In [1]:

```
import pandas as pd
import numpy as np
```

In [2]:

```
#配置

import pandas as pd
from pandas import DataFrame
import matplotlib.pyplot as plt
pd.plotting.register_matplotlib_converters()

%matplotlib inline
import seaborn as sns
from wordcloud import WordCloud, STOPWORDS
from collections import Counter
print("Setup Complete")
```

```
Setup Complete
```

In [3]:

```
sample_path='/Users/van/Downloads/insurance.csv'
df_sample=pd.read_csv(sample_path)
df_sample.head(15)
```

Out[3]:

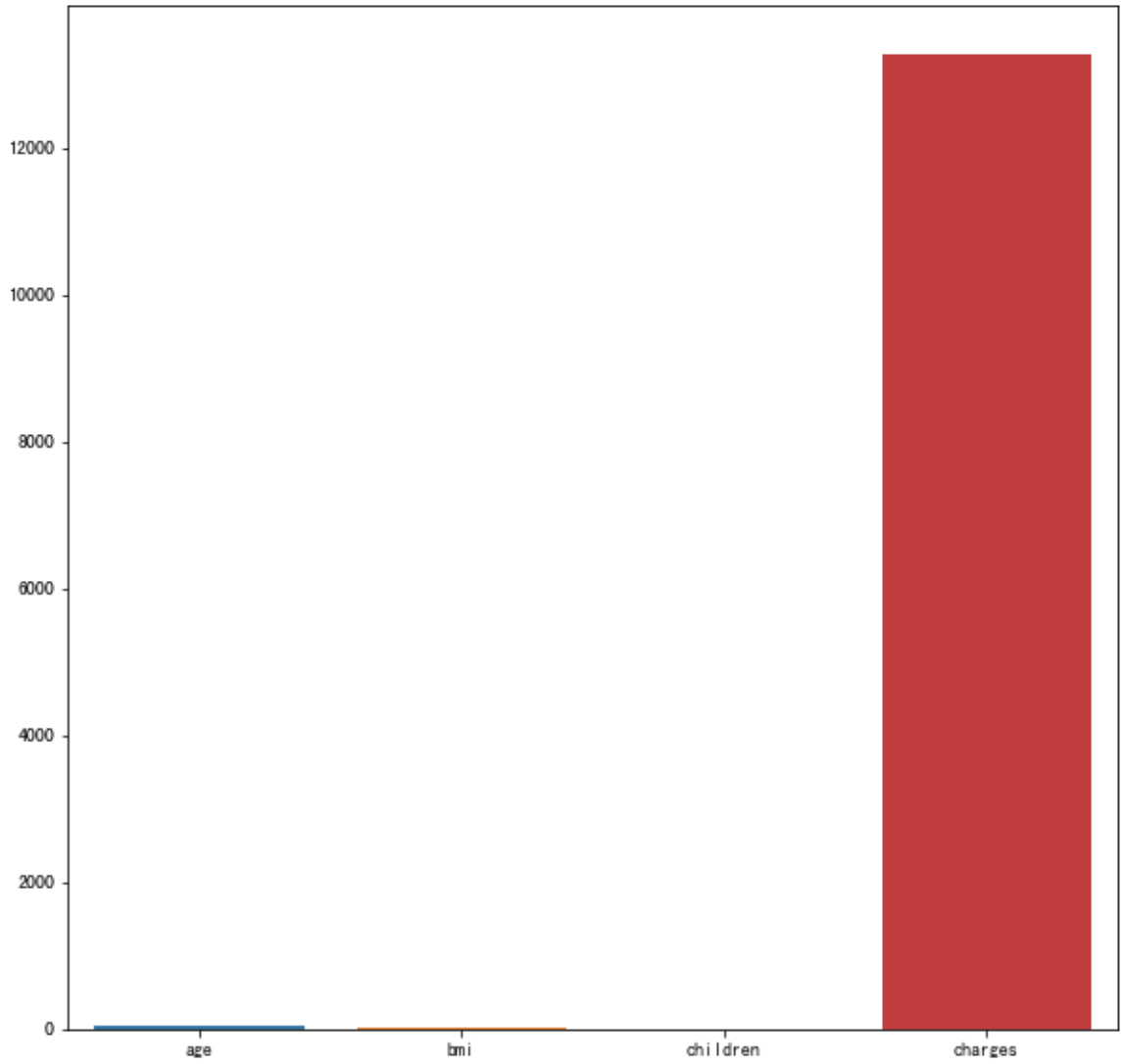
	age	sex	bmi	children	smoker	region	charges
0	19	female	27.900	0	yes	southwest	16884.92400
1	18	male	33.770	1	no	southeast	1725.55230
2	28	male	33.000	3	no	southeast	4449.46200
3	33	male	22.705	0	no	northwest	21984.47061
4	32	male	28.880	0	no	northwest	3866.85520
5	31	female	25.740	0	no	southeast	3756.62160
6	46	female	33.440	1	no	southeast	8240.58960
7	37	female	27.740	3	no	northwest	7281.50560
8	37	male	29.830	2	no	northeast	6406.41070
9	60	female	25.840	0	no	northwest	28923.13692
10	25	male	26.220	0	no	northeast	2721.32080
11	62	female	26.290	0	yes	southeast	27808.72510
12	23	male	34.400	0	no	southwest	1826.84300
13	56	female	39.820	0	no	southeast	11090.71780
14	27	male	42.130	0	yes	southeast	39611.75770

In [4]:

```
#条形图
def draw_bar_chart_plot(data,x=None,y=None,hue=None,ci=None,fig_x=10,fig_y=10,fig_title=None):
    '''
    Ref:
    https://seaborn.pydata.org/generated/seaborn.barplot.html
    https://www.kaggle.com/alexisbcook/bar-charts-and-heatmaps


    1.图的高度表示了，这些变量的集中的趋势
    2.条形图反映的是平均值
    3.两种形式：
     long-form(推荐)：
       需要指定x,y （在通常是dataframe中为列名）
     wide-form：
       画图的是根据输入数据(通常是dataframe obj)的每列数据

    4.关键参数：
    data:pandas DataFrame obj
        data的输入格式：
        label_1,  label2 , ...
         x[0]  ,  y_1[0] , y_2[0]
         x[1]  ,  y_1[1] , y_2[1]
         ...
    x:x坐标的name
    y:y坐标的name
    hue:类别对应的column名字
    ci:画图时采样的方式 ， ci==None时不用采样的方式获取观测值
    fig_x:图的长
    fig_y:图的宽
    fig_title:图的标题



    '''

    #设置画布大小
    plt.figure(figsize=(fig_x,fig_y))
    # 添加标题
    if fig_title:
        plt.title(fig_title)
    #label===>设置图中label的标签
    if x is  None and y is None:
        #没有指定列，则所有列全部被使用
        sns.barplot(data=data,ci=ci)
    else:
        #直接使用df的对应列作为y坐标,label_name作为类名
        sns.barplot(data=data,x=x,y=y,hue=hue,ci=ci)
```

