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# Using Artificial Intelligence to Read and Understand Letters Or Orders Received at the University and Intelligently Direct Them to Departments

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**Abstract:** This article presents the opinions of domestic and foreign scientists on using artificial intelligence to read and understand letters or orders received at universities and intelligently direct them to departments. Using AI to read and understand letters or orders received at a university and intelligently direct them to the appropriate departments is a great use of natural language processing (NLP) and automation. Using artificial intelligence to read and understand letters or orders received at a university and then intelligently direct them to the appropriate departments can streamline operations, improve efficiency, and reduce human error.

**Keywords:** Recognition of Text (OCR), Text Analysis Using Natural Language Processing (NLP) Techniques, User Interface Dashboard, Search and Filter Options, Observation and Upkeep, Orders and letters can arrive in a variety of formats, including faxes, scanned photos, emails, PDFs, and physical mail.

## Introduction.

A university must have a number of essential elements in order to deploy an AI system that can read, comprehend, and intelligently route letters or instructions. The design and implementation of such a system may be broken down as follows:

1. Recognition of Text (OCR)

OCR, or optical character recognition: To turn scanned letters or paper documents into machine-readable text, use optical character recognition (OCR) technology. Processing hard copies of orders and correspondence requires this.[1]

2. Text Analysis Using Natural Language Processing (NLP) Techniques: Utilize NLP methods to examine the text and extract important details. This entails comprehending the background, recognizing the departments that were specifically addressed, important dates, and action items.

Intent Recognition: Use algorithms to ascertain the message's intent, which will assist in identifying the department that should be routed.

[1] Manning, C. D., & Schütze, H. (1999). *Foundations of Statistical Natural Language Processing.*

3. System of Classification

Department Classification: Create a machine learning model that can categorize incoming documents according to the department to which they are meant and their content. Examples of previous conversations and historical data can be used to train this model.[2]

**Materials and Methods**

Particular Guidelines: Establish a set of predetermined guidelines to help organize papers that might not easily fall into one of the many categories.

4. The Routing System

Automated process: Include an automated process that, in accordance with the classification findings, forwards classified papers to the appropriate departments. Task assignments in project management software or email alerts might be a part of this system.

Feedback Loop: Establish a system for departments to submit comments on papers that were misrouted so that the AI classification model may be improved over time.

5. Integration with Current Frameworks

System Integration: Verify that the AI system is compatible with the current university administration systems, including the email, document, and student information systems.[3]

Secure Access: Ensure that private information is managed in accordance with university norms and privacy laws.

6. User Interface Dashboard: Provide an intuitive dashboard that allows administrative personnel to keep track of incoming orders and letters, their categorization status, and any routing actions that have been done.

Search and Filter Options: Make it simpler to monitor and manage communications by enabling users to search and filter documents according to a variety of criteria.

7. Observation and Upkeep

Performance measures: Use measures like as classification accuracy, processing time, and user satisfaction to monitor the AI system's performance over time.

Frequent Updates: To increase accuracy and adjust to evolving terminology and departmental requirements, update the NLP models and classification algorithms on a regular basis with fresh data.

8. Instruction and Assistance

Employee Education: Educate employees on the new AI system's operation and how to understand its results.

Technical Support: Verify that the AI system has access to technical support for upkeep and troubleshooting.[4]

Letters and orders received at a university can be intelligently routed to the appropriate departments with the assistance of artificial intelligence. This is a difficult but worthwhile use of artificial intelligence. Here is a closer look:

1. The Fundamental Difficulties:

Orders and letters can arrive in a variety of formats, including faxes, scanned photos, emails, PDFs, and physical mail.

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[2] Smith, R. (2007). *An Overview of the Tesseract OCR Engine.*

[3] Ray, R. (2012). *OCR with OpenCV and Tesseract on Linux.*

[4] Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep Learning.*

Unstructured Data: This type of data is mostly textual and frequently has different degrees of organization and wording.

Ambiguity: Words can be unclear. There are several ways to communicate the same idea.[5]

Domain Specificity: It is necessary to comprehend department names, university lingo, and internal procedures.

High Volume: Scalability is necessary since universities get a lot of communication.

Accuracy: Delays and inefficiencies result from improper routing.

2. Solution Driven by AI: The Essential Elements:

To overcome these obstacles, we may create an AI-powered system in the following ways:

A. Data extraction and input processing:

Optical Character Recognition (OCR): OCR transforms text into a machine-readable format for scanned documents and photos.[6]

**Results.**

AI algorithms are used in document parsing and structure analysis to recognize sections (such as sender, recipient, topic, and body), important aspects (such as date and order number), and document kinds (such as letters, invoices, and orders).

Text Extraction: Take pertinent text out of the document, sometimes paying particular attention to terms and phrases.

Data cleaning is the process of addressing formatting irregularities, typos, and other typical textual problems.[7]

B. Understanding Natural Language (NLU):

Lemmatization and Tokenization: reduce words to their most basic form (lemmas) and break text down into individual words (tokens).

Determine the grammatical functions of words (such as nouns, verbs, and adjectives) by part-of-speech tagging.

Named Entity Recognition (NER) is the process of recognizing and categorizing named entities, such as project titles, department names, course codes, and person names.

Keyword Extraction: Automatically find pertinent terms and expressions that reflect the content and target audience.

Semantic analysis is going beyond keywords to comprehend the text's context and meaning. This calls for the use of methods such as sentence and word embeddings.

