

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

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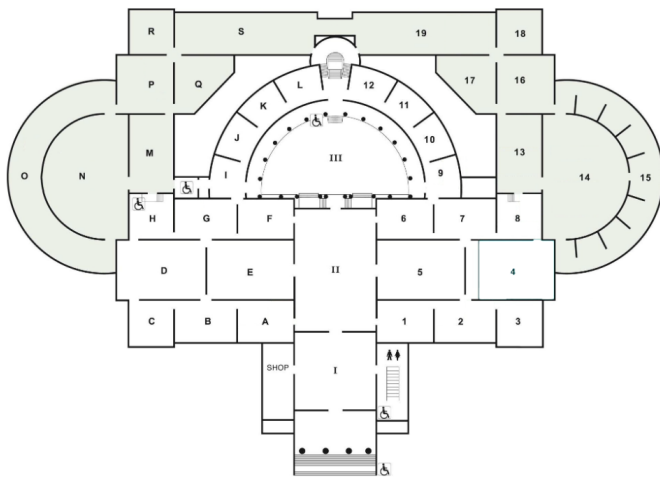


Fig. 1. A ground plan of The Museum of Fine Arts, Ghent.

**Abstract**—This paper describes our method to localise a painting on a ground plan based on The Museum 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 werkten**

- **\_ToDo: vanishing points**
- **\_ToDo: hough transformatie**
- **\_ToDo: lijn intersectie**
- **\_ToDo: gabor filter**
- **\_ToDo: local binary patterns**
- **\_ToDo: gebruik ook afbeeldingen**

## A. Painting Segmentation

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

## B. Feature Detection

## 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 shown 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 cameras: 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. EVALUATION

To measure the performance metrics of our algorithm, we employ three different methods: for painting segmentation, the matching algorithm and room localisation consistency. First, an evaluation of painting segmentation is done using a random sample of the dataset. In this sample, each painting is segmented manually, resulting in four coordinates for each image. These coordinates can be compared against the coordinates that are generated by the painting segmentation algorithm. A distance metric is used to compare the closeness of two coordinates.

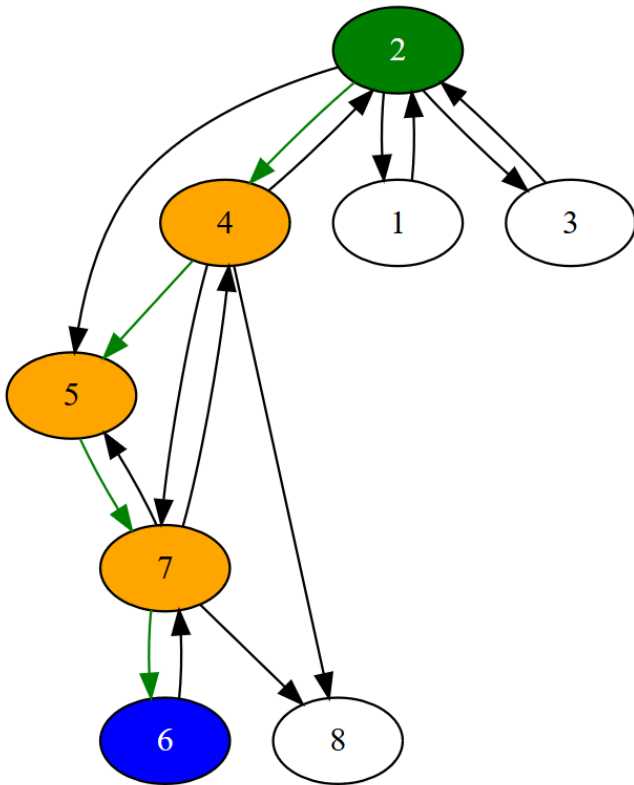


Fig. 2. Path tracking using a graph.

The matching algorithm has to be evaluated manually by comparing the matcher's result. The correctness of the matching algorithm is simply the ratio of the correct matches against the false matches.

To evaluate the room localisation, a sample of the video dataset was taken. The generated path is compared against the actual path.

#### IV. RESULTS

\_ToDo: qualitative as well as quantitative

\_ToDo: quantitative: graphs, tables, roc-curves, f1-scores, ...

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

#### V. 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: eventuel future work

#### 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.