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# Investigation on the effect of support structure space in determining optimal part orientation using a generic algorithm

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## Abstract

Prominence on support structure in limiting the build time of additive manufacturing (AM) or rapid prototyping (RP) processes got the least allure from researchers. Likewise, the support structure space (3S) was not utilised yet to prolong the investigation in this arena. Build time reduction leads to faster production and lower fabrication cost of the part. This paper proposes a critical thinking approach that limits build time to a lesser value, for part building in RP processes using a generic algorithm. The support structure (2S) volume is one of the dominant factors in reducing the build time. The proposed algorithm replaces the 2S volume by the 3S volume to find the best part deposition orientation. Construction of the bounding box, computation of the 3S volume and orientation of the part are discussed in the development phase of the algorithm. The verification and validation of sample-fabricated parts on FDM system have been done by comparing the outcomes obtained against the numerically estimated values.

## Keywords

rapid prototyping, additive manufacturing, part orientation, build time, support structure, fused deposition modelling, FDM

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