

Automated defect detection during steel production using Machine Learning

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With Industry 4.0, the concept of Zero-Defect Manufacturing (ZDM) has become a focus area for the process and manufacturing industry with the goal of improving process efficiency and product quality by minimizing-, eliminating- or compensating for defects- and process errors. Surface defects are a priority issue for many steel making companies, and they all work continuously to improve the quality of products and processes. Monitoring product quality using cameras together with AI in an industrial process will provide a unique opportunity for direct feedback and the opportunity to correct production parameters and would thus be a powerful tool in the improvement process. This work presents development- and evaluating of a camera system together with the AI technology for detecting and classifying surface defects from an industrial perspective. Surface defects are a common reason why parts of hot-rolled products (rod, wire, strip, etc.) need to be scrapped or downgraded. This work will show the development- and implementation of a camera-based technology that can automatically photograph, detect, identify and classify surface defects online. The camera system and the various image analysis models used to identify the different defects are developed by the Swedish research institute Swerim in collaboration with industrial partners. The work presented will include hardware descriptions together with results from industrial trials.