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smArt: Open and Interactive Indoor Cultural Data

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<http://www.micc.unifi.it>

smArt is a low-cost framework to quickly set up indoor exhibits in museums featuring a smart navigation system. The framework is web-based and allows the design on a digital map of a sensorized museum environment and the dynamic and assisted definition of the multimedia materials and sensors associated to the artworks.

The screenshot displays the smArt web interface, which is used for configuring museum exhibits. It features a central map area and two side panels for selecting museums and artworks.

Map Area: A central map shows a network of nodes connected by lines. The nodes include:

- city:** A central node with a city skyline icon.
- artworks:** A node with a portrait icon and a '2' in a circle.
- Sensor:** A node with a sensor icon and a '2' in a circle.
- museums:** Two nodes with museum icons and a '2' in a circle.
- City Selection:** Three circular icons at the top representing Florence (with 'F'), Rome (with 'RM'), and Venice.

Left Panel (City Selection):

- Checkboxes for **Florence** (checked), **Rome** (checked), and **Venice** (unchecked).
- Buttons for **museums** and **Sensor**.
- build map** button at the bottom.

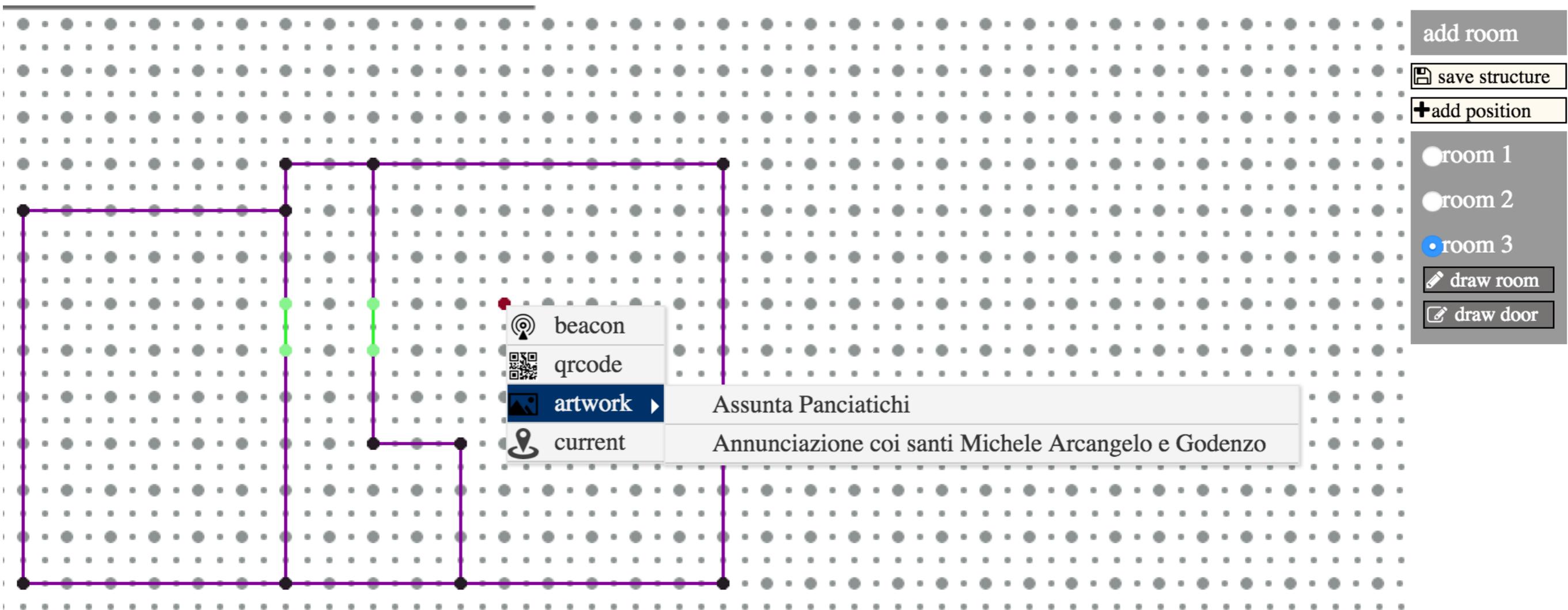
Right Panel (Museum Selection):

- search museum** input field.
- List of museums with checkboxes:
 - Galleria Borghese** (piazzale del Museo Borghese, 5 - 00197Roma)
 - Museo nazionale romano** (via Enrico de Nicola 79Roma(terme di Diocleziano)largo di Villa Peretti 1 (palazzo Massimo)via Sant'Apollinare 46 (palazzo Altemps)via delle Botteghe Oscure 31 (Crypta Balbi)
 - Museo nazionale di San Marco** (Piazza San Marco 3, 50121 Firenze)
 - Galleria dell'Accademia** (Via Ricasoli 58-60 aFirenze,Italia)
 - Palazzo Pitti** (Piazza de' Pitti1 - Firenze)
- Selected Museum:**
 - Galleria Palatina** (Piazza Pitti1, Firenze)
 - Museo Bardini** (Via dei Renai 37, Firenze)

