



# Visit Notes Analysis Module

## Implementer's Guide

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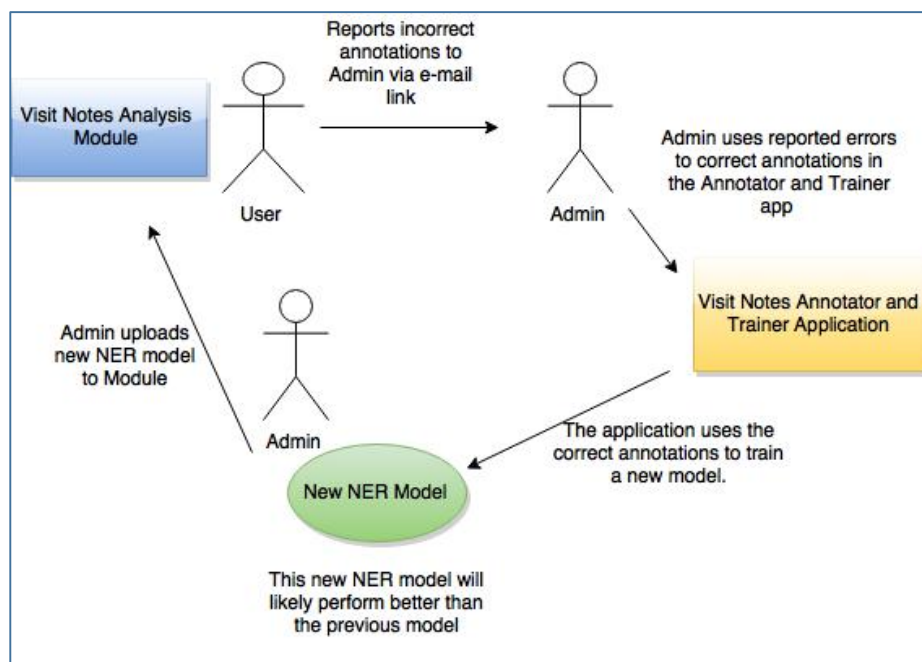
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# Overview

This document provides implementation details for the Visit Notes Analysis Module as well as the companion web application, the Visit Note Annotator and Trainer. These two pieces work together to allow the optimal performance of the system. Figure 1 shows the circular workflow between the two applications. The Visit Note Annotator and Trainer is used to improve the performance of the Visit Notes Analysis module. However, it is worth noting that while these applications can improve the performance of the system, it is not 100% accurate. More details on this are provided in section 1.3.

Figure 1: Visit Notes Analysis and Visit Notes Annotator and Trainer application workflow.



## 1.1 Visit notes Analysis Module Overview

The Visit Notes Analysis Module performs Named Entity Recognition (NER) on Visit Note text to identify where in the text a *problem*, *treatment* or *test* is mentioned. The underlying algorithm for identifying these entities has many moving parts, and this document will serve as a guide to configuring the NER functions for the best performance.

## 1.2 Visit Note Annotator and Trainer Overview

The Name Entity Recognition algorithm used to identify medical concepts in the text of Visit Notes relies in part on a machine learning algorithm called Conditional Random Fields, implemented in BANNER (<http://banner.sourceforge.net/>). Like many machine learning algorithms, in order to show strong performance, it must first be trained on sample data. In our case this sample data consists of Visit Notes where entities of the types “Problem,” “Treatment,” and “Test” have been annotated. The text area in Figure 2 shows an example of annotated data. The process of providing correctly annotated data to the algorithm for it to

Figure 2: The Visit Note Annotator and Trainer application

The screenshot displays the 'Visit Note Annotator and Trainer' web application. The browser's address bar shows the URL `204.28.114.72:8080/bannertrain/#`. The page features a navigation bar with the title 'OpenMRS Visit Note Analysis Module Companion' and a main heading 'Visit Note Annotator and Trainer'. Below the heading, there is a search bar with the placeholder text 'host.domain:port' and a 'populate' button. The main content area is divided into three sections:

- Visit Note List:** A table with columns 'DocID', 'Date', and 'Name MRN'. It contains 4 entries:
 

DocID	Date	Name MRN
1	07/24/2015 15:08:15	Patient, John 100-8
2	07/26/2015 12:03:42	Patient, John 100-8
3	07/26/2015 18:33:00	Patient, John 100-8
4	07/26/2015 18:35:46	Patient, John 100-8
- HISTORY OF PRESENT ILLNESS:** A text area containing medical text with colored annotations. The text reads: "The patient is a 47 year old male , with end stage liver disease secondary to hepatitis C cirrhosis diagnosed about 5 years prior to admission .The patient had undergone treatment with interferon and Ribavirin .He had been admitted to the St. Margaret 's Center for Women & Infants multiple times early in 2013 for management of encephalopathy and ascites .The patient had been discharged from the St. Margaret 's Center for Women & Infants on 2013-05-06 , but was readmitted on 2013-05-09 when noted to have worsening renal function .". The words 'end stage liver disease', 'hepatitis C cirrhosis', 'treatment with interferon and Ribavirin', 'management of encephalopathy and ascites', and 'worsening renal function' are highlighted in red, green, and blue.
- Change Log:** A table with columns 'From' and 'To'. It contains 1 entry:
 

From	To
worsening renal function	worsening renal function

learn from is called training a model. The algorithm builds a model of what entities of the different types look like, and uses this model to identify entities in new text.

### 1.2.1 Why Train a new model?

The default model shipped with the Visit Notes Analysis module is trained on a public set of annotated clinical notes provided by I2B2 ([i2b2.org](http://i2b2.org)). This model showed strong performance

when used to tag documents in the I2B2 corpus, but textual and linguistic differences between I2B2 documents and Visit Notes encountered in the field might degrade the performance of the default model and cause it to overlook entities or mis-identify them.

We have provided the Visit Note Annotator and Training application to allow the OpenMRS administrators to use Visit Notes captured in their database to train a new model in the hopes that this model will improve performance of the system. Henceforth, when discussing the Trainer, the *user* will refer to the administrator responsible for training.

## 1.2.2 Example Use Case

To illustrate how the OpenMRS module and Language Model Trainer application work together, consider the following use case. A user is examining the visit notes for patient John D. Patient. Figure 3 shows the annotations made to the Visit Note. An annotation is indicated by different text colors. Red for *problem*, green for *treatment* and blue for *test*. Here, “prednisone” is green, indicating it is a treatment. The user notices that one or more words in the visit note are not tagged correctly. “Prednisone” is correctly identified as a *treatment*, but “Neoral”, and “CellCept” should have been identified as *treatments*, but were not, neither was “physical therapy”. “liver function tests” should have been recognized as a *test*, but it was not.

Figure 3: Annotations by a model that performs poorly on this text. Many entities are not recognized.

DATE: 2015-07-26

He was advanced to a regular house diet later on postop day 3 .The patient was advanced per protocol to an immunosuppressive regimen of prednisone Neoral, and CellCept.The patient 's mental status remained essentially clear throughout the entire postoperative period .The patient started ambulating with the assistance of physical therapy following transfer to the surgical floor .At the time of discharge , the patient was independent , ambulating , and functioning well .The patient 's appetite improved significantly , and at the time of discharge the patient was on a regular diet with no tube feed supplements deemed necessary .The patient 's liver function tests all improved appropriately by the time of discharge .The patient 's surgical incision was also healing well by the time of discharge with no evidence of infection .

A user (e.g. clinician using OpenMRS) can send an e-mail to the admin to report the incorrect annotations. An example template e-mail is shown in figure 4. It provides the admin with the document number, the date and time the note was recorded, the patient Medical Record Number and the text of the Visit Note. This info will allow the admin to find and make corrections in the next steps.

Figure 4: Template email to admin to report errors.