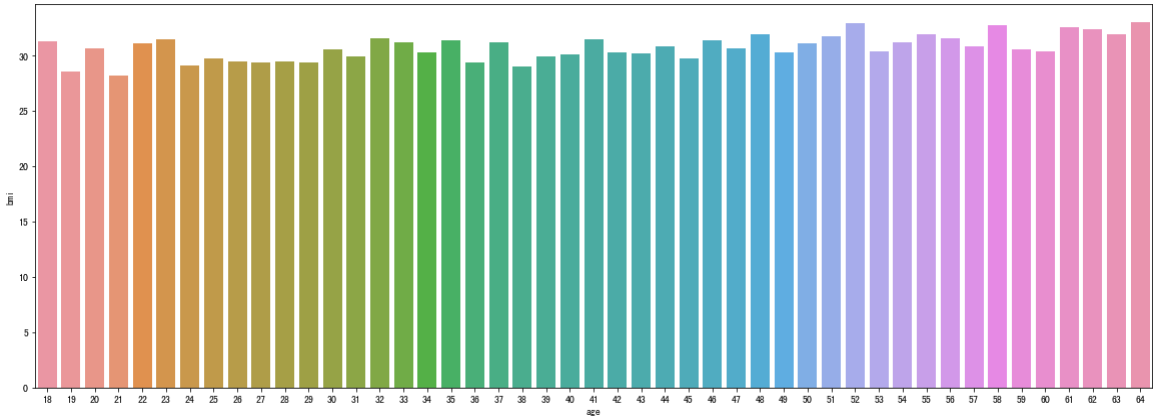
In [5]:

```
draw_bar_chart_plot(df_sample)
```



In [6]:

```
draw_bar_chart_plot(df_sample,x='age',y='bmi',fig_x=20,fig_y=7)
```

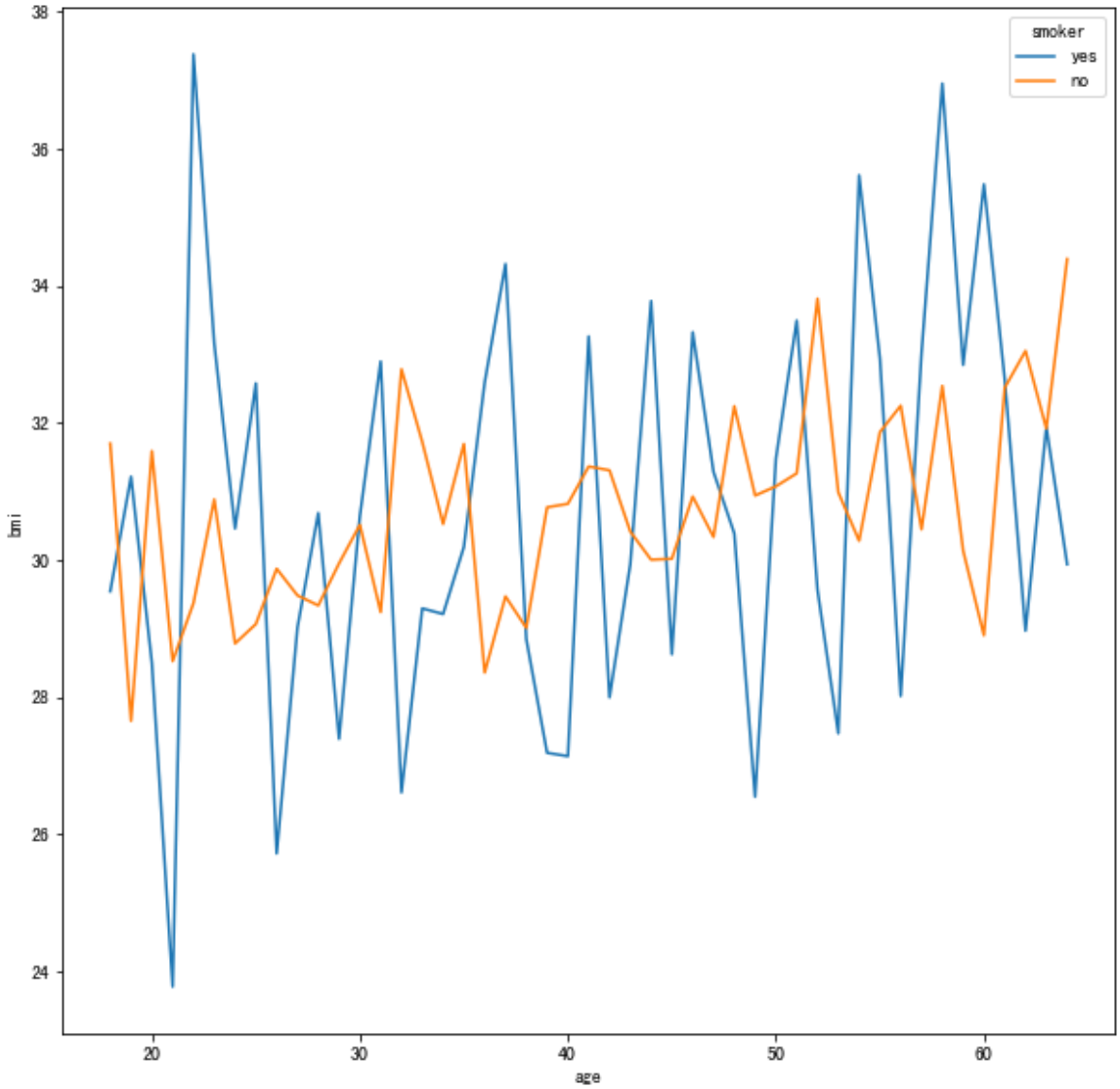


In [7]:

```
#折线图
def draw_line_plot(data,x=None,y=None,hue=None,ci=None,fig_x=10,fig_y=10,fig_tit
le=None):

    '''
    Ref:
    https://seaborn.pydata.org/generated/seaborn.lineplot.html?highlight=lineplo
t#seaborn.lineplot
    https://www.kaggle.com/alexisbcook/line-charts

    关键参数:
    df的输入格式:
        label_1,label2,...
     x[0],  y_1[0]   , y_2[0]
     x[1],  y_1[1]   , y_2[1]
     ...
    data:pandas DataFrame obj
        data的输入格式:
        label_1,  label2 , ...
         x[0]  ,  y_1[0] , y_2[0]
         x[1]  ,  y_1[1] , y_2[1]
         ...
    x:x坐标的name
    y:y坐标的name
    hue:类别对应的column名字
    ci:画图时采样的方式 , ci==None时不用采样的方式获取观测值
    fig_x:图的长
    fig_y:图的宽
    fig_title:图的标题

    '''


    #设置画布大小
    plt.figure(figsize=(fig_x,fig_y))
    # 添加标题
    if fig_title:
        plt.title(fig_title)
    #label===>设置图中label的标签
    if x==None or y==None:
        #没有指定列，则所有列全部被使用
        sns.lineplot(data=data,hue=hue,ci=ci)
    else:
        #直接使用df的对应列作为y坐标,label_name作为类名
        sns.lineplot(data=data,x=x,y=y,hue=hue,ci=ci)
```

In [8]:

```
draw_line_plot(df_sample,x='age',y='bmi',hue='smoker')
```



In [9]:

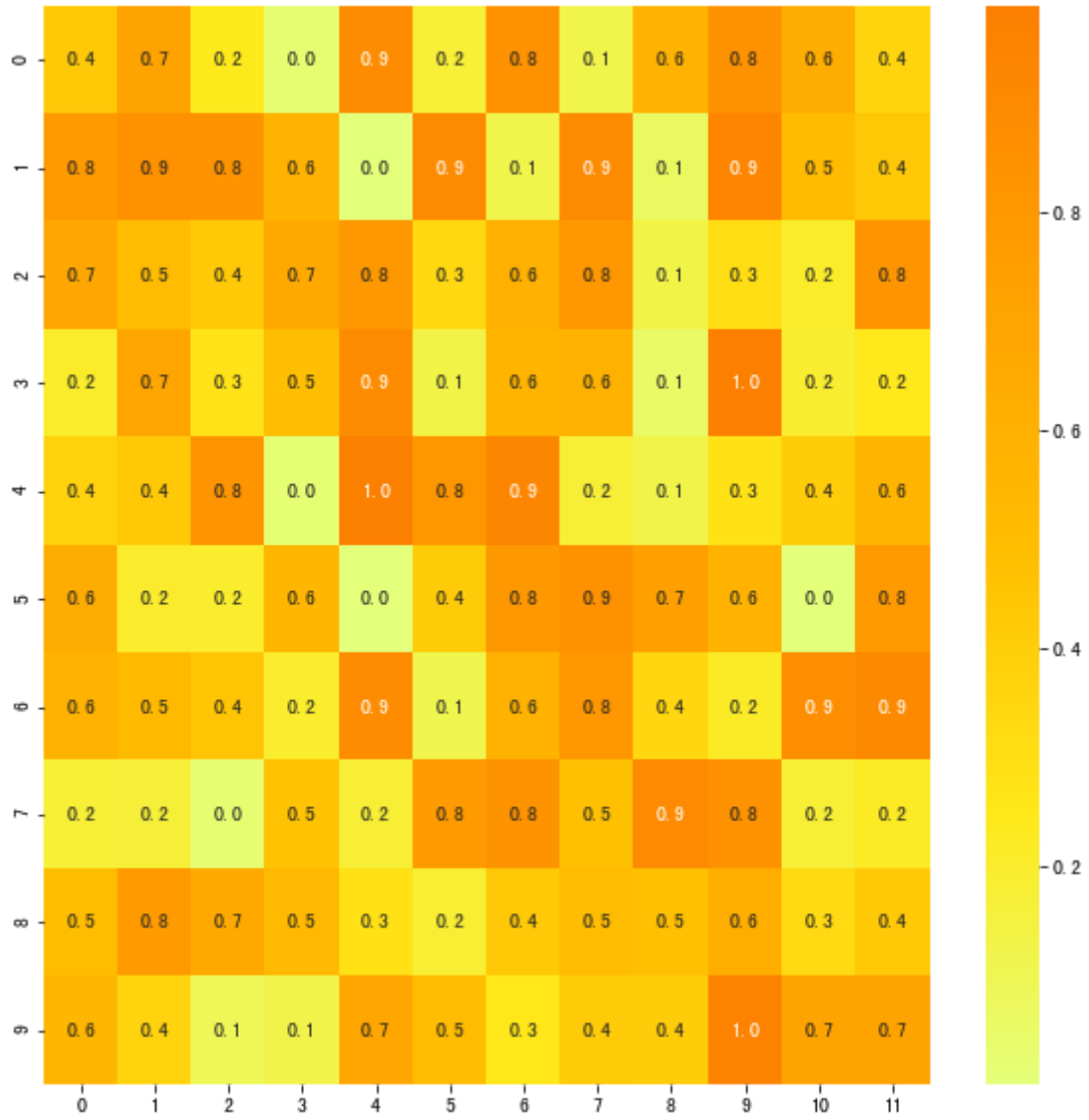
```
#sample
import numpy as np
uniform_data = np.random.rand(10, 12)
```

In [10]:

```
#热图
def draw_heatmap(data,annot=False,fmt=None,vmin=None,vmax=None,cmap='YlGnBu',fig_x=10,fig_y=10,fig_title=None):
    '''
    Ref:
    https://seaborn.pydata.org/generated/seaborn.heatmap.html?highlight=heatmap#seaborn.heatmap
    https://www.kaggle.com/alexisbcook/bar-charts-and-heatmaps

    关键参数:
    data:能够转化为2维ndarray,使用dataframe对象时headmap的横纵坐标的label从行列名中自动找出
    annot:图中是否标识出label值
    fmt:annot的格式，'d'表示整数格式,'.1f'表示小数（保留小数点后一位）
        annot和fmt一般要同时使用。
    vmin, vmax:热点图的bar中的最大值和最小值范围，不提供则自动统计
    cmap：热点图的颜色样式，如“YlGnBu”/"Wistia"
    fig_x:图的长
    fig_y:图的宽
    fig_title:图的标题
    '''

     #设置画布大小
    plt.figure(figsize=(fig_x,fig_y))
    # 添加标题
    if fig_title:
        plt.title(fig_title)

    #直接使用df的对应列作为y坐标,label_name作为类名
    sns.heatmap(data=data,annot=annot,fmt=fmt,vmin=vmin,vmax=vmax,cmap=cmap)
```

In [11]:

```
draw_heatmap(uniform_data,annot=True,fmt='.1f',cmap='Wistia')
```

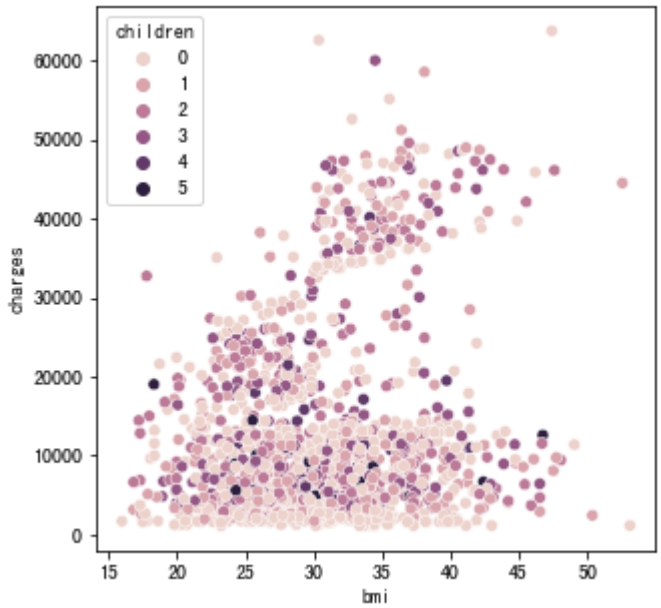


In [12]:

```
#散点图
def draw_scatter_plot(data,x=None,y=None,hue=None,size=None,style=None,fig_x=10,
fig_y=10,fig_title=None):

    '''
    Ref:
    https://seaborn.pydata.org/generated/seaborn.scatterplot.html?highlight=scat
terplot#seaborn.scatterplot
    https://www.kaggle.com/alexisbcook/scatter-plots

    功能：通过x,y展示和(hue,size,style)等参数来展示不同子集之间的关系

    关键参数：
    data:能够转化为2维ndarray,使用dataframe对象时headmap的横纵坐标的label从行列名中自动找
出
    x:明确data中的哪一列作为x轴
    y:明确data中的哪一列作为y轴
    hue:不同类别对应的column名字====>对应不同的色调
    size:不同类别对应的column名字====>对应不同的大小（可通过sizes参数调节大小）
    style:不同类别对应的column名字====>对应不同的风格
    fig_x:图的长
    fig_y:图的宽
    fig_title:图的标题
    '''

     #设置画布大小
    plt.figure(figsize=(fig_x,fig_y))
    # 添加标题
    if fig_title:
        plt.title(fig_title)


    #直接使用df
    if x==None and y==None:
        sns.scatterplot(data)
    else:
        sns.scatterplot(data=data,x=x,y=y,hue=hue,size=size,style=style)
```

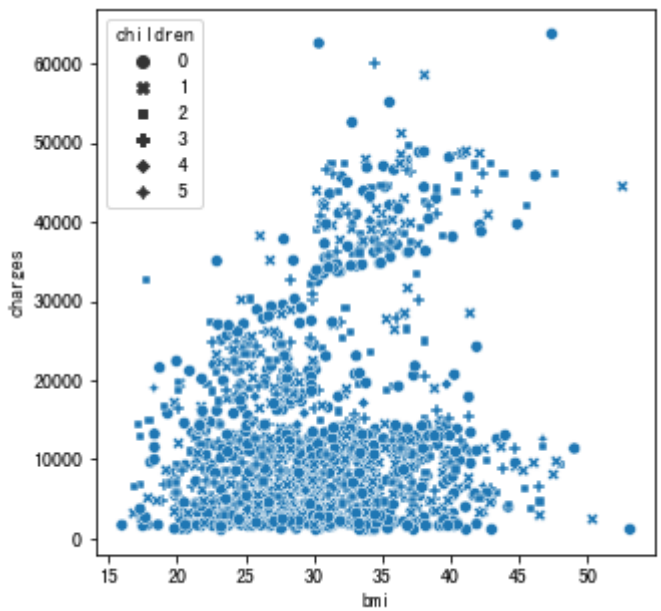
In [13]:

```
draw_scatter_plot(df_sample,x='bmi',y='charges',hue='children',fig_x=5,fig_y=5)
```



