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MACHINE VISION AND ARTIFICIAL INTELLIGENCE FOR VISUAL CONTENT INTERPRETATION DURING TASK ALLOCATION WITHIN DISTRIBUTED COMPUTING SYSTEMS

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Abstract
This thesis explores the integration of Machine Vision (MV) and Artificial Intelligence (AI) to enhance customer support processes by recognizing and analyzing visual content embedded in emails. By leveraging AI-driven image recognition, the study aims to improve task allocation and resolution efficiency, particularly in scenarios where users provide minimal textual information but include visual cues like error screenshots.
Keywords: machine vision, artificial intelligence, embedded visuals recognition, task allocation.

Introduction

Providing high-quality customer support is important for any company [1]. However, the way support is organized can vary a lot depending on the type of business. For example, some companies, especially from manufacturing industry, use detailed forms where customers must enter specific information like product serial numbers, error codes, and/or software versions [2]. Others take a simpler approach, asking customers to send an email or talk to a chatbot when they have a problem.

While detailed forms help collect all the needed information from the start, they can be time-consuming or confusing for customers [3]. On the other hand, simple methods like emails or chatbot messages are easier to use but often don't include enough details to understand the problem right away. This can lead to delays and extra back-and-forth with the support team.

Improving these processes can be expensive, especially if it means rebuilding the whole solution. But modern technologies like Machine Vision (MV) and Artificial Intelligence (AI) may offer a smarter way to upgrade existing tools – with just a few changes, companies can teach their systems to "see" and understand pictures or screenshots sent by customers.

This means even if a customer doesn't explain the issue clearly in writing, support teams could still understand what's wrong by System "looking" at the images [5]. This opens the door for potentially faster and more accurate help and makes the support process more efficient.

Research outcomes

AI tools, especially those using MV, are getting better at understanding pictures. This means that when a customer sends an email with a screenshot or photo, AI can look at that image and figure out useful information – like what error is showing on a screen, which product is involved, or what might be broken [6].

For example, if a customer sends a picture of an error message, AI can recognize the text, icons, or layout and match it to known issues. This helps support teams understand the problem faster — even if the customer didn't explain much in the message. Some systems already use this kind of technology in areas like email sorting and ticket routing.

To see how helpful this can be, let's compare three ways a customer might submit a complaint in table 1:

1. Standardized form – the customer fills out a detailed form with fields for product info, error codes, etc.
2. Simple form – only basic info like contact details and a short message is collected.
3. Simple form + MV/AI – the same as the simple form, but with AI that can read and understand attached images.

Table 1 – Comparison of time spent on various steps of CS process by complaint submission method

CS Process Step	Standardized form	Simple form	Simple form + MV/AI
Complaint submission	10 minutes	3 minutes	3 minutes
Triage (initial review)	5 minutes	15 minutes	7 minutes
Need for clarification	Rare	Often	From time to time
Manual complaint assignment	5 minutes	10 minutes	6 minutes
Complaint assignment can be automated?	Yes	No	Yes
Self-service options may be suggested	Yes	No	Yes
Resolution time	30 minutes	45 minutes	35 minutes
Cycle time	50 minutes	73 minutes	51 minutes

Table above shows that using AI to understand pictures in simple complaints helps save time – not just for the support team, but for the customer as well. It makes the process nearly as fast as using a detailed form, but without asking customers to do so much upfront.

Summary

By comparing different ways of submitting complaints, the study shows that combining a simple form with AI-driven image recognition saves time and reduces the need for extra communication. It offers nearly the same level of detail as more complex forms, while still being easy for customers to use.

Overall, this approach makes the support process faster, more accurate, and more user-friendly. As AI continues to grow, using it to understand visual content will likely become a valuable tool for many companies looking to improve how they handle customer complaints.

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МАШИННИЙ ЗІР ТА ШТУЧНИЙ ІНТЕЛЕКТ ДЛЯ ІНТЕРПРЕТАЦІЇ ВІЗУАЛЬНОГО КОНТЕНТУ ПІД ЧАС РОЗПОДІЛУ ЗАДАЧ У РОЗПОДІЛЕНИХ ОБЧИСЛЮВАЛЬНИХ СИСТЕМАХ

Анотація

У цій доповіді досліджується доцільність застосування комп'ютерного зору (КЗ) та штучного інтелекту (ШІ) з метою покращення процесів обслуговування клієнтів шляхом розпізнавання та аналізу візуального контенту, вбудованого в повідомлення про скарги. Завдяки використанню технологій розпізнавання зображень, що базуються на основі ШІ, дослідження має на меті підвищити ефективність розподілу задач та швидкість вирішення проблем, особливо в ситуаціях, коли користувачі надають мінімум текстової інформації, але прикріплюють зображення, як-от скріншоти з помилками.

Ключові слова: комп'ютерний зір, штучний інтелект, розпізнавання візуального контенту, розподіл задач.

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