Roll No: 2003028

Lab Evaluation 1

Lab Task Q1

Question: Create a Latex program which will format following text:

Solution (Latex Code):

```
\documentclass{book}
\usepackage{ulem}
\usepackage{fancyhdr}
\usepackage{amsmath}

\title{2003028}
\author{Md. Abdullah AL Mamun}
\begin{document}

\setlength{\topmargin}{5cm}
\setlength{\rightmargin}{5cm}
\setlength{\leftmargin}{5cm}

\maketitle

If $f(x,y)$ is a function, where $f$ partially depends on $x$ and $y$ and if we differentiate
$f$ with respect to $x$ and $y$, then the derivatives are called the partial derivatives of
$f$. The formula for the partial derivative of $f$ with respect to $x$, taking $y$ as a
constant, is given by:

\begin{center}
   $f_x =  \frac{\partial f}{\partial x} = \lim_{h \to 0} \frac{f(x+h,y)-f(x,y)}{h}$
\end{center}

And the partial derivative of $f$ with respect $y$ keeping $x$ as constant, we get;

\begin{center}
   $f_y =  \frac{\partial f}{\partial y} = \lim_{h \to 0} \frac{f(x,y+h)-f(x,y)}{h}$
\end{center}

The $Gradient$ of f at point (x0 , y0 ) is defined as follows:

\begin{center}
   $\nabla f(x_0,y_0) =$
   $\begin{bmatrix}
         \frac{\partial f}{\partial x}(x_0,y_0) \\
         \frac{\partial f}{\partial y}(x_0,y_0)
      \end{bmatrix}$
\end{center}
\begin{center}
   $=
      \begin{matrix}
```

```
        f_x \\
        f_y
    \end{matrix}$
\end{center}

\end{document}
```

Output (Screen/SnapShot of Generated PDF):

If $f(x, y)$ is a function, where f partially depends on x and y and if we differentiate f with respect to x and y, then the derivatives are called the partial derivatives of f. The formula for the partial derivative of f with respect to x, taking y as a constant, is given by:

$$f_x = \frac{\partial f}{\partial x} = \lim_{h \to 0} \frac{f(x+h,y) - f(x,y)}{h}$$

And the partial derivative of f with respect y keeping x as constant, we get;

$$f_y = \frac{\partial f}{\partial y} = \lim_{h \to 0} \frac{f(x,y+h) - f(x,y)}{h}$$

The *Gradient* of f at point (x0 , y0) is defined as follows:

$$\nabla f(x_0, y_0) = \begin{bmatrix} \frac{\partial f}{\partial x}(x_0, y_0) \\ \frac{\partial f}{\partial y}(x_0, y_0) \end{bmatrix}$$

$$= \begin{matrix} f_x \\ f_y \end{matrix}$$

Lab Task Q2

Question: Create two chapters using same paragraph with formatting as in previous question in a two mini page whose margin will be narrow and there will be two footers with random texts.

Solution (Latex Code):

```
\documentclass{article}
\usepackage{ulem}

\title{2003028}
\author{Md. Abdullah AL Mamun}
\begin{document}

\maketitle

This research work is focused on detecting low-grade
glioma tumorous cells in MRI images. Glioma is a common
brain tumor, that exhibits properties of benign tumors.
We used the TCGA-LGG Segmentation dataset for our
research. It consists of 3929 brain tumor images and
corresponding FLAIR abnormality segmentation masks
obtained from 110 patients. \citation{wadhwa2019review}.

Table \ref{tab:encoder-models} lists the models used as
encoder for U-Net architecture.

\begin{table}[htbp]
    \centering
    \caption{Models used for U-Net encoder and trainable
blocks/stages for finetuning.}
    \label{tab:encoder-models}
    \begin{tabular}{c c c}
        \hline
        Family       & Models                    &
Trainable Blocks \\
        \hline
        EfficientNet & EfficientNetB0 to B7      & Block
30 to 32   \\
        DenseNet     & DenseNet169, DenseNet201 & Block
7          \\
        VGG          & VGG16, VGG19              & Block
5          \\
```

```
        \hline
    \end{tabular}
\end{table}

\bibliographystyle{plain}
\bibliography{references}

\end{document}
```

Output (Screen/SnapShot of Generated PDF):

2003028

Md. Abdullah AL Mamun

January 14, 2024

This research work is focused on detecting low-grade glioma tumorous cells in MRI images. Glioma is a common brain tumor, that exhibits properties of benign tumors. We used the TCGA-LGG Segmentation dataset for our research. It consists of 3929 brain tumor images and corresponding FLAIR abnormality segmentation masks obtained from 110 patients. .

Table 1 lists the models used as encoder for U-Net architecture.

Table 1: Models used for U-Net encoder and trainable blocks/stages for fine-tuning.

Family	Models	Trainable Blocks
EfficientNet	EfficientNetB0 to B7	Block 30 to 32
DenseNet	DenseNet169, DenseNet201	Block 7
VGG	VGG16, VGG19	Block 5

References