Pediatric pneumonia remains a common condition associated with considerable morbidity and mortality with approx. 120 million new cases occurring each year with almost 1 million deaths among children under 5 years of age. Establishing the etiology of pneumonia (viral vs bacterial) is essential to ensuring the most effective therapy since each agent requires a very different form of management (mere supportive care satisfactory for viral vs urgent antibiotic treatment required for bacterial). The derivation of the necessary diagnostic information requires advanced equipment (such as X-rays) and clinical expertise to correctly assess observational clinical signs; both of which are often unavailable in resource-constrained settings.

We address these challenges through a machine learning tool, facilitating automated detection and diagnosis of pediatric pneumonia utilizing chest x-ray images. Notably, we demonstrate our ability to localize areas that are most indicative of infection.

**INTRODUCTION**

- Pediatric pneumonia remains a common condition associated with considerable morbidity and mortality with approx. 120 million new cases occurring each year with almost 1 million deaths among children under 5 years of age.
- Establishing the etiology of pneumonia (viral vs bacterial) is essential to ensuring the most effective therapy since each agent requires a very different form of management (mere supportive care satisfactory for viral vs urgent antibiotic treatment required for bacterial).
- The derivation of the necessary diagnostic information requires advanced equipment (such as X-rays) and clinical expertise to correctly assess observational clinical signs; both of which are often unavailable in resource-constrained settings.
- We address these challenges through a machine learning tool, facilitating automated detection and diagnosis of pediatric pneumonia utilizing chest x-ray images. Notably, we demonstrate our ability to localize areas that are most indicative of infection.

**METHOD**

- **Data:** We used a set of publicly-available pediatric X-rays (CXR). The dataset includes chest X-ray images (anterior-posterior) of pediatric patients of one to five years old from Guangzhou Women and Children's Medical Center, Guangzhou, China.

**RESULTS**

<table>
<thead>
<tr>
<th>Category</th>
<th>Training Samples</th>
<th>Test Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal vs Pneumonia</td>
<td>5216</td>
<td>624</td>
</tr>
<tr>
<td>Bacterial vs Viral</td>
<td>3875</td>
<td>390</td>
</tr>
</tbody>
</table>

**Localization:** Most methods require additional localization data such as specific coordinates of the bounding box.

**APPLICATIONS TO OTHER DOMAINS:**
- Banking
- Self-driving cars

**REFERENCES**