# 中国大学生计算机设计大赛 上海第二工业大学

面向统计学的数据计算可视化分析平台

作者: 王贤安 唐振川 李辰彦 何秀敏 张倬诚

指导老师: 朱丹丽 于程程

演示: 王贤安



## CONTENTS

## 

统计学分析平台的作用,统计学分析数据可视化的意义

## 02 模块简介

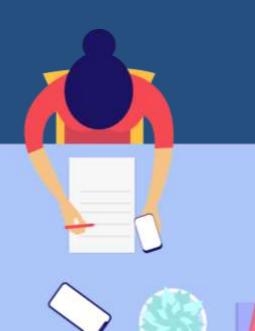
一共分为七个模块,分别代表七个网页, 主页和相应的六个功能,不断更新中

## 03 功能实现

功能:判别分析,一元回归分析, 多元回归分析,逻辑回归分析、支持向 量机分析、机器学习案例

# (1) (1) (1) (2) (1)(2) (1) (1)(3) (1) (1)(4) (1) (1)(4) (1) (1)(4) (1) (1)(4) (1) (1)(5) (1) (1)(6) (1) (1)(7) (1) (1)(8) (1) (1)(9) (1) (1)(1) (1) (1)(1) (1) (1)(1) (1) (1)(1) (1) (1)(1) (1) (1)(2) (1) (1)(3) (1) (1)(4) (1) (1)(5) (1) (1)(6) (1) (1)(7) (1) (1)(8) (1) (1)(9) (1) (1)(1) (1)(1) (1) (1)(1) (1) (1)(1) (1) (1)</

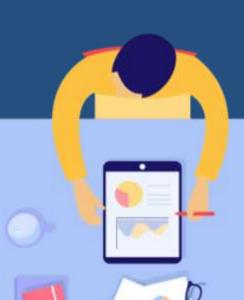
基于Web.py框架的后端,bootstrap框架的前端,部分前端使用JavaScript辅助 计算











# 平台创意

专业课课程《统计学基础》 A platform for visualizing the statistical calculation and analysis process.



## 设计创意

当我们在做统计学数据分析 的题目时,我们会发现.



### **☆ 痛点1:**

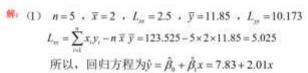
统计学公式记不住



(4) 別量上海市1~1 世里改的平均体量、保到政策如下。

年龄2,《少》	1.0	1.5	2.0	2.5	3.0
体置y, (kg)	9.75	10.01	12.67	12.80	13.74

- 说  $y_i = \beta_0 + \beta_1 x_i + \varepsilon_i$  ,  $\varepsilon_i \sim N(0, \sigma^2)$  , t = 1, 2, ..., 5 ,  $\varepsilon_1, \varepsilon_2, ..., \varepsilon_3$ 相互独立。
- 宋· (1) 月, 月 的基小二项估计 月, 月 :
  - (2) 驻差平方和 33。,估计的标准差 6 ,将本报关至数 7 。



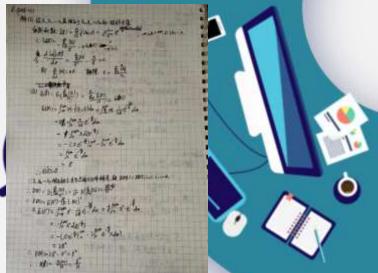
(2) 
$$SS_g = L_{xy} - \hat{\beta}_1 L_{xy} = 10.173 - 2.01 \times 5.025 = 0.07275$$

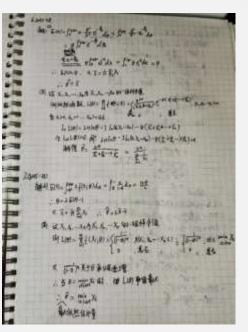
$$\hat{\sigma} = \sqrt{\frac{SS_e}{n-2}} = \sqrt{\frac{0.07275}{5-2}} = 0.1557 \quad r = \frac{L_{v_0}}{\sqrt{L_{xx}L_{v_0}}} = \frac{5.025}{\sqrt{2.5 \times 10.173}} = 0.9964$$

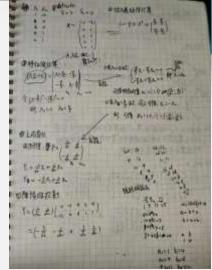
### 痛点2:

