The Lung Image Database Consortium (LIDC):
Fundamental Issues for the Creation of a Resource for the Image Processing Research Community

THE LIDC AND ITS MISSION

The LIDC is a Consortium of 5 Institutions funded by the National Cancer Institute under the Cancer Imaging Program (CIP). These institutions are:
* The University of Chicago
* University of Iowa Roy J. and Lucille A. Carver School of Medicine
* The David Geffen School of Medicine at UCLA
* Weill Medical College of Cornell University
* The University of Michigan Medical School

The mission of the LIDC is the sharing of lung images, especially low-dose helical CT scans of adults screened for lung cancer, and related technical and clinical data for the development and testing of computer-aided diagnosis (CAD) technologies.

PRINCIPAL GOALS

To establish standard formats and processes for managing thoracic CT scans and related technical and clinical data for use in the development and testing of CAD algorithms.

To develop an image database as a web-accessible international research resource for the development, training, and evaluation of CAD methods for lung cancer detection and diagnosis using helical CT.

CHALLENGES IN CONSTRUCTING THE DATABASE

1. Defining a Nodule - The Nodule Visual Library
   - Written definitions are problematic. We are developing a Nodule Visual Library. This will attempt to describe the full spectrum of "Focal Abnormalities," of which nodules are a subset.

2. Establishing Spatial "Truth" for Nodule Boundary
   - Consensus on boundary is also difficult to arrive at (see below). We will assess reader variability of contours and construct a probabilistic description of boundaries.

DATABASE IMPLEMENTATION STEPS

TASKS COMPLETED (see current reports on website):
1. Specification of Inclusion Criteria:
   - (a) CT scanning technical parameters
   - (b) Patient inclusion criteria
2. Process Model for Data collection
   - (a) Determination of Spatial "truth" Using Blinded and Unblinded reads
3. Development of Boundary Drawing/Contouring Tools

TASKS ONGOING (expected completion date):
1. Definition of Nodule - Nodule Visual Library (Feb 04)
2. Evaluation of Boundary Variability (Feb 04):
   - (a) Inter-Reader Variability
   - (b) Boundary Drawing Tool Variability

IMPLEMENTATION TIMELINE

<table>
<thead>
<tr>
<th>Task</th>
<th>Date Expected</th>
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</thead>
<tbody>
<tr>
<td>(a) CT scanning technical parameters</td>
<td>Jan 04</td>
</tr>
<tr>
<td>(b) Patient inclusion criteria</td>
<td>Jan 04</td>
</tr>
<tr>
<td>Data passing, Performing reviews</td>
<td>Jan/ Feb 04</td>
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<tr>
<td>Initial implementation, testing of workflow</td>
<td>Jan/Feb 04</td>
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<tr>
<td>Database Implementation- Start</td>
<td>Jan/ Feb 04</td>
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<tr>
<td>Database Implementation- Completion</td>
<td>Mar/Apr 04</td>
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<tr>
<td>Implementing Public Interface to Database</td>
<td>Apr/May 04</td>
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<tr>
<td>PUBLIC ACCESS TO CASES - EXPECTED</td>
<td>MAY/JUN 04</td>
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LIDC WEBSITE

Overview - www3.cancer.gov/bip/steer_lidc.htm
Committee Reports - www3.cancer.gov/bip/lidc_comm.htm
Contains publicly available documents describing inclusion criteria, process model details, etc.