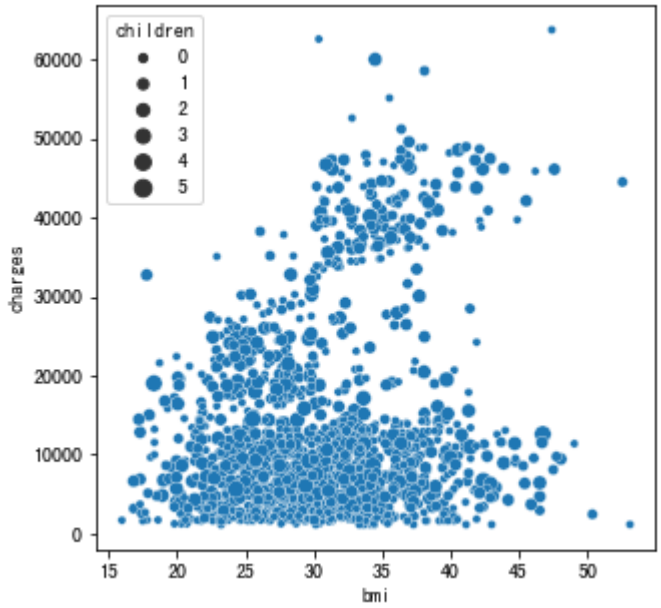
In [14]:

```
draw_scatter_plot(df_sample,x='bmi',y='charges',style='children',fig_x=5,fig_y=5
)
```



In [15]:

```
draw_scatter_plot(df_sample,x='bmi',y='charges',size='children',fig_x=5,fig_y=5)
```

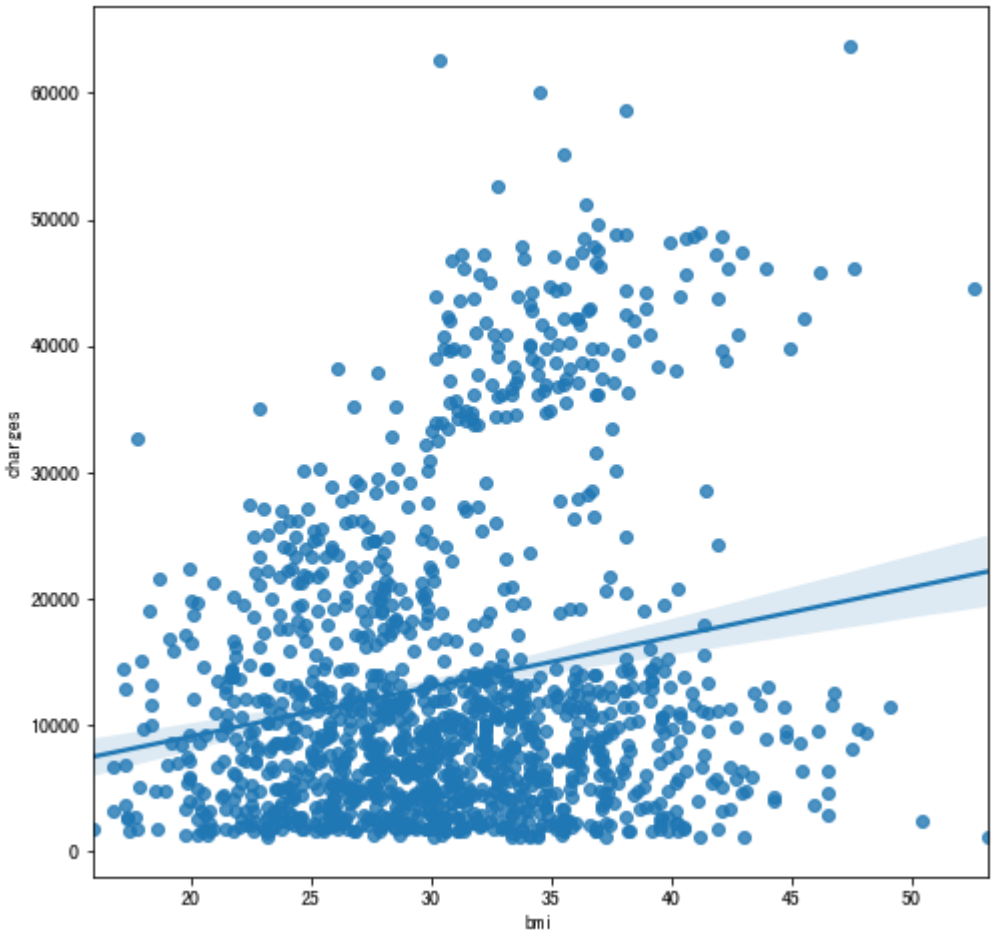


In [16]:

```
#带有回归线的散点图
def draw_regplot(data,x,y,fig_x=10,fig_y=10,fig_title=None):
    '''
    Ref:
    https://seaborn.pydata.org/generated/seaborn.regplot.html?highlight=regplot#seaborn.regplot
    https://www.kaggle.com/alexisbcook/scatter-plots

    功能：画出这些数据，同时画出这些数据的回归模型

    data:Dataframe格式的数据
    x:横坐标的列名
    y:纵坐标的列名
    fig_x:图的长
    fig_y:图的宽
    fig_title:图的标题

    '''

     #设置画布大小
    plt.figure(figsize=(fig_x,fig_y))
    # 添加标题
    if fig_title:
        plt.title(fig_title)

    sns.regplot(data=data,x=x,y=y)
```

In [17]:

```
draw_regplot(df_sample,x='bmi',y='charges',fig_x=8,fig_y=8)
```



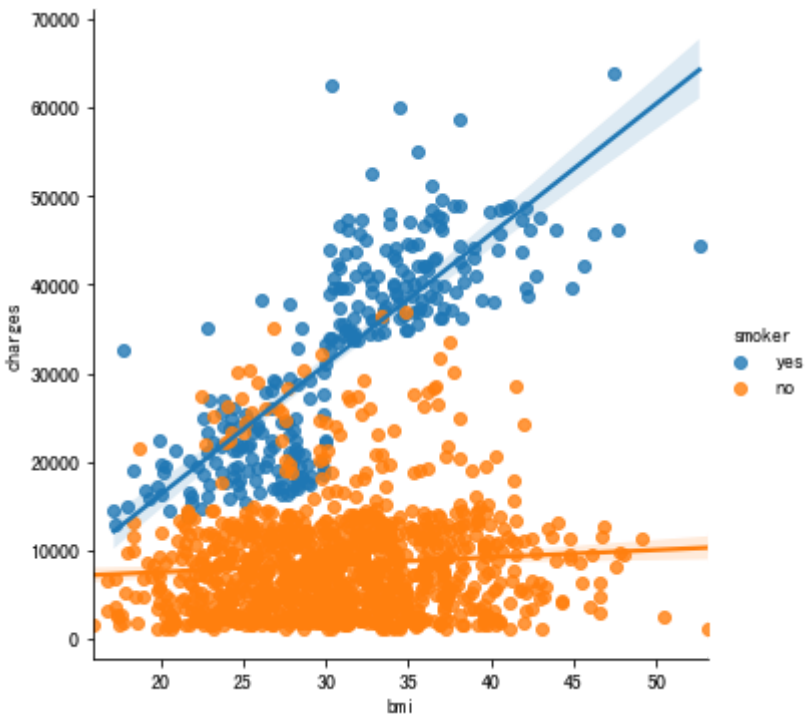
In [18]:

```
#带有多条回归线的散点图
def draw_lmplot(data,x,y,hue,fig_x=10,fig_y=10,fig_title=None):
    '''

    Ref:
    https://www.kaggle.com/alexisbcook/scatter-plots
    https://seaborn.pydata.org/generated/seaborn.lmplot.html?highlight=lmplot#seaborn.lmplot

    功能：画出多组数据，同时画出多组数据的回归模型，

    data:Dataframe格式的数据
    x:横坐标的列名
    y:纵坐标的列名
    hue:不同类别对应的column名字====>对应不同的色调
    fig_x:图的长
    fig_y:图的宽
    fig_title:图的标题

    '''

     #设置画布大小
    plt.figure(figsize=(fig_x,fig_y))
    # 添加标题
    if fig_title:
        plt.title(fig_title)

    sns.lmplot(data=data,x=x,y=y,hue=hue)
```

