

An NLP System that Saved \$2 Million in Medical Transcription Costs



Executive Summary

Our client is a Fortune 500 Hospital chain, which has centers across 80 different locations. They wanted a Natural Language Processing system that could help the HMA doctors in recording the patient information effectively. We built an NLP system that made the life of the doctors easy when it came to recording the patient information effectively.

Problem Statement

Our client, a Fortune 500 Hospital chain, was spending more than \$2 Million in preparing medical transcription every year. The client was losing on both time and money. The Doctors used to record every patient's conversation, which then went to a medical transcription company. The whole process was costly, time-consuming and error-prone.

Business Requirements

Objective

There was a need for a Natural Language Processing system that helped the HMA doctors in recording the patient information effectively.

Key Requirements

The client wanted an elegant but smart mobile application, which would not just work as a voice to text converter but also would be able to do Real-Time categorization of doctors' notes into different categories.

Impact and involvement of stakeholders

Doctors: Save time and effort on documentation, by taking notes and filling the patient EMR forms using speech recognition, they could focus on patients and spend quality time with them.

Solution Approach

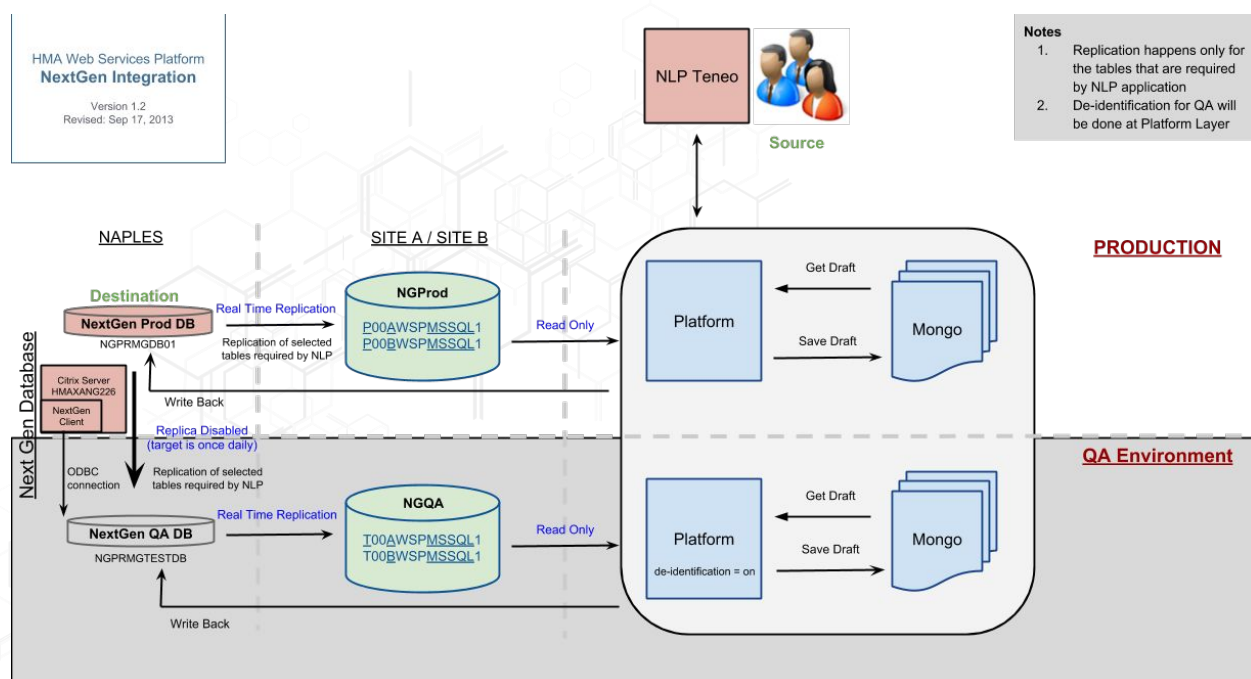
Our Solution Structure

We used Nuance to record the patient information as they speak in real-time and categorize them into EMR leveraging IBM Watson. The engine would take the input data, analyze the information and the final EHR document would be generated.

- ▶ The Nuance engine was trained with medical-specific terms. As the doctor dictates the text, the nuance engine would convert the text in real-time into categories like vitals, pre-existing ailments, current medication, allergies and other categories
- ▶ The engine would use the pre-saved templates from the EMR which would control the data that would be displayed. The business rules were configured in the templates
- ▶ The NLP annotator will look for specific tags to define templates and display the templates that were found
- ▶ The nuance engine was trained to identify the incomplete sections and would be marked for the doctor to fill in the missing vital information
- ▶ The Nuance engine was also trained to identify conflicts if present in the dictated notes
- ▶ The prev history of the patient would be visible to the doctor if the patient was treated by the doctor earlier
- ▶ The dictated text could be saved as a draft or converted into an EMR

Solution Dynamics and Interactions

While the frontend is built using Native iOS, the backend application is built using Python Django, which publishes the REST APIs to be consumed by the iOS Apps. The Django application integrates with Nuance Dragon for Medical Speech recognition and transcription. The text is rendered by Next-gen (IBM Watson) for AI + ML to generate meaningful data that is loaded on the EMR form for the doctors to review and submit. The EMR forms submitted are available for later retrieval and review by the doctors.