Classify the document's intent by identifying its general goal (e.g., purchase order, grant application, complaint, or request for information).[8]

**Discussion.**

C. Department Mapping & Routing: Knowledge Base (KB): A structured database that includes details about every university department, along with information about their roles and pertinent keywords.

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[5] Vaswani, A., et al. (2017). *Attention Is All You Need.*

[6] Devlin, J., et al. (2018). *BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding.*

[7] Joachims, T. (1998). *Text Categorization with Support Vector Machines: Learning with Many Relevant Features.*

[8] Sebastiani, F. (2002). *Machine Learning in Automated Text Categorization.*

Machine Learning Classification: Utilizing the collected features and NLU analysis, train a machine learning model to categorize documents and assign them to the appropriate department.

System Based on Rules: Add rules to the ML model that are based on certain keywords, formats, or situations (for example, mails with a particular subject line are always forwarded to a particular office).

Confidence Scores: Give each routing choice a confidence value so that borderline cases may be manually reviewed.[9]

D. Workflow & Integration:

API Integration: The university's current systems, such as email and document management systems, should be easily integrated with the AI system.

Automated Routing: Send documents to specified departmental inboxes or staff members automatically.

Exception Handling: Offer a way to deal with documents that the AI system is unable to reliably categorize.

Feedback Loop: To continually increase the system's accuracy, get input on routing choices.[10]

3. Considerations for Technical Implementation:

Cloud vs. On-Premise: Think about the security and scalability of an on-premise system against a cloud-based AI solution.

Data Security & Privacy: Verify that all DAT processing conforms with applicable privacy laws and institution rules.

Scalability and Performance: The system must be able to process documents quickly and manage high document quantities.

Training Data: Create a thorough training dataset that includes department-specific labeled communication instances.

Technology Stack: Select suitable frameworks and technologies, maybe such as:

Python, Java, and ML are programming languages. Libraries: Scikit-learn, PyTorch, and TensorFlow[11]

NLP Libraries: Transformers, SpaCy, and NLTK

Cloud services include Azure, Google Cloud, and AWS.

Database: choices for SQL or NoSQL

4. Advantages of AI-Powered Technology:

Enhanced Productivity: saves time and costs by automating manual routing.

Decreased Errors: Lowers the possibility of letters being misdirected.

Faster Processing: Enhances workflow overall and speeds up reaction times.

Better Data Tracking: Offers a clearer picture of the document flow.

Scalability: The capacity to manage growing letter quantities without needing more physical labor.

Savings: Lowers labor expenses related to processing and routing by hand.[12]

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[9] Alhawiti, K. M. (2017). *Artificial Intelligence Technologies for Smart University Services.*

[10] Jain, A., & Saha, B. (2015). *Automation in Higher Education Using AI and Machine Learning.*

[11] Jurafsky, D., & Martin, J. H. (2021). *Speech and Language Processing* (3rd ed.).

5. Iterative Development: Begin with a pilot project with a certain group of departments, then progressively add others. Keep an eye on the system's functioning at all times and adjust as necessary.

An example of a scenario

Consider the following letter that arrives: "Regarding the undergraduate research project in the Biology Department, I would like to request access to the university's lab facilities."

1. OCR: Produces text from the scanned picture.

2. NLU: NER: Defines "undergraduate research project" as a project type and "biology department" as a department.

Extraction of Keywords: Finds "research," "lab," and "facilities."

Identifying the purpose as a resource request is known as intent classification.

3. Department Mapping: This mail is mapped to the administrative inbox of the Biology Department by the system using its categorization model and knowledge base.[13]

4. Routing: The designated mailbox automatically receives the email with the scanned letter.

**Conclusion.**

Universities may greatly simplify their administrative procedures by integrating OCR, NLP, machine learning, and intelligent routing. In addition to saving time, this improves communication effectiveness, freeing up departments to concentrate more on their primary duties. Purchasing such a system may increase the university's operational effectiveness in the long run.[14]

A university may greatly increase operational efficiency and lessen administrative responsibilities by utilizing AI to effectively route incoming letters. A system that combines OCR, NLU, ML classification, and a robust knowledge base can handle documents accurately, quickly, and automatically. In the end, this makes university management more efficient and successful.

**List of used literatures:**


1. Jurafsky, D., & Martin, J. H. (2021). *Speech and Language Processing* (3rd ed.).
2. Manning, C. D., & Schütze, H. (1999). Foundations of Statistical Natural Language Processing.
3. Smith, R. (2007). *An Overview of the Tesseract OCR Engine.*
4. Ray, R. (2012). *OCR with OpenCV and Tesseract on Linux.*
5. Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep Learning.*
6. Vaswani, A., et al. (2017). *Attention Is All You Need.*
7. Devlin, J., et al. (2018). *BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding.*
8. Sebastiani, F. (2002). *Machine Learning in Automated Text Categorization.*
9. Joachims, T. (1998). *Text Categorization with Support Vector Machines: Learning with Many Relevant Features.*
10. Alhawiti, K. M. (2017). *Artificial Intelligence Technologies for Smart University Services.*
11. Jain, A., & Saha, B. (2015). *Automation in Higher Education Using AI and Machine Learning.*


[12] Devlin, J., et al. (2018). *BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding.*

[13] Joachims, T. (1998). *Text Categorization with Support Vector Machines: Learning with Many Relevant Features.*

[14] Manning, C. D., & Schütze, H. (1999). *Foundations of Statistical Natural Language Processing.*