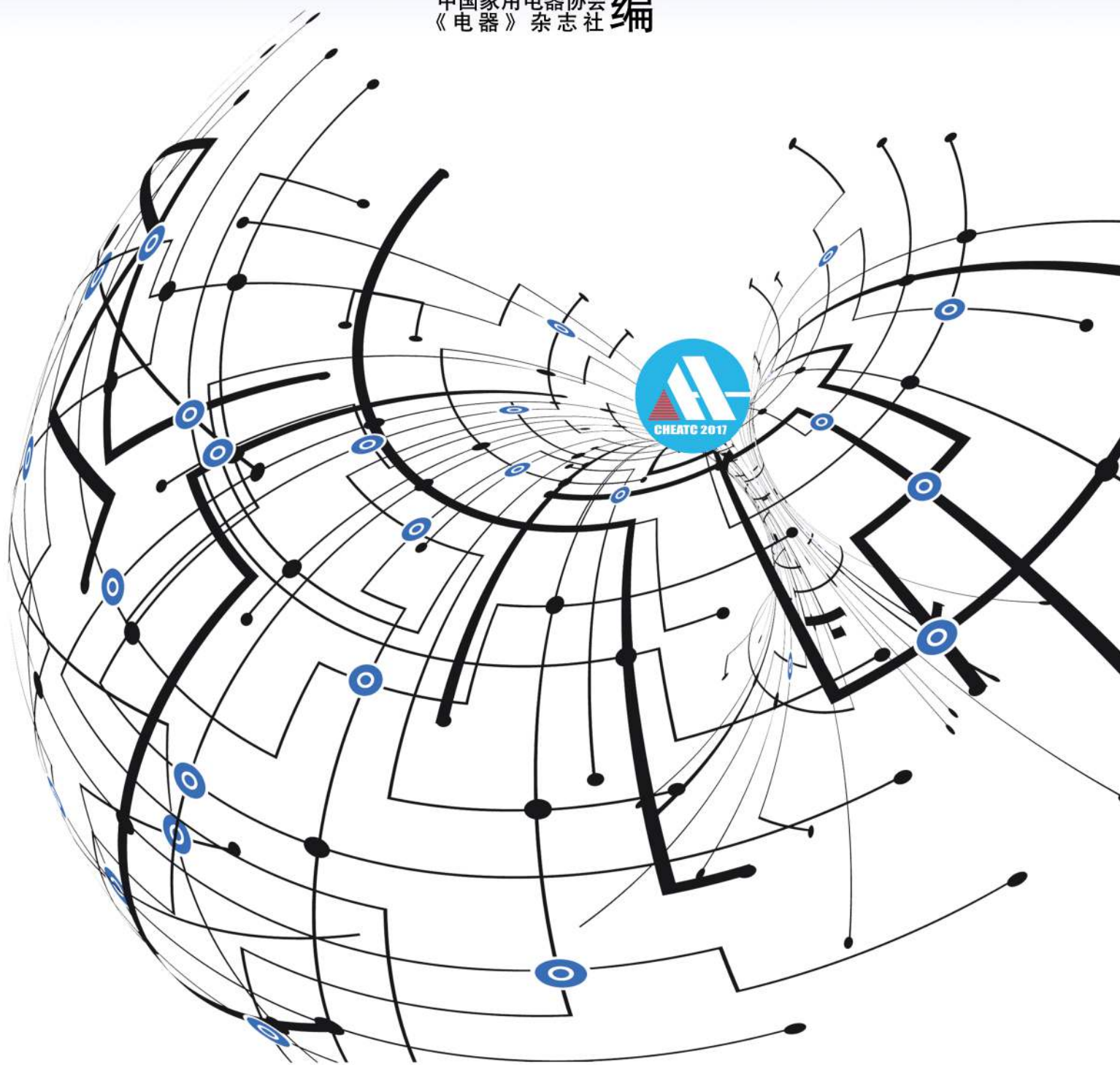


CHEATC

2017 年中国家用电器技术大会

论文集

中国家用电器协会 编
《电器》杂志社



技术落地，产业升级

(前言)

时光飞逝，又到一年的金色秋季。当我们在这个收获的季节回首，比时间跑得更快的，是这个时代的技术发展。曾经觉得只是很“炫”、很虚，离现实还很遥远的技术，旋即一个接一个落地到应用领域。单说图像识别技术，在前不久，人脸识别让“刷脸”进入生活场景中。马上，步态识别就要用在安防领域。接下来，静脉生物识别技术或将成为金融服务行业的宠儿。大数据、机器学习、物联网、虚拟现实、人工智能……正在给我们产业的技术创新带来无限可能。

智能，是家电技术创新最活跃的部分。在今年，我们明显感到，智能化技术在家电领域的应用正在不断细化和聚焦。包括智能技术的不断迭代升级，更注重挖掘智能化带给消费者的体验价值，定制出许多的个性化的应用场景功能；通过智能的精准控制让家电更省电节能；传感技术和传感硬件也获得更为广泛的应用。从另一个维度来看，智能化产品的品种、规模和功能也在快速扩展——智能成为高端空调的标配；一款智能冰箱不仅要做好食品管理，还要升级为厨房平台，实现与烤箱、吸油烟机、灶具等智能终端的互联互通；扫地机器人要做智能家庭空间关联的平台；还有洗衣机、电饭锅甚至于整个浴室的智能化……也是图像识别技术，在家电领域，美的的研究人员独创地将神经网络深度学习技术应用在大米识别场景，使被称为“煮饭机器人”的智能电饭煲可以依照大米地图识别不同米种，并依照不同米种的加热曲线自动选择煮饭程序，煮出最美味的米饭。海尔互联网冰箱采用创新的图像识

