Antibiotic Ninja

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**Mentors:** Dr. Jennifer Townsend, Gorkem Sevinc, and Michael Cohen
Background and Significance

● 50% of prescribed antibiotics are unnecessary
● Antibiotic overuse leads to resistance
● Problems with alternative treatments
● Solution: Antibiotic Ninja
  ○ Tool for healthcare providers
  ○ Steps through patient exam and diagnosis
  ○ Generate antibiotic recommendation
● Decision Trees inform solution

Technical Approach: Application Overview

● Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Administrators customize decision trees</td>
</tr>
<tr>
<td>2</td>
<td>User selects the type of infections (SSTI, UTI, Respiratory)</td>
</tr>
<tr>
<td>3</td>
<td>Application fetches patient information from EMR</td>
</tr>
<tr>
<td>4</td>
<td>User inputs remaining information (i.e. other symptoms)</td>
</tr>
<tr>
<td>5</td>
<td>Application makes antibiotic recommendation</td>
</tr>
</tbody>
</table>

● Follow up

○ Pulls outcome data from EMR to determine past efficacy
Technical Approach: Backend Design

- Technical Components:
  - PostgreSQL database
  - Node.js, Express.js, Angular.js

- Database
- API to query/manipulate database
- Interaction with EPIC for EMR data
- Administrator portal
- User portal
Technical Approach: Backend Implementation

- Create and test database
  - Populate with test data, ensure proper querying
- Administrator portal
  - Administrators can customize decision trees
- User portal
  - Use decision trees to get relevant information from users
  - Implement interactions with EMR
    - Test pulling relevant information
- Iterative testing
Technical Approach: Frontend Implementation

- Use designs and work with mentors
- Administrator portal
  - Interface to create decision trees
- User portal
  - Interface to input data and receive antibiotic recommendation
- Enhancing UI
  - Get feedback from end users and make improvements to frontend
<table>
<thead>
<tr>
<th>Minimum</th>
<th>Documentation including use cases and exploration of external API’s</th>
<th>March 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Backend design for database, admin portal, and user portal</td>
<td>March 6</td>
</tr>
<tr>
<td>Expected</td>
<td>Backend implementation for database, admin portal, and user portal</td>
<td>April 4</td>
</tr>
<tr>
<td></td>
<td>Frontend implementation for admin portal, and user portal</td>
<td>April 25</td>
</tr>
<tr>
<td></td>
<td>Minimum viable product for testing at Bayview Medical Center</td>
<td>April 25</td>
</tr>
<tr>
<td>Maximum</td>
<td>User Interface enhancements</td>
<td>May 9</td>
</tr>
<tr>
<td></td>
<td>Decision Tree FDA approval</td>
<td>May 9</td>
</tr>
</tbody>
</table>
Dependencies and Management Plan

- Weekly meeting with project team
- Bi-weekly demo and discussion of progress
- Work at Technology Innovation Center
- Pair programming

<table>
<thead>
<tr>
<th>Dependency</th>
<th>Resolution Plan</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtain decision trees</td>
<td>Request from mentors</td>
<td>Resolved</td>
</tr>
<tr>
<td>Obtain initial user interface wireframes</td>
<td>Request from mentors</td>
<td>Resolved</td>
</tr>
<tr>
<td>Documentation for epic API</td>
<td>Explore online resources</td>
<td>In-progress</td>
</tr>
<tr>
<td>Software needed for backend</td>
<td>Download and/or install</td>
<td>Not started</td>
</tr>
<tr>
<td>External libraries for implementation</td>
<td>Get documentation and/or install</td>
<td>Not started</td>
</tr>
</tbody>
</table>
Schedule

Antibiotic Ninja

- **Documentation**
  - Compile use cases
  - Explore external APIs

- **Backend Design**
  - Design backend component: database
  - Design backend component: admin portal
  - Design backend component: user portal
  - Iterate design with mentor feedback

- **Backend Implementation**
  - Implement backend component: database
  - Implement backend component: admin portal
  - Implement backend component: user portal
  - Iterate testing and feedback modifications

- **Frontend Implementation**
  - Implement frontend component: admin portal
  - Implement frontend component: user portal
  - Iterate testing and feedback modifications

- **Enhancing User Interface**
  - Get feedback from end users
  - Makes improvements to UI

- **Decision Tree FDA Approval**
  - Complete tasks from mentors for FDA approval, ...


