

目 次

特约专稿

农作物遥感识别与单产估算研究综述 赵龙才 李粉玲 常庆瑞(1)

农业装备与机械化工程

预切种振动供种式木薯播种器勺链排种机构设计与试验
..... 牟向伟 陈林涛 马 旭 薛俊祥 向金山(20)

施肥播种机肥料流量分段式 PID 控制系统设计与试验
..... 王 辉 刘艺豪 周利明 周海燕 牛 康 徐名汉(32)

油菜侧深穴施肥装置设计与试验 廖庆喜 陈 勇 张青松 王 磊 林建新 杜文斌(41)

圆锥盘推板式水田侧深施肥双行排肥器设计与试验
..... 王金峰 付佐栋 翁武雄 王震涛 王金武 杨东泽(53)

基于人体姿态估计与场景交互的果园喷施行为检测方法
..... 宋怀波 韩梦璇 王云飞 宋 磊 陈春堃(63)

基于改进 U-Net 模型的小麦收获含杂率在线检测方法
..... 陈 满 金诚谦 莫恭武 刘士坤 徐金山(73)

高茬黏重稻茬田油菜直播埋茬防堵深施肥复合装置研究
..... 王 磊 边祺旺 廖庆喜 王 彪 廖宜涛 张青松(83)

履带自走式分拣型马铃薯收获机设计与试验
..... 魏忠彩 王兴欢 李学强 王法明 李志合 金诚谦(95)

马铃薯收获机辊组式薯土分离装置设计与试验
..... 杨然兵 田光博 尚书旗 王炳军 张 建 翟宇鸣(107)

甘蔗收获机割台随动控制系统设计与试验 官元娟 金忠博 白晓平 王思佳 吴 玲 黄婉媛(119)

基于 VS-IRRT 算法的采摘机械臂路径规划
..... 荀 一 李道政 王 勇 黄旭婷 王志恒 杨庆华(129)

基于 RSM 和 GA-BP-GA 优化的油茶籽仿真参数标定
..... 丁辛亭 李 凯 郝 伟 杨其长 闫锋欣 崔永杰(139)

基于环境源项法的 SST $\gamma-Re_{\theta}$ 转捩模型的修正 叶长亮 王福军 汤 远 陈 俊 郑 源(151)

农业信息化工程

基于多源光学雷达数据融合的黄淮海平原冬小麦识别

..... 冯权泷 任 燕 姚晓闯 牛博文 陈泊安 赵圆圆(160)

基于 Sentinel - 1 影像的浙江省沿海养殖池塘提取与管理 蔡丹丰 胡求光 魏昕伊(169)

基于无人机遥感影像的多生育期冬小麦种植行检测方法

..... 杨蜀秦 林丰山 徐鹏辉 王鹏飞 王 帅 宁纪锋(181)

基于无人机高光谱遥感的水稻氮营养诊断方法 许童羽 白驹驰 郭忠辉 金忠煜 于丰华(189)

免耕播种装备 PDM 系统影像资源管理研究..... 刘宏新 周丽丽 张一鸣 赵一健 解勇涛(198)

基于本体与认知经验的农业机器人视觉分类决策方法

..... 熊俊涛 廖世盛 梁俊浩 韦婷婷 陈淑绵 郑镇辉(208)

基于改进 YOLO v3 的玉米叶片气孔自动识别与测量方法

..... 张 帆 郭思媛 任方涛 张新红 李结平(216)

基于改进 SqueezeNet 模型的多品种茶树叶片分类方法

..... 孙道宗 丁 郑 刘锦源 刘 欢 谢家兴 王卫星(223)

基于混合扩张卷积和注意力的黄瓜病害严重度估算方法 李凯雨 朱昕怡 马浚诚 张领先(231)

基于改进 YOLO v4 的生猪耳根温度热红外视频检测方法 刘 刚 冯彦坤 康 熙(240)

基于 DeepLabCut 算法的猪只体尺快速测量方法研究

..... 赵宇亮 曾繁国 贾 楠 朱 君 王海峰 李 斌(249)

融合注意力机制的开集猪脸识别方法 王 荣 高荣华 李奇峰 刘上豪 于沁杨 冯 璐(256)

基于改进 YOLO v4 的单环刺蝥洞口识别方法 冯 娟 梁翔宇 曾立华 宋小鹿 周玺兴(265)

基于空间注意力和可变形卷积的无人机田间障碍物检测 杜小强 李卓林 马程宏 王大帅(275)

基于 D2 - YOLO 去模糊识别网络的果园障碍物检测

..... 蔡舒平 潘文浩 刘 慧 曾 潇 孙仲鸣(284)