In [19]:

```
draw_lmplot(df_sample,x='bmi',y='charges',hue='smoker',fig_x=10,fig_y=10)
```

```
<Figure size 720x720 with 0 Axes>
```



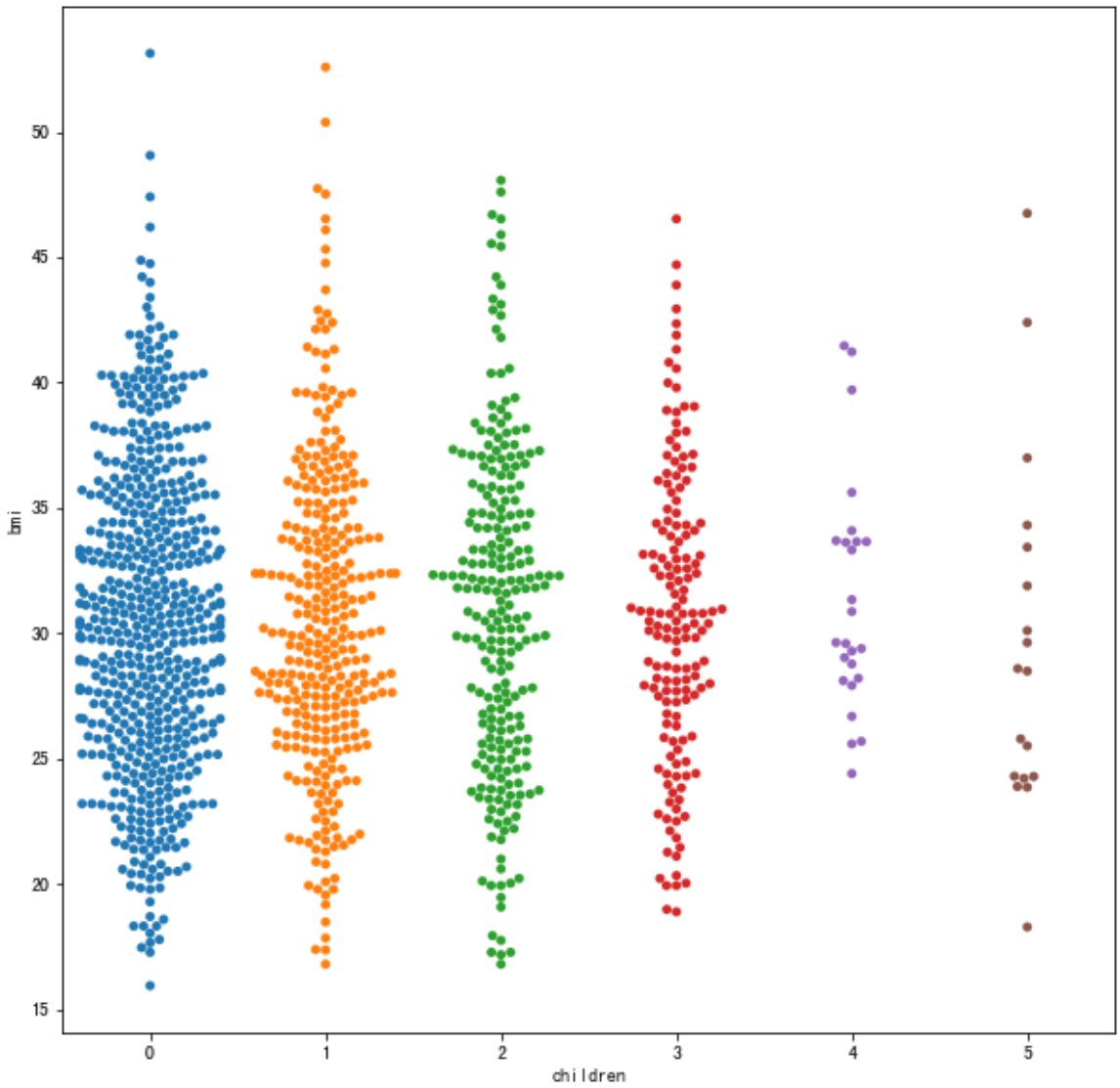
In [20]:

```
#群图
def draw_swarmplot(data,x,y,hue=None,fig_x=10,fig_y=10,fig_title=None):
    '''

    Ref:
    https://www.kaggle.com/alexisbcook/scatter-plots
    https://seaborn.pydata.org/generated/seaborn.swarmplot.html?highlight=swarmplot#seaborn.swarmplot

    功能:
    Draw a categorical scatterplot with non-overlapping points.
    画出一个不会有重合点的类别散点图

    data:Dataframe格式的数据
    x:横坐标的列名
    y:纵坐标的列名
    hue:不同类别对应的column名字====>对应不同的色调
    fig_x:图的长
    fig_y:图的宽
    fig_title:图的标题

    '''

     #设置画布大小
    plt.figure(figsize=(fig_x,fig_y))
    # 添加标题
    if fig_title:
        plt.title(fig_title)

    sns.swarmplot(data=data,x=x,y=y,hue=hue)
```

