Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	03 October 2022
Team ID	PNT2022TMID53060
Project Name	Project - A Gesture-based Tool for Sterile Browsing of Radiology
Maximum Marks	4 Marks

Technical Architecture:

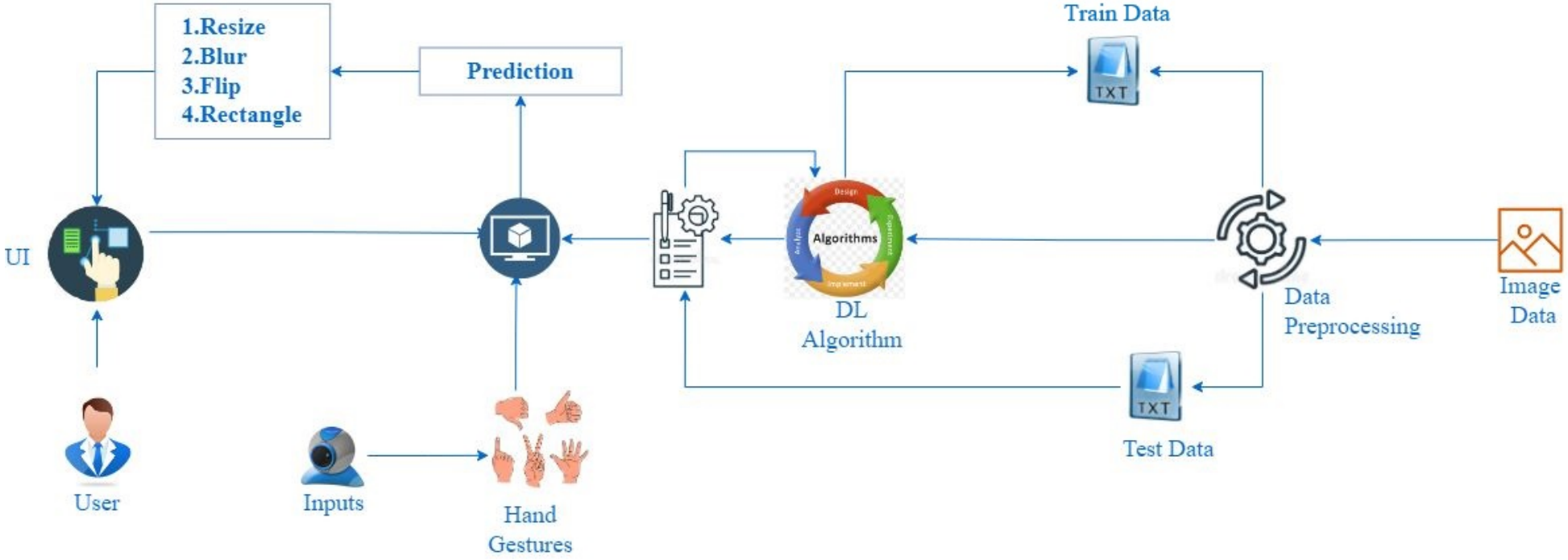

Table-1: Components & Technologies:

<table>
<tr><th>S.No</th><th>Component</th><th>Description</th><th>Technology</th></tr>
<tr><td>1.</td><td>User Interface</td><td>Web UI</td><td>HTML, CSS, JavaScript</td></tr>
<tr><td>2.</td><td>Application Logic-1
Frame Preprocessing</td><td>Frame is to be preprocessed using Python libraries viz. numpy, scikit-image, opencv</td><td>Python</td></tr>
<tr><td>3.</td><td>Application Logic-2
Model Construction</td><td>Deep learning model is to be constructed to classify hand gestures</td><td>Python, TensorFlow, Keras, IBM Watson Studio</td></tr>
<tr><td>4.</td><td>Application Logic-3
Application Development</td><td>Web application is to be built to take a gesture as input and display the model inference</td><td>Front-End: HTML, CSS, JavaScript
Back-End: Flask</td></tr>
<tr><td>5.</td><td>Cloud Database</td><td>Hand images are to be stored on a cloud database for training the machine learning model</td><td>IBM Cloudant DB</td></tr>
<tr><td>6.</td><td>Local File Storage</td><td>Local file system stores user input images</td><td>Local file system</td></tr>
<tr><td>7.</td><td>Dataset</td><td>Labeled images of hand gestures</td><td>Proprietary dataset provided by IBM</td></tr>
<tr><td>8.</td><td>Machine Learning Model</td><td>CNN model is to be used to classify preprocessed frames segmented from a video stream</td><td>CNN model using TensorFlow, Keras</td></tr>
<tr><td>9.</td><td>Infrastructure (Server / Cloud)</td><td>Application is to be deployed on a local server
Local Server Configuration:

<table><tr><td>Host Name</td><td>localhost</td></tr><tr><td>HTTP Port</td><td>3000</td></tr><tr><td>SSL(HTTPS) Port</td><td>8443</td></tr><tr><td>Connector</td><td>8081</td></tr><tr><td>Database</td><td>Yes (IBM Cloudant DB)</td></tr></table>
http://localhost:3000/HandGestureWebApp</td><td>Local</td></tr>
</table>

Table-2: Application Characteristics:

<table>
<tr><th>S.No</th><th>Characteristics</th><th>Description</th><th>Technology</th></tr>
<tr><td>1.</td><td>Open-Source Frameworks</td><td>Open-source software is to be used for application development, model training and version control</td><td><table>
<tr><td>Version Control</td><td>GitHub, GitLens</td></tr>
<tr><td>Editors</td><td>Visual Studio Code</td></tr>
<tr><td>Languages & Libraries</td><td>Python, JavaScript, TensorFlow, Keras</td></tr>
<tr><td>Frameworks</td><td>Flask</td></tr>
</table></td></tr>
<tr><td>2.</td><td>Robustness</td><td>Hand gestures can be captured at different angles and under varied lighting conditions</td><td>Scikit-image, OpenCV</td></tr>
<tr><td>3.</td><td>Performance</td><td>Light-weight SOTA deep learning model with low inference time</td><td>TensorFlow, Keras</td></tr>
<tr><td>4.</td><td>Availability</td><td>The application is to be deployed on a high-performance, reliable server</td><td>IBM Cloud</td></tr>
<tr><td>5.</td><td>Scalability</td><td>The system shall limit the number of user requests to one per second, serve each request on a separate thread</td><td>Python</td></tr>
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