基于激光 SLAM 的牛场智能推翻草机器人自主导航系统

..... 宋怀波 段援朝 李 嵘 焦义涛 王 政(293)

农业水土工程

基于圆筒入渗仪的田间膜孔灌土壤入渗参数研究 范严伟 唐兴鹏 史金红 马天花(302)

考虑气候分区的甘肃省干旱时空分布特征分析

..... 郑 健 鲍婷婷 王春霞 赵雨露 陈 娅 王 燕(311)

补灌对旱作集雨下麦田微生物呼吸与熵值的影响 徐悦悦 王楹鑫 马向成 蔡 铁 贾志宽(321)

覆膜滴灌紫薯农田水热传输规律及其对环境因子的响应

..... 张友良 李 躲 冯绍元 王凤新 胡英杰 汪兆辉(330)

基于 DNDC 的夏玉米农田控氮稳产氮肥和秸秆措施优化

..... 赵政鑫 王晓云 田雅洁 王 锐 彭 青 蔡焕杰(341)

农业生物环境与能源工程

- 基于 SSA - LSTM 的日光温室环境预测模型研究…………… 祖林禄 柳平增 赵妍平 李天华 李 辉(351)
可组合式堆肥发酵多层温度自适应监测系统设计与试验 ……… 王纪章 茆 寒 王 旭 周 静(359)

农产品加工工程

- 高压均质辅助酶解豆乳对蛋白结构及抗营养因子的影响
…………… 齐宝坤 王 琪 钟明明 廖 一 孙禹凡(368)
基于改进 ResNet18 模型的饲料原料种类识别方法 …… 牛智有 于重洋 吴志陶 邵艳凯 刘梅英(378)
基于近红外光谱与多品质指标的苹果出库评价模型研究
…………… 赵 娟 沈懋生 浦育歌 陈 昂 李 豪(386)
基于无参数高效算法的近红外光谱模型传递研究 …… 刘翠玲 徐金阳 孙晓荣 张善哲 咎佳睿(396)
可更换探头的手持式多果品内部品质无损检测仪研究 ……… 郭文川 纪同奎 张宗逸 周一航(403)

车辆与动力工程

- 基于扩张观测器的 HMCVT 换段离合器油压跟踪控制
…………… 陆 凯 王 琳 鲁植雄 周华栋 钱 进 赵一荣(410)

机械设计制造及其自动化

- 零耦合度部分运动解耦 2T1R 并联机构拓扑与性能研究 ……… 沈惠平 朱晨阳 李 菊 李 涛(419)
基于 Jacobian + RBF 的 3 - PTT 并联机构末端精确控制方法
…………… 陈明方 黄良恩 魏松坡 郑仕高 陈中平(430)
基于参考轨迹实时修正的机器人轨迹跟踪控制方法
…………… 肖 帆 李公法 章晓峰 陶 波 蒋国璋 李 光(441)
基于改进复合三角函数的伺服压力机轨迹规划研究
…………… 徐道春 吕明青 邵珠峰 陈涵玉 胡益玮 王传英(450)

**Transactions of the Chinese Society
for Agricultural Machinery
Vol. 54 No. 2 2023**

Contents

Invited Paper

Review on Crop Type Identification and Yield Forecasting Using Remote Sensing
..... ZHAO Longcai LI Fenling CHANG Qingrui (1)

Agricultural Equipment and Mechanization Engineering

Design and Experiment of Spoon Chain Seed Metering Mechanism of Precutting Vibration Seed Feeding
Cassava Planter MOU Xiangwei CHEN Lintao MA Xu XUE Junxiang XIANG Jinshan (20)

Design and Test of Fertilizer Flow Piecewise PID Control System of Fertilizer Planter
..... WANG Hui LIU Yihao ZHOU Liming ZHOU Haiyan NIU Kang XU Minghan (32)

Design and Experiment of Side Deep Hole Fertilization Device for Rapeseed
..... LIAO Qingxi CHEN Yong ZHANG Qingsong WANG Lei LIN Jianxin DU Wenbin (41)

Design and Experiment of Conical-disc Push Plate Double-row Fertilizer Apparatus for Side-deep Fertilization
in Paddy Field
..... WANG Jinfeng FU Zuodong WENG Wuxiong WANG Zhentao WANG Jinwu YANG Dongze (53)

Monitoring of Spraying Behavior in Orchard Based on Interaction of Human Posture Estimation and Scenes
..... SONG Huaibo HAN Mengxuan WANG Yunfei SONG Lei CHEN Chunkun (63)