To: Administrator@organization.com ▾
Cc:
Subject: Visit Notes Analysis Module Correction
[describe problem here]
*****
Document Number: 5
Document Date: 2015-07-30 20:39:03.0
Patient MRN: 100-8
Visit Note Text:
HISTORY OF PRESENT ILLNESS :
The patient is a 47 year old male , with end stage liver disease secondary to hepatitis C cirrhosis diagnosed about 5 years prior to admission .The patient had undergone treatment with Ribavirin .He had been admitted to the St.Margaret 's Center for Women & Infants multiple times early in 2013 for management of encephalopathy and ascites .The patient had been discharged from the St.Margaret 's Center for Women & Infants on 2013-05-06 , but was readmitted on 2013-05-09 when noted to have worsening renal function .]

The Admin can then navigate to the Visit Note Annotator and Trainer application, load the annotated visit notes, and correct the errors that were observed in the OpenMRS module. In figure 5, the documents are loaded and we can see that the mistakes match those found in the OpenMRS module. Figure 6 shows the corrections to the annotations made by the admin. These corrections are reflected both on the document rendering as well as the Change Log.

Figure 5: Poorly annotated Visit Note loaded into application.

OpenMRS Visit Note Analysis Module Companion

# Visit Note Annotator and Trainer [help](#)

host.domain:port

### Visit Note List

Show  entries

Search:

DocID	Date	Name MRN
1	07/24/2015 15:08:15	Patient, John 100-8
2	07/26/2015 12:03:42	Patient, John 100-8
3	07/26/2015 18:33:00	Patient, John 100-8
4	07/26/2015 18:35:46	Patient, John 100-8

Problem
Test
Treatment
Modified

He was advanced to a regular house diet later on postop day 3 .The patient was advanced per protocol to an immunosuppressive regimen of prednisone , Neoral , and CellCept .The patient 's mental status remained essentially clear throughout the entire postoperative period .The patient started ambulating with the assistance of physical therapy following transfer to the surgical floor .At the time of discharge , the patient was independent , ambulating , and functioning well .The patient 's appetite improved significantly , and at the time of discharge the patient was on a regular diet with no tube feed supplements deemed necessary .The patient 's liver function tests all improved appropriately by the time of discharge .The patient 's surgical incision was also healing well by the time of discharge with no evidence of infection .

### Change Log

Show  entries

Search:

From	To
No data available in table	
From	To
Showing 0 to 0 of 0 entries	
Previous	Next

Figure 6: Admin corrects the annotations

Problem
Test
Treatment
Modified

He was advanced to a regular house diet later on postop day 3 .The patient was advanced per protocol to an immunosuppressive regimen of prednisone , Neoral , and CellCept .The patient 's mental status remained essentially clear throughout the entire postoperative period .The patient started ambulating with the assistance of physical therapy following transfer to the surgical floor .At the time of discharge , the patient was independent , ambulating , and functioning well .The patient 's appetite improved significantly , and at the time of discharge the patient was on a regular diet with no tube feed supplements deemed necessary .The patient 's liver function tests all improved appropriately by the time of discharge .The patient 's surgical incision was also healing well by the time of discharge with no evidence of infection .

### Change Log

Show  entries

Search:

From	To	
Neoral	<span style="color: green;">Neoral</span>	<input type="button" value="undo"/>
CellCept	<span style="color: green;">CellCept</span>	<input type="button" value="undo"/>
physical therapy	<span style="color: green;">physical therapy</span>	<input type="button" value="undo"/>
liver function tests	<span style="color: blue;">liver function tests</span>	<input type="button" value="undo"/>
From	To	

When the admin is satisfied with the document annotations, the admin selects the “Build” button and the text and annotations are used to train a new BANNER Language Model. The admin is able to download this model from the training application and upload it to the OpenMRS implementation via a configurations page.

This new model is used to re-analyze the text and it is able to successfully find the correct entities in the text. Figure 7 shows the results of the new analysis.

In this way, the OpenMRS can improve their language model as they encounter errors.

*Figure 7: The new model re-analyzed the text and correctly identified the entities.*

DATE: 2015-07-26

He was advanced to a regular house diet later on postop day 3 .The patient was advanced per protocol to an immunosuppressive regimen of **prednisone**, **Neoral** , and **CellCept** .The patient 's mental status remained essentially clear throughout the entire postoperative period .The patient started ambulating with the assistance of **physical therapy** following transfer to the surgical floor .At the time of discharge , the patient was independent , ambulating and functioning well .The patient 's appetite improved significantly , and at the time of discharge the patient was on a regular diet with no tube feed supply deemed necessary. The patient 's **liver function tests** all improved appropriately at the time of discharge .The patient 's surgical incision was also healing well by the time of discharge with no evidence of infection .

### 1.3 Limitations

During the development of this module, we performed evaluations of several NER algorithms in order to choose the best one to use here. During these evaluations it became clear that the current state of NER is not perfect. This module uses the BANNER NER system and our measurements showed that of the entities it finds, about 80% are correct. Also, it tends to find about 70% of the entities in the text. While this performance is good, it indicates that the results of this module should not be relied upon for perfect accuracy, and should be used as a tool to assist in analyzing Visit Notes.



# Installation

## 2.1 Visit Notes Analysis Module Installation

### Requirements:

- Jdk 1.7
- At least 2GB available RAM
- Requires OpenMRS versions 2.x, core 1.11.x
- [Support for 1.9x is not available yet.]

### Pre-Installation – Server Configuration (Tomcat)

Ensure server JVM has at least 2GB of heap space available

1. Include this line to \$CATALINA\_HOME/bin/setenv.sh:  
`CATALINA_OPTS="-Xms512M -Xmx2048M"`  
 On a standard tomcat installation on Ubuntu, this is in  
 /usr/share/tomcat6/bin

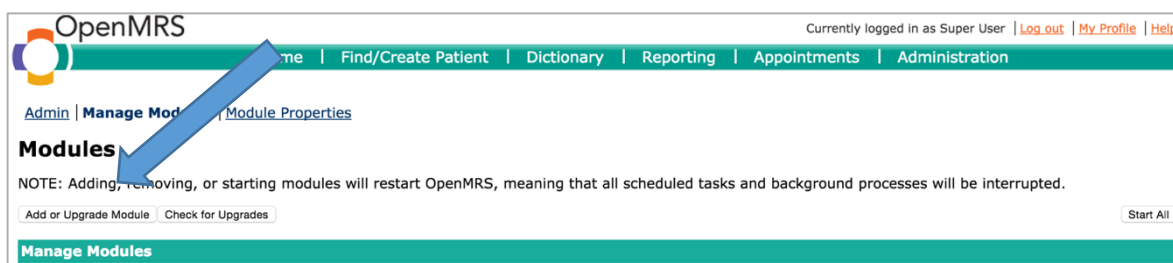
### Installation

Installation of the module follows the standard OpenMRS module installation procedures.

**NOTE: installing this module requires you to restart your OpenMRS installation**

1. Navigate to OpenMRS Administration Page
2. Select the “Manage Modules” Link
3. Upload the .omod file through the “add or upgrade module” button.  
 Note: the .omod file is rather large ~48MB so the upload may take some time
4. Restart your OpenMRS installation.

Figure 8: Upload the module via OpenMRS’s Manage Modules page



## 2.2 Visit Notes Annotator and Trainer installation

This application has been tested in the following environment:

Java Servlet Container:	Apache Tomcat 6 servlet container
JVM:	Java 1.7
OS:	Ubuntu Linux 14.04

For current Tomcat installation instructions, please refer to one of the many Tomcat installation guides available on the web. For example:

<https://help.ubuntu.com/lts/serverguide/tomcat.html>

Note: be sure to install the Tomcat administration pages webapps.