User Interface

The application is designed and built for use on iPhone and iPad. The application is built as a Native iOS app which interacts with the Doctors and uses voice to text and NLP. The system helps in translating the physician's speech into text and provides an option to type the notes. The physician's original notes and context will be preserved but the discrete data that is critical to EMR systems will be improved.

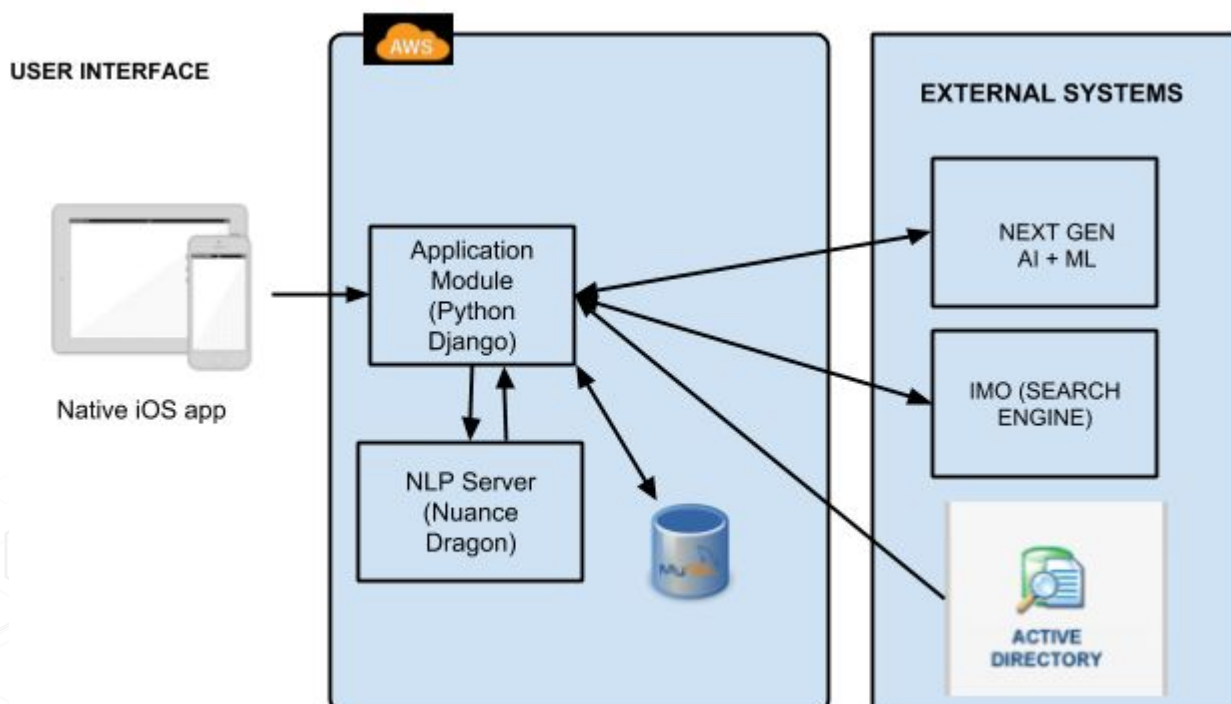
The ideal use case is for a physician to be able to open the application or click to start a new record, start dictating or typing their note, receive real-time visual guidance on the completeness of their note as well as the discrete data being extracted, then make one click to save the record.

The physician could also carry forward data from the previous encounters and add them to the current encounter notes.

Technology Stack

The application is built using Native iOS for iPhone and iPad. It uses the device microphone to capture voice and transmits it backend servers.

The backend is built using Python Django framework which is fast and secure. The application integrates with Nuance Dragon to convert speech to text. Nuance Dragon is tuned for Medical terminologies. The converted text is then passed through Next Gen (IBM Watson) for AI and Machine Learning for building meaningful data and for identifying the data for the EMR form.



Business Outcomes

HashedIn wowed the client with a feature enriched product. Some of the impacts were:

1. Automated understanding of physician narratives reduced the time and effort to document encounter notes with discrete data
2. Improved quality of overall encounter note through real-time extraction of, and feedback on, discrete data in free-form text
3. Reduced time to create a complete record - estimated 1+ hour per day
4. Improved accuracy of final note - time lag and rework queues
5. Saved several million per annum on operational and labor cost through automation

HashedIn has helped many promising firms across the globe by building customized solutions to give the users a completely hassle-free experience. Kindly let us know if you have any specific problem/use case, where we can provide more information or consult you.

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