Online Detection Method of Impurity Rate in Wheat Mechanized Harvesting Based on Improved U – Net
Model CHEN Man JIN Chengqian MO Gongwu LIU Shikun XU Jinshan (73)

Burying Stubble and Anti-blocking Deep Fertilization Composite Device for Rapeseed Direct Planting in
High Stubble and Heavy Soil Rice Stubble Field
..... WANG Lei BIAN Qiwang LIAO Qingxi WANG Biao LIAO Yitao ZHANG Qingsong (83)

Design and Experiment of Crawler Self-propelled Sorting Type Potato Harvester
..... WEI Zhongcai WANG Xinghuan LI Xueqiang WANG Faming LI Zhihe JIN Chengqian (95)

Design and Experiment of Roller Group Type Potato Soil Separator for Potato Harvester
..... YANG Ranbing TIAN Guangbo SHANG Shuqi WANG Bingjun ZHANG Jian ZHAI Yuming (107)

Design and Experiment of Servo Control System for Sugarcane Header
..... GONG Yuanjuan JIN Zhongbo BAI Xiaoping WANG Sijia WU Ling HUANG Wanyuan (119)

Motion Planning of Harvesting Manipulator Based on VS – IRRT Algorithm
..... XUN Yi LI Daozheng WANG Yong HUANG Xuting WANG Zhiheng YANG Qinghua (129)

Calibration of Simulation Parameters of *Camellia oleifera* Seeds Based on RSM and GA – BP – GA
Optimization DING Xinting LI Kai HAO Wei YANG Qichang YAN Fengxin CUI Yongjie (139)

Modification of SST $\gamma - Re_{\theta}$ Transition Model Based on Ambient Source Term Method
..... YE Changliang WANG Fujun TANG Yuan CHEN Jun ZHENG Yuan (151)

Agricultural Informatization Engineering

Identification of Winter Wheat in Huang – Huai – Hai Plain Based on Multi-source Optical Radar Data Fusion
..... FENG Quanlong REN Yan YAO Xiaochuang NIU Bowen CHEN Boan ZHAO Yuanyuan (160)

Extraction and Management of Coastal Aquaculture Ponds in Zhejiang Province Based on Sentinel – 1 SAR Images	CAI Danfeng HU Qiuguang WEI Xinyi (169)
Planting Row Detection of Multi-growth Winter Wheat Field Based on UAV Remote Sensing Image	YANG Shuqin LIN Fengshan XU Penghui WANG Pengfei WANG Shuai NING Jifeng (181)
Diagnosis Method of Rice Nitrogen Deficiency Based on UAV Hyperspectral Remote Sensing	XU Tongyu BAI Juchi GUO Zhonghui JIN Zhongyu YU Fenghua (189)
Image Resource Management of No-tillage Seeding Equipment PDM System	LIU Hongxin ZHOU Lili ZHANG Yiming ZHAO Yijian XIE Yongtao (198)
Visual Classification Decision-making Method for Agricultural Robots Based on Ontology and Cognitive Experience	XIONG Juntao LIAO Shisheng LIANG Junhao WEI Tingting CHEN Shumian ZHENG Zhenhui (208)
Automatic Identification and Measurement of Maize Leaves Stomata Based on YOLO v3	ZHANG Fan GUO Siyuan REN Fangtao ZHANG Xinhong LI Jieping (216)
Classification Method of Multi-variety Tea Leaves Based on Improved SqueezeNet Model	SUN Daozong DING Zheng LIU Jinyuan LIU Huan XIE Jiaying WANG Weixing (223)
Estimation Method of Leaf Disease Severity of Cucumber Based on Mixed Dilated Convolution and Attention Mechanism	LI Kaiyu ZHU Xinyi MA Juncheng ZHANG Lingxian (231)
Detection Method of Pig Ear Root Temperature Based on Improved YOLO v4	LIU Gang FENG Yankun KANG Xi (240)
Rapid Measurements of Pig Body Size Based on DeepLabCut Algorithm	ZHAO Yuliang ZENG Fanguo JIA Nan ZHU Jun WANG Haifeng LI Bin (249)
Open-set Pig Face Recognition Method Combining Attention Mechanism	WANG Rong GAO Ronghua LI Qifeng LIU Shanghao YU Qinyang FENG Lu (256)
<i>Urechis unicinctus</i> Burrows Recognition Method Based on Improved YOLO v4	FENG Juan LIANG Xiangyu ZENG Lihua SONG Xiaolu ZHOU Xixing (265)
UAV Field Obstacle Detection Based on Spatial Attention and Deformable Convolution	DU Xiaoqiang LI Zhuolin MA Zenghong YANG Zhenhua WANG Dashuai (275)
Orchard Obstacle Detection Based on D2 – YOLO Deblurring Recognition Network	CAI Shuping PAN Wenhao LIU Hui ZENG Xiao SUN Zhongming (284)
Autonomous Navigation System for Pasture Intelligent Overthrowing Grass Robot Based on Laser SLAM	SONG Huaibo DUAN Yuanchao LI Rong JIAO Yitao WANG Zheng (293)