## Installing the application via Tomcat Application Manager

1. Navigate and login to the Tomcat Application Manager, this is often at [server-URL]:[port]/manager/html.

Figure 9: Tomcat Application Manager page

The screenshot displays the Tomcat Web Application Manager interface. At the top, the Apache Software Foundation logo and the Tomcat logo are visible. The main heading is "Tomcat Web Application Manager". Below this, a message box indicates "Message: OK". A navigation bar includes links for "List Applications", "HTML Manager Help", "Manager Help", and "Server Status".

The "Applications" section contains the following table:

Path	Display Name	Running	Sessions	Commands
/		true	0	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes
/manager	Tomcat Manager Application	true	1	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes
/openmrs	OpenMRS	true	1	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes

The "Deploy" section is divided into two parts:

- Deploy directory or WAR file located on server:** Includes input fields for "Context Path (required)", "XML Configuration file URL", and "WAR or Directory URL", along with a "Deploy" button.
- WAR file to deploy:** Includes a "Choose File" button and a "No file chosen" message, with a "Deploy" button below.

The browser's address bar shows the URL "204.28.114.72:8080/manager/html/". The browser window title is "/manager". The browser's bookmark bar shows "Apps", "Gmail - Inbox (7696)", "Arts/Culture", "CS bookmarks", "My Websites", and "Other Bookmarks". The browser's status bar shows a file named "63300.gif" and a "Show All" button.

Figure 10: upload the .war file

Deploy	
Deploy directory or WAR file located on server	
Context Path (required):	<input type="text"/>
XML Configuration file URL:	<input type="text"/>
WAR or Directory URL:	<input type="text"/>
<input type="button" value="Deploy"/>	
WAR file to deploy	
Select WAR file to upload	<input type="button" value="Choose File"/> bannertrain.war
<input type="button" value="Deploy"/>	

- upload the bannertrain.war file via the “WAR file to deploy” pane
- Click “Deploy”
- After the files finishes uploading to the server (may take several minutes, depending on connection). The application will be visible in the “Applications” pane, figure 11.

Figure 11: The application is running and accessible at the indicated path

Applications				
Path	Display Name	Running	Sessions	Commands
/		true	0	Start <a href="#">Stop</a> <a href="#">Reload</a> <a href="#">Undeploy</a> Expire sessions with idle ≥ 30 minutes
<a href="#">/bannertrain</a>	bannertrain	true	0	Start <a href="#">Stop</a> <a href="#">Reload</a> <a href="#">Undeploy</a> Expire sessions with idle ≥ 30 minutes
<a href="#">/manager</a>	Tomcat Manager Application	true	1	Start <a href="#">Stop</a> <a href="#">Reload</a> <a href="#">Undeploy</a> Expire sessions with idle ≥ 30 minutes
<a href="#">/openmrs</a>	OpenMRS	true	1	Start <a href="#">Stop</a> <a href="#">Reload</a> <a href="#">Undeploy</a> Expire sessions with idle ≥ 30 minutes

- Clicking through the link will bring you to the deployed web app, figure 12.

Figure 12: Visit Note Annotator and Trainer application with no Visit Notes loaded

OpenMRS Visit Note Analysis Module Companion

# Visit Note Annotator and Trainer [help](#)

host.domain:port

### Visit Note List

Show ( 10 ) entries

Search:

DocID	Date	Name MRN
none	none	none

Showing 1 to 1 of 1 entries

Previous  Next

Problem Test Treatment Modified

--

### Change Log

Show ( 10 ) entries

Search:

From	To
No data available in table	

Showing 0 to 0 of 0 entries

## Module Configurations and Maintenance

### 3.1 Defining Concept Class – Entity Mappings

The first step of the Named Entity Recognition algorithm uses the Concept Dictionary to perform string matching against concepts in the dictionary. Because our module tags entities into three distinct entity types but an OpenMRS implementation often has many more concept classes, we allow the user to provide a many-to-one mapping from OpenMRS concept classes to entity type.

To set this mapping:

1. Navigate to the “Manage Module” page from the OpenMRS Administration page

Figure 13: OpenMRS Administration page

The screenshot shows the OpenMRS Administration page. The top navigation bar includes 'Home', 'Find/Create Patient', 'Dictionary', and 'Administration'. The main content area is titled 'Administration' and is organized into several columns of links. A blue arrow points to the 'Visit Note Analysis Module' link in the 'Modules' section.

**OpenMRS** Currently logged in as Super User | [Log out](#) | [My Profile](#) | [Help](#)

[Home](#) | [Find/Create Patient](#) | [Dictionary](#) | [Administration](#)

**Administration**

**Users**  
[Manage Users](#)  
[Manage Roles](#)  
[Manage Privileges](#)  
[Manage Alerts](#)

**Patients**  
[Manage Patients](#)  
[Manage Tribes](#)  
[Find Patients to Merge](#)  
[Manage Identifier Types](#)  
[Manage Patient Identifier Sources](#)  
[Auto-Generation Options](#)  
[View Log Entries](#)

**Person**  
[Manage Persons](#)  
[Manage Relationship Types](#)  
[Manage Person Attribute Types](#)

**Visits**  
[Manage Visit Types](#)  
[Manage Visit Attribute Types](#)  
[Configure Visits](#)

**Encounters**  
[Manage Encounters](#)  
[Manage Encounter Types](#)  
[Manage Encounter Roles](#)

**Providers**  
[Manage Providers](#)  
[Manage Provider Attribute Types](#)

**Locations**  
[Manage Locations](#)  
[Manage Location Tags](#)  
[View Location Hierarchy](#)  
[Manage Location Attribute Types](#)  
[Manage Address Template](#)

**Observations**  
[Manage Observations](#)

**Scheduler**  
[Manage Scheduler](#)

**Programs**  
[Manage Programs](#)  
[Manage Triggered State Conversions](#)

**Concepts**  
[View Concept Dictionary](#)  
[Manage Concept Drugs](#)  
[Manage Proposed Concepts](#)  
[Manage Concept Classes](#)  
[Manage Concept Datatypes](#)  
[Manage Concept Sources](#)  
[Manage Concept Stop Word](#)  
[Manage Reference Terms](#)

**Forms**  
[Manage Forms](#)  
[Manage Fields](#)  
[Manage Field Types](#)  
[Merge Duplicate Fields](#)

**HL7 Messages**  
[Manage HL7 Sources](#)  
[Manage Queued Messages](#)  
[Manage Held Messages](#)  
[Manage HL7 Errors](#)  
[Manage HL7 Archives](#)  
[Migrate HL7 Archives](#)

**Maintenance**  
[Set Implementation Id](#)  
[System Information](#)  
[View Quick Reports](#)  
[Settings](#)  
[Advanced Settings](#)  
[View Server Log](#)  
[View Database Changes](#)  
[Manage Locales And Themes](#)  
[View Logged In Users](#)  
[Search Index](#)

**Modules**  
[Manage Modules](#)  
[Module Properties](#)

**OpenMRS Atlas**  
[Manage Atlas Marker](#)

**ID Generation**  
[Manage Patient Identifier Sources](#)  
[Auto-Generation Options](#)  
[View Log Entries](#)

**Metadata Mapping**  
[Configure](#)

**Data Exchange Module**  
[Export](#)  
[Import](#)

**Calculation Module**  
[Manage Calculation Registrations](#)

**REST Web Services**  
[Settings](#)  
[Test](#)  
[Help](#)

**HTML Form Entry**  
[Manage HTML Forms](#)  
[Preview HTML Form from File](#)

**Registration Core Module**  
[Manage module](#)

**Allergy API Module**  
[Manage module](#)

**Allergy UI Module**  
[Manage module](#)

**Visit Note Analysis Module**  
[Manage Visit Notes Analysis](#)

2. Locate the input fields labeled “Problems”, “Treatments”, and “Tests.” The values should be a comma separated list of the Concept Classes that match to each Entity class. A list of concept classes can be found at the “Manage Concept Classes” link from the Administration page. The “Manage Tagger” sections maintains configurations related to the NER tagger.

