**Intro script**

We present density aware sliders. Here we have a visual representation of a database of movies. Users can filter the data by actor, actress, director, running time, etc….The actor slider contains approximately 60 000 actors. We see that upon dragging the actor slider, the scatterplot updates itself showing all videos that the queried actor played a role in. The default windows trackbar, as seen here, provides limited capabilities for querying such large datasets because it cannot and does not adapt to the size of the dataset it contains.

**Description of ways to interact with trackbar**

The default windows trackbar provides several interaction capabilities, some of which may be confusing or unintuitive, especially with large data sets. Users can click on and drag the slider thumb. Users can also click to the left or to the right of the thumb. Users can also roll the mouse wheel. Clicking to the left or right of the thumb and rolling the mousewheel all change the current query but the slider does not provide visual feedback indicating this. The thumb does not always move. This may be unpredictable to some users.

**What is said when the static Alphaslider picture is shown.**

Researchers have shown alternatives to the trackbar. The Alphaslider, as seen here is one of those alternatives. With this slider users are provided with fine and coarse grain querying and are also provided display distortion that visualizes the data distribution.

**Alphaslider interaction and disadvantages**

The Alphaslider has four main interaction capabilities. Users can drag the top half of the thumb for coarse querying or drag the bottom half of the thumb for fine grain querying. Users can also jump around or click on the arrow buttons. The Alphaslider still has two problems: 1) It does not always provide visual feedback and it’s display distortion must omit certain letters.

**Alphaslider affected by density**

As shown here, the performance of the Alphaslider is negatively affected by local density.

**Introduction of distortions**

We propse a new distortion called Input Distortion, as seen on the bottom. This distortion is meant to solve the issue of hidden letters while still providing users with information about the data distribution through the use of histograms.

**Introduction of DAS**

We introduce two new density-aware sliders that are compatible both of which are compatible with display and input distortion. The sliders use knowledge of the underlying data to ease data selection and provide users with better visual feedback, especially at the subpixel level.

**ActiveArea Interaction**

The ActiveArea Slider has 4 interaction capabilities. Users can jump by clicking on the slide track. Users can drag the main thumb left and right. Users can also perform subpixel querying by dragin the secondary slider left and right within the bounds of the main slider. Users can also roll the mouse wheel. It is worth noting that the width of the main slider varies with the input distortion while it stays constant with the display distortion. This happens because different indices in the input distortion have different denstities while they do not for the display distortion.

**ActiveList Interaction**

The ActiveList slider provides interaction capabilities almost identical to that of the ActiveArea slider. Users can jump, drag the main slider, drag the secondary slider or roll the mousewheel. The only significant difference is the presence of a list that disappears when the slider loses focus and reappears when the slider gains focus. We theorize that the presence of a list will speed up data acquisition.

**Results**

12 users participated in the study. Users were given 6 low and 6 high density search targets for each slider and distortion style.

Users performed significantly faster with the ActiveList Slider while retaining accuracy. Participants generally preferred using the ActiveList slider to the others.