In [21]:

```
draw_swarmplot(df_sample,x='children',y='bmi')
```

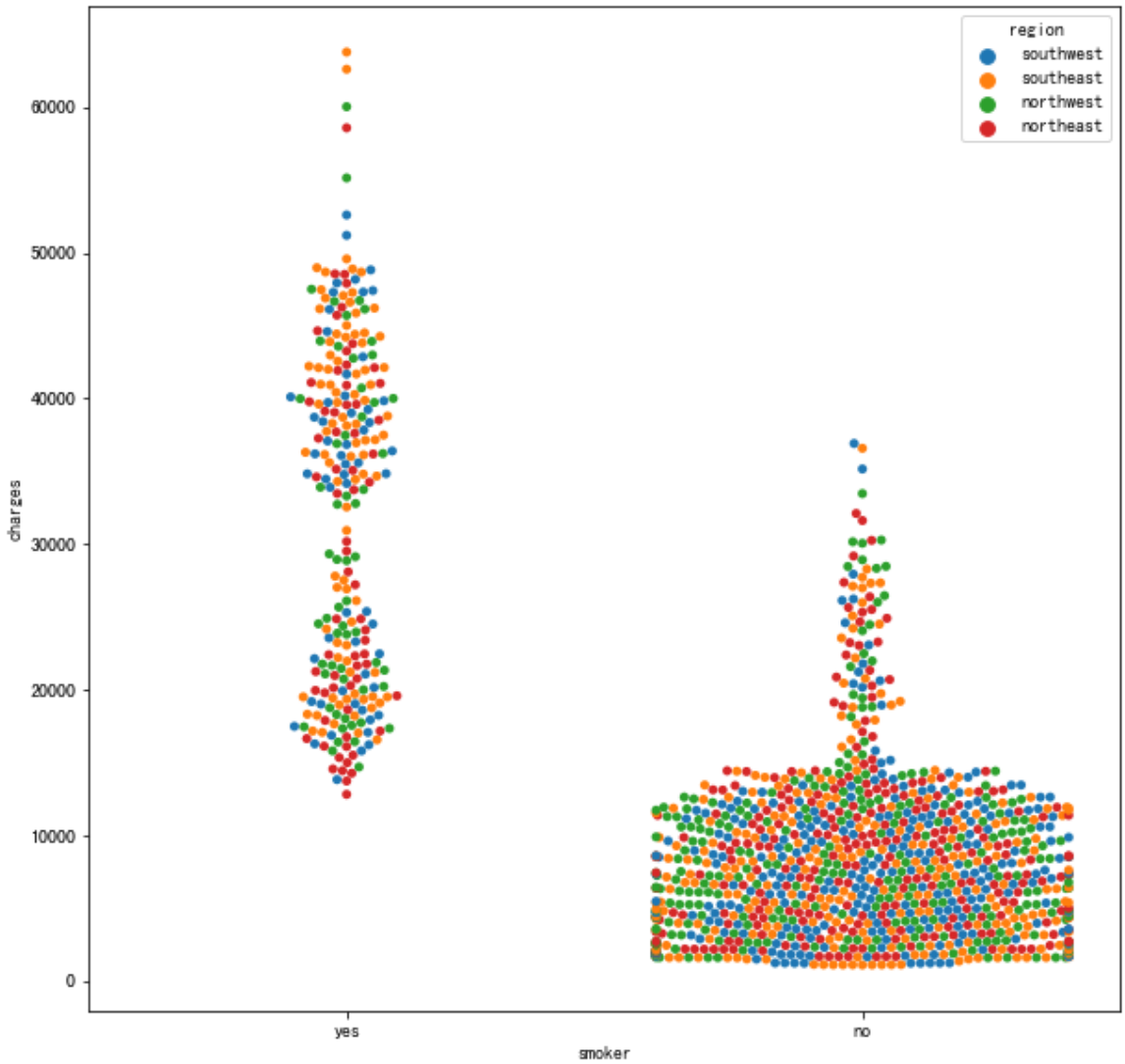
```
/Users/van/anaconda/anaconda3/envs/python36/lib/python3.6/site-packa
ges/seaborn/categorical.py:1296: UserWarning: 6.1% of the points can
not be placed; you may want to decrease the size of the markers or u
se stripplot.
  warnings.warn(msg, UserWarning)
```



In [22]:

```
draw_swarmplot(df_sample,x='smoker',y='charges',hue='region')
```

```
/Users/van/anaconda/anaconda3/envs/python36/lib/python3.6/site-packa
ges/seaborn/categorical.py:1296: UserWarning: 11.4% of the points ca
nnot be placed; you may want to decrease the size of the markers or
use stripplot.
  warnings.warn(msg, UserWarning)
```



In [23]:

```
#词云
def draw_wordcolud(allwords=None,fig_x=30,fig_y=10,fig_title=None):
    #Ref:
    #https://amueller.github.io/word_cloud/
    #
    #allwords:word list
    #
    #
    #WordCloud重要参数:
    #
    #min_font_size:最小的字体大小\default=4
    #font_step:字体增长的step
    #max_words:能够画的最多的字
    #stopwords:停用词（不展示）
    #background_color:背景颜色
    #max_font_size:最大的字体尺寸
    #relative_scaling:字的相对大小，relative_scaling=0时，只考虑rank排名，relative_scaling=1字体大小和重要性的两倍成正比
    #           default='auto'即relative_scaling=0.5，此时只考虑词的重要性
    #repeat：没有达到最大的词数量或者最小的字体大小时，是否重复词云中的word,default=False
    #include_numbers:是否包含数字default=False
    #
    #
    #fig_x:图的长
    #fig_y:图的宽
    #fig_title:图的标题

    #默认列表
    if not allwords:
        allwords={'好':1,'不好':0.001,'差':0.001,'优秀':1}
    #根据频率排序
    mostcommon = sorted(Counter(allwords).items(),key=lambda x:x[1],reverse=True)#[('好',0.1),('优秀',0.2),('不好',0.9),('差',0.8),]#FreqDist(allwords).most_common(100)#来自文本中出现频率最高的100个词

    #设置中文字体的路径
    font = '/Library/Fonts/Songti.ttc'


    wordcloud = WordCloud(width=1600, height=800,font_path=font,relative_scaling=1,repeat=True, background_color='white', stopwords=STOPWORDS).generate(str(most common))

    fig = plt.figure(figsize=(fig_x,fig_y), facecolor='white')

    plt.imshow(wordcloud, interpolation="bilinear")

    #关掉坐标显示
    plt.axis('off')

    plt.title(fig_title, fontsize=50)
    #padding
    plt.tight_layout(pad=0)

    plt.show()
```

In [24]:

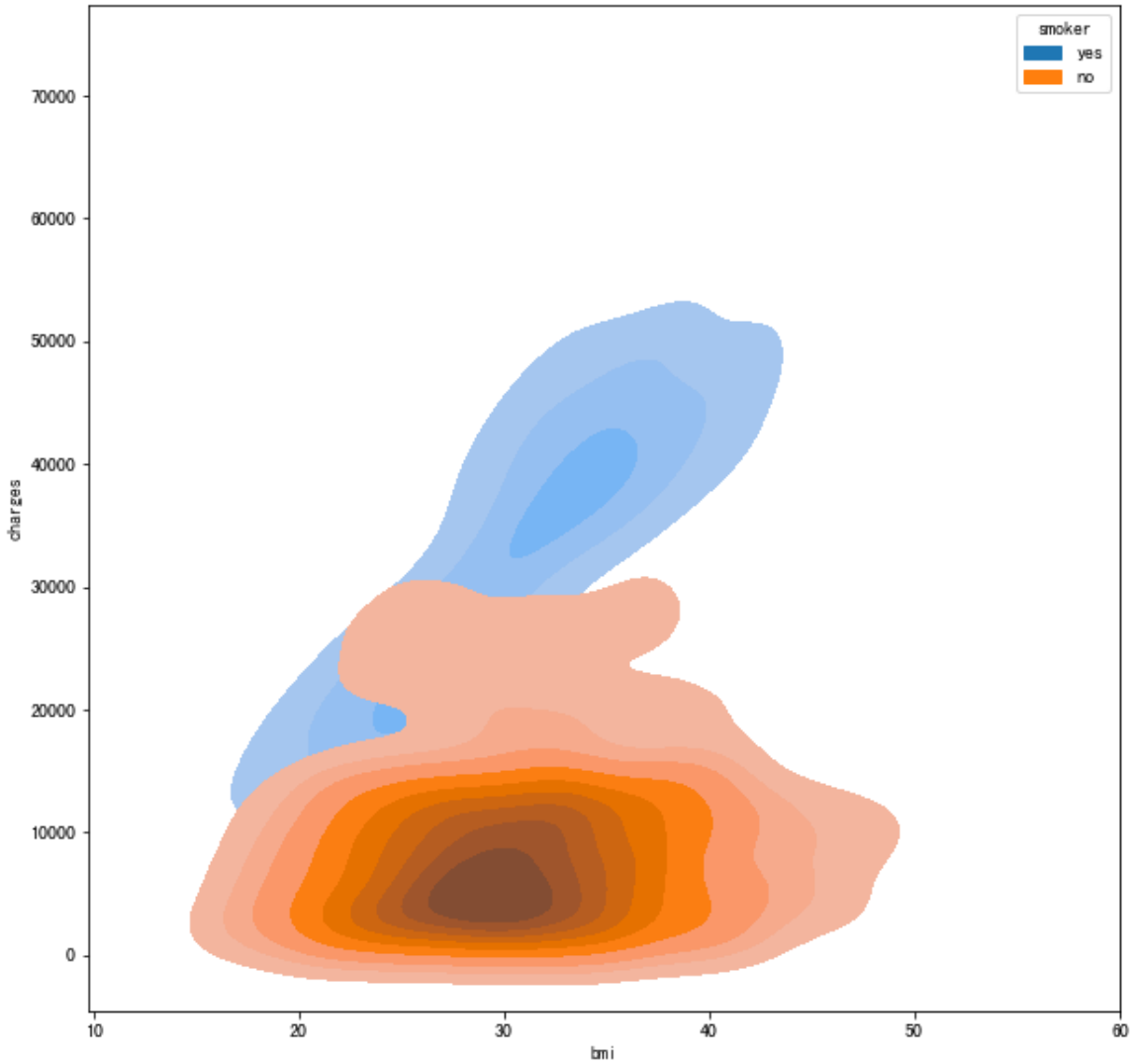
```
draw_wordcolud()
```

In [25]:

```
#密度分布图
def draw_kde_plot(data,x,y,hue=None,shade=True,fig_title=None,fig_x=10,fig_y=10
):

    '''
    Ref:
    https://www.kaggle.com/alexisbcook/distributions
    https://seaborn.pydata.org/generated/seaborn.kdeplot.html

    功能:
    Plot univariate or bivariate distributions using kernel density estimation.
    使用核密度估计绘制单变量或双变量分布。
    用连续变量展示数据的分布。

    data:Dataframe格式的数据
    x:横坐标列名
    y:纵坐标列名
    shade：是否使用阴影
    hue:不同类别对应的column名字====>对应不同的色调
    fig_x:图的长
    fig_y:图的宽
    fig_title:图的标题

    '''

     #设置画布大小
    plt.figure(figsize=(fig_x,fig_y))
    # 添加标题
    if fig_title:
        plt.title(fig_title)

    sns.kdeplot(data=data,x=x,y=y,hue=hue,shade=shade)
```

In [26]:

```
draw_kde_plot(df_sample,x='bmi',y='charges',hue='smoker')
```



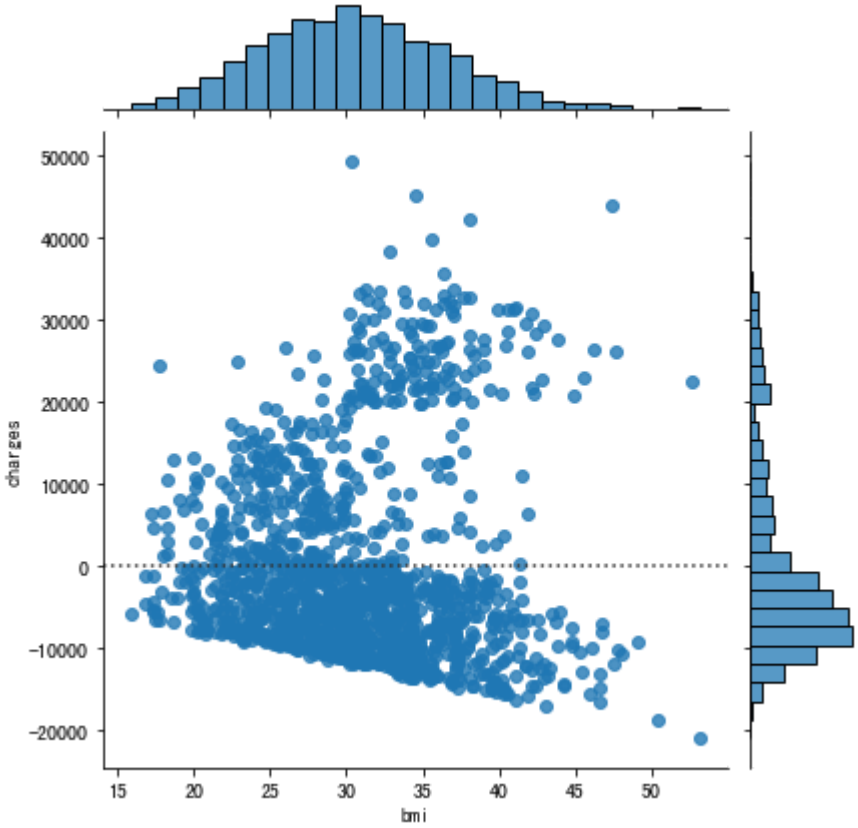
In [27]:

```
#分布图
def draw_jointplot(data,x,y,hue=None,kind='kde',fig_title=None,fig_x=10,fig_y=10
):

    '''

    Ref:
    https://www.kaggle.com/alexisbcook/distributions
    http://seaborn.pydata.org/generated/seaborn.jointplot.html

    功能:
    Draw a plot of two variables with bivariate and univariate graphs.
    用双变量和单变量图绘制两个变量的图。

    data:Dataframe格式的数据
    x:横坐标列名
    y:纵坐标列名
    shade：是否使用阴影
    hue:不同类别对应的column名字====>对应不同的色调
    kind:不同种类的图，包括{ “scatter” | “kde” | “hist” | “hex” | “reg” | “resid” }
    fig_x:图的长
    fig_y:图的宽
    fig_title:图的标题

    '''

     #设置画布大小
    plt.figure(figsize=(fig_x,fig_y))
    # 添加标题
    if fig_title:
        plt.title(fig_title)

    sns.jointplot(data=data,x=x,y=y,hue=hue,kind=kind)
```

In [28]:

```
draw_jointplot(df_sample,x='bmi',y='charges',kind='resid')
```

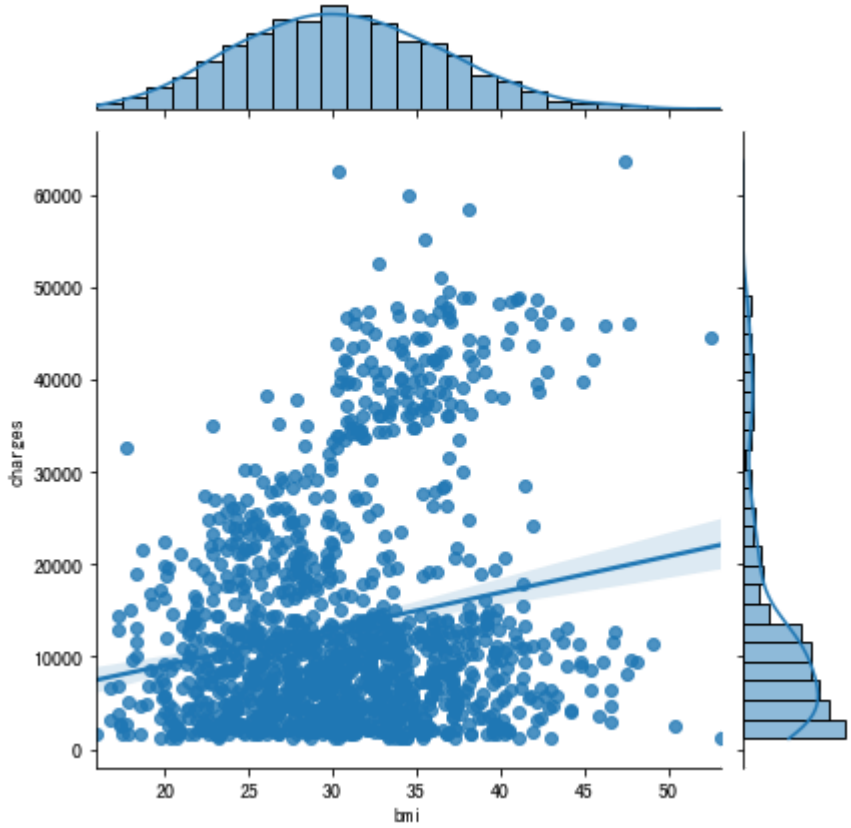
```
<Figure size 720x720 with 0 Axes>
```