Figure 14: Setting Concept Class – Entity Type mapping

### Manage Tagger

Tagger:  Choose one of the Models to tag documents

Problems:  Comma separated list of Concept Classes to be mapped to "Problem"

Treatments:  Comma separated list of Concept Classes to be mapped to "Treatment"

Tests:  Comma separated list of Concept Classes to be mapped to "Test"

Administrator Email:  This address will be used to report incorrect annotations

---

### Upload New Model

File to upload:  No file chosen

Name:

Press here to upload the file!

---

### Re-analyze documents

Run the analysis on all Visit Notes in the database with the chosen Tagger

---

### Reports

#### Entity Frequency Report

This report contains all entities identified and their frequencies

#### All Note Report

This report shows all entities identified broken down per visit note

Figure 15 shows how to navigate to the Concept Class Manager from the Administration page and figure 16 shows the list of Concept Classes:

Figure 15: Administration page – finding Concept Classes page

**OpenMRS** Currently logged in as Su

Home | Find/Create Patient | Dictionary | Administration

**Administration**

- Users**
  - [Manage Users](#)
  - [Manage Roles](#)
  - [Manage Privileges](#)
  - [Manage Alerts](#)
- Patients**
  - [Manage Patients](#)
  - [Manage Tribes](#)
  - [Find Patients to Merge](#)
  - [Manage Identifier Types](#)
  - [Manage Patient Identifier Sources](#)
  - [Auto-Generation Options](#)
  - [View Log Entries](#)
- Person**
  - [Manage Persons](#)
  - [Manage Relationship Types](#)
  - [Manage Person Attribute Types](#)
- Visits**
  - [Manage Visit Types](#)
  - [Manage Visit Attribute Types](#)
  - [Configure Visits](#)
- Concepts**
  - [View Concept Dictionary](#)
  - [Manage Concept Drugs](#)
  - [Manage Proposed Concepts](#)
  - [Manage Concept Classes](#)
  - [Manage Concept Datatypes](#)
  - [Manage Concept Sources](#)
  - [Manage Concept Stop Word](#)
  - [Manage Reference Terms](#)
- Forms**
  - [Manage Forms](#)
  - [Manage Fields](#)
  - [Manage Field Types](#)
  - [Merge Duplicate Fields](#)
- HL7 Messages**
  - [Manage HL7 Sources](#)
  - [Manage Queued Messages](#)
  - [Manage Held Messages](#)
  - [Manage HL7 Errors](#)
  - [Manage HL7 Archives](#)
  - [Migrate HL7 Archives](#)
- Modules**
  - [Manage Modules](#)
  - [Module Properties](#)
- OpenMRS Atlas**
  - [Manage Atlas Marker](#)
- ID Generation**
  - [Manage Patient Identifier Sources](#)
  - [Auto-Generation Options](#)
  - [View Log Entries](#)
- Metadata Mapping**
  - [Configure](#)
- Data Exchange Module**
  - [Export](#)
  - [Import](#)
- Calculation Module**
  - [Manage Calculation Registrations](#)
- REST Web Services**
  - [Settings](#)
  - [Test](#)

Figure 16: Concept Classes shown inside red box

Current Concept Classes	
Name	Description
<input type="checkbox"/> <a href="#">Test</a>	Acq. during patient encounter (vitals, labs, etc.)
<input type="checkbox"/> <a href="#">Procedure</a>	Describes a clinical procedure
<input type="checkbox"/> <a href="#">Drug</a>	Drug
<input type="checkbox"/> <a href="#">Diagnosis</a>	Conclusion drawn through findings
<input type="checkbox"/> <a href="#">Finding</a>	Practitioner observation/finding
<input type="checkbox"/> <a href="#">Anatomy</a>	Anatomic sites / descriptors
<input type="checkbox"/> <a href="#">Question</a>	Question (eg, patient history, SF36 items)
<input type="checkbox"/> <a href="#">LabSet</a>	Term to describe laboratory sets
<input type="checkbox"/> <a href="#">MedSet</a>	Term to describe medication sets
<input type="checkbox"/> <a href="#">ConvSet</a>	Term to describe convenience sets
<input type="checkbox"/> <a href="#">Misc</a>	Terms which don't fit other categories
<input type="checkbox"/> <a href="#">Symptom</a>	Patient-reported observation
<input type="checkbox"/> <a href="#">Symptom/Finding</a>	Observation that can be reported from patient or found on exam
<input type="checkbox"/> <a href="#">Specimen</a>	Body or fluid specimen
<input type="checkbox"/> <a href="#">Misc Order</a>	Orderable items which aren't tests or drugs
<input type="checkbox"/> <a href="#">Frequency</a>	A concept used for capturing frequency information such as for medication ordering.
<input type="checkbox"/> <a href="#">Pharmacologic Drug Class</a>	Class of medications based on pharmacologic properties as opposed to therapeutic properties
<input type="checkbox"/> <a href="#">Units of Measure</a>	For prescribing and dispensing

Delete Selected Concept Classes



## 3.2 Analyzing and Re-analyzing Visit Notes

When the module is first installed, there might be a corpus of visit notes existing in the current database. The module does not automatically run its analysis on these documents. Once installed, it will run the analysis on all Visit Notes that are subsequently submitted. Our module provides the ability to retroactively run the text analysis on Visit Notes currently in the Database.

To analyze all Visit Notes in the database:

1. Navigate to the “Manage Visit Notes Analysis” page from the OpenMRS Administration.

Figure 17: Re-running Visit Note analysis

**Manage Tagger**

Tagger:  Choose one of the Models to tag documents

Problems:  Comma separated list of Concept Classes to be mapped to "Problem"

Treatments:  Comma separated list of Concept Classes to be mapped to "Treatment"

Tests:  Comma separated list of Concept Classes to be mapped to "Test"

Administrator Email:  This address will be used to report incorrect annotations

---

**Upload New Model**

File to upload:  No file chosen

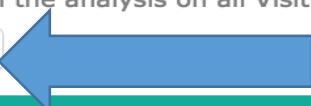
Model Name:

Don't Forget The Model Name!  Press here to upload the file!

---

**Re-analyze documents**

Run the analysis on all Visit Notes in the database with the chosen Tagger



---

**Reports**

**Entity Frequency Report (Right click, 'save as...' to download)**  
[Entity Frequency Report](#)  
This report contains all entities identified and their frequencies

**All Note Report (Right click, 'save as...' to download)**  
[All Note Report](#)  
This report shows all entities identified broken down per visit note

2. Select “Run” to run the text analysis on all Visit Notes in the database, figure 17.

**NOTE:** As there may be a very large number of Visit Notes in the database, this job may take a while and consume considerable resources. We recommend running this job during low demand, low traffic periods.

- Results from this analysis will now be visible through the “Visit Notes Analysis” action on the patient dashboard, figures 18 and 19.