统计学分析数据计算复杂, 做题时,无法精确定位错 误

## 该怎么办呢?





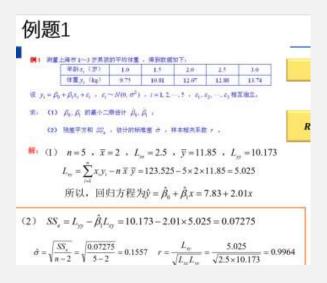


## 设计创意



### 设计思路:

- 1.自动提供计算思 路
- 2.根据需求提供计 算过程及结果
- 3.可视化展示



## ₩ 解决方案:

在网络平台上进行统计学计算,即可获得对应的<mark>公式与运算过程、计算结果</mark>即:

#### 统计学数据分析可视化平台

#### 一元线性回归分析



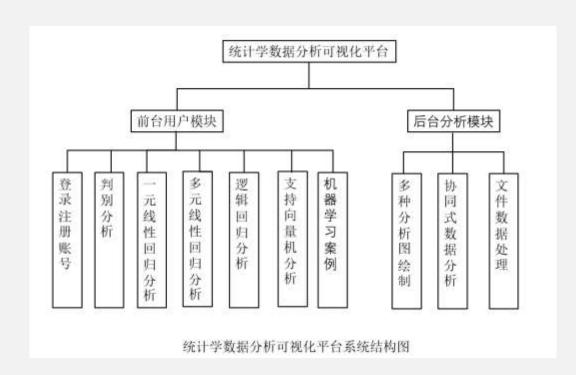
## 面向统计学的数据计算可视化分析平台

# 模块简介

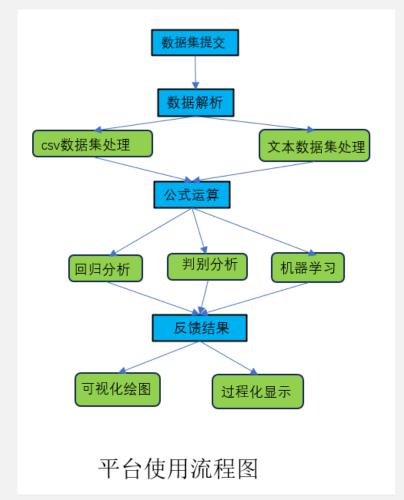
平台具有的功能,网页呈现. 目前一共分为七个模块,分别 代表七个网页,即主页和相应 的七个功能







