How to filter a list dynamically while typing with LCDUI - Part 2 (Single Selection)

This article describes how to create a touch friendly incremental search UI with high level LCDUI components. This is the second of a three part article series that deal with this task. Part 2 focuses on Single Selection Lists while Part 1 and Part 3 deal with Multiple Selection Lists and CustomItem Lists respectively. There are more available options, when implementing a similar non-touch interface, such as using StringItem objects for each item on the list and setting an itemCommandListener on each of them. Doing the same however for a Touch UI with high level LCDUI components, where a single tap can capture the user's selection, restricts the developer's available options. This series of articles describe these available options and point out each option's advantages and drawbacks. Check the links at the bottom of the page for more information.

Introduction

An Incremental Search UI is a method to progressively search for and filter through text. This kind of filter-as-you-type interface is becoming popular nowadays due to the ability to provide extremely fast search results, before even typing is over. Not only does the user no longer need to type the entire search string and hit the search button, but also scrolling down through long lists becomes redundant. While eSWT provides this functionality in the form of a ShortedList with FILTER option, this cannot be implemented on low end devices, like Series 40, because eSWT is supported only by Symbian. This article describes an alternative way to create a dynamic filter-as-you-type list, by using high level LCDUI components and more precisely Single Selection Lists.

Main Components and Implementation Design for the Filtered Search

There are two main components in this MIDlet. A TextField and a ChoiceGroup of EXCLUSIVE type. Both can generate ItemStateChanged events as long as an ItemStateListener is set to the Form that contains the components. While the user types the search string in the TextField, this triggers the filtering in the list of results. If the search string matches the beginning of an item in the list, the list is updated with only the matched items, otherwise it is emptied. If the search string becomes the empty string, that means the user has deleted any previous searches and needs to start over, therefore the original list of items should be shown:

```
if(label.equals("Search"))
{
 String typedtext=searchtext.getString();
 //if the search string is not the empty string
 if(!typedtext.equals(""))
 {
  String[] newlist=FilterList(listitems,typedtext);
  //if there is at least a match
  if(newlist!=null)
   updateList(newlist);
  //if there is no match empty the list
  else
   updateList(new String[0]);
 }
 //if the search string is the empty string
 //set the list back to the default
 else
 {
  updateList(listitems);
 }
}
```

The search is non case sensitive and the results are stored in a vector. This is the code for the filtering:

```
public String[] FilterList(String[] list, String filtertext)
{
 //makes the search non-case sensitive
 String textupper=filtertext.toUpperCase();
    String textlower=filtertext.toLowerCase();
    char[] firsttext=new char[1];
    char[] resttext=new char[textlower.length()-1];
    textupper.getChars(0, 1, firsttext, 0);
    textlower.getChars(1, textlower.length(), resttext, 0);
```


(c) Copyright Nokia 2013. All rights reserved.

```
    String firstletter=new String(firsttext);
    String remainingletters=new String(resttext);
    filtertext=firstletter+remainingletters;


  Vector v=new Vector();
  String[] result=null;
  for(int i=0;i<list.length;i++)
  {
   //if the i item of the list starts with
   //the search text
   if(list[i].indexOf(filtertext, 0)==0)
    v.addElement(list[i]);
  }
  int vectorsize=v.size();
  //if at least one item is found in the list
  //that starts with the search text
  if(vectorsize>0)
  {
   result=new String[vectorsize];
   for(int i=0;i<vectorsize;i++)
   {
    result[i]=(String) v.elementAt(i);
   }
  }
  return result;
 }
```

Single Selection versus Multiple Selection List

In this example, a Single Selection List (i.e. a ChoiceGroup of type EXCLUSIVE) was chosen over a Multiple Selection List (i.e. a ChoiceGroup of type BUTTON or MULTIPLE). There are certain advantages and disadvantages for this choice. The major advantage is that, in a Single Selection, only one item can be selected at any given time. This is particularly useful in a scenario where always one item is picked from the list. While Part 1 explains, how to limit the selection to one item by adding some logic when using a Multiple Selection List, the radio-button style of Single Selection Lists predisposes the user to assuming that only one selection is required. Multiple Selection Lists are drawn with a check-box style, which implies that more than one option might be required.

The major disadvantage of using a Single Selection List, is that an additional dummy option should be added, if it is important to know the current selection state (i.e. whether the user has selected an option or not). This is because, Single Selection Lists always require that an item is selected, even if the user hasn't selected yet one. That is why, in this example, a dummy preselected option called "Make a Selection" has been added to the list. This option becomes visible only when the results of the filtering return at least one item.