Figure 18: Patient Dashboard shows how to find the Visit Notes Analysis module

The screenshot displays the OpenMRS Patient Dashboard for a patient named John D Patient. The dashboard is organized into several sections:

- DIAGNOSIS:** Anaemia
- VITALS:** None
- APPOINTMENTS:** None
- VISITS:** Today (Active - Outpatient)
- ALLERGIES:** Unknown

A blue arrow points to the "Current Visit Actions" menu, which is open and shows the following options:

- End Visit
- Visit Note
- Admit to Inpatient
- Capture Vitals
- General Actions
  - Add Past Visit
  - Merge Visits
  - Chart Search
  - Visit Notes Analysis

Figure 19: Results of NER analysis visible from the Visit Notes Analysis page

OpenMRS admin Inpatient Ward Logout

Patient, John > Visit Notes Analysis

prednisone management intubated distress hepatitis C cirrhosis physical therapy infection Cell Saver platelets  
encephalopathy hepatitis C crystalloid tube feed supplements CellCept The procedure Neoral ascites an  
immunosuppressive regimen interferon end stage liver disease fresh frozen plasma complications Ribavirin and treatment

Search History: >  
clear history

KEY: test treatment problem

Feedback On Results? [E-mail the administrator](#)

DATE: 2015-07-26

Problems Treatments Tests All

Search: Show 10 entries

Doc Date	All
2015-07-26	<a href="#">infection</a> <a href="#">physical therapy</a> <a href="#">Neoral</a> <a href="#">CellCept</a> <a href="#">an immunosuppressive regimen</a> <a href="#">prednisone</a> <a href="#">tube feed supplements</a>
2015-07-26	<a href="#">complications</a> <a href="#">distress</a> <a href="#">platelets</a> <a href="#">The procedure</a> <a href="#">intubated</a> <a href="#">crystalloid</a> <a href="#">Cell Saver</a> <a href="#">fresh frozen plasma</a>
2015-07-26	<a href="#">infection</a> <a href="#">physical therapy</a> <a href="#">tube feed supplements</a> <a href="#">prednisone</a> <a href="#">Neoral</a> <a href="#">CellCept</a> <a href="#">an immunosuppressive regimen</a>
2015-07-26	<a href="#">end stage liver disease</a> <a href="#">hepatitis C</a> <a href="#">hepatitis C cirrhosis</a> <a href="#">ascites</a> <a href="#">and</a> <a href="#">encephalopathy</a> <a href="#">management</a> <a href="#">treatment</a> <a href="#">Ribavirin</a> <a href="#">interferon</a>

Showing 1 to 4 of 4 entries  
First Previous 1 Next Last

The patient is a 47 year old male , with **end stage liver disease** secondary to **hepatitis C** cirrhosis diagnosed about 5 years prior to admission .The patient had undergone **treatment** with **interferon** and **Ribavirin** .He had been admitted to the St.Margaret 's Center for Women & Infants multiple times early in 2013 for **management** of **encephalopathy and ascites** .The patient had been discharged from the St.Margaret 's Center for Women & Infants on 2013-05-06 , but was readmitted on 2013-05-09 when noted to have worsening renal function .

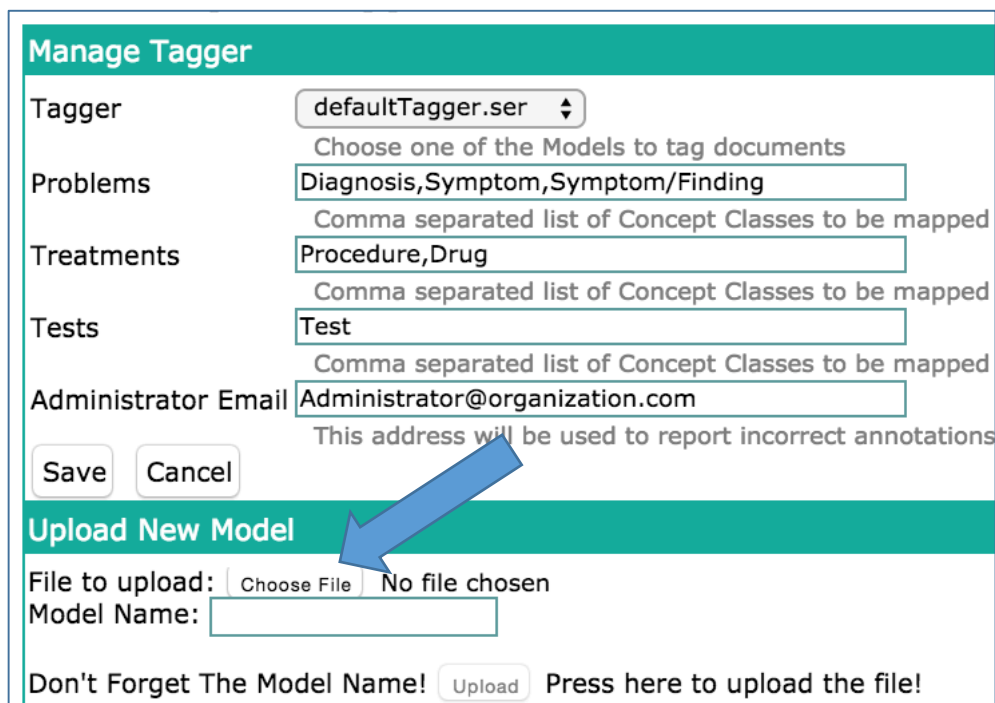
### 3.3 Adding a New Model

The companion application “Visit Note Annotator and Trainer” allows the user to build a new model to improve the module’s ability to recognize medical entities. See section 6 of this guide for instructions on building a new model. Once the Trainer has built the model file, follow these steps to upload the model into the module.

### Uploading a new Model:

1. Navigate to the “manage Visit Notes Analysis” page from the OpenMRS Administration page.
2. Select “Choose File” and find the model file on your local file system, figure 20.

Figure 20: Uploading a new model



**Manage Tagger**

Tagger: defaultTagger.ser

Choose one of the Models to tag documents

Problems: Diagnosis,Symptom,Symptom/Finding

Comma separated list of Concept Classes to be mapped

Treatments: Procedure,Drug

Comma separated list of Concept Classes to be mapped

Tests: Test

Comma separated list of Concept Classes to be mapped

Administrator Email: Administrator@organization.com

This address will be used to report incorrect annotations

Save Cancel

**Upload New Model**

File to upload: Choose File No file chosen

Model Name:

Don't Forget The Model Name! Upload Press here to upload the file!

3. Input a name for your model, figure 21.
4. Select “upload,” figure 21.
5. The new model is now uploaded into the module and can be chosen for tagging in the future

Figure 21: Name and save the model

**Manage Tagger**

**Tagger**    
Choose one of the Models to tag documents

**Problems**    
Comma separated list of Concept Classes to be mapped to "Problem"

**Treatments**    
Comma separated list of Concept Classes to be mapped to "Treatment"

**Tests**    
Comma separated list of Concept Classes to be mapped to "Test"

**Administrator Email**    
This address will be used to report incorrect annotations

**Upload New Model**

**File to upload:**

**Model Name:**

Press here to upload the file!

**Re-analyze all Visit Notes**

Run the analysis on all Visit Notes in the database with the chosen Tagger

**Reports**

**Entity Frequency Report**

This report contains all entities identified and their frequencies

**All Note Report**

This report shows all entities identified broken down per visit note

### 3.4 Choosing a Model

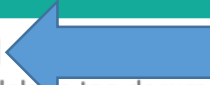
This module is distributed with a default tagging model and allows for new models to be uploaded. To configure which tagger your module will use, follow these instructions

Choosing a Tagger:

1. Navigate to the Manage Visit Notes Analysis page.

Figure 22: choosing a tagger from the dropdown

**Manage Tagger**

Tagger    
 Choose one of the Models to tag documents

Problems   
 Comma separated list of Concept Classes to be mapped to "Problem"

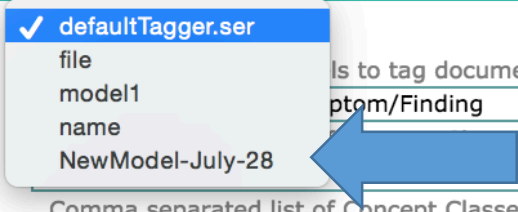
Treatments   
 Comma separated list of Concept Classes to be mapped to "Treatment"

Tests   
 Comma separated list of Concept Classes to be mapped to "Test"

Administrator Email   
 This address will be used to report incorrect annotations

Figure 23: Select your tagger

**Manage Tagger**

Tagger    
 Choose one of the Models to tag documents

Problems   
 Comma separated list of Concept Classes to be mapped to "Problem"


Treatments   
 Comma separated list of Concept Classes to be mapped to "Treatment"

Tests   
 Comma separated list of Concept Classes to be mapped to "Test"

Administrator Email   
 This address will be used to report incorrect annotations

Figure 24: Save this new setting

**Manage Tagger**

Tagger    
 Choose one of the Models to tag documents

Problems   
 Comma separated list of Concept Classes to be mapped to "Problem"

Treatments   
 Comma separated list of Concept Classes to be mapped to "Treatment"

Tests   
 Comma separated list of Concept Classes to be mapped to "Test"

Administrator Email   
 This address will be used to report incorrect annotations

2. select the dropdown list under “Manage Tagger,” figures 22 and 23.
3. Save this new setting by clicking the “save” button, figure 24.
4. NewModel-July-28 will now be used to tag new Visit Notes.
5. Optionally, the admin can now follow the steps in section 3.2 to re-analyze the existing corpus of visit notes using the new model. All old models are saved (see the dropdown menu in figure 23) and can be chosen for use by following the steps in this section.