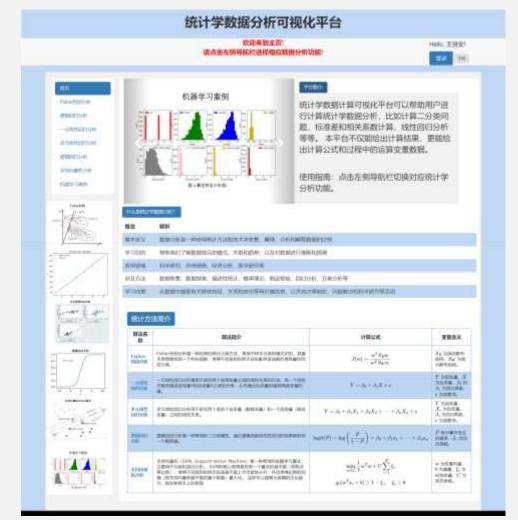
• 系统结构与使用流程





- 登录账号
- 跳转页面
- 系统介绍

主界面=系统简介+操作指南



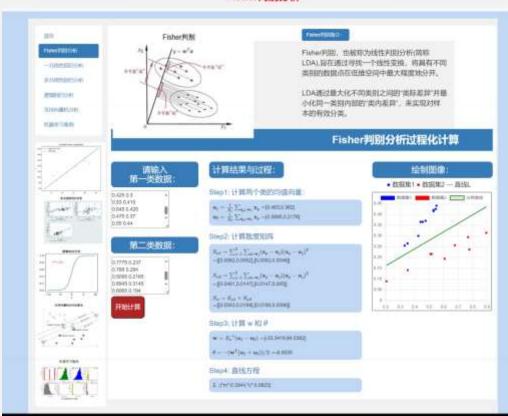
### 主界面截图



#### 统计学数据分析可视化平台

#### Fisher判别分析





### FISHER判别分析主界面

Fisher判别,也被称为线性判别分析(简称LDA),旨在通过寻找一个线性变换,将具有不同类别的数据点在低维空间中最大程度地分开,实现对样本的有效分类。



FISHER判别分析计算界面

输入数据集

统计学

后台计算分析

可视化

公式结果

绘制图像



### 逻辑回归分析主页图



数据矩阵

标签向量



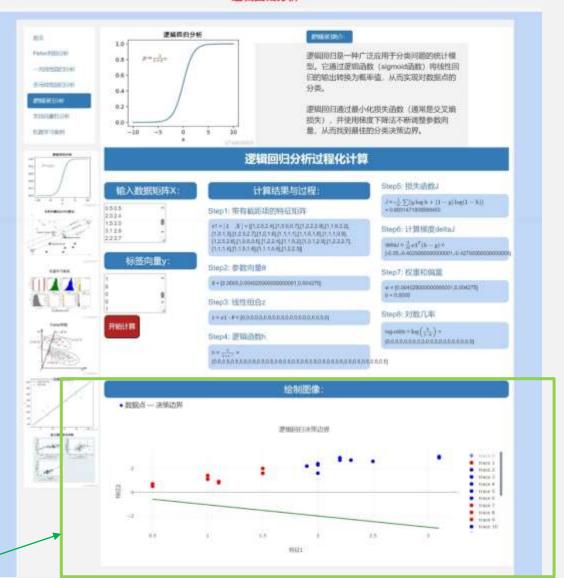
对数几率

• 逻辑回归

PlotlyChart绘图

### 统计学数据分析可视化平台

#### 逻辑回归分析





## 支持向量机分析主页图

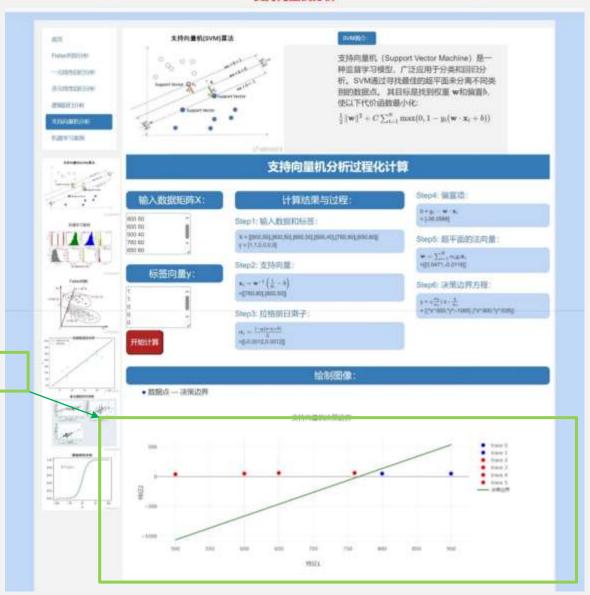


支持向量机 (Support Vector Machine)

可读性进一 步增强

#### 统计学数据分析可视化平台

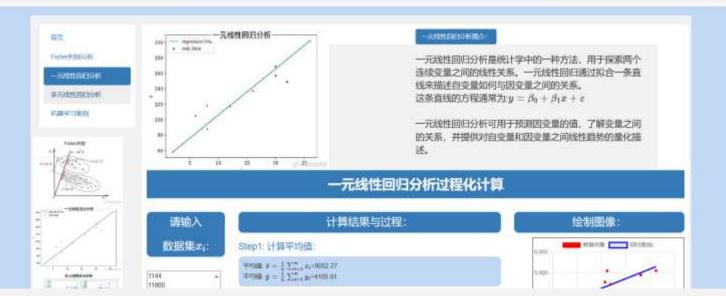
#### 支持向量机分析





### 统计学数据分析可视化平台

#### 一元线性回归分析



### 一元线性回归分析主页图

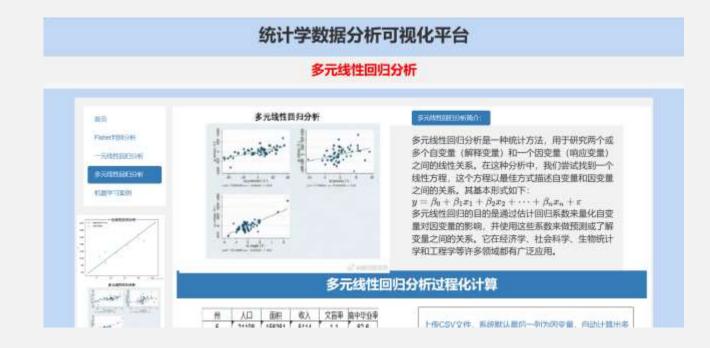
### • 描述:

- 一元线性回归分析是统计学中的一种方法,用于探索两个连续变量之间的线性关系。
- 一元线性回归通过拟合一条直线来描述自变量如何与因变量之间的关系。



- 自动调节刻度
- · 红点蓝线





## 多元线性回归分析界面

(CSV表格分析)

• 多元线性回归分析研究的线性关系与一元线性回归类似,同样是拟合直线,但是 其比一元线性回归方程需要更多自变量,因此计算复杂度更高,本系统采取csv文件分析。



文件上传

后台计算

输出结果





- 鲍鱼机器学习案例,使用鲍鱼各项物理测量(如长度、直径等)进行机器学习训练,以预测其生物年龄。
- 此界面体现出本系统高聚合、低耦合,要增添新功能稳定且操作简单。



· 下载数据集

• 下载学习模型

机器学习: 鲍鱼年龄预测

输入编号

读取数据

调用数据库

机器学习

预测结果



## 面向统计学的数据计算可视化分析平台



查看历史记录

# 功能实现

实现具体的功能,需要网页与用户 进行交互,用户输入数据即可实现 计算分析。

具体运行过程可参考程序演示视频



# 技术手段

基于Web.py框架的后端, bootstrap框架的前端,部分前端 使用JavaScript辅助计算



```
import meb
 import pynysgl
 import tempfile
 import csv
 from sklearn import metrics
 from sklearn_linear_model import LinearRegression
 import joblib
 import json
 import numpy as np
                                                                                                            页面美化
 import pandas as pd
 import statsmodels.api as sm
                                            web.py框架
                                                                     [ / ]
                      服务端构建依赖于Python的web.py框架
                                             数据库MySQL5.7
                                                                                         |E ~7
                                                                                       关键词
                                             公式使用Math Jax
                                                                                                               *script>
                                                          复杂的公式呈现
<div id="step1" >
   <h2 class="text2">Step1: 计算两个类的均值向量: </h2>
   \( \mathbf{u}_1 = \frac{1}{N_1} \sum_{\mathbf{x}_p \in \mathbf{w}_1} \mathbf{x}_p = \)<span</pre>
   \ \ \mathbf{v}_2 = \frac{1}{N_2} \sum_{\mathbb{X}_p in \mathbb{X}_2} \mathbf{w}_2} \mathbf{x}_p = \) < pan id="u2Result"> 
</div>
```



if (dutaset), length \*\*\* 0 || dataset2, length \*\*\* 0 || dataset1, length !\*\* dataset2, length]

glert('Please enter an equal number of valid values in both datasets,');

Patient



### 公式使用Math Jax

### 复杂的公式呈现与绘图

```
op class inflorent NV (setter(d)1 - (tracilids.i) (setter(d)2 (pr (setter(d)3 (setter(d)3 - (trace))))
                                                  servici (sertrafis) 2 - \frac(1)-00.25 \sum_(varrafis) p \psi (sertrafis) 2) \textsoris) p \(\sum_(varrafis) p \)\constant(v) \(\sum_(varrafis) p \)\constan
          HOLE TO LIGHTLA
                                        th2 =lase='text1'rdtep2; 計算數規矩阵+/h2+
      *p (\aux-\n(t)\matter(a) = \n(\aux-\n(t)\matter(a) \) (in (\n(\aux-\n(\aux)\matter(a)) (in (\n(\aux+\n(\aux)\matter(a))) (\n(\aux+\n(\aux+\n(\aux)\matter(a))) (\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(\aux+\n(
      mrser-(C.S.SS = \max.tj-i3*G) \max.ContrafG() \in \maxrer(i) \land \maxrer(i) \maxrer(i)
      survium-A) S_a =0,(sd) + 5,(sd) \) surv\(= \) copen id="inHauththe/spame/go-
          NAME OF
                note invistage?'s
                                           · 中立 、channe "trott?" ofteph: 分類 * 取 なく \theta \Jv/52*
                              or classification of the control of 
                                     encylor distribution (Quantific and Annie and 
          wate terminates of
          中日 chase-"text2"-theps: 直接力程s/hgs
          op stans-raytomestratt tittesom intrimunttrac/opena/go-
          4/3300
Malle
```