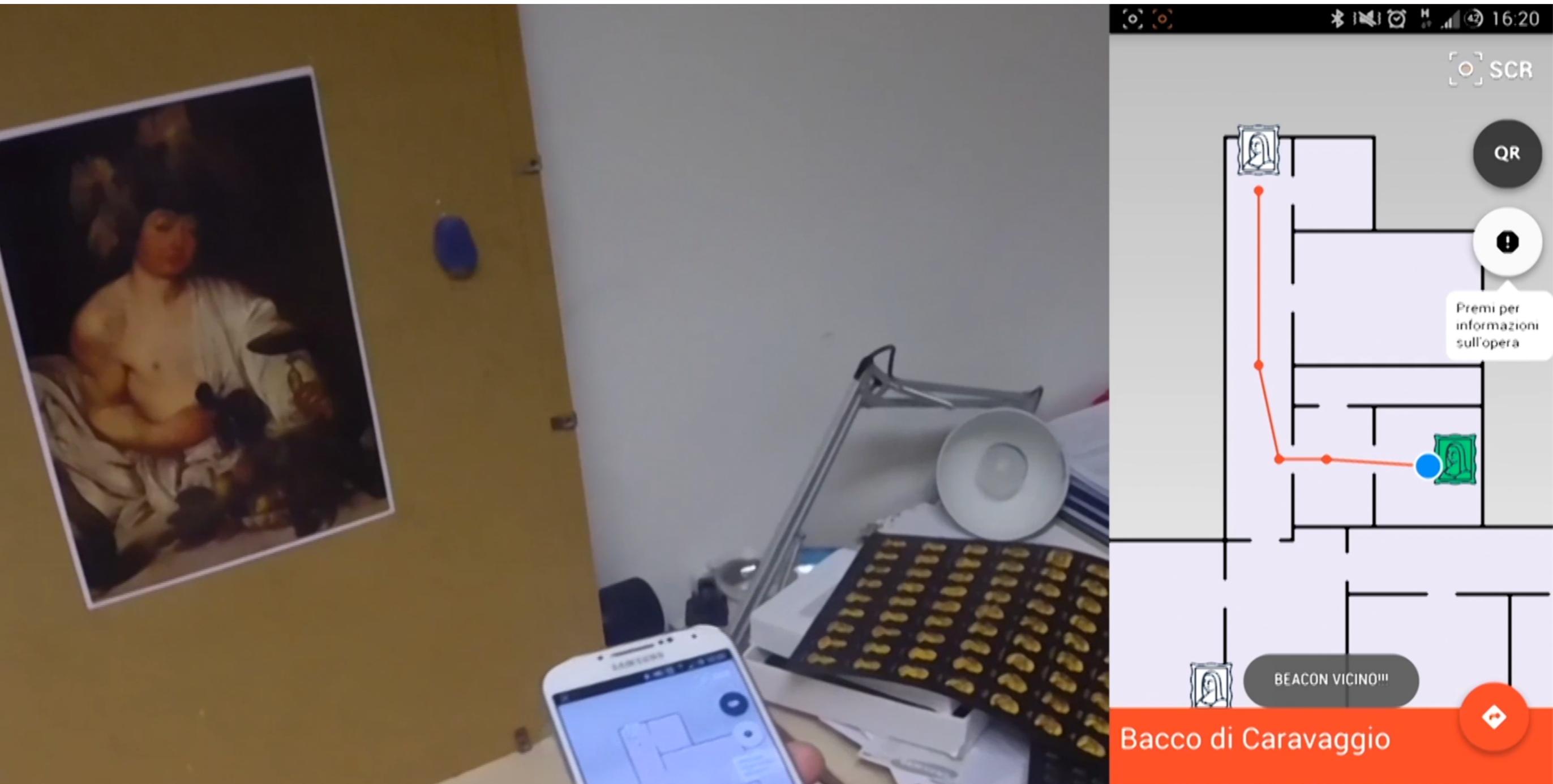
Right Panel (Artwork Selection):

- search artworks** input field.
- List of artworks with checkboxes:
 - Adorazione dei Magi (Pontorno)** (Galleria Palatina)
 - Amorino dormiente** (Galleria Palatina)
 - Annunciazione Della Scala** (Galleria Palatina)
 - Annunciazione di San Gallo** (Galleria Palatina)
 - Assunta Passerini** (Galleria Palatina)
 - Carità (Tino di Camaino)**
- selected artworks:**
 - Assunta Panciaticchi** (Galleria Palatina) with a **QR CODE** button.
 - Annunciazione coi santi Michele Arcangelo e Godenzo** (Galleria Palatina)

The framework is web-based and allows the design of a digital map of a sensorized museum environment and the dynamic and assisted definition of the multimedia materials and sensors associated to the artworks.



A mobile Android application exploits the data generated by the web app and reacts to the expected signals in the real environment.



smArt exploits bluetooth beacons and QR Codes as sensors.



The app provides indoor localisation and routing exploiting available sensors.

Passable spots have been defined by the web app user on the map and can be sensorized artworks, door spot or localisation spots. The shortest path to an artwork is computed by the indoor engine using the Dijkstra's algorithm.

The engine provides also a completely automatic system to calculate the shortest path which uses automatic 2D polygon convex partitioning of the museum map: the Hertel-Mehlhorn algorithm is exploited. Then the center of mass of each partition is treated as a path spot to be used in the graph by the Dijkstra's algorithm.

More Info

MICC

<http://www.micc.unifi.it>

MICC Visual Information and
Media Lab:

<http://www.micc.unifi.it/vim/>

MICC blog

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