Systematic Review PROTOCOL for 3D Reconstruction Methods from a Limited Number of X-ray Images

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I. STUDY MOTIVATION

In this document, we present the protocol, we have designed to start a Systematic Review(SR) in Computer Vision and Medical Imaging areas. This study focused on peer-reviewed articles.

II. SEARCH STRATEGY

A. Research Questions

In order to follow the methodology proposed by Kitchenham [1], [2], we have elaborated the following research questions:

TABLE I: Research Questions

RQ1	Is it possible to do the reconstruction of a 3D model from a limited number of X-ray images?
RQ2	Which methods exist to reconstruct 3D models from a limited number of X-ray images?
RQ3	What is the maturity level of these model reconstruction methods with respect to the following criteria: scope, programming level (prototype or end-product), programming approach, scalability, correctness, robustness and theoretical and empirical performance (CPU, space memory).
RQ4	How are these reconstruction methods evaluated?
RQ4.1	Which is the obtained quality after this evaluation? Do the researchers compare their results with the ones of others researchers
RQ4.2	Which kind of data is used to evaluate these methods?
RQ5	Do these reconstruction methods present a form of validation?
RQ5.1	Which is the obtained quality after this validation? Do the researchers compare their result with the ones of other researchers
RQ5.2	Which kind of data is used to validate the methods?

B. Keywords to be considered:

- 3d geometric transformation

- 3d model

- 2d/3d reconstruct or 2d-3d reconstruct

- X-ray images

C. Search string:

((3d geometric transformation) or (2d/3d reconstruct or 2d-3d reconstruct)) and (x-ray images)

D. Libraries

- Scopus

- IEEE Xplore

- Science Direct

- ACM Digital Library

- Springer Link

- Wiley Online Library

III. INCLUSION / EXCLUSION CRITERIA: BASED ONLY ON TITLE AND ABSTRACT

The selection of the inclusion/exclusion criteria is a very important task. According to [1], [2], they "should be piloted" to guarantee the reliability of the results. For this review the inclusion and exclusion criteria are:

A. Inclusion criteria

- English, peer-review articles in journals, conferences and workshops, published until April 30th, 2015.

- Without restrictions about the years.

B. Exclusion criteria

- The article is related to Architecture, Archaeological, Fuzzy objects, Astrophysical, Functional Materials, Geoscience, Remote Sensing, Electronic Materials, Biomaterials, Radiotherapy and Oncology Process.

- The article includes the words: Augmented Reality, Cardiac, and/or Vessels.

- The article is only an abstract.

- The article describes a panel, a workshop, a conference and a journal, among others.

- The article is not in English.

- The article is not peer reviewed or refereed.

- The full article is not available on-line.

- The article does not include evaluation or validation of the method.

- The article is a survey or Systematic Literature Review without the outcomes of some specific research work.

In case the same work appears in more than one venue or type of publication, we only include the latest version, preferring journal articles over conference articles, and conference articles over workshop articles.

IV. PRIMARY STUDIES, SELECTION PROCESS

After applying the inclusion/exclusion criteria, 39 relevant papers [3],..., [41] were selected and considered as primary studies. These articles were selected by using the following steps:

1) Identify the relevant studies from the Search Databases mentioned in Section II-D
2) Apply the inclusion/exclusion criteria described in Section III
3) Analyze and synthesize the knowledge corpus
4) Build the review

V. DATA EXTRACTION

The data extraction forms must be designed to collect all the information needed to address the review questions and the study quality criteria [1], [2].

TABLE II: Data Collection Form

Data Item	Value	Additional notes
Data Extractor	Eveling Castro	Apr 15th to May 30th, 2015
Data Checker	Eveling Castro y Nancy Hitschfeld	May 15th to June20th, 2015

VI. SEARCH SPACE

TABLE III: Databases

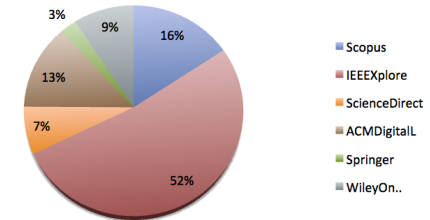| Databases |
|---|
| Scopus |
| IEEE Xplore |
| Science Direct |
| ACMDigitalLibrary |
| Springer |
| WileyOnLibrary |

Fig. 1: Representativeness of the literature sources

Table IV shows the amount of articles retrieved from each database. The obtained information was compiled into ad-hoc Mendeley tools (https://www.mendeley.com/).

TABLE IV: Amount of Articles Retrieved from each Database

Source	Retrieved
Scopus	121
IEEE Xplore	402
ScienceDirect	56
ACMDigital	101
Springer	20
Wiley Online Library	71
Total	**771**

The abstract of these 771 articles were read and evaluated by using the inclusion/exclusion criteria described in Section III in order to decide if they should be included or not in the review. This step was done by iteratively applying the inclusion and exclusion criteria.

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