### 公式可视化

#### IT SEEL CATHERESE SHOW AND A the trips of formal of the confinement and the confinement of the conf ear and a Seth.max(.../stanet]. - ret(deteart)). - (print a) mast. rll; ser limitary . I so mist, at result, i.e. a said a result, i.e. by ser landed + ( so mal), ye resultable + mal + condition by ser ats a deciment, millionerity Dill'selliert 3, publicorant ("26"); willies AyChart I see Chartfirth, & tupe: Capatter. data) ( deterrine (4) Limits remest. date: debesett, huntgrandCxtart "Kbac" best 'sam'. dried submertly packgroundstart Fed? 1.1 tends "HERE" date: Directors, morrell, time: "tim", bookelide: 'green', broketutt: 2, CITTLE CALLS. smother: tree. potential a estrone: E mater: I arrid. tape: "Lame", printing "better! el t Segunktiens: true

### 数据可视化

### ● 数据集1 ● 数据集2 — 直线L 数据集1 ● 数据集2 □ 公类直线 0.45 0.45

绘制图像:

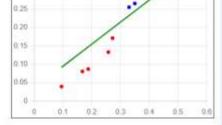


Chart.js

#### Step1: 计算平均值:

```
学的的 \bar{x} = \frac{1}{\pi} \sum_{i=1}^{n} x_i = 9002.27
学的的 \bar{y} = \frac{1}{\pi} \sum_{i=1}^{n} y_i = 4165.91
```

#### Step2: 计算相关系数:

```
新的方式 L_{xx} = \sum_{i=1}^{n} (x_i - \bar{x})^2 = 457836460.16
外的方式 L_{yx} = \sum_{i=1}^{n} (y_i - \bar{y})^2 = 6665166.91
协方式3 L_{xy} = \sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y}) = n\bar{x}\bar{y} = 42664314.27
```

#### Step3: 计算估计参数:

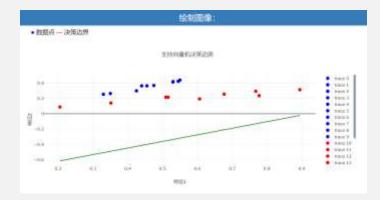
$$\begin{split} (\hat{\vec{\beta}}) &= \frac{\sum (r_1 - \hat{x})(g_1 - \hat{y})}{\sum (r_1 - \hat{x})^2} = \frac{\sum x_{1|0} - x\hat{x}\hat{y}}{\sum (r_1 - \hat{x})^2} = 0.08\\ \hat{\beta}_0 &= \hat{y} - \hat{\beta}_1 \hat{x} - 3323.27 \end{split}$$

#### Step4: 直线方程

Ly=0.09360319170853636\*x+3323.267631005653

#### Step6: 误差分解

```
報題事方的: SS_r = L_{to} - \beta_1 L_{to} = 972930.28
(法計句報題: \dot{\sigma} = \sqrt{\frac{\sum_{n} - (r_n)^2}{n + 1}} = 328.79
相关系数: r = \frac{\sum_{n} (r_n + 0) r_n + 1}{\sqrt{\sum_{n} (r_n + 0) r_n + 1}} = 0.90
決定系数: R^2 = \frac{42\pi}{n} = \frac{12\pi}{n} = 0.80
```



