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"13th International Conference on Industrial Engineering and Industrial Management" and "XXIII Congreso de Ingeniería de Organización (CIO2019)"

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Servicio de Publicaciones de la Universidad de Oviedo
Campus de Humanidades. Edificio de Servicios. 33011 Oviedo (Asturias)
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http: www.uniovi.es/publicaciones
servipub@uniovi.es

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LONJA3D: Additive Manufacturing, Scheduling and Genetic Algorithms

Castillo-Rivera S[97], De Antón J[1], Del Olmo R[2], Pajares J[1], López-Paredes A[1]

Keywords: Scheduling; Genetic Algorithm; Packing Problem

1 Introduction

This work presents preliminary results of an ongoing study. A theoretical framework of Additive Manufacturing (AM) and Genetic Algorithm (GA) has been done, in order to shed light on the challenging that 3D printing industry must face. It has been carried out because the authors are currently working in the design of a managed market called “Lonja3D”. It should be used to purchase products made using 3D printing. In this market, the coordination and organization of offers will be eased between the customers that will receive the bids from the providers of 3D printing services. This "Lonja3D" or market will allow customers to obtain better prices from the manufacturers. In addition to this, the manufacturers are able to optimize their installed production capacity and they are able to decrease operating costs in each case according to the technology.

[1] Salvador Castillo-Rivera (✉ e-mail: salvador.castillo@uva.es), Juan De Antón (e-mail: juan.anton@uva.es), Javier Pajares (e-mail: pajares@insisoc.org), Adolfo López-Paredes (e-mail: adolfo@insisoc.org)

INSISOC Research Group (UIC086), University of Valladolid, Paseo del Cauce 59, 47011 Valladolid, Spain

[2] Ricardo del Olmo (e-mail: rdelolmo@ubu.es)

INSISOC Research Group (UIC086), University of Burgos, C/ Villadiego s/n. 09001, Burgos, Spain

2 Objectives

To study the scheduling, the packing problem and genetic algorithms in AM.

To present a GA to approach the packing problem for 3D printing, which it will be applied to a managed market, “Lonja3D”.

3 Methods

Most of the packing problems found in the specialist literature are two dimensional. According to the items to be placed, two main groups can be distinguished, those which present regular or irregular shapes. It must be optimized the production capacity and the reduction of operating costs, establishing a production rate with the least empty space on the build platform. A first approach can be done through a layout space which the size could be determined i.e., rectangle packing problem.

4 Results

A GA is implemented according to the requirements established by the authors to derive suitable outcomes for "Lonja 3D".

5 Conclusion

A GA has been presented to establish the adequate stage for setting up “LONJA 3D”. The work provides suitable information for 3D printing industry scheduling.

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