Agricultural Soil and Water Engineering

Soil Infiltration Parameters for Field Film Hole Irrigation Based on Cylinder Infiltrometer	FAN Yanwei TANG Xingpeng SHI Jinhong MA Tianhua (302)
Spatial and Temporal Distribution Characteristics of Drought in Gansu Province Considering Climate Zoning	ZHENG Jian BAO Tingting WANG Chunxia ZHAO Yulu CHEN Ya WANG Yan (311)
Response of Wheat Field Microbial Respiration and Its Entropy to Different Supplementary Irrigation under Ridge-furrow Mulching System	XU Yueyue WANG Yingxin MA Xiangcheng CAI Tie JIA Zhikuan (321)
Water and Heat Transfer and Its Response to Environmental Factors in Drip Irrigated Purple Potato Field with Film Mulching	ZHANG Youliang LI Duo FENG Shaoyuan WANG Fengxin HU Yingjie WANG Zhaohui (330)
Optimization of Nitrogen Fertilizer and Straw Measures to Control Ammonia and Stabilize Nitrogen Yield in Summer Maize Farmland Based on DNDC Model	ZHAO Zhengxin WANG Xiaoyun TIAN Yajie WANG Rui PENG Qing CAI Huanjie (341)

Agricultural Bio-environment and Energy Engineering

Solar Greenhouse Environment Prediction Model Based on SSA – LSTM

..... ZU Linlu LIU Pingzeng ZHAO Yanping LI Tianhua LI Hui (351)

Combinable Multi-storey Adaptive Monitoring System for Composting Fermentation Temperature

..... WANG Jizhang MAO Han WANG Xu ZHOU Jing (359)

Agricultural Products Processing

Effects of High-pressure Homogenization Assisted Enzymatic Hydrolysis of Soybean Milk on Protein Structure and Anti-nutritional Factors

QI Baikun WANG Qi ZHONG Mingming LIAO Yi SUN Yufan (368)

Identification of Feed Raw Material Type Based on Improved ResNet18 Model

..... NIU Zhiyou YU Chongyang WU Zhitao SHAO Yankai LIU Meiyong (378)

Out-of-warehouse Evaluation and Prediction Model of Apple Based on Near-infrared Spectroscopy Combined with Multiple Quality Indexes

ZHAO Juan SHEN Maosheng PU Yuge CHEN Ang LI Hao (386)

Near Infrared Spectroscopy Calibration Transfer Based on Parameter-free and Efficient Calibration Enhancement

Algorithm

LIU Cuiling XU Jinyang SUN Xiaorong ZHANG Shanzhe ZAN Jiarui (396)

Handheld Non-destructive Detector for Internal Quality of Multi-fruits with Replaceable Probe

..... GUO Wenchuan JI Tongkui ZHANG Zongyi ZHOU Yihang (403)

Vehicle and Power Engineering

Sliding Mode Control for HMCVT Shifting Clutch Pressure Tracking Based on Expanded Observer

..... LU Kai WANG Lin LU Zhixiong ZHOU Huadong QIAN Jin ZHAO Yirong (410)

Mechanical Design & Manufacturing and Automation

Topology and Performance Analysis of 2T1R Parallel Mechanism with Zero Coupling Degree and Motion

Decoupling

SHEN Huiping ZHU Chenyang LI Ju LI Tao (419)

End Precise Control Method of 3 – PTT Parallel Mechanism

..... CHEN Mingfang HUANG Liang'en WEI Songpo ZHENG Shigao CHEN Zhongping (430)

Robot Trajectory Tracking Control Based on Reference Trajectory Real-time Modification

..... XIAO Fan LI Gongfa ZHANG Xiaofeng TAO Bo JIANG Guozhang LI Guang (441)

Trajectory Planning of Servo Press Based on Improved Composite Trigonometric Functions

..... XU Daochun LÜ Mingqing SHAO Zhufeng CHEN Hanyu HU Yiwei WANG Chuanyong (450)