DATA INPUT DEVICE AND PORTABLE ELECTRONIC DEVICE

TECHNICAL FIELD

[0001] Embodiments disclosed herein may relate to the field of portable electronic devices and more particularly may relate to the provision of a data input device and a portable electronic device including a data input device.

DESCRIPTION OF RELATED ART

[0002] Portable electronic devices like cellular phones are becoming smaller and smaller in size. This also leads to the reduction in size of elements provided on them such as keys and keypads. This also means that it may be hard for users to input data. A user of a portable communication device may furthermore not need to use all the keys that are provided.

SUMMARY

[0003] One or more embodiments disclosed herein may be directed to using an electroactive polymer in a data input device in order to enable the provision of keys that can be raised in relation to the environment in which they are provided.

[0004] A first aspect of one embodiment may be directed towards a data input device that may include: a key sensing mechanism, a solid material layer provided above the key sensing mechanism, wherein the solid material layer may include a least one cavity going through the whole of the solid material layer, and wherein the cavity may include an electroactive polymer and two electrodes for providing a key that can be changed in shape based on an applied voltage and register inputs in the key sensing mechanism based on a user pressing down the electroactive polymer on the key sensing mechanism.

[0005] A second aspect of one embodiment may be directed towards a data input device including the features of the first aspect, wherein the electroactive polymer and the key sensing mechanism are transparent.

[0006] A third aspect of one embodiment may be directed towards a data input device including the features of the second aspect, and may further include a display below the key sensing mechanism.

[0007] A fourth aspect of one embodiment may be directed towards a data input device including the features of the first aspect, wherein the solid material layer may include a number of cavities, each having electroactive polymer and electrodes.

[0008] A fifth aspect of one embodiment may be directed towards a data input device including the features of the fourth aspect, wherein the cavities are provided in a structure and the key sensing mechanism is arranged to detect a key press through providing data indicating a position in the structure based on pressure applied by the electroactive polymer of a cavity on an area in the key sensing mechanism.

[0009] A sixth aspect of one embodiment may be directed towards a data input device including the features of the first aspect, wherein the electroactive polymer is an ionic electroactive polymer.

[0010] A seventh aspect of one embodiment may be directed towards a data input device including the features of the first aspect, and may further include an elastic shielding layer above the solid material layer and covering the cavity.

[0011] An eighth aspect of one embodiment may be directed towards a data input device including the features of the first aspect, wherein the electroactive polymer is surrounded by a gel formed electrolyte.

[0012] A ninth aspect of one embodiment may be directed towards a data input device including the features of the first aspect, wherein the electrodes are provided opposite each other on the walls of the cavity.

[0013] A tenth aspect of one embodiment may be directed towards portable electronic device that may include: a data input device having a key sensing mechanism, a solid material layer provided above the key sensing mechanism, wherein the solid material layer may include a least one cavity going through the whole of the solid material layer, wherein the cavity may include an electroactive polymer and two electrodes for providing a key that can be changed in shape based on an applied voltage and register inputs in the key sensing mechanism based on a user pressing down the electroactive polymer on the key sensing mechanism.

[0014] An eleventh aspect of one embodiment may be directed towards a portable electronic device including the features of the tenth aspect, wherein the electroactive polymer and the key sensing mechanism are transparent

[0015] A twelfth aspect of one embodiment may be directed towards a portable electronic device including the features of the eleventh aspect, and may further include a display below the key sensing mechanism.

[0016] A thirteenth aspect of one embodiment may be directed towards a portable electronic device including the features of the tenth aspect, wherein the solid material layer may include a number of cavities, each having electroactive polymer and electrodes.

[0017] A fourteenth aspect of one embodiment may be directed towards a portable electronic device including the features of the thirteenth aspect, wherein the cavities are provided in a structure and the key sensing mechanism is arranged to detect a key press through providing data indicating a position in the structure based on pressure applied by the electroactive polymer of a cavity on an area in the key sensing mechanism.

[0018] A fifteenth aspect of one embodiment may be directed towards a portable electronic device including the features of the tenth aspect, wherein the electroactive polymer is an ionic electroactive polymer.

[0019] A sixteenth aspect of one embodiment may be directed towards a portable electronic device including the features of the tenth aspect, and may further include an elastic shielding layer above the solid material layer and covering the cavity.

[0020] A seventeenth aspect of one embodiment may be directed towards a portable electronic device including the features of the tenth aspect, wherein the electroactive polymer is surrounded by a gel formed electrolyte.

[0021] An eighteenth aspect of one embodiment may be directed towards a portable electronic device including the features of the tenth aspect, wherein the electrodes are provided opposite each other on the walls of the cavity.

[0022] A nineteenth aspect of one embodiment may be directed towards a portable electronic device including the features of the tenth aspect, and may further include a control unit arranged to receive location detection data from the key sensing mechanism corresponding to a pressing down of the electroactive polymer in a cavity on the key sensing mechanism and providing a voltage to be applied on the electrodes