### 3.5 Running Reports

The Visit Notes Analysis module allows you to run two reports at this time. The Entity Frequency Report and the All Notes Report.

The Entity Frequency Report generates a csv file with all entities and their entity type along with the number of occurrences of that entity in the entire visit note corpus. Output is in the format:

```
Entity,type,frequency.
```

For example:

```
Nausea,problem,5
cd4,test,4
```

The All Notes Report generates a csv that shows all notes analyzed in the system and the entities in them. This note shows one note per line in the format:

```
patientID,DocID,date,entities&&types
```

entities&&types is a vertical bar separated list of all entities found in the note DocID is a unique document identifier. An example line in this report:

```
3,1,2015-07-29 14:42:48.0,nausea&&problem|vomiting&&problem
```


To run the reports, follow these instructions;

Running Reports:

1. Navigate to the Manage Visit Note Analysis page
2. Find the section labeled “Reports,” figure 25.
3. This section contains links for the Entity Frequency Report and the All Notes Report

Figure 25: Running Reports

### Manage Tagger

Tagger:  

Choose one of the Models to tag documents

Problems:

Comma separated list of Concept Classes to be mapped to "Problem"

Treatments:

Comma separated list of Concept Classes to be mapped to "Treatment"

Tests:

Comma separated list of Concept Classes to be mapped to "Test"

Administrator Email:

This address will be used to report incorrect annotations

### Upload New Model

File to upload:  No file chosen

Model Name:

Don't Forget The Model Name!  Press here to upload the file!

### Re-analyze documents

Run the analysis on all Visit Notes in the database with the chosen Tagger

### Reports

**Entity Frequency Report (Right click, 'save as...' to download)**  
[Entity Frequency Report](#)

This report contains all entities identified and their frequencies

**All Notes Report (Right click, 'save as...' to download)**  
[All Notes Report](#)


This report shows all entities identified broken down per visit note

4. Clicking on the link will render the report in the browser, figures 26 and 27.




Figure 26: Selecting a Report

**Reports**

**Entity Frequency Report (Right click, 'save as...' to download)**  
[Entity Frequency Report](#) 

This report contains all entities identified and their frequencies

**All Notes Report (Right click, 'save as...' to download)**  
[All Notes Report](#) 

This report shows all entities identified broken down per visit note

Figure 27: Entity Frequency Report

```

Entity,Type,Frequency
the blue elephant aspergum,problem,1
aspirin,treatment,1
cat scratch fever,problem,1
a burning pain,problem,1
left upper quadrant pain,problem,1
resection,treatment,1
blood transfusions,treatment,1
fever,problem,1
the pain,problem,1
heterosexual transmission,problem,1
similar pain,problem,1
DDI,treatment,1
HIV positive,problem,2
aspergum,treatment,2
any anti retroviral therapy,treatment,1
HIV,problem,2
an abscess in the left lower extremity,problem,1
vomiting,problem,3
presumed,problem,1
nausea,problem,2
pancytopenia,problem,1

```

5. Right click on the link and select "Save as..." to download the report to your local machine.

# Visit Note Annotator User Interface

The UI consists of 6 major components. They are labeled in figure 28, followed by a brief description. Usage details are provided in Section 5. The components are as follows:

1. Help
2. Populate
3. Visit Notes List
4. Visit Note Annotation Editor
5. Change Log
6. Controls

Figure 28: Application with UI components labeled

The screenshot shows the 'Visit Note Annotator and Trainer' application interface. The title bar is purple with the text 'Visit Note Annotator and Trainer' and a 'help' link. Below the title bar is a navigation bar with a 'host.domain:port' field and a 'populate' button. The main content area is divided into three sections:

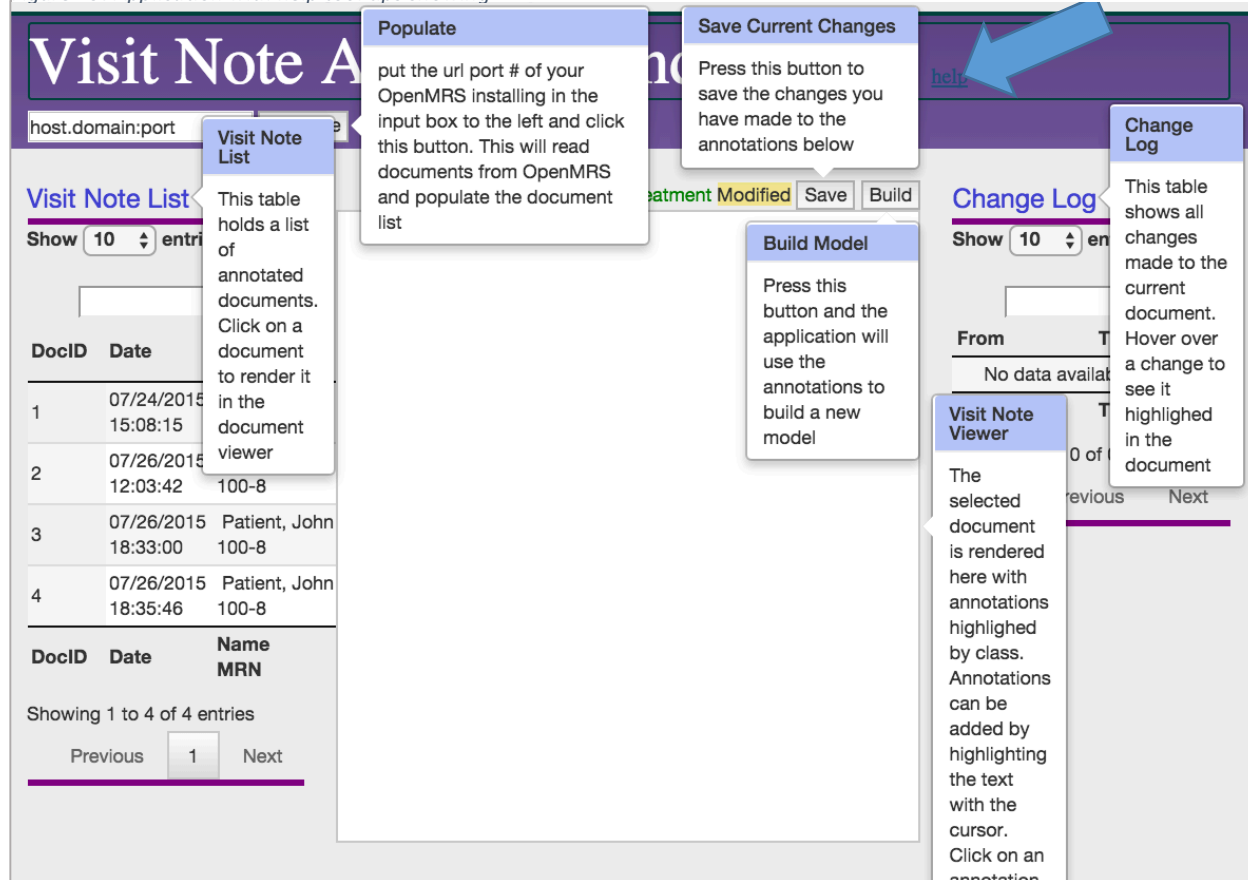
- 3. Visit Notes List:** A table with columns 'DocID', 'Date', and 'Name MRN'. It shows four entries for 'Patient, John 100-8' with dates from 07/24/2015 to 07/26/2015. Below the table are 'Previous' and 'Next' buttons.
- 4. Visit Note Annotation Editor:** A text area containing a 'HISTORY OF PRESENT ILLNESS' note. The text is color-coded: 'end stage liver disease' (red), 'hepatitis C cirrhosis' (orange), 'treatment with interferon and Ribavirin' (green), and 'management of encephalopathy and ascites' (blue). Above the text are buttons for 'Problem', 'Test', 'Treatment', 'Modified', 'Save', and 'Build'.
- 5. Change Log:** A section with a 'Show (10) entries' dropdown and a search field. It displays 'From' and 'To' columns and shows 'No data available in table'. Below this, it says 'Showing 0 to 3 entries' and has 'Previous' and 'Next' buttons.

