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## Smart robotic system for scrap sorting

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The system utilizes one or more robotic arms, depending on plant requirements, to remove impurities from recycled scrap during the final sorting phase. By leveraging an innovative multi-sensor system and a Deep Learning algorithm trained on analyzed materials, the system classifies materials on the conveyor based on their elemental composition (e.g., iron, copper, brass, plastic, etc.).

A 3D scanner guides the robotic arm to precisely identify and extract unwanted elements, discarding them into designated containers. Thanks to its kinematic properties, the delta-type robotic arm achieves up to 45 picks per minute, ensuring high-speed sorting. The system's modular design allows customization to various plant configurations, enabling scalability through multiple robots operating in series and adaptability to different material types via specialized training and custom gripper development.

The circular economy plays a pivotal role in modern industries, particularly in the steel sector, where recycled scrap is a fundamental raw material in electric arc furnace steel production. The quality of the final steel product is directly influenced by the purity and composition of the scrap used, making advanced sorting solutions like this system essential for improving sustainability and production efficiency.

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