The code snippet below, runs within the ItemStateChanged method, identifies the chosen item and then restores the list:

```
  //when the user selects an item
  if(label.equals(""))
  {
   int selectedindex=choice.getSelectedIndex();
   //if an item is selected
   if(selectedindex!=-1)
   {
    selectedchoice=choice.getString(selectedindex);
    //shows alert
    alert=new Alert("Info",selectedchoice,null,AlertType.INFO);
    alert.setTimeout(500);
    Display.getDisplay(this).setCurrent(alert,mainform);

    //restore the default selected option back to "Make a Selection"
    choice.setSelectedIndex(0, true);
   }
  }
```

Part 3 of this series of articles describe an alternative solution to the problem of taping and selecting instantly an item from the filtered list, without having to use a dummy radio-button-like preselected option or without having to draw a check-box-like multiple selection list. See the links at the bottom of this page for more information.

The MIDlet's code

```
import java.util.Vector;
import javax.microedition.lcdui.Alert;
import javax.microedition.lcdui.AlertType;
import javax.microedition.lcdui.ChoiceGroup;
import javax.microedition.lcdui.Command;
import javax.microedition.lcdui.CommandListener;
import javax.microedition.lcdui.Display;
import javax.microedition.lcdui.Displayable;
import javax.microedition.lcdui.Form;
import javax.microedition.lcdui.Item;
import javax.microedition.lcdui.ItemStateListener;
import javax.microedition.lcdui.TextField;
import javax.microedition.midlet.MIDlet;
import javax.microedition.midlet.MIDletStateChangeException;


public class SingleDynamicSearch extends MIDlet implements ItemStateListener, CommandListener  {
 TextField searchtext;
 Form mainform;
 Display display;
 String[] listitems;
 ChoiceGroup choice;
 String selectedchoice;
 Alert alert;

 Command exitCmd=new Command("Exit",Command.EXIT,0);
 protected void destroyApp(boolean arg0) throws MIDletStateChangeException {}
 protected void pauseApp() {}
 protected void startApp() throws MIDletStateChangeException
 {
  mainform=new Form("List of Countries");
  Display display;
  searchtext=new TextField("Search","",15,TextField.ANY);
```


(c) Copyright Nokia 2013. All rights reserved.

```
 //This initializes the list of countries
 initList();

 //Only one option can be selected
 choice=new ChoiceGroup("",ChoiceGroup.EXCLUSIVE,listitems,null);

 //This adds the "Make a selection" item
 updateList(listitems);

 display=Display.getDisplay(this);
 display.getColor(Display.COLOR_BORDER);

 mainform.append(searchtext);
 mainform.append(choice);
 mainform.addCommand(exitCmd);
 mainform.setCommandListener(this);
 mainform.setItemStateListener(this);
 display.setCurrent(mainform);
}
public void itemStateChanged(Item item)
{
 String label=item.getLabel();
 //when the textfield is modified, i.e.
 //text is added or deleted
 if(label.equals("Search"))
 {
  String typedtext=searchtext.getString();
  //if the search string is not the empty string
  if(!typedtext.equals(""))
  {
   String[] newlist=FilterList(listitems,typedtext);
   //if there is at least a match
   if(newlist!=null)
    updateList(newlist);
   //if there is no match empty the list
   else
    updateList(new String[0]);
  }
  //if the search string is the empty string
  //set the list back to the default
  else
  {
   updateList(listitems);
  }
 }

 //when the user selects an item
 if(label.equals(""))
 {
  int selectedindex=choice.getSelectedIndex();
  //if an item is selected
  if(selectedindex!=-1)
  {
   selectedchoice=choice.getString(selectedindex);
   //shows alert
   alert=new Alert("Info",selectedchoice,null,AlertType.INFO);
   alert.setTimeout(500);
   Display.getDisplay(this).setCurrent(alert,mainform);

   //restore the default selected option back to "Make a Selection"
   choice.setSelectedIndex(0, true);
  }
 }
}
//Updates the list according to the input array
public void updateList(String[] newitems)
{
 choice.deleteAll();

 for(int i=0;i<newitems.length;i++)
 {
  //Adds the "Make a Selection" item at the very beginning of the list
  if(i==0)
   choice.append("Make a Selection", null);

  choice.append(newitems[i], null);
 }
}
//returns a new list of items based on the search text
public String[] FilterList(String[] list, String filtertext)
{
 //makes the search non-case sensitive
 String textupper=filtertext.toUpperCase();
    String textlower=filtertext.toLowerCase();
    char[] firsttext=new char[1];
    char[] resttext=new char[textlower.length()-1];
    textupper.getChars(0, 1, firsttext, 0);
    textlower.getChars(1, textlower.length(), resttext, 0);
    String firstletter=new String(firsttext);
    String remainingletters=new String(resttext);
    filtertext=firstletter+remainingletters;


 Vector v=new Vector();
 String[] result=null;
 for(int i=0;i<list.length;i++)
 {
  //if the i item of the list starts with
  //the search text
  if(list[i].indexOf(filtertext, 0)==0)
   v.addElement(list[i]);
 }
 int vectorsize=v.size();
 //if at least one item is found in the list
 //that starts with the search text
 if(vectorsize>0)
 {
  result=new String[vectorsize];
  for(int i=0;i<vectorsize;i++)
  {
   result[i]=(String) v.elementAt(i);
  }
 }
 return result;
}
//The original list of countries
public void initList()
{
 listitems=new String[196];
```