Blue arrows point from labels to these components: '2: populate' points to the 'populate' button; '6: Controls' points to the navigation bar; '1: Help' points to the 'help' link; '3: Visit Notes List' points to the table; '4: Visit Note Annotation Editor' points to the text area; and '5: Change Log' points to the change log section.

## 4.1 Help

Clicking on the help button shows six popover tool tips to assist the user. The next time the user clicks the mouse, these popovers disappear. Figure 29 shows this.

Figure 29: Application with help tool tips showing



## 4.2 Populate

The Populate component is used to communicate with the OpenMRS installation to read in Visit Notes. More details are provided in section 5.

## 4.3 Visit Notes List

The Visit Notes list shows the visit notes that were imported from OpenMRS. This list is used to select a document to annotate. Three data points are provided for each Visit Note: The DocID, The date/time of the note, Patient name/Medical Record Number. When a note is selected for editing, it will be highlighted in the Visit Note List

## 4.4 Visit Note Annotation Editor

The editor allows the user to add new annotations to the Visit Note text as well as correct or delete existing annotations.

## 4.5 Change log

The Change Log keeps a record of changes made to the current Visit Note being displayed with the option to undue the changes.

## 4.6 Controls

The controls allow the user to save current changes as well as build the new model based on all documents and all annotations currently in the app.

# Visit Note Annotator Usage

## 5.1 Import Data from OpenMRS

This application does not read from the OpenMRS database directly. Once the Visit Notes Analysis module is installed, an HTTP URL is exposed when an administrator navigates to the Manage Visit Notes Analysis page. The web app then uses this endpoint URL to request the Visit Note Data from OpenMRS.

Steps to populate the Visit Notes List are the following:

1. Administrator navigates to Manage Visit Notes Analysis page within OpenMRS

Figure 30: OpenMRS Administration page with Manage Visit Note Analysis highlighted

The screenshot shows the OpenMRS Administration page. The top navigation bar includes 'Home', 'Find/Create Patient', 'Dictionary', 'Reporting', 'Appointments', and 'Administration'. The 'Administration' section is expanded, showing a list of links organized into categories:

- Users**: Manage Users, Manage Roles, Manage Privileges, Manage Alerts
- Patients**: Manage Patients, Manage Tribes, Find Patients to Merge, Manage Identifier Types, Manage Patient Identifier Sources, Auto-Generation Options, View Log Entries
- Person**: Manage Persons, Manage Relationship Types, Manage Person Attribute Types
- Visits**: Manage Visit Types, Manage Visit Attribute Types, Configure Visits
- Encounters**: Manage Encounters, Manage Encounter Types
- Concepts**: View Concept Dictionary, Manage Concept Drugs, Manage Proposed Concepts, Manage Concept Classes, Manage Concept Datatypes, Manage Concept Sources, Manage Concept Stop Word, Manage Reference Terms
- Forms**: Manage Forms, Manage Fields, Manage Field Types, Merge Duplicate Fields
- HL7 Messages**: Manage HL7 Sources, Manage Queued Messages, Manage Held Messages, Manage HL7 Errors, Manage HL7 Archives, Migrate HL7 Archives
- Maintenance**: Set Implementation Id, System Information, View Quick Reports
- Modules**: Manage Modules, Module Properties
- OpenMRS Atlas**: Manage Atlas Marker
- ID Generation**: Manage Patient Identifier Sources, Auto-Generation Options, View Log Entries
- Metadata Mapping**: Configure
- Metadata Sharing**: Export Metadata, Import Metadata, Manage Tasks, Configure
- Data Exchange Module**: Export, Import
- Visit Note Analysis Module**: Manage Visit Notes Analysis (highlighted with a red box)

2. Once here, the URL endpoint can be accessed by the Visit Note Annotator and Trainer.

Figure 31: Manage Visit Notes Analysis page, with URL:port# of installation highlighted

OpenMRS

Currently logged in as Super User | [Log out](#) | [My Profile](#) | [Help](#)

[Home](#) | [Find/Create Patient](#) | [Dictionary](#) | [Reporting](#) | [Appointments](#) | [Administration](#)

[Admin](#) | [Manage module](#)

## banner prototype Module

### Manage Tagger

Tagger:  Choose one of the Models to tag documents

Problems:  Comma separated list of Concept Classes to be mapped to "Problem"

Treatments:  Comma separated list of Concept Classes to be mapped to "Treatment"

Tests:  Comma separated list of Concept Classes to be mapped to "Test"

Administrator Email:  This address will be used to report incorrect annotations

### Upload New Model

File to upload:   Model Name:

Don't Forget The Model Name!  Press here to upload the file!

### Re-analyze documents

Run the analysis on all Visit Notes in the database with the chosen Tagger

### Reports

**Entity Frequency Report (Right click, 'save as...' to download)**  
[Entity Frequency Report](#)  
This report contains all entities identified and their frequencies

**All Notes Report (Right click, 'save as...' to download)**  
[All Notes Report](#)  
This report shows all entities identified broken down per visit note

English (United States) | English (United Kingdom) Last Build: 2015-05-21 17:02 Version: 1.11.3 Build 03b68a Powered by OpenMRS

3. Enter the URL and port number into the input box next to the “populate” button in the web applications. The URL and Port number are highlighted in figure 31.

Figure 32: Visit Note Annotator and Trainer app with OpenMRS URL:Port# in “populate” input

Click the “populate” button.

5. The documents from OpenMRS will now appear in the Visit Note List, figure 33.

Figure 32: visit notes populated from OpenMRS

DocID	Date	Name MRN
1	07/24/2015 15:08:15	Patient, John 100-8
2	07/26/2015 12:03:42	Patient, John 100-8
3	07/26/2015 18:33:00	Patient, John 100-8
4	07/26/2015 18:35:46	Patient, John 100-8

Showing 1 to 4 of 4 entries

Previous 1 Next

## 5.2 Selecting a Visit Note

The user can search for a specific visit note with the Search Box or file through them sequentially with the “previous” and “next” buttons. Once the desired document is in view, clicking on the document will render it in the Editor.

Figure 34: Document selected with text and annotations rendered

The screenshot shows a web interface for viewing visit notes. On the left, there is a 'Visit Note List' section with a search box and a table of four entries. The first entry is selected. On the right, the content of the selected note is displayed, with various terms highlighted in different colors (red, green, blue) to represent annotations. At the top right of the content area, there are buttons for 'Problem', 'Test', 'Treatment', 'Modified', 'Save', and 'Build'.

