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e&quot;:&quot;markdown&quot;,&quot;source&quot;:&quot;# \*\*\*\*Spam Message Classification using

LSTM\*\*\*\*&quot;,&quot;metadata&quot;:{}},{&quot;cell\_type&quot;:&quot;markdown&quot;,&quot;source&quot;:&quot;## 1.Import the Necessary

Libraries&quot;,&quot;metadata&quot;:{}},{&quot;cell\_type&quot;:&quot;code&quot;,&quot;source&quot;:&quot;import numpy as np\nimport pandas as

pd\nimport os\nimport seaborn as sns\nimport matplotlib.pyplot as plt\n%matplotlib inline\nfor

dirname, \_, filenames in os.walk(&#39;/kaggle/input&#39;):\n for filename in filenames:\n

print(os.path.join(dirname, filename))\n&quot;,&quot;metadata&quot;:{&quot;execution&quot;:{&quot;iopub.status.busy&quot;:&quot;2022-10-

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24T19:10:03.096453Z&quot;,&quot;shell.execute\_reply.started&quot;:&quot;2022-10-

24T19:10:02.240435Z&quot;,&quot;shell.execute\_reply&quot;:&quot;2022-10-

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aggle/input/sms-spam-collection-

dataset/spam.csv\n&quot;,&quot;output\_type&quot;:&quot;stream&quot;}]},{&quot;cell\_type&quot;:&quot;markdown&quot;,&quot;source&quot;:&quot;\*\*\*\*2. Reading

the .csv

dataset\*\*\*\*&quot;,&quot;metadata&quot;:{}},{&quot;cell\_type&quot;:&quot;code&quot;,&quot;source&quot;:&quot;data=pd.read\_csv(\&quot;../input/sms-spam-

collection-

dataset/spam.csv\&quot;,encoding=\&quot;latin\&quot;)\ndata.head()&quot;,&quot;metadata&quot;:{&quot;execution&quot;:{&quot;iopub.status.busy&quot;

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ut\_type&quot;:&quot;execute\_result&quot;,&quot;data&quot;:{&quot;text/plain&quot;:&quot; v1 v2 Unnamed: 2

\\\n0 ham Go until jurong point, crazy.. Available only ... NaN \n1 ham Ok lar...

Joking wif u oni... NaN \n2 spam Free entry in 2 a wkly comp to win FA Cup fina... NaN

\n3 ham U dun say so early hor... U c already then say... NaN \n4 ham Nah I don&#39;t think he

goes to usf, he lives aro... NaN \n\n Unnamed: 3 Unnamed: 4 \n0 NaN NaN \n1

NaN NaN \n2 NaN NaN \n3 NaN NaN \n4 NaN NaN

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{\n text-align: right;\n }\n&lt;/style&gt;\n&lt;table border=\&quot;1\&quot; class=\&quot;dataframe\&quot;&gt;\n &lt;thead&gt;\n

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crazy.. Available only ...&lt;/td&gt;\n &lt;td&gt;NaN&lt;/td&gt;\n &lt;td&gt;NaN&lt;/td&gt;\n &lt;td&gt;NaN&lt;/td&gt;\n &lt;/tr&gt;\n

&lt;tr&gt;\n &lt;th&gt;1&lt;/th&gt;\n &lt;td&gt;ham&lt;/td&gt;\n &lt;td&gt;Ok lar... Joking wif u oni...&lt;/td&gt;\n

&lt;td&gt;NaN&lt;/td&gt;\n &lt;td&gt;NaN&lt;/td&gt;\n &lt;td&gt;NaN&lt;/td&gt;\n &lt;/tr&gt;\n &lt;tr&gt;\n &lt;th&gt;2&lt;/th&gt;\n

&lt;td&gt;spam&lt;/td&gt;\n &lt;td&gt;Free entry in 2 a wkly comp to win FA Cup fina...&lt;/td&gt;\n