(c) Copyright Nokia 2013. All rights reserved.

```
listitems[0]="Afghanistan";
listitems[1]="Albania";
listitems[2]="Algeria";
listitems[3]="Andorra";
listitems[4]="Angola";
listitems[5]="Antigua & Deps";
listitems[6]="Argentina";
listitems[7]="Armenia";
listitems[8]="Australia";
listitems[9]="Austria";
listitems[10]="Azerbaijan";
listitems[11]="Bahamas";
listitems[12]="Bahrain";
listitems[13]="Bangladesh";
listitems[14]="Barbados";
listitems[15]="Belarus";
listitems[16]="Belgium";
listitems[17]="Belize";
listitems[18]="Benin";
listitems[19]="Bhutan";
listitems[20]="Bolivia";
listitems[21]="Bosnia Herzegovina";
listitems[22]="Botswana";
listitems[23]="Brazil";
listitems[24]="Brunei";
listitems[25]="Bulgaria";
listitems[26]="Burkina";
listitems[27]="Burundi";
listitems[28]="Cambodia";
listitems[29]="Cameroon";
listitems[30]="Canada";
listitems[31]="Cape Verde";
listitems[32]="Central African Rep";
listitems[33]="Chad";
listitems[34]="Chile";
listitems[35]="China";
listitems[36]="Colombia";
listitems[37]="Comoros";
listitems[38]="Congo";
listitems[39]="Congo {Democratic Rep}";
listitems[40]="Costa Rica";
listitems[41]="Croatia";
listitems[42]="Cuba";
listitems[43]="Cyprus";
listitems[44]="Czech Republic";
listitems[45]="Denmark";
listitems[46]="Djibouti";
listitems[47]="Dominica";
listitems[48]="Dominican Republic";
listitems[49]="East Timor";
listitems[50]="Ecuador";
listitems[51]="Egypt";
listitems[52]="El Salvador";
listitems[53]="Equatorial Guinea";
listitems[54]="Eritrea";
listitems[55]="Estonia";
listitems[56]="Ethiopia";
listitems[57]="Fiji";
listitems[58]="Finland";
listitems[59]="France";
listitems[60]="Gabon";
listitems[61]="Gambia";
listitems[62]="Georgia";
listitems[63]="Germany";
listitems[64]="Ghana";
listitems[65]="Greece";
listitems[66]="Grenada";
listitems[67]="Guatemala";
listitems[68]="Guinea";
listitems[69]="Guinea-Bissau";
listitems[70]="Guyana";
listitems[71]="Haiti";
listitems[72]="Honduras";
listitems[73]="Hungary";
listitems[74]="Iceland";
listitems[75]="India";
listitems[76]="Indonesia";
listitems[77]="Iran";
listitems[78]="Iraq";
listitems[79]="Ireland {Republic}";
listitems[80]="Israel";
listitems[81]="Italy";
listitems[82]="Ivory Coast";
listitems[83]="Jamaica";
listitems[84]="Japan";
listitems[85]="Jordan";
listitems[86]="Kazakhstan";
listitems[87]="Kenya";
listitems[88]="Kiribati";
listitems[89]="Korea North";
listitems[90]="Korea South";
listitems[91]="Kosovo";
listitems[92]="Kuwait";
listitems[93]="Kyrgyzstan";
listitems[94]="Laos";
listitems[95]="Latvia";
listitems[96]="Lebanon";
listitems[97]="Lesotho";
listitems[98]="Liberia";
listitems[99]="Libya";
listitems[100]="Liechtenstein";
listitems[101]="Lithuania";
listitems[102]="Luxembourg";
listitems[103]="Macedonia";
listitems[104]="Madagascar";
listitems[105]="Malawi";
listitems[106]="Malaysia";
listitems[107]="Maldives";
listitems[108]="Mali";
listitems[109]="Malta";
listitems[110]="Marshall Islands";
listitems[111]="Mauritania";
listitems[112]="Mauritius";
listitems[113]="Mexico";
listitems[114]="Micronesia";
listitems[115]="Moldova";
listitems[116]="Monaco";
listitems[117]="Mongolia";
listitems[118]="Montenegro";
listitems[119]="Morocco";
```


