Room localisation in the Museum of Fine Arts in Ghent using painting recognition

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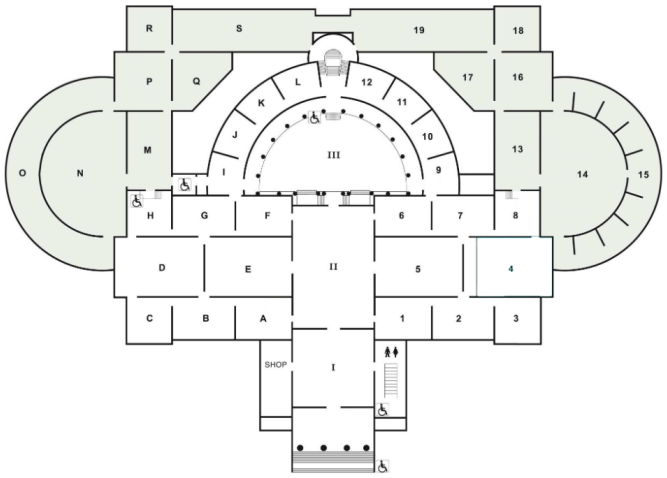

Fig. 1. A ground plan of The Museum of Fine Arts, Ghent.

***Abstract*—This paper describes our method to localise a painting on a ground plan based on The Musem of Fine Arts in Ghent.**

I. Introduction

This paper introduces a framework for rapid painting detection. _ToDo: What makes this work useful?

_ToDo: Why should someone spend time to read this paper

_ToDo: clarification of title and context

_ToDo: which problem has been solved

_ToDo: overview of related work

_ToDo: benefits and shortcomings of related work

_ToDo: overview of your own contributions This paper contains x contributions: _ToDo: overview of results

_ToDo: why these results are useful

_ToDo: overview of structure of the paper In section 2 ...

Based on a frame from a camera which contains a painting, Figure 1 shows the ground plan that is used to mark the correct room

II. Painting Detection

_ToDo: ook dingen uitleggen die niet werkte

- _ToDo: vanishing points
- _ToDo: hough transformatie
- _ToDo: lijn intersectie
- _ToDo: gabor filter
- _ToDo: local binary patterns

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A. Painting Segmentation

Before a painting can be matched against the database it must first be recognized in an arbitrary frame.

B. Feature Detection

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C. Path Tracking

Once a painting is identified and matched, it can be localised on the ground plan. To achieve this, the ground plan is converted into a directed graph. The nodes of this graph are the rooms of the museum and the edges define the connections between rooms. When a user starts recording paintings, the matching algorithm will be performed on each frame and a location will be found. The graph is able to mark nodes in three distinct ways. A green node is the start of the path, an orange node is an intermediate path and the blue node is the end of the path. The path ends when the user stops recording. The path direction is also visualised by coloring the corresponding edges green. Note that when a cyclic path occurs which was walked in both directions, information of order is lost.

To illustrate the path tracking algorithm, a small segment consisting of rooms 1, 2, 3, 4, 5, 6, 7 and 8 are converted into such a graph and is show on figure 2.

D. Database

The database consists of 688 images of various paintings and sculptures in the museum. In this work we only focus on the paintings of this dataset. The paintings were extracted from two different camera's: a Nokia 7 plus and a Samsung A3. Each image also contains the room in which it resides as metadata.

To reduce the load time of this database, a prebuilding stage was implemented. This stage reduces each image to a collection of interest points and corresponding descriptors for these interest points as generated by the ORB [1] algorithm.

III. Results

_ToDo: qualitative as well as quantitative
_ToDo: quantitative: graphs, tables, roc-curves, f1-scores, ...

_ToDo: qualititative: technisch, show where and why the method succeeds or fails, pictures of easy and difficulty cases
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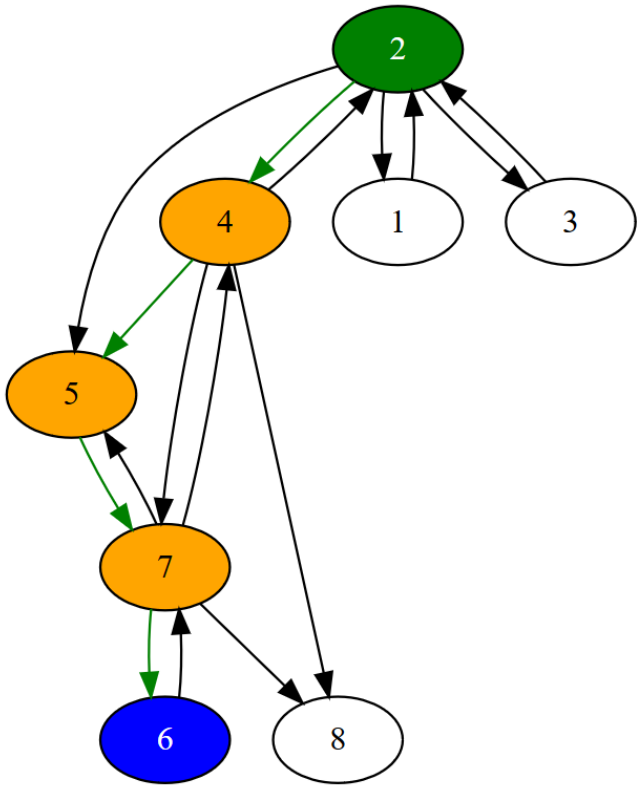

Fig. 2. Path tracking using a graph.

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IV. Conclusion

_ToDo: overview of the most important contributions and the results, without introducing anything new

_ToDo: after the reader has read the paper, the reader can look at the contributions and results from a different viewpoint

_ToDo: statements can be made more explicit

_ToDo: eventueel future work Nulla non mauris vitae wisi posuere convallis. Sed eu nulla nec eros scelerisque pharetra. Nullam varius. Etiam dignissim elementum metus. Vestibulum faucibus, metus sit amet mattis rhoncus, sapien dui laoreet odio, nec ultricies nibh augue a enim. Fusce in ligula. Quisque at magna et nulla commodo consequat. Proin accumsan imperdiet sem. Nunc porta. Donec feugiat mi at justo. Phasellus facilisis ipsum quis ante. In ac elit eget ipsum pharetra faucibus. Maecenas viverra nulla in massa.

REFERENCES

[1] E. Rublee, V. Rabaud, K. Konolige, and G. Bradski, "Orb: An efficient alternative to sift or surf," in *2011 International Conference on Computer Vision*, Nov 2011, pp. 2564–2571.