet Computing, IEEE , vol.17, no.6, pp.66,70, Nov.-Dec. 2013.

[3] Pasquale Daponte, Luca De Vito, Francesco Picariello and Maria Riccio, "State of the art and future developments of the Augmented Reality for measurement applications," Elsevier Measurement, vol.57, pp.53.70, Nov. 2014.

[4] Perey, Christine et al., "Open and interoperable augmented reality," Mixed and Augmented Reality (ISMAR), 2014 IEEE International Symposium on pp.1,3, 10-12 Sept. 2014.

[5] Chaves-Diéguez, D.; Pellitero-Rivero, A.; García-Coego, D.; González-Castaño, F.J.; Rodríguez-Hernández, P.S.; Piñeiro-Gómez, Ó.; Gil-Castiñeira, F.; Costa-Montenegro, E. "Providing IoT Services in Smart Cities through Dynamic Augmented Reality Markers," Sensors, vol.15, iss.7, pp.16083-16104, 2015.

Next Year Planning

- Disseminate the results of the smart space in the Radiation Oncology deparment of the Meixoeiro Hospital.
- Continue the ongoing collaboration with the NYU Augmented Reality Lab.
  - Smart Building AR data visualization.
- Explore AR uses for people with special needs.