&lt;td&gt;NaN&lt;/td&gt;\n &lt;td&gt;NaN&lt;/td&gt;\n &lt;td&gt;NaN&lt;/td&gt;\n &lt;/tr&gt;\n &lt;tr&gt;\n &lt;th&gt;3&lt;/th&gt;\n

&lt;td&gt;ham&lt;/td&gt;\n &lt;td&gt;U dun say so early hor... U c already then say...&lt;/td&gt;\n &lt;td&gt;NaN&lt;/td&gt;\n

&lt;td&gt;NaN&lt;/td&gt;\n &lt;td&gt;NaN&lt;/td&gt;\n &lt;/tr&gt;\n &lt;tr&gt;\n &lt;th&gt;4&lt;/th&gt;\n &lt;td&gt;ham&lt;/td&gt;\n

&lt;td&gt;Nah I don&#39;t think he goes to usf, he lives aro...&lt;/td&gt;\n &lt;td&gt;NaN&lt;/td&gt;\n &lt;td&gt;NaN&lt;/td&gt;\n

&lt;td&gt;NaN&lt;/td&gt;\n &lt;/tr&gt;\n

&lt;/tbody&gt;\n&lt;/table&gt;\n&lt;/div&gt;&quot;},&quot;metadata&quot;:{}}]},{&quot;cell\_type&quot;:&quot;code&quot;,&quot;source&quot;:&quot;data.columns&quot;,&quot;metad

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&#39;Unnamed: 4&#39;], dtype=&#39;object&#39;)&quot;},&quot;metadata&quot;:{}}]},{&quot;cell\_type&quot;:&quot;markdown&quot;,&quot;source&quot;:&quot;\*\*\*\*3. Drop

the unnamed

Columns\*\*\*\*&quot;,&quot;metadata&quot;:{}},{&quot;cell\_type&quot;:&quot;code&quot;,&quot;source&quot;:&quot;data=data.drop(columns=[\&quot;Unnamed:

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&quot;source&quot;:&quot;\*\*\*\*4. Renaming Column names

sensible\*\*\*\*&quot;,&quot;metadata&quot;:{}},{&quot;cell\_type&quot;:&quot;code&quot;,&quot;source&quot;:&quot;data=data.rename(\n{\n

\&quot;v1\&quot;:\&quot;Category\&quot;,\n \&quot;v2\&quot;:\&quot;Message\&quot;\n},\n

axis=1\n)&quot;,&quot;metadata&quot;:{&quot;execution&quot;:{&quot;iopub.status.busy&quot;:&quot;2022-10-

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ut\_type&quot;:&quot;execute\_result&quot;,&quot;data&quot;:{&quot;text/plain&quot;:&quot; Category Message\n0

ham Go until jurong point, crazy.. Available only ...\n1 ham Ok lar... Joking wif u

oni...\n2 spam Free entry in 2 a wkly comp to win FA Cup fina...\n3 ham U dun say so early

hor... U c already then say...\n4 ham Nah I don&#39;t think he goes to usf, he lives

aro...&quot;,&quot;text/html&quot;:&quot;&lt;div&gt;\n&lt;style scoped&gt;\n .dataframe tbody tr th:only-of-type {\n vertical-

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thead th {\n text-align: right;\n }\n&lt;/style&gt;\n&lt;table border=\&quot;1\&quot; class=\&quot;dataframe\&quot;&gt;\n

&lt;thead&gt;\n &lt;tr style=\&quot;text-align: right;\&quot;&gt;\n &lt;th&gt;&lt;/th&gt;\n &lt;th&gt;Category&lt;/th&gt;\n

&lt;th&gt;Message&lt;/th&gt;\n &lt;/tr&gt;\n &lt;/thead&gt;\n &lt;tbody&gt;\n &lt;tr&gt;\n &lt;th&gt;0&lt;/th&gt;\n &lt;td&gt;ham&lt;/td&gt;\n

