Computer Vision for Additive Manufacturing.

Ever since the commercialization of additive manufacturing in the late 80’s, it has been clear what enormous potential the technology could have, potentially disrupting several industries. However, we have yet to see the technology fully adopted by the manufacturing industry. One of the issues that has prevented widespread adoption of 3D printing for use within manufacturing is the apparent lack of quality control during and after the printing process. This thesis demonstrates how computer vision may be applied in beneficial ways within additive manufacturing. The main contributions aim at solving part of the challenges required for the technology to reach its full envisioned potential, and to reach widespread industry adoption as a de-facto manufacturing modality. Quality control has been a major milestone to overcome in this regard. As a result, a core part of the contributions revolves around this central topic. The work is separated into three main categories: The first two concerning process and quality control of appearance and geometry. The third category concerns machine interaction paradigms within additive manufacturing. Here, challenges are addressed within the 3D ecosystem, aiming towards facilitating a fluid integration of additive manufacturing within the factory of tomorrow.