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Spatial position recognition method of semi-transparent and flexible workpieces: A machine vision based on red light assisted

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ABSTRACT

In the automatic sorting process, overlapping translucent and flexible workpieces on the conveyor belt, blurring the imaging edge features of translucent and flexible workpieces is a challenge to locate the upper and lower workpieces spatially, we propose a method for locating translucent and flexible workpieces spatially under the overlapping environment in conjunction with the most common automatic sorting of translucent and flexible workpieces such as infusion tube drip buckets. Firstly, we propose a rectangular surface light source based on 650 nm band and monocular CCD for imaging translucent workpieces such as infusion tube drip buckets and optimize the imaging parameters. Secondly, we study a feature matching recognition algorithm for flexible workpieces that are prone to deformation, construct a mapping relationship between the position of overlapping layers and imaging quality of translucent and flexible workpieces such as infusion tube drip buckets based on clarity and information entropy, and establish The mapping relationship between the position of the overlapping layers and the imaging quality of translucent and flexible workpieces such as infusion tube drip buckets is constructed based on clarity and information entropy, and a local spatial coordinate conversion model is established. Finally, the spatial positioning coordinates of overlapping and non-overlapping translucent and flexible workpieces in the local coordinate system are identified, and the results show that the imaging method and theory can be effectively applied to the identification of overlapping and spatial positioning coordinates in the automatic sorting of translucent workpieces such as infusion tube drip buckets.

ARTICLE INFO

Keywords:
Machine vision;
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Feature matching;
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Metoda prepoznavanja položaja polprozornih in prožnih obdelovancev: Strojni vid, ki temelji na rdeči svetlobi

Bi, Q.L.[a], **Lai, M.L.**[b,*], **Chen, K.**[b], **Liu, J.M.**[b], **Tang, H.L.**[b], **Teng, X.B.**[a], **Guo, Y.Y.**[a]

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POVZETEK

Pri samodejnem razvrščanju je zaradi prekrivanja prosojnih in prožnih obdelovancev na tekočem traku, izziv prostorsko locirati zgornje in spodnje obdelovance, saj prekrivanje zamegljuje robove. Za rešitev težave predlagamo metodo za lociranje prosojnih in prožnih obdelovancev, kot so kapalke za infuzijske cevi, v okolju s prekrivanjem. Najprej predlagamo vir svetlobe s pravokotno površino in spektrom 650 nm, monokularno kamero CCD za slikanje obdelovancev ter optimizacijo parametrov slikanja. Nato preučimo algoritem za prepoznavanje značilnosti prožnih obdelovancev, ki so nagnjeni k deformacijam in na podlagi jasnosti in entropije informacij zgradimo razmerje med položajem prekrivajočih se plasti in kakovostjo slik ter vzpostavimo model za določitev lokalnih prostorskih koordinat. Na koncu so v lokalnem koordinatnem sistemu določene prostorske položajne koordinate prekrivajočih se in neprekrivajočih se obdelovancev. Rezultati kažejo, da je mogoče metodo učinkovito uporabiti za prepoznavo prosojnih prekrivajočih se obdelovancev, kot so kapalke za infuzijske cevi in za določitev njihovih prostorskih položajnih koordinat pri samodejnem razvrščanju.

PODATKI O ČLANKU

Ključne besede:
Strojni vid;
Obdelava slik;
Vizualno prepoznavanje;
Ujemanje značilnosti;
Kakovost slik;
Rdeča svetloba;
Prosojni in prožni predmeti;
Kapalke za infuzijske cevi;
Pametna proizvodnja

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