&lt;td&gt;Go until jurong point, crazy.. Available only ...&lt;/td&gt;\n &lt;/tr&gt;\n &lt;tr&gt;\n &lt;th&gt;1&lt;/th&gt;\n

&lt;td&gt;ham&lt;/td&gt;\n &lt;td&gt;Ok lar... Joking wif u oni...&lt;/td&gt;\n &lt;/tr&gt;\n &lt;tr&gt;\n &lt;th&gt;2&lt;/th&gt;\n

&lt;td&gt;spam&lt;/td&gt;\n &lt;td&gt;Free entry in 2 a wkly comp to win FA Cup fina...&lt;/td&gt;\n &lt;/tr&gt;\n &lt;tr&gt;\n

&lt;th&gt;3&lt;/th&gt;\n &lt;td&gt;ham&lt;/td&gt;\n &lt;td&gt;U dun say so early hor... U c already then say...&lt;/td&gt;\n

&lt;/tr&gt;\n &lt;tr&gt;\n &lt;th&gt;4&lt;/th&gt;\n &lt;td&gt;ham&lt;/td&gt;\n &lt;td&gt;Nah I don&#39;t think he goes to usf, he lives

aro...&lt;/td&gt;\n &lt;/tr&gt;\n

&lt;/tbody&gt;\n&lt;/table&gt;\n&lt;/div&gt;&quot;},&quot;metadata&quot;:{}}]},{&quot;cell\_type&quot;:&quot;markdown&quot;,&quot;source&quot;:&quot;\*\*\*\*5. Check for

null values in

dataset\*\*\*\*&quot;,&quot;metadata&quot;:{}},{&quot;cell\_type&quot;:&quot;code&quot;,&quot;source&quot;:&quot;data.isnull().sum()&quot;,&quot;metadata&quot;:{&quot;executi

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24T19:10:03.236080Z&quot;,&quot;iopub.status.idle&quot;:&quot;2022-10-

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ass &#39;pandas.core.frame.DataFrame&#39;&gt;\nRangeIndex: 5572 entries, 0 to 5571\nData columns (total 2

columns):\n # Column Non-Null Count Dtype \n--- ------ -------------- ----- \n 0 Category 5572

non-null object\n 1 Message 5572 non-null object\ndtypes: object(2)\nmemory usage: 87.2+

KB\n&quot;,&quot;output\_type&quot;:&quot;stream&quot;}]},{&quot;cell\_type&quot;:&quot;markdown&quot;,&quot;source&quot;:&quot;\*\*\*\*6.Creating a new Field to

store the Message Lengths\*\*\*\*&quot;,&quot;metadata&quot;:{}},{&quot;cell\_type&quot;:&quot;code&quot;,&quot;source&quot;:&quot;data[\&quot;Message

Length\&quot;]=data[\&quot;Message\&quot;].apply(len)&quot;,&quot;metadata&quot;:{&quot;execution&quot;:{&quot;iopub.status.busy&quot;:&quot;2022-10-

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,&quot;source&quot;:&quot;\*\*\*\*7. Histogram Inference of Message Lengths of Spam and Non-spam

messages\*\*\*\*&quot;,&quot;metadata&quot;:{}},{&quot;cell\_type&quot;:&quot;code&quot;,&quot;source&quot;:&quot;fig=plt.figure(figsize=(12,8))\nsns.histpl

ot(\n x=data[\&quot;Message Length\&quot;],\n hue=data[\&quot;Category\&quot;]\n)\nplt.title(\&quot;ham &amp; spam

messege length comparision\&quot;)\nplt.show()&quot;,&quot;metadata&quot;:{&quot;execution&quot;:{&quot;iopub.status.busy&quot;:&quot;2022-

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24T19:10:03.308780Z&quot;,&quot;shell.execute\_reply&quot;:&quot;2022-10-

24T19:10:04.059065Z&quot;},&quot;trusted&quot;:true},&quot;execution\_count&quot;:11,&quot;outputs&quot;:[{&quot;output\_type&quot;:&quot;display\_da

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