(c) Copyright Nokia 2013. All rights reserved.

```
    listitems[120]="Mozambique";
    listitems[121]="Myanmar, {Burma}";
    listitems[122]="Namibia";
    listitems[123]="Nauru";
    listitems[124]="Nepal";
    listitems[125]="Netherlands";
    listitems[126]="New Zealand";
    listitems[127]="Nicaragua";
    listitems[128]="Niger";
    listitems[129]="Nigeria";
    listitems[130]="Norway";
    listitems[131]="Oman";
    listitems[132]="Pakistan";
    listitems[133]="Palau";
    listitems[134]="Panama";
    listitems[135]="Papua New Guinea";
    listitems[136]="Paraguay";
    listitems[137]="Peru";
    listitems[138]="Philippines";
    listitems[139]="Poland";
    listitems[140]="Portugal";
    listitems[141]="Qatar";
    listitems[142]="Romania";
    listitems[143]="Russian Federation";
    listitems[144]="Rwanda";
    listitems[145]="St Kitts & Nevis";
    listitems[146]="St Lucia";
    listitems[147]="Saint Vincent & the Grenadines";
    listitems[148]="Samoa";
    listitems[149]="San Marino";
    listitems[150]="Sao Tome & Principe";
    listitems[151]="Saudi Arabia";
    listitems[152]="Senegal";
    listitems[153]="Serbia";
    listitems[154]="Seychelles";
    listitems[155]="Sierra Leone";
    listitems[156]="Singapore";
    listitems[157]="Slovakia";
    listitems[158]="Slovenia";
    listitems[159]="Solomon Islands";
    listitems[160]="Somalia";
    listitems[161]="South Africa";
    listitems[162]="South Sudan";
    listitems[163]="Spain";
    listitems[164]="Sri Lanka";
    listitems[165]="Sudan";
    listitems[166]="Suriname";
    listitems[167]="Swaziland";
    listitems[168]="Sweden";
    listitems[169]="Switzerland";
    listitems[170]="Syria";
    listitems[171]="Taiwan";
    listitems[172]="Tajikistan";
    listitems[173]="Tanzania";
    listitems[174]="Thailand";
    listitems[175]="Togo";
    listitems[176]="Tonga";
    listitems[177]="Trinidad & Tobago";
    listitems[178]="Tunisia";
    listitems[179]="Turkey";
    listitems[180]="Turkmenistan";
    listitems[181]="Tuvalu";
    listitems[182]="Uganda";
    listitems[183]="Ukraine";
    listitems[184]="United Arab Emirates";
    listitems[185]="United Kingdom";
    listitems[186]="United States";
    listitems[187]="Uruguay";
    listitems[188]="Uzbekistan";
    listitems[189]="Vanuatu";
    listitems[190]="Vatican City";
    listitems[191]="Venezuela";
    listitems[192]="Vietnam";
    listitems[193]="Yemen";
    listitems[194]="Zambia";
    listitems[195]="Zimbabwe";
   }

   public void commandAction(Command c, Displayable d) {
    if(c==exitCmd)
    {
     notifyDestroyed();
    }
   }
  }
```

Resources

The source code of this MIDlet is available for download from here: File:SingleDynamicSearchSource.zip

The binary files of this MIDlet are available for download from here: File:SingleDynamicSearchBinaries.zip

See also

How to filter a list dynamically while typing with LCDUI - Part 1 (Multiple Selection)

How to filter a list dynamically while typing with LCDUI - Part 3 (CustomItem List)

eSWT's ShortedList with FILTER option

(c) Copyright Nokia 2013. All rights reserved.

(c) Copyright Nokia 2013. All rights reserved.