Plotly Chart



### 前后端协同计算

### 后端Python库, 前端JavaScript

```
ctqtrom>
document,getElementSyld("inputForm").addEventListener('submit', function(event) (
      event.presentDefeutt();
       var datal = document.getflementById('Matal').value.split('\n').map(x => x.split(' ').map(Number));
       var dsta2 = document.getflementByfo('data2').value.splitf'\n').map(x => x.splitf' ').map(Number));
       // 任年 ADAX 建石炭油油口
       var xhr = new XMLHttpRequest();
       shr.upeo('POST', '/ralculate', true);
       shr.tetRequestReader['Content-Type', 'application/jesn');
       ahr, unresdystatechange = function () (
          if (khr.commyState == 4 && shc.status == 200) {
               var result = 350N.perse(whr.responseText);
               war dataset1 = date1.map(function(point) { return { a: point[0], y: point[1] }; });
               ver dataset2 = data2.map(function(point) ( return { s: point[0], y: point[1] }; ));
               // HESSENSEFFERS
               document.getElementById('w1Result').textContent = 350W.stringify(result.u1);
               Hocument.getElementHyId('u2Result').textContent * JSOW.atringify(result.u2);
               document.getflementfly3d('51Result').textContent = 350W.stringify(result.51);
               document.getflementHyId('S2Result').textContent * JSON.atringify(result.$2);
               document.getElementHyTd('laResult').testContent = JSDN.stringify(result.Se);
               document.getElementById('eMeault'),textCentent = JSOW.stringify(result.w);
               document.getFlementByTd('thetaResult').textContent = JSDN.stringify(result.theta);
               document.gotElementById('LResult').textEuntent = JSDW.stringify(result.L):
           7/ 前原數小次數次x 查计表直接的数式均差点
           ver sink = Math.sin(...datecetl.concat(datecetl).mep(opint => point.x)):
           ver waxX = Math.max(...detsnet1.cuncst(deteset2).map(ppint => ppint.x));
           wer lineStart = { a: minX, y: result.L.m * minX * result.L.c };
           war linefind = { st mank, wt result.L.m * mank + result.L.c };
           wer cts = document.getElementById('myChert').getContext('2d'):
```

前后端协同运算

```
class Calculate:
    def POST(self):
        data = json.loads(web.data())
        coordinates1 = np.array(data['coordinates1'])
        coordinates2 = np.array(data['coordinates2'])
       u1 = np.mean(coordinates1, axis=0)
        u2 = np.mean(coordinates2, axis=0)
        $1 = np.cov(coordinates1, rowvar=False)
        S2 = np.cov(coordinates2, rowvar=False)
        SW = S1 + S2
        reg_lambda = 1e-5
        Sw_reg = Sw + np.eye(Sw.shape[0]) * reg_lambda
        w = np.linalg.inv(Sw_reg).dot(u1 - u2)
        theta = -0.5 * np.dot(w.T, (u1 + u2))
        m = -w[0] / w[1]
        c = -theta / w[1]
        result = {
            'u1': u1.tolist(),
            'u2': u2.tolist(),
            'S1': S1.tolist(),
            'S2': S2.tolist(),
            'Sw': Sw.tolist(),
            'w': w.tolist(),
            'theta': theta,
           'L': {'m': m, 'c': c}
           \#'y = \{L.m.toFixed(2)\}x + \{L.c.toFixed(2)\}';
        web.header('Content-Type', 'application/json')
        return json.dumps(result)
```



### 多种计算模型

### 判别分析, 回归分析, 机器学习

```
class Calculate:
   def POST(setf):
       data = jsun.loads(meb.data())
       coordinates1 = np.array(data['coordinates1'])
       coordinates2 = np.array(data["coordinates2"])
       w1 + np.mean(coordinates1, axis=0)
       u2 - np.mean(coordinates2, axis=8)
       S1 = np.cov(coordinates1, rowyar=False)
       52 - np.cov(coordinates2, rowver-False)
       Sw - S1 + S2
       reg_lambds = 1e-5
       Sm_reg = Sm + np.eye(Sw.shape[0]) = reg_lambdm
       w - np.linelu.inv(Sw_reg).dot(v1 - v2)
       theta = -0.5 * np.dot(w.T. (u1 + u2))
       m + -m[0] / w[1]
       a - - theta / w[1]
       result = (
            '01': 01.tolist();
            'U2': U2.tolist(),
            '31': SI.telist(),
            '82!: $2.telist(),
            'Bw': Bw.tolist(),
            'm': w.tolist(),
            "theta': theta,
            "L': {'H': N, '0': 0}
           # y = ${1.0.toFleed(2)}* * ${1.0.toFleed(2)} ;
        web.Reader('Contact-Type', 'application/jsun')
        return [sen.dumps(result)
```