别技术，150多种常用食材随意堆放在冰箱中，识别率超过90%。与此同时，智能家电正在成为体察消费痛点、了解用户需求的数字化通道。

中国家电业技术创新的步伐正在全面提速。在同样的市场环境下，业绩飘红、品牌影响力提升的企业，背后不单是营销策略的正确，更是产品力的提升，是技术实力的晋级，是满足消费升级需求的比较优势。在这些企业的研发架构中，基础性研究与开放式生态系统相得益彰，从资源投入的不断加大到研发体系的逐步完善，从人才集聚效应到创新平台的成熟，成果正在或即将如秋收的果实逐一瓜熟蒂落。如：海尔以用户为核心，打造 CosmoPlat 平台来发现需求、验证需求，成为产品创新技术升级的起点，并开发出集合用户智慧的多款产品。美的投入资源，建立开放式创新体系和四级研发体系，快速集聚大批高端人才；作为美的技术体系的中枢机构，美的中央研究院布局研究流体力学、固体力学、传热学、材料学、传感等十大基础性、共性技术。方太发起并承担的国家“十三五”重点研发计划——“大气污染成因与控制技术研究”中的“油烟高效分离与烟气净化关键技术与设备”项目。这些既是模式创新的成果，是带给行业创新体系建设的示范和标杆，也会是中国家电技术创新的最前沿。

从中国家用电器技术大会的论文中，也能感受到行业技术发展的活力，感受到家电技术工作者对创新和产品技术进步的执着以及专业上的精和专。本次会议共收到来自国内外家电生产企业及研究所的技术论文 260 篇。论文内容涉及家用电器的各

个品类及上游关键零部件。制冷、空调及压缩机研究仍是论文集的实力担当；近年来，厨电类论文的数量明显增加，今年相关论文的占比更是达到约1/4，覆盖了吸油烟机、灶具、微波炉、洗碗机、消毒柜、烤箱、食品垃圾处理器等几乎所有厨电品类；与政策和市场热点相关的产品，如空气能热泵、空气净化器、净水器、智能坐便器等产品技术的论文数量也在增加，反映出家电技术进步和消费升级的热点。

论文中有当今家电技术最新的研究进展，有行业关注度最高的技术问题，也有不少是在技术和产品进步细节上的探索。优化产品性能优化控制或优化结构、智能相关技术、降噪改善声品质、变频技术、关注用户体验、提高能源效率、材料应用研究、新工质替代等都成为多个品类产品的技术研究热点；在分析研究方法上，数字仿真、数值模拟应用面不断扩大，也有采用数字图像相关测量、有限元分析、多元回归分析等多种分析研究方法。

在论文的原创性方面，经过查重检索，超过73%的论文与论文库中论文重合率（以下简称“查重率”）低于10%。本论文集淘汰了查重率超过15%的论文，计20篇。经过专家组严格筛选，206篇论文入选《2017年中国家用电器技术大会论文集》，专家审核淘汰的34篇论文主要问题有：创新性不够、技术含量低；跑题；也有按照申报专利的方式写作或像测试报告而达不到论文标准。希望这部分作者不要因此而气馁，日后努力使论文写作能力与研究能力同步提升。同时，专家评出优秀论文40篇，其中包括青岛海尔空调器有限总公司杨晓《热泵型变频空调器APF计算方法的辨析》、广东美的制冷设备有限公司邱文辉《基于有限元仿真技术的空调配管结构优化设计》、广东美芝制冷设备有限公司冯利伟《优化 $\phi 5$ 换热器流程提高R290空调器制热量》、华中科技大学唐唯尔《R290应用于2P分体式房间空调器的安全性实验研究》、合肥美菱股份有限公司陈

开松《一种R290工质变频冷柜技术开发与试验研究》、博西华电器（江苏）有限公司徐礼嘉《冰箱用VIP保温性能研究》、美的冰箱事业部李语亭《冰箱轴流风扇气动噪声的分析和研究》、无锡小天鹅股份有限公司杨森《振动检测技术在滚筒洗衣机上的应用》、宁波方太厨具有限公司吴丽波《燃气灶具火焰结构激光诊断和分析》、青岛海尔洗碗机有限公司邓鹏飞《低温等离子体助燃研究进展及其应用于家用燃气灶的可行性分析》、杭州老板电器股份有限公司李晗《吸油烟机噪声声品质的评价及建模》、加西贝拉压缩机有限公司武守飞《压缩机对冰箱噪声的影响分析》等。专家对这些优秀论文评价概括如下：针对问题，采用多种方法与技术，在技术方案上有一定的创新性；理论分析与实验验证结合；论点清晰，论据充分，概念正确；逻辑严密，叙述清晰准确，文字流畅，数据可信；对解决问题能提供意见和建议，或具有较强的技术指导和参考价值。希望更多的作者也以此作为写作论文的标准。

在此，我代表中国家用电器协会、代表中国家电行业，感谢作者们踊跃发表论文参与技术交流！感谢大家为家电技术进步、产业升级所做的工作。感谢李红旗、黎晓云、吴建华、陈江平、何国庚、王瑞祥、晏刚、鲁建国、黄敏、万春晖等专家帮助我们进行论文评审，感谢各位专家在最炎热的今年暑期中不辞辛苦仔细阅读论文，也为作者提出了很多宝贵的意见和建议。感谢所有编辑工作者的辛勤工作！

感谢所有的参与者！技术大会因为你们而更精彩！

中国家用电器协会副理事长



2017年10月16日

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