DocID	Date	Name MRN
1	07/24/2015 15:08:15	Patient, John 100-8
2	07/26/2015 12:03:42	Patient, John 100-8
3	07/26/2015 18:33:00	Patient, John 100-8
4	07/26/2015 18:35:46	Patient, John 100-8

HISTORY OF PRESENT ILLNESS :The patient is a 47 year old male , with **end stage liver disease** secondary to **hepatitis C cirrhosis** diagnosed about 5 years prior to admission .The patient had undergone **treatment** with **interferon** and **Ribavirin** .He had been admitted to the St. Margaret 's Center for Women & Infants multiple times early in 2013 for **management of encephalopathy and ascites** .The patient had been discharged from the St. Margaret 's Center for Women & Infants on 2013-05-06 , but was readmitted on 2013-05-09 when noted to have worsening renal function .

## 5.3 Editing Visit Note Annotations

To edit the annotations of a Visit Note, the user can click on an annotation to either change the annotation type, or remove it from the annotations list, figure 35.

Figure 35: Editing annotations. hepatitis C cirrhosis selected

Problem Test Treatment Modified Save Build

HISTORY OF PRESENT ILLNESS :The patient is a 47 year old male , with end stage liver disease secondary to hepatitis C cirrhosis diagnosed about 5 years prior to admission .The patient had undergone treatment with interferon and Ribavirin .He had been admitted to the St. Margaret 's Center for Women & Infants multiple times early in 2013 for management of encephalopathy and ascites .The patient had been discharged from the St. Margaret 's Center for Women & Infants on 2013-05-06 , but was readmitted on 2013-05-09 when noted to have worsening renal function .

**Choose Concept Type For**

hepatitis C cirrhosis

Problem Treatment Test None

Any changes made by the user will be reflected in the Visit Note rendering as well as the Change Log. Here the user changed the concept type of hepatitis C cirrhosis from “problem” to “treatment.” See figure 36.

Figure 36: user changed the type of "hepatitis C cirrhosis" from problem to test

Problem Test Treatment Modified Save Build

HISTORY OF PRESENT ILLNESS :The patient is a 47 year old male , with end stage liver disease secondary to hepatitis C cirrhosis diagnosed about 5 years prior to admission .The patient had undergone treatment with interferon and Ribavirin .He had been admitted to the St. Margaret 's Center for Women & Infants multiple times early in 2013 for management of encephalopathy and ascites .The patient had been discharged from the St. Margaret 's Center for Women & Infants on 2013-05-06 , but was readmitted on 2013-05-09 when noted to have worsening renal function .

**Change Log**

Show 10 entries

Search:

From	To	
hepatitis C cirrhosis	hepatitis C cirrhosis	undo

Showing 1 to 1 of 1 entries

Previous 1 Next



The user can add a new annotation by highlighting the text. Once a text is highlighted, the same entity-type selection box will appear, allowing the user to select the annotation type, figure 37.

Figure 37: User highlighted "worsening renal function" and is prompted to choose an entity type

Problem Test Treatment Modified Save Build

HISTORY OF PRESENT ILLNESS :The patient is a 47 year old male , with end stage liver disease secondary to hepatitis C cirrhosis diagnosed about 5 years prior to admission .The patient had undergone treatment with interferon and Ribavirin .He had been admitted to the St. Margaret 's Center for Women & Infants multiple times early in 2013 for management of encephalopathy and ascites .The patient had been discharged from the St. Margaret 's Center for Women & Infants on 2013-05-06 , but was readmitted on 2013-05-09 when noted to have worsening renal function .

**Choose Concept Type For**

worsening renal function

Problem Treatment Test None

## 5.4 Reviewing Edits

The user can use the change log to review and undo annotation edits that have been made. Hovering the mouse over a change highlights it in the text, figure 38.

Figure 38: User hovers mouse over Change Log entry, corresponding entity is highlighted

Problem Test Treatment Modified Save Build

HISTORY OF PRESENT ILLNESS :The patient is a 47 year old male , with end stage liver disease secondary to hepatitis C cirrhosis diagnosed about 5 years prior to admission .The patient had undergone treatment with interferon and Ribavirin .He had been admitted to the St. Margaret 's Center for Women & Infants multiple times early in 2013 for management of encephalopathy and ascites .The patient had been discharged from the St. Margaret 's Center for Women & Infants on 2013-05-06 , but was readmitted on 2013-05-09 when noted to have worsening renal function .

**Change Log**

Show 10 entries

Search:

From	To	
hepatitis C cirrhosis	hepatitis C cirrhosis	undo
worsening renal function	worsening renal function	undo

From To

Selecting the “undo” button will reverse the corresponding edit change.

Here the user has selected “undo” and “hepatitis C cirrhosis” has reverted from the “treatment” to “problem” and the entry has been removed from the Change Log. Figure 39

Figure 39: User selects “undo” and hepatitis C cirrhosis is reverted from a treatment back to at test. The change log entry is

The screenshot shows a text editor with a toolbar containing 'Problem', 'Test', 'Treatment', 'Modified', 'Save', and 'Build'. The text area contains a paragraph about a patient's medical history. A blue arrow points from the text 'worsening renal function' to the 'undo' button in the Change Log. Another blue arrow points from the text 'hepatitis C cirrhosis' to the 'undo' button.

**Change Log**  
 Show 10 entries  
 Search:   

From	To	
worsening renal function	worsening renal function	undo

## 5.5 Save Annotations

When the user is satisfied with the changes made to the text, they can save the changes by clicking on the save button. If the user navigates to another note without saving, they will be prompted to save.

Figure 40: User has saved annotations.

The screenshot shows the same text editor as Figure 39. The 'Save' button in the toolbar is highlighted with a blue arrow. The Change Log is empty, displaying 'No data available in table' and 'Showing 0 to 0 of 0 entries'.

**Change Log**  
 Show 10 entries  
 Search:   

From	To
No data available in table	

 Showing 0 to 0 of 0 entries  
 Previous Next

## 5.6 Build Model

When the user is satisfied with all the annotations on all the documents under scrutiny. They can use the documents and annotations to build a new model. Clicking on the build button will begin model computation, figure 41.

Figure 41: Select "build" to use text and annotations to compute new model.

Problem Test Treatment Modified Save Build

HISTORY OF PRESENT ILLNESS :The patient is a 47 year old male , with **end stage liver disease** secondary to **hepatitis C cirrhosis** diagnosed about 5 years prior to admission .The patient had undergone **treatment** with **interferon** and **Ribavirin** .He had been admitted to the St. Margaret 's Center for Women & Infants multiple times early in 2013 for **management** of **encephalopathy and ascites** .The patient had been discharged from the St. Margaret 's Center for Women & Infants on 2013-05-06 , but was readmitted on 2013-05-09 when noted to have **worsening renal function** .

Change Log

Show 10 entries

Search:

From	To
No data available in table	

From To

Showing 0 to 0 of 0 entries

Previous Next

NOTE: This may take some time, depending on the number of documents

## 5.7 Export Model

When the training process is complete, the user will be notified and a "download" button will appear. Clicking the download button will allow the user to download the new model.

Figure 42: The model has been computed and is available for download.

Download Problem Test Treatment Modified Save Build

HISTORY OF PRESENT ILLNESS :The patient is a 47 year old male , with **end stage liver disease** secondary to **hepatitis C cirrhosis** diagnosed about 5 years prior to admission .The patient had undergone **treatment** with **interferon** and **Ribavirin** .He had been admitted to the St. Margaret 's Center for Women & Infants multiple times early in 2013 for **management** of **encephalopathy and ascites** .The patient had been discharged from the St. Margaret 's Center for Women & Infants on 2013-05-06 , but was readmitted on 2013-05-09 when noted to have **worsening renal function** .

Change Log

Show 10 entries

Search:

From	To
No data available in table	

From To

Showing 0 to 0 of 0 entries

Previous Next

The user can now refer to section 3 of this guide for instructions on how to load this model into OpenMRS and use it for tagging Visit Note text.