In [29]:

```
draw_jointplot(df_sample,x='bmi',y='charges',kind='reg')
```

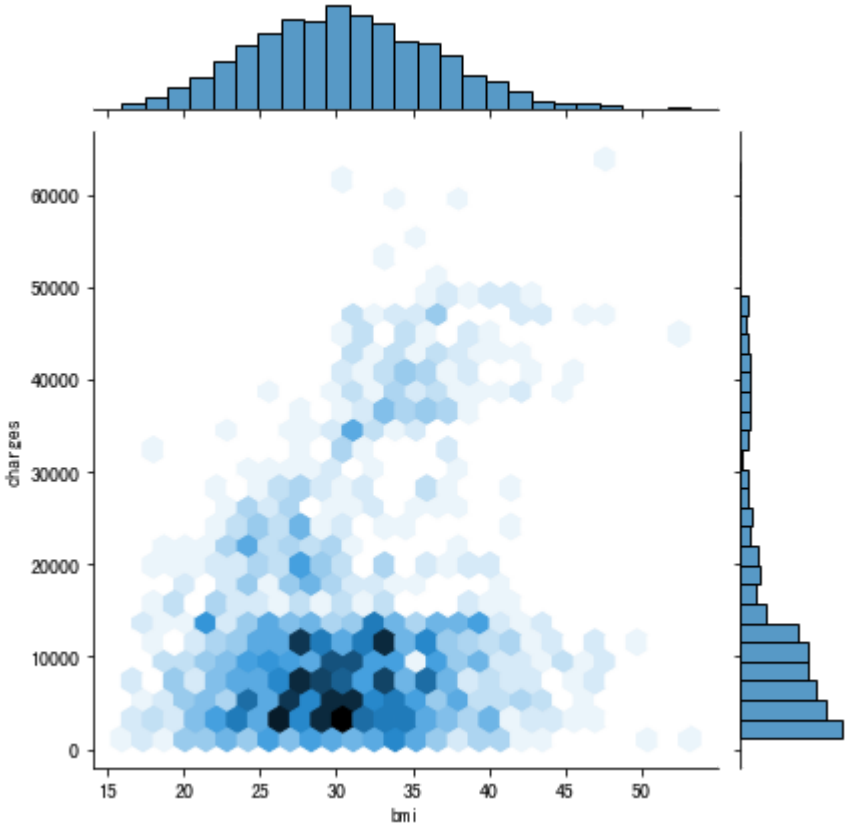
```
<Figure size 720x720 with 0 Axes>
```



In [30]:

```
draw_jointplot(df_sample,x='bmi',y='charges',kind='hex')
```

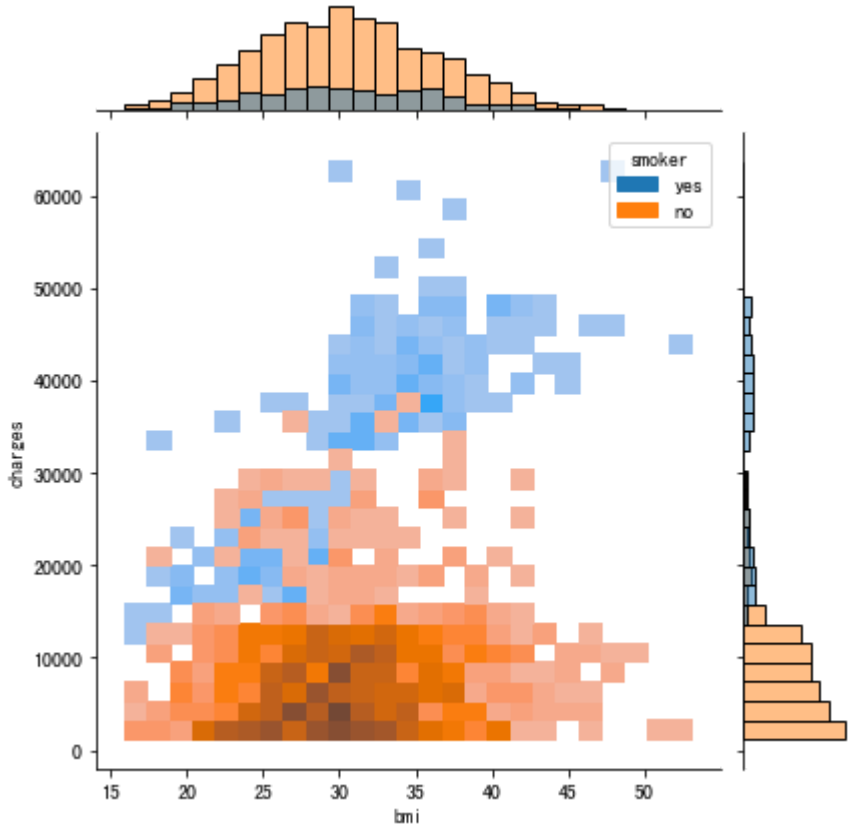
```
<Figure size 720x720 with 0 Axes>
```



In [31]:

```
draw_jointplot(df_sample,x='bmi',y='charges',hue='smoker',kind='hist',fig_x=15,fig_y=15)
```

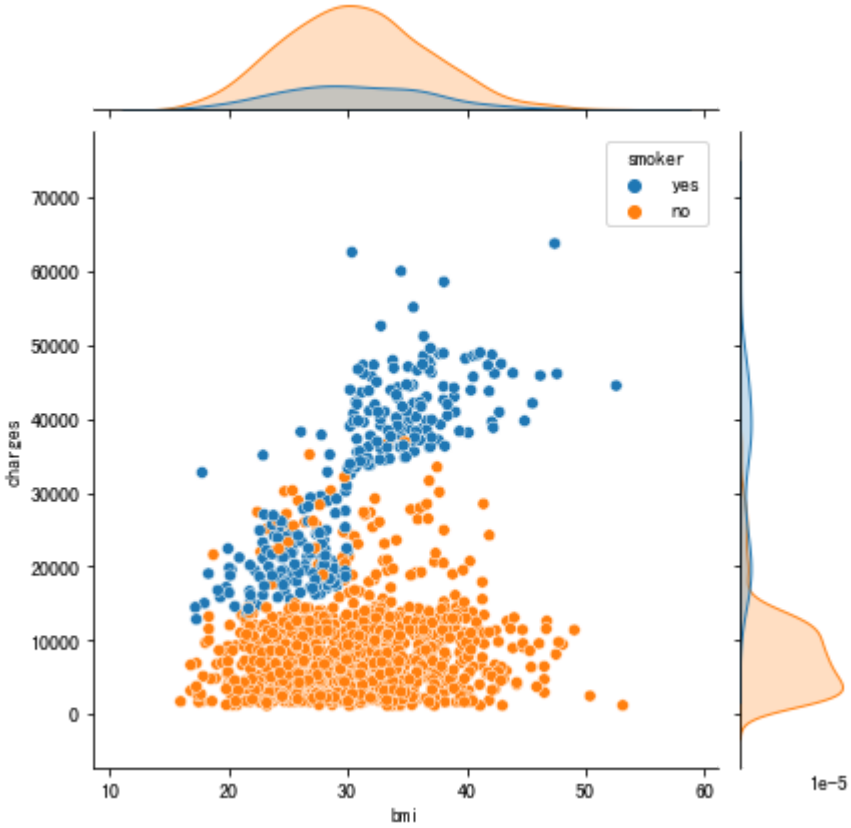
```
<Figure size 1080x1080 with 0 Axes>
```



In [32]:

```
draw_jointplot(df_sample,x='bmi',y='charges',hue='smoker',kind='scatter')
```

```
<Figure size 720x720 with 0 Axes>
```



In [ ]:

In [ ]: