

全港首個嚴重肢體殘障人士 聲控電腦輔助軟件

First Human Computer Interface for Severely Disabled Persons — CP2Joy

FSC901C&D

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嚴重肢體殘障人士

- 殘疾程度相等於失去百分之一百謀生能力，即可被定為嚴重殘疾
 - 身體上多種不同程度的缺陷
 - 並非一定智力受損
- 符合領取傷殘津貼的資格
- 例：大腦痲痺、四肢癱瘓、肌肉萎縮



嚴重肢體殘障人士

- 香港的肢體殘障和言語障礙人士#
 - 共有約三十六萬之多
 - 只有八萬人從事經濟活動
 - 所佔比率不多於四分之一



嚴重肢體殘障人士面對的挑戰

- 賴以社會福利補助制度為生
- 靠其他家庭成員分擔生活開支
- 嚴重影響學習進度和能力
- 難在職場上謀生

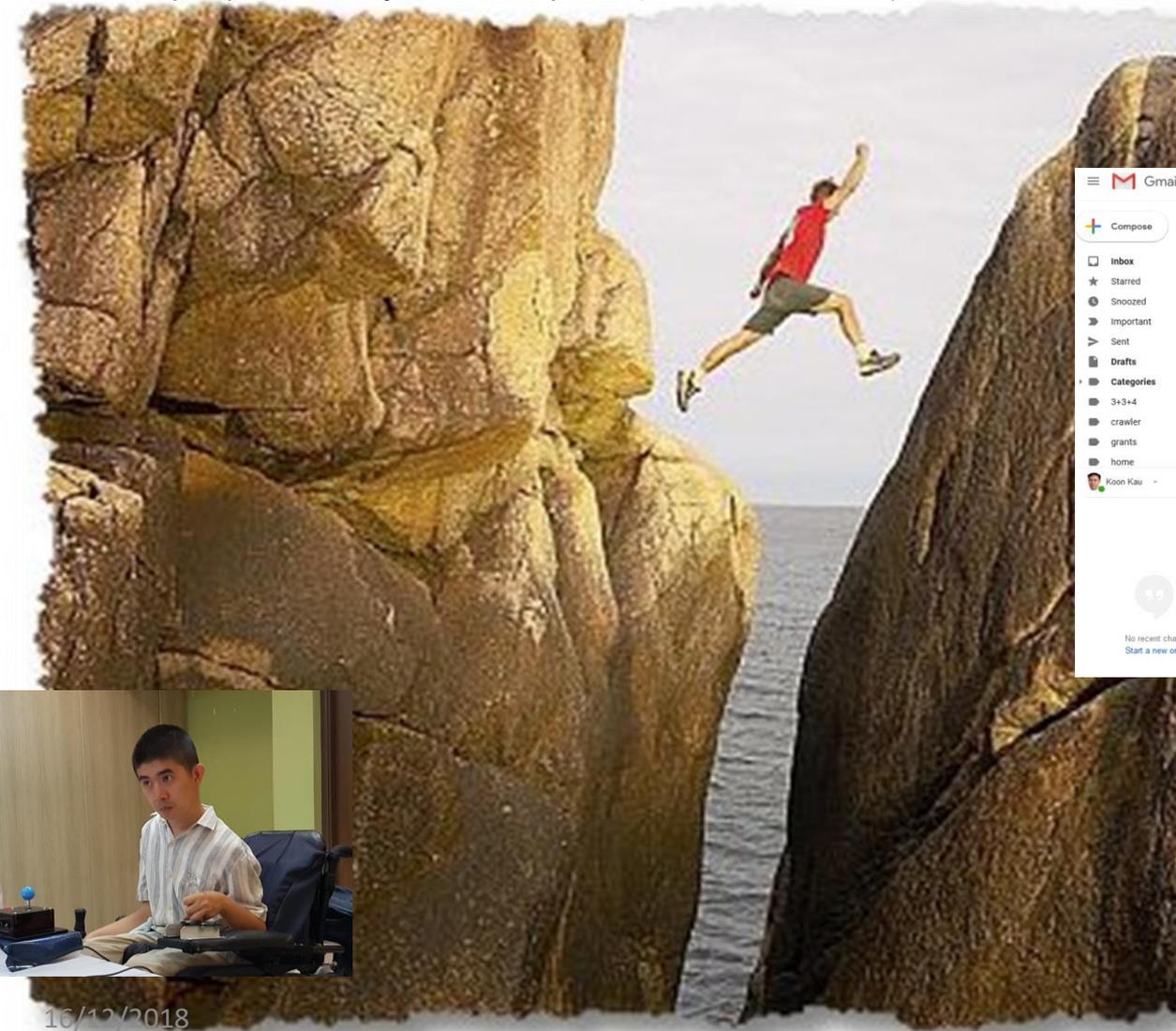


嚴重肢體殘障人士例子

- 浸大高級信息系統理學碩士生張世豪患有大腦麻痺症
- 體能只有健全人士五分之一
- 只有右手一隻手指能打字



弱勢社群數碼鴻溝



16/12/2018

HKBU moodle English (en)

COMP7460 (1) [2017 S2]

- Participants
- Badges
- Competencies
- Grades
- HKBU Moodle
- Dashboard
- Calendar
- Private files
- My courses
- COMP GRF proposal
- COMP2018 (1) [2018 S1]
- COMP4888 (1) [2018 S1]
- COMP7080 (1) [2018 S1]
- COMP4057 (1) [2017 S2]
- COMP4889 (1) [2017 S2]
- COMP4899 (1) [2017 S2]

COMP7460 MSc Practicum for Information Systems (Section 1) [2017 S2]

HKBU Moodle / My courses / COMP7460 (1) [2017 S2]

Announcements

- First Progress Report (Draft)
- First Progress Report (Final)
- Second Progress Report (Draft)
- Second Progress Report (Final)
- Third Progress Report (Draft)
- Third Progress Report (Final)
- Final Report (Draft)
- Final Report (Final)

Topic 1

Hidden from students

Topic 2

Hidden from students

Gmail

Compose

Inbox 2,762

Starred

Snoozed

Important

Sent

Drafts 132

Categories

- 3+3+4
- crawler
- grants
- home

Koon Kau

Inbox

- Jean, Zhou, Byron 8: COMP1006: Individual reports - FW: COMP1006: Individual COMP1006_Ex...
- Jean, Byron 3: COMP1006: individual reports - Re: COMP1006: Individual i
- Ming, Byron, Jean 3: Fwd: Individual Report for COMP1006(15219194 Lee Ming Lee_Ming_Fung_...
- Jean Lai: FW: about the individual report - jeanlai@Comp.HKBU.Edu.
- Ka.. Zhou, Byron 25: COMP1006 - invitation to collaborate - Re: COMP1006 - Inv
- Yuhong, Byron 2: Re: COMP1006 (1) [2016 S1]: PFT for tomorrow's session - Mobile payment...
- CFQ Administrator: Participation Rate in the Course Feedback Questionnaire (C
- Ming Chung LAU: Submission of COMP1006_Session20002_Topic3_Individu COMP1006_Se...
- Do not reply to thi. 43: Submission made to assignment - the class COMP1006 Fa
- Do not reply to thi. 6: Submission made to assignment - the class COMP1006 Fa
- Do not reply to thi. 4: Submission made to assignment - the class COMP1006 Fa
- Do not reply to thi. 2: Submission made to assignment - the class COMP1006 Fa
- Yatao, Byron 2: About Content in Individual Report - important to Comp100

```

/**
 * this procedure computes a Directed Acyclic Graph ---- shrink the Strongly Connected Component
 * @param graph
 * @return
 */
public cg.graph sccM(cg.graph graph){
    StrongConnectivityInspector<String, edge> sccIn = new StrongConnectivityInspector<String, edge>(graph);
    List<Set<String>> sccsets = sccIn.stronglyConnectedSets();
    cg.graph sccOut = new cg.graph();

    int i = 0;
    for (Set<String> s:sccsets){
        String newnode = String.valueOf(i);
        sccOut.addVertex(newnode); // label the node with natural number
        for (String n:s){
            this.clusterMap.put(n, newnode);
        }
        HashSet<String> scc = new HashSet<String>();
        scc.addAll(s);
        this.sMap.put(newnode, scc); // map the scc node to a set of nodes which are shrinked to be scc node
        if (s.size() > 1){
            this.sccvset.add(newnode); // put new node in the scc node set
        }
        i++;
    }
    for (Set<String> s:sccsets){
        for (String n:s){
            if (graph.outDegreeOf(n) > 0){
                for (edge e:graph.outgoingEdgesOf(n)){
                    String end = graph.getEdgeTarget(e);
                    if (!s.contains(end)){ // get the node outside the current cluster
                        String newstart = this.clusterMap.get(n);
                        String newend = this.clusterMap.get(end);
                        edge newedge = new edge(newstart, newend);
                        if (!sccOut.containsEdge(newedge)){
                            sccOut.addEdge(newstart, newend, newedge);
                        }
                    }
                }
            }
        }
    }
    return sccOut;
}

```



坊間其他軟件

- 螢幕鍵盤
- 體感控制系統
- 鼠標眼球追蹤系統
- 健全人士以為容易的系統，對傷健人士來說
 - 對肌肉的靈活度要求高
 - 準確性不太穩定



簡介

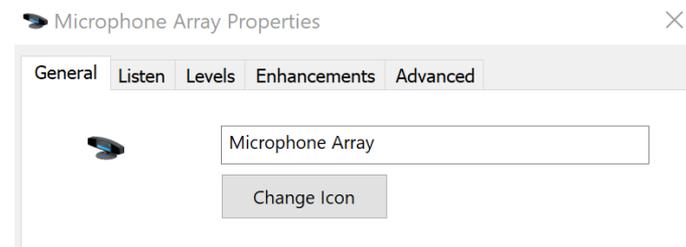
Cerebral Palsy to Joy – CP2Joy



CP2Joy運用普及的配置



- 運用普及硬件配置
 - 市場上流通的USB操控桿 (PC Joystick device)
 - 新型號的電動輪椅操控桿
 - 不需安裝任何額外驅動程式
 - 個人電腦咪高峰
- 軟件配置
 - 一般聲音辨識程序





CP2Joy軟件對用戶的要求

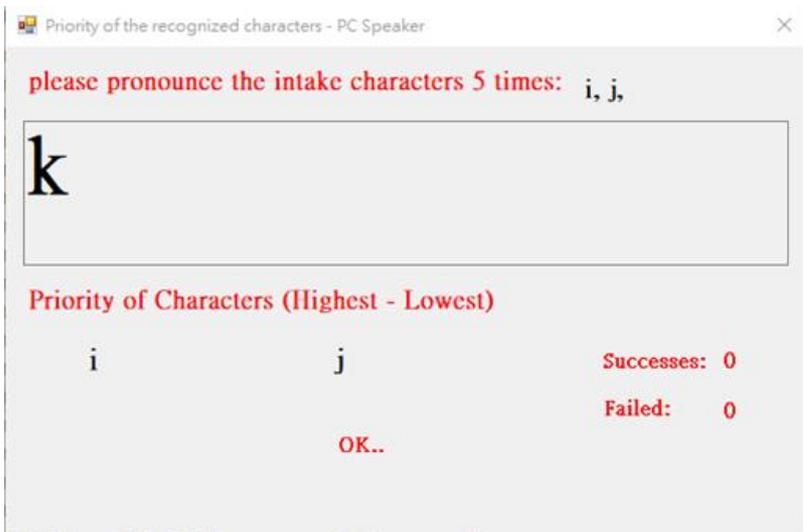
- 用者需要
 - 能夠發出幾個單音
 - “a”, “i”, “o”
 - 能夠拍打一個按鈕
- 用者不需要
 - 不斷移動雙手(肌肉活動)



功能簡介

- 功能一：自選最佳單字聲控電腦
- 功能二：滾動式選擇字母
- 功能三：跳至鼠標常用位置

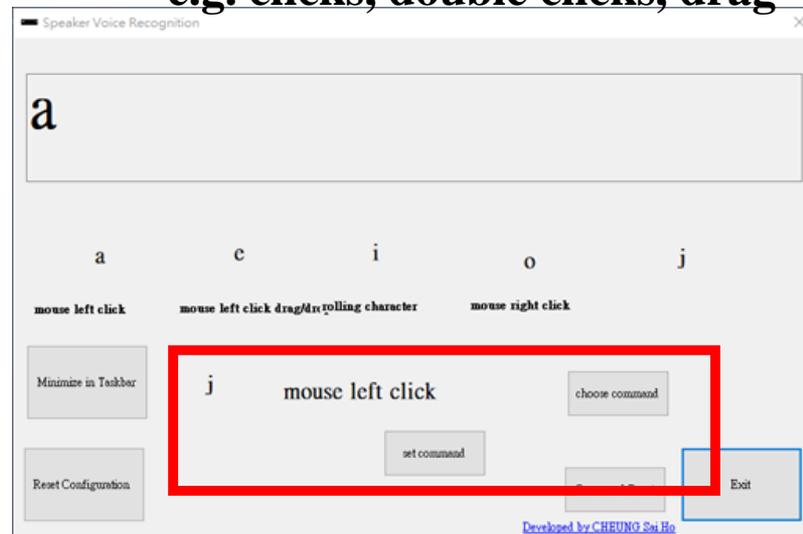
功能一：自選最佳單字聲控電腦



② Success

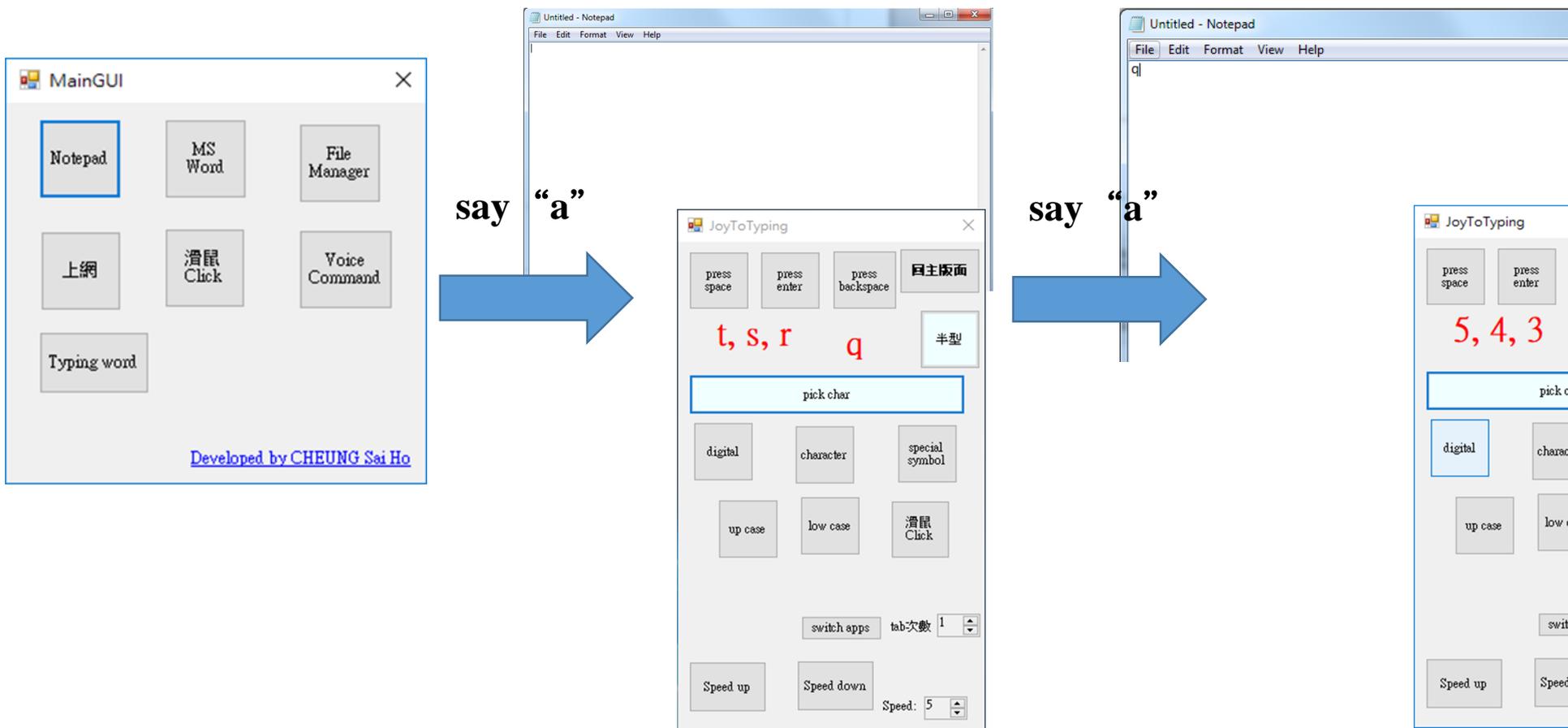
① Say “ J ” 5 times

③ Assign a command to “J”
e.g. clicks, double clicks, drag



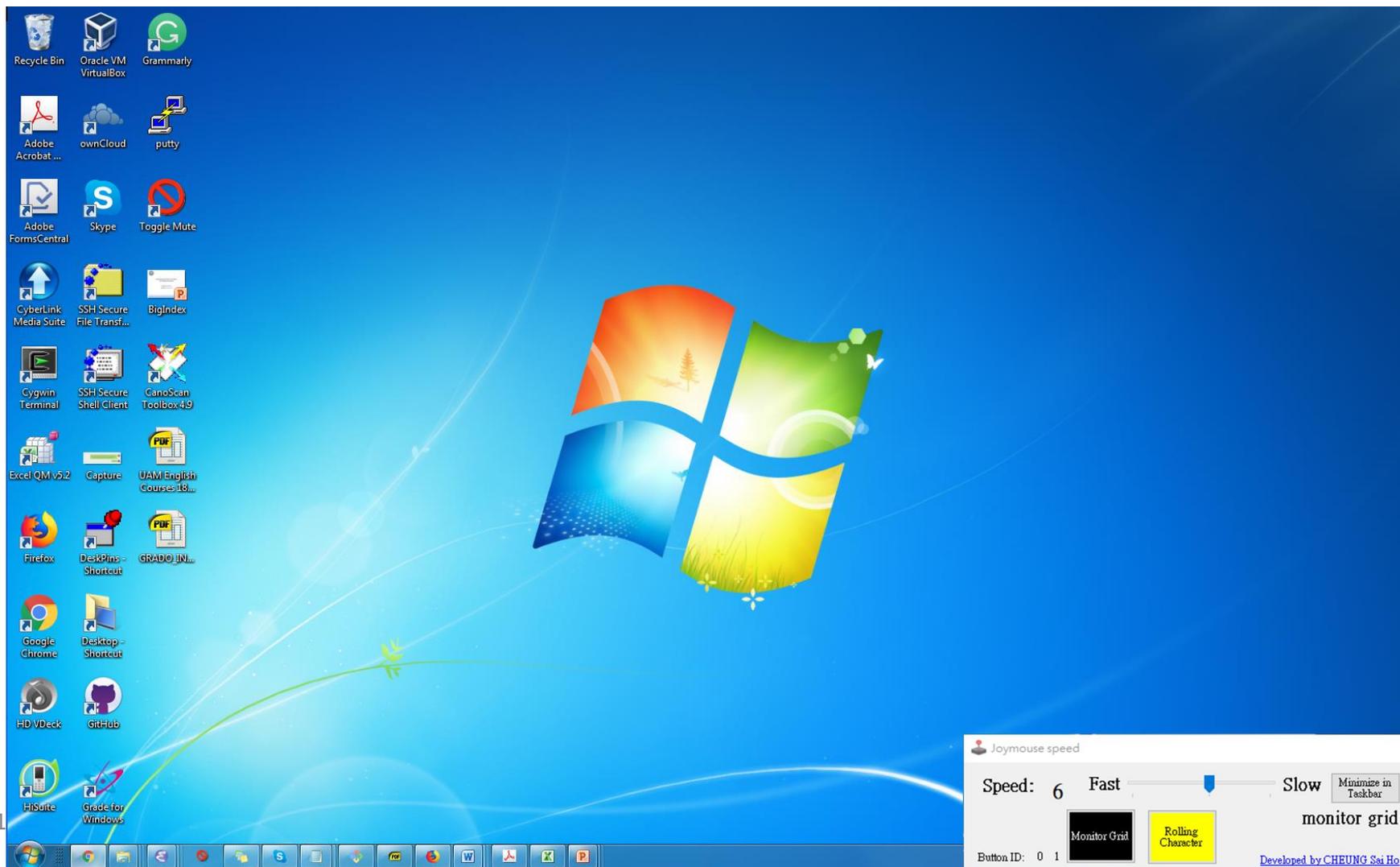


功能二：滾動式選擇字母



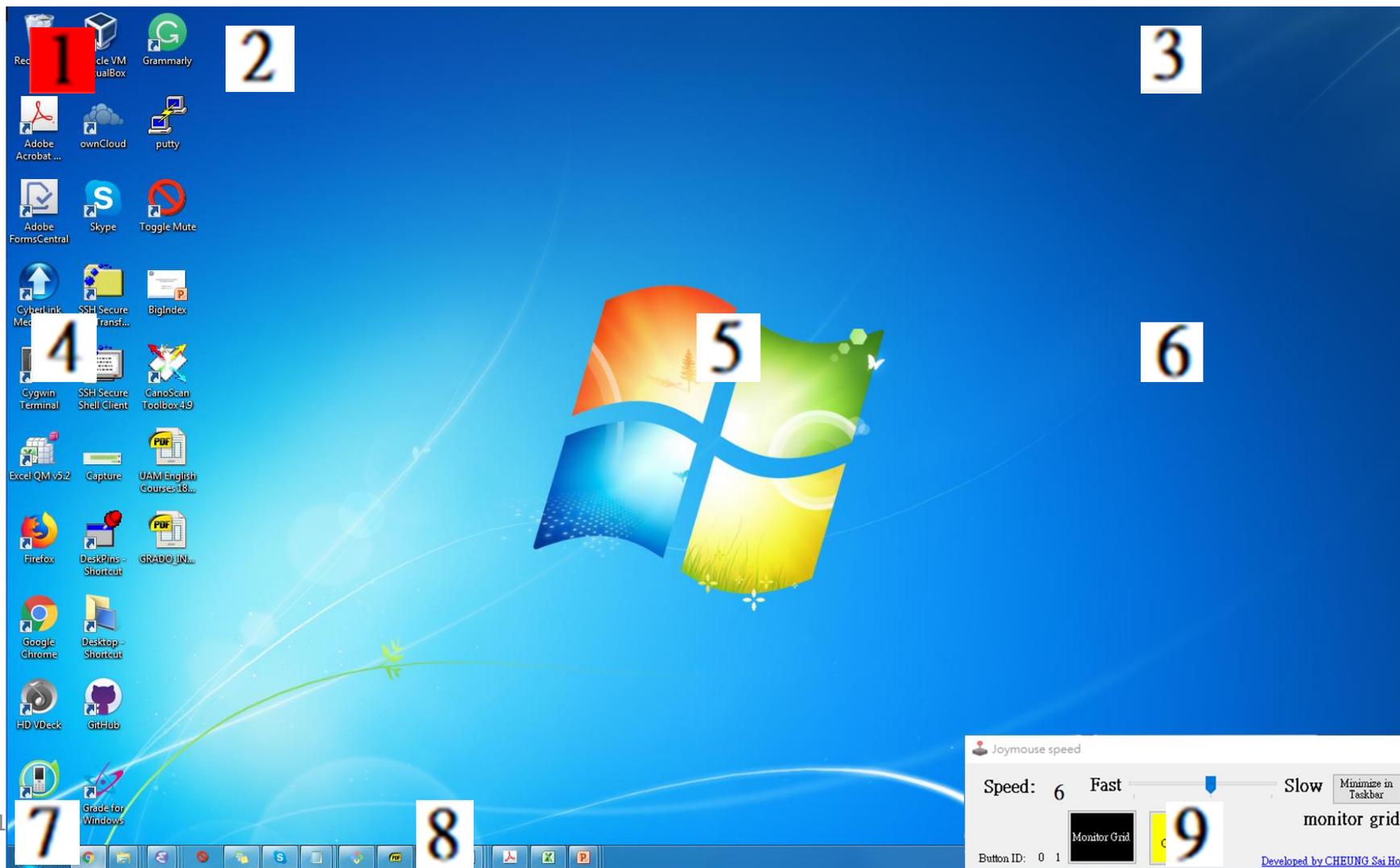


功能三：跳至鼠標常用位置





功能三：跳至鼠標常用位置





未來發展

- 正計劃籌辦一間社企，把系統商品化。



CP患者示範

- 收聽網上電台
- 英文輸入



世豪背景

- 浸大高級信息系統理學碩士生
- 社會創新及創業發展基金 (社創基金) 2018
- 香港青年協會 - 2016年青年服務大獎
- 2013-2014年香港十大再生勇士
- 香港紅十字會甘迺迪中心(JFKC)傑出校友
- 2005年尤德基金傷殘學生獎