Fisher判别分析代码节选

```
class tglosacts;
                               a - sekingundenville-(1)
                                if mortile' set in a se not al'ambile fatilement
                                               Petro 1448HEER- WENTSCHOOL
                                conflic - el covido l'fite
                                of * sd.read.cov[revfile)
                                x v or that the real
                                v = mt.s'tee[:. -1]
                                  X = am.add.cohktast(30)
                                model o encircity, theretal
                                predictions - month predict(x)
                                sgnation\_terms = \{f(z, z)\}^*, format(most)\_permex[asset]\} + \{f' + \{z, zf\} + i\}\}^*, format(perms_2+i) + f' + i + i + if' + i\}\}^*, format(perms_2+i) + f' + i + i + if' 
                                equation = "Y = " + " ", (sinceparties, terms)
                                                    'summary' model.commery().ak_tect(),
                                                     prediction: prediction.tellett).
                                                     "Revention": Revention
                                  sea header("factort-Type", "egglication/jour )
                                  return year, mean(resett)
```

### 多元线性回归分析代码节选

```
mount antiquoristal parties 7,000 (solutional lateir, feldicinal) (
       med accombination to automorphism.
         per missers a proposition open per constitute setter trained
        or bishoot, hepti ere titt delasti, hepti ere till sebasti, hepti te sesset hepti ti
                signed the property of
        mount, prillips of a party of a large party of a property of the a for a party of
        mount, prince out of result 1, store Angles 1, these
         servers and provided specifications a commission to a pay of posts.
        mount administrately care because to recommend a security and reported
         mount action of the Continues a recommendation of the continues.
        modest, better constitution in the historian A representation of the order
         decrees professional Canal Consultation Congruencement stage, of confi
         Bouser, artifice energy by heren't hermatient it menousements broken, no country
        manner, artificial for Landanian a parameter of the infrastilla
         According to the complete many of the property of the complete of the complete
         moment, printing officer = 3 (buttories, * cappointment, A. Arrico (D.
        design of the second of the Transferror of the second section of the second
         we are a second professional layer to promote the be-
```

### 一元线性回归分析代码节选

```
fram salearn import metrics
free ablears these mont toget theerworks to
trains, trains = [], []
fekj v spec("f"/\Geldfish_rax", "r", encoding="orF-8")
reader - pay, reader ( food)
for this resident
   t a (disstitt) for the sa ti.
   trains,append[t[1:-1]3
   traiss.append[t]-(1)
fishj.rtese()
madel . LinearRegression()
model firstrains, trainy)
justice sump(model, "in.model.")
print("WESSEL", mainlinest, 3
tests - {{1, 0.400, 0.000, 0.000, 0.000, 0.014, 0.1000, 0.101, 0.101,
        [I, P.64, 0.565, 0.122, 0.216, 0.2105, 0.514, 0.350]]
pres - seekl.predictitestX)
ever_receded-Iroundip, 2) for a lo great
print("MAKE;", pred)
```

### 机器学习模型代码节选

```
for _ is range(iterations);
   g = sp.dot(ul. theta)
   r = ep.clus(r, -10000, 10000)
   h = 1 / (1 = np.exp(-z1)
   h = ep.olipCh, le-18, 1 - 1e-101
   J = -1 / n + (np.det(y, np.leg(h)) + np.det((1 - y), np.leg(1 - h)))
   deltal = 1 / s + ng_dot(s1.1, (h - y))
   theta -= slatu * deltaJ
w = thetalill
B = thetaigl
leg_odds = np.legth / (1 - h))
s_boundary = np.erroy([ep.min(Rf:, 81), np.max(Rf:, 8331)
x_boundary = -(w[8] + x_boundary + b) / w[1]
sectationSoundary = [f's': flost(x_boundary[8]), 'y': flost(y_boundary[8])),
                   ('s': flost(x_boosfary[1]), 'y': flost(y_boundary[1])}]
result = {
    'sl': round_to_A(sl_autype(float).tsliat()),
    'theta': roomd_to_4(theta_astype(float).tslist()),
   'z': roomi_ts_4(& axtype(flast).tslist()),
    'h': round_ts_4(h.estype(flast).tslist()).
   144
```

### 逻辑回归分析代码节选

# 总结

专业领域+程序设计=实际应用创新

### 感想:

设计扩展更多数据可视化和数学公式展示模块引入更多高级的数据分析方法学习模型。

帮助学习统计学课程,提高计算效率,学习效率!



COMPUTING

VISUALIZATION

ANALYSIS

# 中国大学生计算机设计大赛

# THANK YOU

演示ppt

面向统计学的计算分析过程可视化平台

A platform for visualizing the statistical calculation and analysis process.

