Predictive Modeling and Patient Flow at C.S Mott Children’s Hospital

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Predictive Modeling
Predictive Modeling

Background:
• Emergency Department visits are meant to take *less than 6 hours*
• Difficult to predict who will take longer
• Readmissions and inappropriate admissions

Objective:
• Predict disposition decision (*admit or discharge*) using administrative and clinical ED data

Implications
• Earlier mobilization of resources
• Improve patient outcomes
Predictive Modeling: Results

**NN Disposition**

<table>
<thead>
<tr>
<th>ED Dispo.</th>
<th>discharge</th>
<th>admit</th>
</tr>
</thead>
<tbody>
<tr>
<td>discharge</td>
<td>83%</td>
<td>17%</td>
</tr>
<tr>
<td>admit</td>
<td>21%</td>
<td>79%</td>
</tr>
<tr>
<td>152</td>
<td>89</td>
<td>164</td>
</tr>
<tr>
<td>77</td>
<td>89</td>
<td></td>
</tr>
</tbody>
</table>

**SVM Disposition**

<table>
<thead>
<tr>
<th>ED Dispo.</th>
<th>discharge</th>
<th>admit</th>
</tr>
</thead>
<tbody>
<tr>
<td>discharge</td>
<td>91%</td>
<td>9%</td>
</tr>
<tr>
<td>admit</td>
<td>47%</td>
<td>53%</td>
</tr>
<tr>
<td>186</td>
<td>55</td>
<td>164</td>
</tr>
<tr>
<td>77</td>
<td>89</td>
<td></td>
</tr>
</tbody>
</table>

**NN: 81.74% accuracy**

**SVM: 82.32% accuracy**
Patient Flow

Background
- Hospital processes complex
- Difficult to understand for patients and families and often frustrating

Objective
- Build an interactive flow process map to educate users on complex hospital processes

Implications.
- Patient satisfaction
- Patients are proactive in their care
Specify what is decided that the patient needs.

- Treat
- Discharge
- Transfer

Flowchart Key:
- ICU
- Moderate Care
- General Care
- Nurse Admit, Paperwork and Assessment
- Nurse Diagnosis & Care Plan
- Resident Admit, Paperwork and Assessment
- Medical Diagnosis & Care Plan

What is the Care Decision?
- Treat
- Discharge
- Transfer