Document Imaging Report

Business Trends on Converting Paper Processes to Electronic Format

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A2iA Leverages RNN Technology in new SDK

Recognition technology is getting a lot more versatile these days. Initially, we had OCR and ICR, which focused primarily on typewritten and hand-printed characters. Based on that technology, forms processing was built, which was limited to fixed fields on consistent forms. About 10 years ago, we started expanding into IDR (intelligent document recognition), which for the most part has been utilized on variably structured forms—invoices being the most popular one, as well as for auto-classification. Lately, we've been starting to dive into the automated capture of data from unstructured forms, utilizing technology like natural language processing (NLP) and semantic understanding.

Now, French recognition specialist **A2iA** has thrown another type of technology into the mix. Incorporating Recurrent Neural Network (RNN) algorithms, the ISV has released its new TextReader SDK. It advertises the ability to recognize printed and cursive text with the same engine and deliver reasonable results without the use of a dictionary. "TextReader was developed using a different approach than our other products," said Wendi Klein, director, marketing and business development, North America, for A2iA. "The company has put many years of R&D effort into RNN.

"TextReader can deliver full-text recognition—a literal translation of any document. It's designed to compete with traditional OCR engines, but with the added benefit of being able to handle cursive, even if it's in the same document as printed information."

From what I can tell through limited Internet research, RNN differs from traditional neural networking in that it can incorporate feedback—whereas traditional neural networking runs in more of a linear fashion. RNN is a newer approach and thus the technology isn't as mature, but its potential lies in the fact that RNNs are designed to operate more similar to how the human brain functions.

DIR received input from A2iA as to what makes RNN-based recognition technology different from what is currently on the market today. Apparently RNN can process entire lines of writing without the need to segment each word into characters. (With TextReader, users receive confidence-level feedback on a word-by-word basis). This helps improve the learning capabilities of the software because it does not have to utilize resources on character location.

RNN-based recognition also does not need to rely on hand-crafted features, which are common in most OCR/ICR applications. Instead, features are learned by the software during training, which helps maximize the accuracy of the recognition.

Finally, although RNN techniques can apparently be utilized in NLP and semantic understanding, A2iA is not doing that in TextReader. TextReader applies RNN in an optical model, which takes an image that is input and outputs character probabilities. TextReader doesn't attempt to understand concepts like those other technologies do.

Klein said a typical document type that TextReader might be useful on is a patient record. "There is still a lot of paper in the healthcare industry and there are requirements to recognize it to populate EMR and cording systems," she said. "Oftentimes, patient records can contain printed text as well a doctor's handwriting."

Klein stressed that TextReader is a toolkit, designed to be utilized in conjunction with other software elements. "It requires integration into a document processing application," she said. "But, we've created a very simple interface that should reduce the integration efforts. We even call it a plug-and-play toolkit, it's so simple. And once it's integrated, it's ready to go—there is no additional configuration or integration with dictionaries required."

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Klein added that TextReader could be enhanced with custom dictionaries or language modeling tools. "This might include something like medical codes or insurance terminology," she said.

TextReader is the fifth product in A2iA's portfolio and the first to utilize RNN. A2iA is known for its cursive recognition in applications like check capture and the digital mailroom, but utilizes different algorithms it its other products. Klein said there has been customer demand for integration of the new TextReader with A2iA's FieldReader auto-classification.

"TextReader can be used to enhance existing document management applications with some extra recognition capabilities," said Klein. "We are looking at markets like insurance, government, BPOs and service bureaus—really, anyone who extracts data from paper."

Klein noted that the SDK is a server-based technology that could potentially be deployed by a user in a cloud solution. TextReader currently supports English, French, and Arabic with additional languages in development. "Although the technology is focused on character recognition, it can be tuned for handwriting and word types common to specific languages," said Klein.

For more information: http://www.a2ia.com/en/a2ia-text-reader